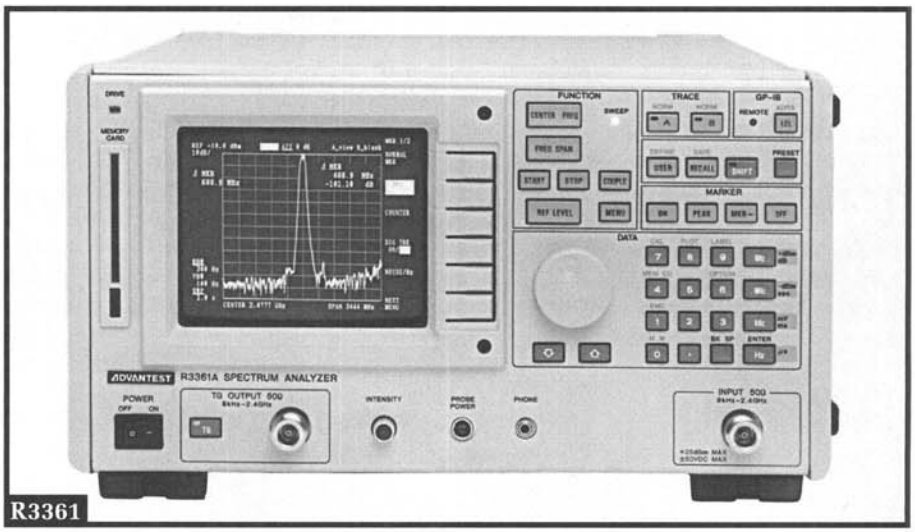
Spectrum Analyzers

R3361C • R3361CN • R3361D • R3261C • R3261CN • R3261D

Features

R3261C, R3261CN, R3261D, R3361C, R3361CN, R3361D

- Total Level Accuracy of 1 dB (Typical)
- User-defined Functions
- Measuring Window Function
- 120 dB Display Range
- Built-in Tracking Generator (R3361C, R3361CN, R3361D)
- CDMA Power Measurements (with Option 1K)



R3361

R3261/R3361 Series Spectrum Analyzers

The R3261/R3361 Series spectrum analyzers use a synthesized technique to cover wide frequency bands: 9 kHz to 2.6 GHz (R3261C, R3361C) or 9 kHz to 3.6 GHz (R3261D, R3361D). These compact analyzers also offer high-performance functions, such as the 1 Hz resolution frequency setting function and 1 Hz resolution frequency counter function.

The R3261/R3361 Series spectrum analyzers are easy to operate because they incorporate unique features such as user-defined and measuring window functions. Weighing only 15 kg (33 lbs.) the analyzers are small and useful for measurement and analysis of all kinds, from manufacturing to research and development.

The analyzers have an internal controller function (Option 15), parallel I/0, and GPIB interface for line connection and automatic measurement, so the user can create the optimum system configuration.

CHOOSE FROM SIX MODELS, DEPENDING UPON YOUR APPLICATION

The R3261/R3361 Series consists of six models. All models feature high performance and a set of features and functions for various applications.

For your local Tektronix representative see the list in the back of this catalog or outside the U.S. call: 1-503-627-1933, inside the U.S. call: 1-800-426-2200.

See Tektronix on the World Wide Web: http://www.tek.com

GPIB IEEE-488 *Product(s) complies with IEEE Standard 488.1-1987, and with Tektronix Standard Codes and Formats.*

ADVANTEST

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

Spectrum Analyzers

R3361C • R3361CN • R3361D • R3261C • R3261CN • R3261D

	R3261C	R3261CN	R3261D	R3361C	R3361CN	R3361D
Frequency Range	9 kHz to 2.6 GHz	9 kHz to 2.6 GHz	9 kHz to 3.6 GHz	9 kHz to 2.6 GHz	9 kHz to 2.6 GHz	9 kHz to ,br>3.6 GHz
Input Impedance	50 Ω	75 Ω	50 Ω	50 Ω	75 Ω	50 Ω
Internal Tracking Generator	Not available	Not available	Not available	Standard	Standard	Standard
Memory Card	Standard	Standard	Standard	Standard	Standard	Standard
Controller Function	Opt. 15	Opt. 15	Opt. 15	Opt. 15	Opt. 15	Opt. 15
Occupied Bandwidth Measurement, Adjacent-channel Leakage, Power Measurement	Standard	Standard	Standard	Standard	Standard	Standard
Burst Signal Analysis	Opt. 12	Opt. 12	Opt. 12	Opt. 12	Opt. 12	Opt. 12
CDMA Power Measurement	Opt. 1K	N/A	Opt. 1K	Opt. 1K	N/A	Opt. 1K

1 HZ RESOLUTION SYNTHESIZER
The R3261/R3361 Series portable spectrum analyzers are based upon a synthesized system, so the center and start/stop frequencies can be set with a resolution of 1 Hz. The synthesizer, featuring 1 Hz resolution, is a powerful tool ideal for waiting, receiving, or spot measurement in the zero-span mode.

1 HZ RESOLUTION FREQUENCY COUNTER
The frequency counter built into the R3261/R3361 Series features 1 Hz resolution. One of the advantages of these analyzers is that they can measure the modulated frequency or spurious frequency of a radio system that cannot be measured with an ordinary frequency counter simply by setting a marker. In addition, the ability to measure weaker signals than a frequency counter can extend the application range from broadband panoramic measurement to weak signal measurement.

MANUAL SWEEP FUNCTION FOR SPOT MEASUREMENT
EMC measurements using the quasi-peak (QP) detector require an extended sweep time. However, the time required to measure the peak value can be shortened using the manual sweep function.

CREATE YOUR OWN UNIQUE MENU
The R3261/R3361 Series spectrum analyzers are very functional and very easy to use because of the user-defined functions:

- **User-defined function.** The user can define a necessary function on the USER key in the same way as on the function keys of a personal computer. A unique menu can be created.
- **Define function.** The define function enables the user to change the software key menu manually. With this function, you can create a unique system by changing the key functions that were defined before the system was shipped from the factory.

FAST MEASUREMENT WITH MEASURING WINDOW FUNCTION
The R3261/R3361 Series allows the user to define both frequency and level ranges within a span for analysis. This powerful tool enables faster measurement times over frequencies and levels of interest.

Option 1K includes a suite of CDMA test routines which can be accessed through softkey menus. Specific CDMA measurements include channel power, total power across the span, average power, and peak power. The softkey menu for a test along with measured data (waveforms) can be stored in memory cards via the front panel.

Characteristics

FREQUENCY RELATED

Measuring Frequency Range –
R3261C, R3261CN, R3361C, R3361CN: 9 kHz to 2.6 GHz.
R3261D, R3361D: 9 kHz to 3.6 GHz.

Central Frequency Setting Resolution – 1 Hz.

Central Frequency Display Accuracy –
Span ≤2 MHz: ±(3% of span + central frequency x reference oscillator accuracy + 20 Hz).
Span >2 MHz: +(2% of span + central frequency x reference oscillator accuracy + 20 kHz).

Reference Oscillator – Switching by internal or external input (10 MHz).

Internal Reference Oscillator Stability –
$+2 \times 10^{-8}$/day, $\pm 2 \times 10^{-7}$/year.

Frequency Span –
Linear mode: R3261C/CN, R3361C/CN, 1 kHz to 2.6 GHz and zero. R3261D/R3361D, 1 kHz to 3.6 GHz and zero.
Log mode: 1, 2, or 3 decades selected between 10 kHz and 1000 MHz.

Frequency Span Accuracy –
Span <2 MHz: ≤±3% of span.
Span >2 MHz: ≤±5% of span.

Frequency Stability – Residual FM:
10 MHz ≤ span < 2 MHz, 50 kHz p-p or less.
Span >2 MHz, 2 kHz p-p or less.
Span ≤2 MHz, 20 Hz p-p or less.
Frequency drift: Span ≤2 MHz, 300 Hz/min. or less.

Sideband Noise – At 20 kHz offset
f ≤ 3.0 GHz, –105 dBc/Hz;
f ≤ 3.6 GHz, –101 dBc/Hz.

Resolution –
3 dB bandwidth: 30 Hz to 1 MHz; switchable in 1 to 3 steps.
6 dB bandwidth: 200 Hz, 9 kHz, 120 kHz.
Selectivity: ≤15:1 (60 dB: 3 dB).
Bandwidth accuracy: ≤20%.

Marker Accuracy –
Normal mode: Central frequency display accuracy + span accuracy.
Counter mode: Display frequency x reference oscillator accuracy ±1 count.

AMPLITUDE RELATED

Amplitude Measuring Range –
R3261C, R3261D, R3361C, R3361D: –130 dBm to +25 dBm.
R3261CN, R3361CN: –19 dBμV to +132 dBμV.

Screen Display Range –
Log mode: 10 dB/div, 120 dB. 10 dB/div, 80 dB. 5 dB/div, 50 dB. 2 dB/div, 20 dB. 1 dB/div: 10 dB.
Linear mode: 10 div.
QP mode: 80 dB (10 dB/div) when measuring range is 70 dB.

Display Linearity –
Log mode: ±2.0 dB/110 dB, ±1.5 dB/70 dB, ±1.0 dB/10 dB, ±0.2 dB/1 dB.
Linear mode: ±5% of full scale.
QP mode: ±2.0 dB/70 dB, ±1.0 dB/40 dB.

Spectrum Analyzers

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Reference Level Display Range – R3261C, R3261D, R3361C, R3361D: -109.9 dBm to +40.0 dBm, 0.715 µV to 22.4 V. R3261CN, R3361CN: +0.1 dBµV to +150 dBµV, 1.01 µV to 31.6 V.

REFERENCE LEVEL ACCURACY (AFTER AUTOMATIC CALIBRATION) -

	R3261C/R3261D R3361C/R3361D	R3261CN R3361CN
<±0.3 dB	0 dBm to -50 dBm	+110 dBµV to +60 dBµV
<±0.7 dB	+20 dBm to -70 dBm	+130 dBµV to +40 dBµV

Dynamic Range

Average Noise Level – (resolution bandwidth – 300 Hz, Video bandwidth 1 Hz, Input attenuator 0 dB, Frequency range 10 MHz or more): R3261C, R3261D, R3361C, R3361D: -120 dBm + 1.55 f (GHz) dB. R3261CN, R3361CN: –10 dBµV +1.55 f (GHz) dB.

Secondary and Tertiary Distortion – ≤-70 dB at –30 dBm input, Input attenuator 0 dB, Frequency 10 MHz or more.

FREQUENCY RESPONSE -

	R3261C/R3261D R3361C/R3361D	R3261CN R3361CN
100 Hz to 2 GHz	≤+0.5 dB	≤+0.5 dB
9 kHz to 2.6 GHz	≤+1.0 dB	
9 kHz to 3.6 GHz		≤+1.5 dB

Residual Response – R3261C, R3261D, R3361C, R3361D: ≤–100 dB (Termination: 50 Ω). R3261CN, R3361CN: ≤–11 dBµV (Termination 75 Ω). Resolution Bandwidth Switching Accuracy – ≤±0.3 dB after automatic calibration. Video Filter – 1 Hz to 1 MHz; switchable in 1 or 10 steps.

SWEEP RELATED

Sweep Time – 50 ms to 1000 s and manual sweep.

Sweep Time Accuracy – ≤3%.

Trigger Modes – FREE RUN, LINE, VIDEO, EXT, TV-V, and SINGLE.

TRACKING GENERATOR SPECIFICATIONS (R3361C, R3361CN, R3361D)

Frequency Range – R3361C/R3361CN: 9 kHz to 2.6 GHz. R3361D: 9 kHz to 3.6 GHz.

Output Level Range – R3361C, R3361D: 0 dBm to –50 dBm. R3361CN: +105 dBµV to 55 dBµV setting in 1 dB steps.

Output Level Accuracy – ≤±0.5 dB (30 MHz, –10 dBm, 20°C to 30°C).

	R3361C/R3361D (at –10 dBm output)	R3361CN (at +95 dBµV output)
100 kHz to 1.0 GHz	≤0.7 dB	≤0.7 dB
9 kHz to 2.6 GHz	≤1.5 dB	≤1.5 dB
9 kHz to 3.6 GHz	≤2.0 dB	≤2.0 dB

Output Level Switching Accuracy (at 0 dBm/+95 dBµV output) – 100 kHz to 1.0 GHz: ≤±1.0 dB. 9 kHz to 2.6 GHz: ≤±2.0 dB. 9 kHz to 3.6 GHz: ≤±3.0 dB.

Output Spurious (at 0 dBm/+105 dBµV output) – Harmonic spurious: ≤–20 dB. Non-harmonic spurious: ≤30 dB.

Tracking Generator Leakage – R3361C/R3361D: Frequency ≤3.0 GHz, ≤–110 dBm. Frequency ≤3.6 GHz, ≤–100 dBm. R3361CN: ≤+1 dBµV.

Output Impedance – R3361C, R3361D: Approximately 50 Ω. R3361CN: Approximately 75 Ω.

Output VSWR (at ≤–10 dBm/+95 dBµV output) – 100 Hz to 2 GHz: ≤1.5. 9 kHz to 3.6 GHz: ≤2.0.

Output Connector – N type.

INPUT RELATED

Input Impedance – R3261C, R3261D, R3361C, R3361D: 50 Ω. R3261CN, R3361CN: 75 Ω.

VSWR (at input attenuator ≥10 dB) – 100 kHz to 2 GHz: ≤1.5. 9 kHz to 3.6 GHz: ≤2.0.

Input Connector – N type.

Maximum Input Level – R3261C, R3261D, R3361C, R3361D: +25 dBm (attenuator ≥30 dB), 50 V DC max. R3261CN, R3361CN: +132 dBuV (attenuator ≥30 dB), ±50 V DC max.

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

Input Attenuator Switching Accuracy – ≤1.0 dB (≤2.0 GHz), ≤1.5 dB (≤3.6 GHz) at input attenuator 10 dB.

Detection Modes – NORMAL, POSI, NEGA, and SAMPLE.

INPUTS/OUTPUTS

External Memory Function – IC memory card.

GPIB Data Output/Remote Control – Data output and remote control through internal GPIB interface.

Direct Plotting – Hardcopy output of all display data to HPGL plotters through internal GPIB interface.

Voice Monitor Output – AM and FM with ≈ 8 Ω earphone.

Probe Power Source: – ±15 V, 4-Pin connector.

ENVIRONMENTAL

Ambient Temperature – 0°C to +50°C. Relative Humidity: 85% or less.

Storage Temperature – –20°C to +60°C.

Safety – This product has been safety tested by Advantest to IEC 348 specifications.

POWER REQUIREMENTS

Operating Voltage – Standard: 90 to 132 V. Option 40: 198 to 250 V.

Power Consumption – Less than 220 VA.

Frequency – 48 to 66 Hz.

CRT – 5.5 in.

PHYSICAL CHARACTERISTICS

Dimensions (approx.)	mm	in.
Height	177	7.0
Width	330	13.0
Depth	450	17.7
Weight	**kg**	**lbs.**
R3261C/CN/D	15.0	33.0
R3361C/CN/D	17.0	37.5

Spectrum Analyzers

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K475

- Stable/Mobile Platform
- Tiltable Shelf for Optimum Viewing
- Work-bench Height
- Heavy-duty Nylon Instrument Straps
- Surge and Noise Suppression
- Surge-protected Four Outlet Power Strip Accessory
- Shipped Ready to Assemble

ORDERING INFORMATION

For price information: Outside the U.S. contact your local Tektronix representative, inside the U.S. see the price list in the back of this catalog.

R3261C
2.6 GHz, 50 Ω Spectrum Analyzer.

Includes: Power Cord, BNC-to-BNC Cable, N-to-BNC Adapter, Memory Card, Instruction Manual.

R3261CN
2.6 GHz, 75 Ω Spectrum Analyzer.

Includes: Power Cord, BNC-to-BNC Cable, N-to-BNC Adapter, Memory Card, Instruction Manual.

R3261D
3.6 GHz, 50 Ω Spectrum Analyzer.

Includes: Power Cord, BNC-to-BNC Cable, N-to-BNC Adapter, Memory Card, Instruction Manual.

R3361C
2.6 GHz, 50 Ω Spectrum Analyzer with Tracking Generator.

Includes: Power Cord, BNC-to-BNC Cable(2), N-to-BNC Adapter (2), Memory Card, Instruction Manual.

R3361CN
2.6 GHz, 75 Ω Spectrum Analyzer with Tracking Generator.

Includes: Power Cord, BNC-to-BNC Cable(2), N-to-BNC Adapter (2), Memory Card, Instruction Manual.

R3361D
3.6 GHz, 50 Ω Spectrum Analyzer with Tracking Generator.

Includes: Power Cord, BNC-to-BNC Cable(2), N-to-BNC Adapter (2), Memory Card, Instruction Manual.

Opt. 81 – Gated Sweep Plus RS-232; Gated Sweep Plus Controller Function (including Parallel I/O and Serial I/O); 198 to 250 V AC operation; CDMA Power Measurements.

MEASUREMENTS SERVICE OPTIONS

Opt. C3 – Three years of Calibration Services.

Opt. C5 – Five years of Calibration Services.

Opt. D3 – Test Data (requires Opt. C3).

Opt. D5 – Test Data (requires Opt. C5).

Opt. R3 – Repair warranty extended to cover three years.

Opt. R5 – Repair warranty extended to cover five years.

RECOMMENDED ACCESSORIES

PROBES

FET Probe – DC to 900 MHz (Requires 1101A). Order P6201.

FET Probe – DC to 500 MHz. (Requires 1101A). Order P6202A.

50 Ω Divider Probe – DC to 3 GHz. Order P6158.

Current Probe – 935 Hz to 120 MHz. Order P6022.

Carrying Case – Order R16211A.

Front Cover – Order A02804.

Transit Case – Order R16056A.

Memory Card – Set of Five 32 KB Cards. Order A09505.

Memory Card – Set of Five 128 KB Cards. Order A09506.

Preamplifier – 9 kHz to 1 GHz, ≥ 25 dB. Order R14601.

Rackmount Set – Conforms to EIA Standards. Order A02455.

ADDITIONAL ACCESSORIES Also see page 500.

Cart – Order K475

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ADVANTEST

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Spectrum Analyzers
R4131D

Features

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 lbs.)
- Save/Recall Measurement Conditions, Including Waveforms
- Low Price

Applications

- EMC Diagnostic Measurement
- Spectrum Monitoring

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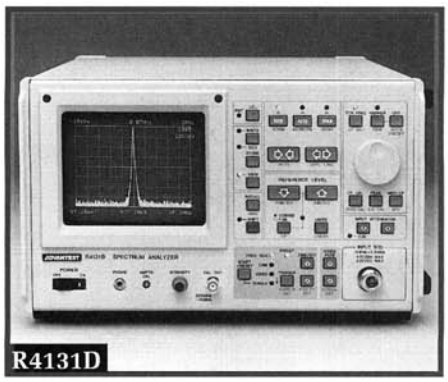

R4131D Spectrum Analyzer

The R4131D Spectrum Analyzer is small, light, and affordable. Its wide frequency range accommodates measurement of PCS 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 ±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 – ±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).

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: ±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: ±5% of full scale.