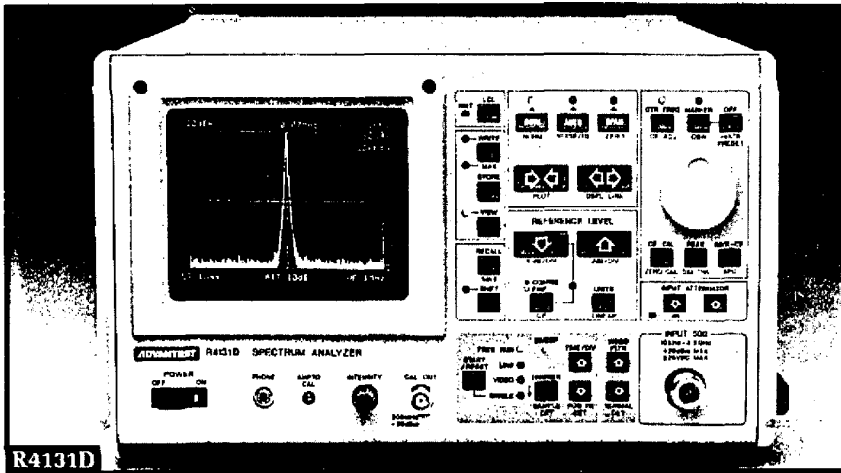


# Spectrum Analyzers

**R4131D**



## R4131D

- 10 kHz to 3.5 GHz Coverage
- Excellent Phase Noise Sideband Characteristics: -80 dBc @ 20X Resolution Offset
- Small and Light, Weighing Only 10 kg (22 lb.)
- Save/Recall Measurement Conditions, Including Waveforms
- Low Price

*Wide frequency range, low price, and portable.*

## R4131D Spectrum Analyzer

The R4131D Spectrum Analyzer is small, light, and affordable. Its wide frequency range accommodates measurement of PCN MDS, and other 2 GHz band signals, plus harmonic distortion of RF signals. Maximum input sensitivity of -116 dBm, dynamic range of 70 dB, and -80 dBc phase noise characteristic enhance the range of signals that can be measured with the R4131D. AFC tuning enhances the stability of this economical spectrum analyzer.

Built-in quasi-peak detector and EMC resolution bandwidth filters enable diagnostic EMC measurement. Automated measurements and data logging are complimented by a GPIB communication interface.

### SAVE/RECALL FUNCTION FOR CONDITIONS AND WAVEFORMS

The R4131D has a save/recall function which operates not only for measurement condition settings but for waveforms as well. Three sets of conditions and waveforms are stored and recalled. This enables a stored waveform to be used as a reference in comparison measurements at different locations. Independent from this function is an auto-recall function that automatically sets the desired measurement conditions when power is switched on - a great convenience in making on-site measurements.

### WIDE DYNAMIC RANGE FOR FREQUENCY CHARACTERISTIC MEASUREMENTS

The R4131D can be combined with the TR4153B or TR4154 Tracking Generators to enable frequency characteristic measurements with wide dynamic range.

### AUTOMATIC MEASUREMENT OF OCCUPIED BANDWIDTH

The R4131D has an optional automatic occupied-bandwidth measurement function. This function automatically determines the bandwidth within which 99% of the radiated power is contained, indicating the bandwidth markers and displaying values digitally.

## Characteristics

### FREQUENCY RELATED

**Frequency Range** - 10 kHz to 3.5 GHz.

**Center Frequency Display** - Displayed on the CRT with a maximum resolution of 1 kHz.

**Center Frequency Display Accuracy (after zero calibration at local feed through)** -  $\pm 100$  kHz  $\pm 3\%$  of span,  $< 2.5$  GHz at a sweep time of 5 ms/div to 0.5 s/div;  $\pm 10$  MHz,  $\geq 2.5$  GHz.

**Frequency Span** - 50 kHz to 4 GHz in 10 divisions on the horizontal scale on the CRT, selectable in 1-2-5 sequence. With zero span, operates as a fixed tuned receiver.

**Frequency Span Accuracy** -  $\pm 5\%$ .

**Stability** - Frequency stability (at fixed frequency, after 30-minute warm-up): 10 kHz max/10 minutes  $\leq 2.5$  GHz at sweep time of 5 ms/div to 0.5 s/div. Residual FM: 2 kHz p-p max/100 ms

**Noise Sideband** - -80 dBc max at resolution bandwidth of 1 kHz (at 20 kHz from the carrier, with a 10 Hz video filter).

## APPLICATIONS

• EMC Diagnostic Measurement

• Spectrum Monitoring

## 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.

# Spectrum Analyzers

**Resolution** – Resolution bandwidth (3 dB points): 1 kHz to 1 MHz in 1, 3, 10 sequence. Resolution bandwidth (6 dB points): 9 kHz, 120 kHz, when QP mode is selected. Selectivity (ratio of 60 dB:3 dB resolution bandwidths): 15:1 max. Resolution bandwidth accuracy:  $\pm 20\%$ , CISPR standard or better in QP mode.

**Marker Display** – Resolution: Maximum 1 kHz (depends on span). Measurement accuracy: Center frequency display accuracy + frequency span accuracy.

## AMPLITUDE RELATED

**Screen Display Range** – LOG mode: With respect to reference level 80 dB for a 10 dB/div display and 20 dB for a 2 dB/div display, or 40 dB for a 5 dB/div display in QP mode. LIN mode: 10 div.

**Linearity** – LOG mode:  $\pm 0.15$  dB/1 dB,  $\pm 1$  dB/10 dB,  $\pm 1.5$  dB/70 dB. LIN mode:  $\pm 5\%$  of full scale.

**Reference Level** – LOG mode:  $-69$  dBm to  $+40$  dBm (for 10 dB/div, 10 dB and 1 dB steps, and for 1 dB/div and 5 dB/div, 1 dB and 0.25 dB steps). LIN mode: 72.77  $\mu$ V to 22.36 V.

**Reference Level Accuracy** –  $\pm 1$  dB in LOG mode (in the reference level range of 0 to  $-59$  dBm at 200 MHz, with attenuation at 10 dB after level calibration).

**Reference Level Units** – Selectable as dBm, dB $\mu$ V, dBm V, or dB $\mu$ V/m. When dB $\mu$ V/m is selected, an automatic correction is made for the antenna calibration factor.

**Marker Display** – Resolution: 0.2 dB (for 10 dB/div) or 0.05 dB (for 2 dB/div). dBm/Hz: RMS noise level is displayed normalized with respect to the 1 Hz bandwidth noise at the marker position.

**Dynamic Range** – Average noise level:  $-116$  dBm + 1.55 f (GHz) dB or less. 2nd and 3rd order distortion: 70 dB down or greater (when input level is  $-30$  dBm, at 10 MHz or above). Frequency response (with 10 dB attenuation):  $\pm 1$  dB or less ( $100$  kHz  $\leq$  F  $\leq$  2 GHz);  $\pm 2$  dB or less ( $10$  kHz  $\leq$  F  $\leq$  3.5 GHz). Residual response (with attenuation 0 dB, input termination 50  $\Omega$ , frequency  $>100$  kHz):  $-100$  dBm or less.

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**Video Filter** – 10 Hz, 100 Hz, 1 kHz, 10 kHz, 100 kHz, 300 kHz, 1 MHz.

**Resolution Bandwidth Switching Accuracy** –  $\pm 1$  dB ( $+20^\circ\text{C}$  to  $30^\circ\text{C}$ ).

**Gain Compression** – 1 dB max for  $-10$  dBm input.

## SWEEP RELATED

**Sweep Time** – 5 ms/div to 100 s/div selectable in 1-2-5 sequence.

**Sweep Time Accuracy** –  $\pm 15\%$ .

**Trigger Modes** – Free-run, line, video, and single (reset, start).

## INPUT RELATED

**RF Input** – Approx. 50  $\Omega$ , N connector.

**Maximum Input Level** –  $+20$  dBm,  $\pm 25$  VDC max (with 20 dB or greater input attenuation).

**Input Attenuator** – 0 to 50 dB in 10 dB steps.

**Input Attenuator Switching Accuracy** –  $\pm 1$  dB ( $10$  kHz  $\leq$  F  $\leq$  2 GHz) or  $\pm 1.5$  dB ( $2$  GHz  $\leq$  F  $\leq$  3.5 GHz) with respect to 10 dB attenuation.

**Input VSWR (at 10 dB input attenuation or greater)** – 1.5 max ( $100$  kHz  $\leq$  F  $\leq$  2 GHz); 2.0 max ( $2$  GHz  $\leq$  F  $\leq$  3.5 GHz).

## DISPLAY RELATED

**Display** – Waveform, setting conditions, grid.

**CRT** – 5.5 inch, phosphor, amber display.

**Trace** – WRITE waveform and VIEW waveform (up to 2 waveforms displayed on the CRT).

**WRITE** – Posi-peak, sample, and posi/peg display.

**MAX HOLD** – For every repetition from the beginning of the function, the maximum signal level along the horizontal axis is displayed.

**MARKER** – Frequency and level at the marker point are measured and displayed.

**PEAK SEARCH** – The marker is moved to the point of maximum level on the displayed waveform.

**MRK CF** – The center frequency is changed to the marker frequency.

**ZERO CAL** – Improves the center frequency accuracy for local feed through.

**PLOT** – Direct plotting via GPIB.

**NORMALIZE** – Display of values relative to an internally stored reference response.

**SAMPLE** – Display of instantaneous time-signal levels at each analysis position for each sweep.

## OUTPUT RELATED

**Calibration Output Signal** – 200 MHz  $\pm 30$  kHz,  $-30$  dBm  $\pm 0.5$  dB

**Monitor Output** – Approx. 8  $\Omega$ , enables monitoring using an earphone.

**Recorder Outputs (analog output of WRITE waveform only)** – X axis: Approx.  $-5$  V to  $+5$  V (approx. 10 k $\Omega$ ). Y axis: Approx. 0 V to  $-4$  V (approx. 220  $\Omega$ ).

**IF Output** – 3.58 MHz IF output, approx. 50  $\Omega$ .

**Video Output** – Approx. 1 V p-p, approx. 75  $\Omega$  (composite signal for external CRT).

**Probe Power Output** –  $\pm 15$  V, 4-Pin connector.

**GPIB** – Fully controllable over the GPIB for automatic testing as well as direct plotting without an external controller.

## POWER REQUIREMENTS

**Line Voltage** – 90 to 132 V.

**Line Frequency** – 50/60 Hz.

**Power Consumption** – 120 VA max.

## GENERAL SPECIFICATIONS

**Save/Recall** – Up to three sets of measurement conditions, including waveforms, can be stored in memory and auto-recall can be used to automatically recall stored conditions when power is applied.

**Temperature** – Operating:  $0^\circ\text{C}$  to  $+50^\circ\text{C}$ . Storage:  $-20^\circ\text{C}$  to  $+70^\circ\text{C}$ .

## PHYSICAL CHARACTERISTICS

Dimensions	mm	in.
Width	300	11.8
Height	177	7.0
Depth	460	18.1
Weight	kg	lb.
Net	10	22

## ORDERING INFORMATION

R4131D  
Spectrum Analyzer ..... \$9,200  
Includes: Power Cable, Input Cable, N-to-BNC Adaptor.

Opt. 14 – Occupied Bandwidth Measurement and 3 dB Down Measurement ..... +\$1,300

## ADDITIONAL ACCESSORIES

See page 446 for complete selection information.