

# 2261 Analyze-R™

## Spectrum Monitor for WLAN Verification

### ACQUIRES & DOCUMENTS MEASUREMENTS FOR SITE ANALYSIS

- Wideband receiver for spread-spectrum signal power measurement and potential interference identification
- 20–30 dB better sensitivity than a Spectrum Analyzer
- Portable and battery-charged for field-use
- 4 Selectable Bands: 2.4 GHz, 5.2 GHz, 5.3 GHz, 5.8 GHz
- LCD-display
- Data Logger Record-R™ with GPS



The Analyze-R™ is an affordable, easy-to-use, application specific Spectrum monitor/Analyzer for ISM and U-NII applications in the 2 GHz and 5 GHz bands. The Analyze-R™ is designed for personnel doing site spectrum monitoring and analysis, surveying, installing, maintaining, and troubleshooting the latest wireless communication systems in the unlicensed ISM/U-NII bands. The Analyze-R™ contains the Data Logger Record-R™ with GPS. Logged data includes e.g. longitude, latitude, date/time, unit's model number and serial number. Multiple sweeps may be stored for later download. This unique instrument is a fraction of the cost of a full-featured general-purpose spectrum analyzer - and far easier to use!

### Portable Wideband Receiver

The Analyze-R™ is a wideband receiver for spread-spectrum signal power measurement and potential interference identification. It has 20–30 dB better sensitivity than a Spectrum Analyzer and is truly portable for field-use.

The LCD display shows the entire band spectrum (1 MHz resolution) with tuneable marker showing frequency and power (peak hold or average). Bands can be swept for power analysis or set to a specific frequency for antenna alignment. The 4 selectable bands are 2.4 GHz (ISM); 5.2 GHz (U-NII-1); 5.3 GHz (U-NII-2); 5.8 GHz (U-NII-3 & ISM).

### Record-R™

The Analyze-R™ contains Record-R™ Data Logger with embedded GPS receiver for specific single frequency information or an entire 100 MHz ISM/U-NII band sweep.

Recorded information includes frequency, peak or average power, longitude, latitude, Received Signal Level power across band (in 1-MHz steps), and UTC date&time.

Recording a Band Sweep will yield individual 1 MHz-wide peak or average power steps through the entire 100 MHz band, and location and date/time information. The instrument includes both RS-232 and USB interfaces.

### Log View-R™

The Log View-R™ companion software (included) provides a virtual graphic display of the original recorded sweep including software marker for reading power/frequency values. The Log View-R™ is used for transferring information from the instrument to a PC for saving, viewing, analyzing, archiving, and printout of the recorded data.

### Applications

The Analyze-R™ allows you to quickly acquire and document accurate test measurements for site analysis. Applications include:

- Verifying geographical site coordinates and antenna centerline elevations for precise analysis of system engineering.
- Aligning the site's antenna by measuring the received signal level. The antenna can be located and adjusted for maximum received signal level. Results are recorded for verification.
- Measuring and documenting the RF signature of the received signal to capture any possible signal distortion.
- Measuring and documenting the RF signature of any potential interfering source.
- Differentiating path-induced problems from equipment problems.
- Confirming optimum antenna locations.

### Finding Optimum Antenna Locations

First, the proposed site/antenna location is analyzed by sweeping the band of interest. This sweep measures all possible interfering transmissions within the band and records their power spectrum. Any one of four ISM/U-NII 100 MHz-wide bands can be swept and the received signal level power recorded, in 1 MHz-wide steps.

The downloaded power-to-frequency information is used by site design and applications engineers to customize radio and antenna design/location to accommodate interfering signals from other transmissions.

### A Complete Solution - Validate-R™

Validate-R™ (Model 2261-1000) is a bundled kit including 4 possible antennas and PC all packed in a case for safe transport of all system items.

It is a complete solution with everything any user would need. The kit contains e.g. a multi-band, omni-directional antenna for the initial power- vs. frequency survey, and 3 band-specific directional antennas for pinpointing the direction to interfering sources.

# 2261 Technical Specifications

## Receiver

### Selectable Frequency Bands:

Band 1 (ISM):	2.400 to 2.484 GHz (85, 1-MHz wide Channels)
Band 2 (U-NII-1):	5.150 to 5.250 GHz (101, 1-MHz-wide Channels)
Band 3 (U-NII-2):	5.250 to 5.350 GHz (101, 1-MHz-wide Channels)
Band 4 (ISM/U-NII-3):	5.725 to 5.875 GHz (3-101, 1-MHz-wide Channels) Low: 5.725-5.825 GHz Medium: 5.750-5.850 GHz High: 5.775-5.875 GHz)

**Bandwidth:** 2 MHz

**Sensitivity:** -100 dBm, nom.

**Overload Point:** -30 dBm, nom.

**Damage Level:** +10 dBm

**Frequency Stability:**  $2 \times 10^{-5}$  (temperature 0° to 50°C)

**Graphic Display:** 64 x 128 pixel LCD, backlit. Displays freq. band (101, 1 MHz points) or single frequency with power (peak hold or average)

### Graphic Resolution:

Power: 1.25 dB/pixel

Frequency: 1 MHz/pixel

**Graphic Dynamic Range:** 35 dBm to -102.9 dBm, graphically displayed.

**Numeric Dynamic Range:** 24.1 dBm to -103.8 dBm, numerically displayed

**Update Time:** 300 ms (2 ms measure, 1 ms compute per channel x 100 channels)

**Marker:** Marker is tuned with a front panel knob. Marker frequency and power intercept are displayed at the top of the LCD

**Marker Resolution:** 0.1 dB (power), 1 MHz (frequency)

## Record-R™ Data Logging

**Data Recorded:** Received Signal Level (in dBm per channel / peak or average), Frequency, Longitude, Latitude, Date, Time (UTC), Model Number & Serial Number of unit

**Max. No. of Records:** 250 single frequency records (32 bytes ea.) or 62 band sweep records (128 bytes ea.) or some combination, 8K Bytes total memory

**Record Time:** Band sweep  $\leq 2$  seconds, single frequency  $\approx 20$  ms, to store results in memory

### GPS

Frequency: L1 (1575.42 MHz), C/A code (SPS), 8-channel cont. tracking, 32 correlators

Position Accuracy: 2 meters CEP (50%)

Timing Accuracy:  $\pm 95$  ns

Position Fix Update: 1s

Time to Lock: Cold Start: <130 seconds (90%); Warm Start: <45 seconds (90%); Hot Start: <20 seconds (90%)

Reacquisition Time: <2 seconds (90%) after loss of signal

**Downloading Records:** Records can be downloaded, thru RS-232-C or USB 'B' rear panel connectors, to a remote computer and displayed, saved and printed, using companion Log View-R™ Data Log Utility software, included (for Windows 95/98/2000/XP)

## Environmental Data

**Operating Temperature:** -10°C to 40°C (14°F to 104°F)

**Storage Temperature:** -40°C to 71°C (-40°F to 160°F)

**Relative Humidity:** 95%  $\pm 5\%$  10°C to 30°C

75%  $\pm 5\%$  to 40°C

45%  $\pm 5\%$  above 40°C

**Burn In:** Failure-free burn in of no less than 100 hours at 40°C

**Pollution Degree:** 1 (no pollution) (EN 61010-1/3.7)

**Transient Overvoltage:** Installation Category II (EN 61010-1/J)

## Supplementary Specifications

**Warranty:** One Year Limited Warranty

**Montreal Protocol:** Nil Return

**ISO 9000:** XL Microwave's Quality System for design and manufacture is registered and certified by TÜV Essen to ISO 9001-1994

**CE (European Union):** EN 55011:1998 w/A1:1999; Group 1 Class B (emissions) EN 61326-1:1997 w/A1:1998 (immunity)

## Mechanical Data

**Power:** Self Contained 12V, 2.3 Ah, rechargeable sealed Lead-Acid Camcorder Battery (op time  $\approx 5-6$  hrs; charging  $\approx 3$  hrs.)

**Weight:** Less than 7 lbs. (including Instrument Back-Pack and Battery)

**Dimensions (HxWxD):** 89 mm x 213 mm x 333 mm (3.5 in. x 8.375 in. x 13.1 in.)

**Antenna Connector:** 'N' female (front panel)

**RS-232-C Connector:** DB-9 (rear panel)

**USB Connector:** USB-B (rear panel)

## Ordering Information

### Basic Models

2261 Analyze-R™

2261-1000 Validate-R™  
(incl. 1 PC, 1 hard transport case, 3 band-specific directional antennas, 1 omni-directional antenna)

### Included with Instrument

1 Weather-resistant Instrument Back-Pack

1 Coax Cable Assembly, N-type (m) to N-type (m), 6-feet long

1 RS-232 Cable Assembly, D-sub 9-pin (male) to D-sub 9-pin (female), 3m (9.84 ft.)

1 USB Cable Assembly, USB 'A' (male) to USB 'B' (male), 2m (6.56 ft.)

1 Battery, Rechargeable, 12 VDC/2.3 Ah, Sealed Lead/Acid Battery

1 AC MAINS powered Battery Charger (90-264 VAC/47-63 Hz); w. IEC-320 input connector

1 AC MAINS Power Cord (IEC-320 to NEMA, type 5-15p plug).

1 Operating/Maintenance Manual with Laminated User Information Card

### Options

Option 342 Omni-directional multi-band stub antenna

Option 343 Directional plate antenna, 2.4-2.5 GHz

Option 344 Directional plate antenna, 5.25-5.35 GHz

Option 345 Directional plate antenna, 5.725-5.875 GHz

### Accessories

Accessory 320 Battery: Spare 12V/2.3 Ah

Accessory 325 Adapter: Connector SMA

Accessory 322 Battery charger: Vehicle DC adapter/charger

Accessory 329 Cable: Coax Cable Assembly SMA to N-type

Accessory 338 Cable: Ruggedized Low-Loss Coax Cable Assembly

Accessory 326 Case: Watertight, airtight, corrosion proof

Specifications subject to change without notice

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## Pendulum Instruments AB

[www.pendulum.se](http://www.pendulum.se)

-experts in Time & Frequency Calibration, Measurement and Analysis