

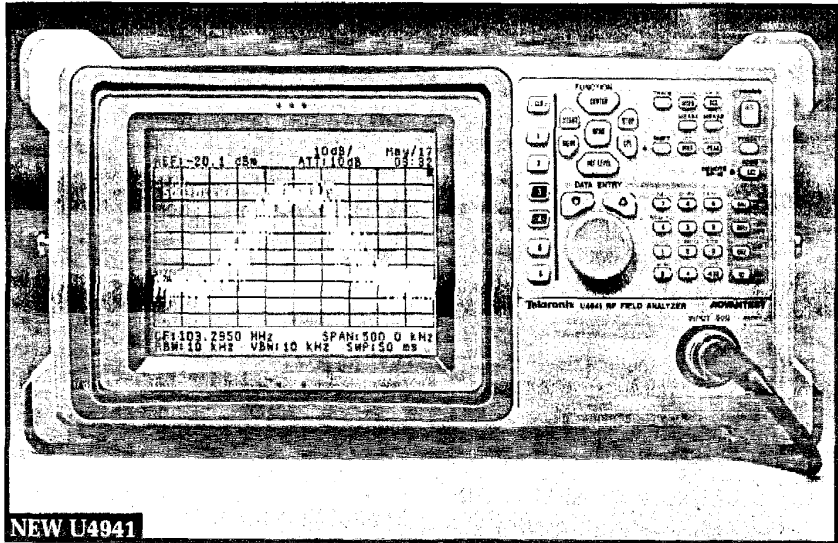
## U4941 U4941N

*Ultimate portability for RF measurements – convenient battery power, convenient operation, high display dynamic range to measure diverse signals.*

### **NEW U4941/U4941N**

- 9 kHz to 2.2 GHz Frequency Range
- High Mobility – Very Light and Compact
- Operate from Attach-on Optional Battery, Standard AC Adapter, or Direct 12-V DC
- Enhanced Spectral Display Comparison using 6-inch Color TFT LCD Display
- Accurate Frequency Measurement with Built-in Counter
- 10 MHz External Frequency Reference Input Providing Added Accuracy
- Diverse Signal Measurement using 90 dB Display Dynamic Range
- EMI Measurement with Built-in Quasi-peak Detector and EMC Filters

# Spectrum Analyzers



### U4941/U4941N RF Field Analyzers

These 9 kHz to 2.2 GHz analyzers introduce a new level of portability and convenience to RF measurements. The 5.8 x 11.5 x 13 inch, 14.3 pound package is easily carried to hard-to-reach places. And if your measurement site lacks AC mains, the U4941/U4941N are ready to run directly from an external 12 V DC supply or from their own optional attach-on battery.

These analyzers feature a mechanical package that is designed to MIL-T-28800D environmental standards for shock, vibration, and drop – adding to your confidence to carry the U4941/U4941N into the field.

#### SEE YOUR RESULTS IN COLOR!

An easy-on-the-eyes, six-inch TFT LCD color display not only reduces instrument weight, size, and power requirements but also lessens user-fatigue when extended display viewing time is required. The display screen may be tilted for optimum viewing angle.

### PERFORMANCE FOR TODAY'S APPLICATIONS... AND TOMORROW'S

Wide, 90 dB display dynamic range and high-sensitivity insure that you see weak signals, even in the presence of much stronger signals. Sensitivity is enhanced by a built-in 20 dB preamp. And signals can be readily identified by a built-in frequency counter.

### EASY TO USE, EASY TO STORE MEASUREMENT RESULTS

Soft-key menus and three modes of data input adapt operation of the U4941/U4941N to differing user preferences. A full complement of marker functions improve speed and repeatability on a variety of measurements. Included is a window function which delimits a portion of the displayed sweep, resulting in a significantly faster update of the spectrum of interest when sweep time must be increased due to change of resolution bandwidth, video bandwidth, or span.

Measurement set-ups, limit lines, measurement results, and other data can be stored on memory cards that plug into either of two PCMCIA slots conforming to JEIDA-Ver 4.1/PCMCIA Rel 2.0. Or, two cards may be used simultaneously for redundant storage of measurement data.

**Tektronix**

**ADVANTEST.**

Product(s) available through your local Tektronix representative (listed in the back of this catalog) or call 1-800-426-2200.

Advantest's quality system complies with the DIN ISO 9002 standard and has been certified by TÜV Product Service GMBH.

### APPLICATIONS

- EMC field measurement
- Broadband LAN installation
- Field-strength measurement
- Two-way and wireless communications troubleshooting

# Spectrum Analyzers

U4941  
U4941N

## COMPLEMENT YOUR APPLICATION WITH THESE ADDITIONAL CAPABILITIES

- AM/FM detector and built-in speaker/headphone jack for signal demodulation
- Faster measurements using built-in routines for:
  - Occupied bandwidth
  - Adjacent channel leakage
  - Noise power
  - 2nd and 3rd order distortion
  - Percent AM
- 10 MHz external reference input for additional frequency accuracy
- Composite video output to display spectrum on a large screen monitor or hard copy on a video printer
- 75  $\Omega$  input for broadband network applications (U4941N)

## Characteristics

### FREQUENCY RELATED

**Frequency Range** – 9 kHz to 2.2 GHz.

**Frequency Readout Accuracy** (Start, Stop, CF, Marker) –  $\pm$  (span  $\times$  span accuracy + 0.15  $\times$  RBW + 50 kHz).

**Count Frequency Marker (S/N  $\geq$  25 dB, 50 kHz  $\leq$  1 GHz span, RBW  $\geq$  100 kHz)** – Resolution: 1 Hz to 10 kHz. Count accuracy:  $\pm$  (marker freq.  $\times$  freq. reference accuracy + 1 LSD  $\pm$  5 Hz).

**Frequency Reference Accuracy** –  $\pm 2 \times 10^{-6}$ /year.  $\pm 1 \times 10^{-5}$  (at 0°C to 50°C).

**Frequency Span** – Range: 50 kHz to 2.4 GHz, ZERO. Accuracy:  $\leq \pm 5\%$  (SPAN  $\geq$  100 kHz).

**Frequency Stability** – Residual FM:  $\leq 3$  kHz p-p/100 ms. Frequency drift (50 ms to 5 s sweep time):  $\leq 10$  kHz after 30 minute warm-up.

**Noise Sidebands** –  $\leq 100$  dBc/Hz at 20 kHz offset.

**Resolution Bandwidth (3 dB)** – Range: 1 kHz to 3 MHz, 1, 3 sequence. Bandwidth accuracy:  $\leq \pm 20\%$  1 kHz to 1 MHz;  $\leq \pm 25\%$  at 3 MHz. Selectivity:  $\leq 15:1$  60 dB to 3 dB. Bandwidth (6 dB): 9 kHz, 120 kHz (conforming to CISPR standard).

**Video Bandwidth** – 10 Hz to 3 MHz

### AMPLITUDE RELATED

**Amplitude Range** – +20 dBm to displayed average noise level; +130 dB $\mu$ V to displayed average noise level.

**Maximum Input Level** – Preamplifier OFF: +27 dBm, +134 dB $\mu$ V (input atten.  $\geq 10$  dB), +50 VDC max. Preamplifier ON: +13 dBm, +120 dB $\mu$ V,  $\pm 50$  VDC max.

**Display Range** – Log: 10  $\times$  10 divisions; 10, 5, 2, 1 dB/div. Linear: 10% of reference level/div. QP Log: 40 dB (5 dB/div).

**Reference Level Range** – Preamplifier OFF: Log, -64 dBm to +40 dBm (0.1 dB step); +46 dB $\mu$ V to +150 dB $\mu$ V. Linear, 141.1  $\mu$ V to 22.36 V. Preamplifier ON: Log, -84 dBm to +10 dBm (0.1 dB step); +26 dB $\mu$ V to +120 dB $\mu$ V. Linear, 14.11  $\mu$ V to 707.1 mV, 19.95  $\mu$ V to 1 V.

**Input Attenuator Range** – 0 to 50 dB (10 dB step).

### DYNAMIC RANGE

**Displayed Average Noise Level** – Preamplifier OFF: -117 dBm + 2.7 f (GHz) dB; -8 dB $\mu$ V + 2.7 f (GHz) dB. Preamplifier ON: -132 dBm + 3.3 f (GHz) dB; -23 dB $\mu$ V + 3.3 f (GHz) dB. (RBW 1 kHz, VBW 10 Hz, Input atten. 0 dB, f  $\geq 1$  MHz).

**Gain Compression (1 dB)** – Preamplifier OFF:  $> -10$  dBm (mixer input level, f  $\geq 10$  MHz);  $> +100$  dB $\mu$ V. Preamplifier ON:  $> -40$  dBm (RF input level, f  $> 10$  MHz);  $> +70$  dB $\mu$ V.

**Spurious Response, Preamplifier OFF (-30 dBm input, input atten. 0 dB, f  $\geq 10$  MHz)** – Second harmonic distortion,  $\leq -70$  dB. Third order intermodulation distortion,  $\leq -70$  dB.

**Residual Responses (input atten. 0 dB, f  $\geq 1$  MHz)** – Preamplifier OFF:  $\leq -100$  dBm;  $\leq +10$  dB $\mu$ V. Preamplifier ON:  $\leq -115$  dBm;  $\leq -5$  dB $\mu$ V.

### AMPLITUDE ACCURACY

**Frequency Response** – Preamplifier OFF (input atten. 10 dB, 20°C to 30°C after calibration):  $\leq \pm 1$  dB (100 kHz to 2 GHz);  $\leq \pm 2$  dB (9 kHz to 2.2 GHz). Preamplifier ON (input atten. 10 dB):  $\leq \pm 1$  dB (100 kHz to 2 GHz);  $\leq \pm 2$  dB (9 kHz to 2.2 GHz).

**Calibration Signal Accuracy** – -20 dBm  $\pm 0.3$  dB; +78 dB $\mu$ V  $\pm 0.3$  dB.

**IF Gain Uncertainty (after automatic calibration)** –  $< \pm 0.5$  dB.

**Scale Fidelity (after automatic calibration)** – Log:  $\leq \pm 1.5$  dB/90 dB;  $\leq \pm 1.0$  dB/10 dB;  $\leq \pm 0.2$  dB/1 dB. Linear:  $\pm 5\%$  of reference level.

**Input Attenuator Switching Accuracy (20 to 70 dB settings referenced to 10 dB)** –  $< \pm 1.0$  dB (100 kHz to 2 GHz);  $< \pm 1.5$  dB (9 kHz to 2.2 GHz).

**Resolution Bandwidth Switching Uncertainty (after automatic calibration)** –  $< \pm 1.0$  dB relative to 3 MHz RBW.

### SWEEP RELATED

**Sweep Time Accuracy** – 50 ms to 1000 s and manual sweep  $\leq \pm 5\%$ .

**Trigger Mode** – FREE RUN, SINGLE, VIDEO, EXT. TV.

### DEMODULATION

**Spectrum Demodulation** – Modulation type: AM and FM. Audio output: Speaker and phone jack with volume control.

**U4941**  
**U4941N**

# Spectrum Analyzers

**INPUTS AND OUTPUTS**

**RF Input** – Connector type: N type. Impedance: U4941, 50 Ω nominal; U4941N, 75 Ω nominal. VSWR, Preamplifier OFF: ≤1.5 (100 kHz to 2.0 GHz, input atten. 10 dB); ≤2.0 (9 kHz to 2.2 GHz). VSWR, Preamplifier ON: ≤2.1 (10 MHz to 2 GHz, input atten. 0 dB).

**10 MHz Reference Input** – Connector: BNC female, rear panel. Impedance: 50 Ω nominal. Input range: +8 dBm to +16 dBm.

**Video Output** – Connector: BNC female, rear panel. Impedance: 75 Ω nominal, AC coupled. Amplitude: Approx. 1 V p-p into 75 Ω (composite video signal).

**External Trigger Input** – Connector: BNC female, rear panel. Impedance: 10 kΩ nominal, DC coupled. Trigger level: TTL level.

**Gate Input** – Connector: BNC female, rear panel. Impedance: 10 kΩ nominal. Sweep step: During TTL low level. Sweep continue: During TTL high level.

**Phone Output** – Connector: Subminiature monophonic jack, front panel. Power output: 0.2 W into 8 Ω nominal.

**GPIB Interface** – IEEE-488 bus connector.

**Plotter** – R9833, HP7470A, HP7475A, HP7440A, HP7550A, HP2225A.

**RS-232C** – D-SUB 9-Pin, rear panel.

**External Memory Card** – Slots: 2. Connector: JEIDA-Ver. 4.1/PCMCIA Rel. 2.0.

**POWER REQUIREMENTS**

**AC input (use AC/DC adaptor A08180)** – Line voltage range: Automatically selects between 100 VAC and 200 VAC. 100 VAC operation: 90 to 120 V. 220 VAC operation, 220 to 240 V. Line frequency: 48 to 66 Hz. Power consumption: 100 VAC, 300 VA maximum. 220 VAC, 110 VA maximum. Maximum peak power consumption of AC/DC adaptor: ≥300 VA.

**External DC input** – Connector: XLR 4-Pin. Voltage range: +10 to +15 V. Power Consumption: 50 W maximum.

**GENERAL SPECIFICATIONS**

**Environmental** – Operating temperature: 0°C to 50°C, humidity 85% or less. Nonoperating temperature: -20°C to +60°C.

**PHYSICAL CHARACTERISTICS**

Dimensions**	mm	in.
Height	148	5.75
Width	291	11.375
Depth	330	13.25
<b>Weight</b>	<b>kg</b>	<b>lb.</b>
Net	6.2	13.6

\*\* Without feet or connector.



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**ORDERING INFORMATION**

<b>U4941</b> RF Field Analyzer, 50 Ω Input.....	<b>\$14,500</b>
<b>U4941N</b> RF Field Analyzer, 75 Ω Input.....	<b>\$14,500</b>
<b>Includes:</b> Front-panel Cover, Carrying Handle, N-to-BNC Adapter, AC/DC Adapter, AC/DC Converter/Mains Cable, Carrying Belt, Instruction Manual, Quick Guide.	
<b>SERVICE ASSURANCE OPTIONS</b>	
<b>Opt. R2</b> – Adds two years of post-warranty Repair Protection.....	<b>+\$590</b>
<b>Opt. C5</b> – Adds five years of Calibration Services.....	<b>+\$1,225</b>

**RECOMMENDED ACCESSORIES**

<b>Battery</b> – Order 146-0111-00.....	<b>\$525</b>
<b>Battery Charger</b> – Order 119-4901-00.....	<b>\$625</b>
<b>Display Hood</b> – Order R16601.....	<b>\$70</b>
<b>External DC Power Cable</b> – Order A01434.....	<b>\$95</b>
<b>Memory Card, 64K IC</b> – Order A09507.....	<b>\$125</b>
<b>Soft Carrying Case</b> – Order R16216.....	<b>\$450</b>
<b>Transit Case</b> – Order R16072.....	<b>\$1,300</b>