



R4131D

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) – ± 100 kHz $\pm 3\%$ of span, < 2.5 GHz at a sweep time of 5 ms/div to 0.5 s/div; ± 10 MHz, ≥ 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 ≤ 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).

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.

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: ± 0.15 dB/1 dB, ± 1 dB/10 dB, ± 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 μ V to 22.36 V.

Reference Level Accuracy – ± 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 μ V, dBm V, or dB μ V/m. When dB μ 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): ± 1 dB or less (100 kHz \leq F \leq 2 GHz); ± 2 dB or less (10 kHz \leq F \leq 3.5 GHz). Residual response (with attenuation 0 dB, input termination 50 Ω , 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 – ± 1 dB ($+20^\circ\text{C}$ to 30°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 Ω , N connector.

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

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

Input Attenuator Switching Accuracy – ± 1 dB (10 kHz \leq F \leq 2 GHz) or ± 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 ± 30 kHz, -30 dBm ± 0.5 dB

Monitor Output – Approx. 8 Ω , enables monitoring using an earphone.

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

IF Output – 3.58 MHz IF output, approx. 50 Ω .

Video Output – Approx. 1 V p-p, approx. 75 Ω (composite signal for external CRT).

Probe Power Output – ± 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°C to $+50^\circ\text{C}$. Storage: -20°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.