

# Spectrum Analyzers



9 kHz to 2.6 GHz /3.6 GHz

## R3261/3361 Series

- **Wide Frequency Range:**  
9 kHz to 2.6 GHz (R3261C/3261CN/3361C/3361CN)  
9 kHz to 3.6 GHz (R3261D/3361D)
- **Total Level Accuracy of 1 dB**  
(Typical Value)
- **CRT Display 120 dB**
- **Memory Card, GPIB Port Provided**  
Standard
- **Internal TG (R3361C/3361CN/3361D)**
- **Controller Function (Option)**



Used by NHK Japanese, Defense Agency

(Photo is R3261D)

## R3261/3361 Series Spectrum Analyzers

The R3261/3361 Series are compact and lightweight spectrum analyzers which use a synthesized technique to cover wide frequency bands: 9 kHz to 2.6 GHz (R3261C/3261CN/3361C/3361CN) or 9 kHz to 3.6 GHz (R3261D/3361D).

ADVANTEST's long experience in RF technology and software calibration technology have enabled a total level accuracy of 1 dB.

These compact analyzers also offer high performance functions such as a central frequency with a 1 Hz resolution, start/stop frequency setting and an internal frequency counter with a 1 Hz resolution.

### ■ Total Level Accuracy of 1 dB (Typ.)

By adding software calibration technology to ADVANTEST's long experience in RF technology, the R3261/3361 Series achieves a total level accuracy of 1 dB (typical value). With this technology, highly accurate level measurements are possible without worrying about linearity error due to IF stage log amp or RBW switching.

### ■ Choose From 6 Models, Depending Upon Your Application

	R3261C	R3261CN	R3261D	R3361C	R3361CN	R3361D
Frequency range	9 kHz to 2.6 GHz		9 kHz to 3.6 GHz	9 kHz to 2.6 GHz		9 kHz to 3.6 GHz
Input impedance	50 Ω	75 Ω	50 Ω	75 Ω		50 Ω
Tracking generator function	-		Standard			
IC memory card function			Standard			
Occupied bandwidth measurement			Standard			
Adjacent channel leakage power measurement			Standard			
Intermittent signal measurement, serial I/O						
Intermittent signal measurement, controller			Option 80			
Function			Option 81			

### ■ 1 Hz Resolution Synthesizer and Frequency Counter

Although portable, the R3261/3361 Series uses a synthesized system, so the central and start/stop frequencies can be set with a resolution of 1 Hz.

Frequency measurements with a 1 Hz resolution can be done with the internal frequency counter. Spectrum analyzers can not only measure transmitter carrier waves, but can also measure modulated frequencies highly accurately, which cannot be done with ordinary frequency counters.

### ■ Unique Sound Monitor Mode and Marker Pause Mode

When measuring electric field strength or doing EMC measurements, there is often the need to monitor the sound. As well as having a conventional sound monitor in zero span mode, by means of a marker pause function, the R3261/3361 Series can monitor sound while doing panoramic reception measurements.

### ■ Manual Sweep Function for Spot Measurement

The sweep time in EMC or QP measurement is extremely long to complete measurement. But the sweep time when measuring the peak value is extremely short and measurement can be done in a short time. So the QP value is usually measured first at the peak, then at the necessary position. The manual sweep function of the R3261/3361 Series is a very handy and unique function to measure only a point specified by turning the rotary knob on the front panel.

### R3261/3361 Series

#### ■ Create Your Own Unique Menu

The R3261/3361 Series spectrum analyzers are very functional, yet very easy to use because of the user-defined functions and define functions. The microprocessor built in to many measuring instruments improved the measurement accuracy and functions but they also made the systems very difficult to use. As a solution to this problem, the software menu method was developed. However, this method was still not satisfactory. ADVANTEST's new concept solves most of these problems.



#### ● User-defined function

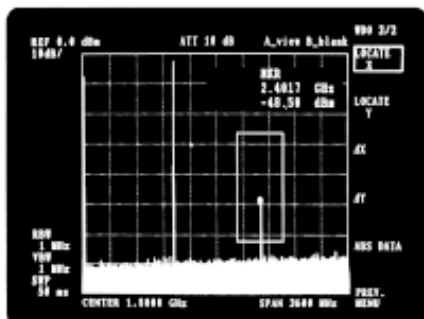
The user-defined function allows the user to pick a desired function and define it on the USER key, which works the same way as the 'function keys' on a personal computer. The user can thereby create a customized software menu.

#### ● Define Function

The software key menu, which corresponds to the keys on the main panel, can be displayed and changed by using this function.

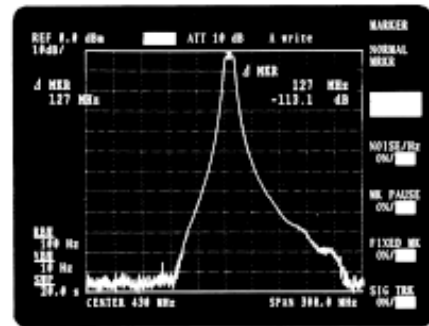
#### ■ Fast Measurement with Measuring Window Function

The R3261/3361 Series models have a measuring window function. In conventional analysis, the user picks up only necessary portions from all the display data with a marker. However, you may need to focus on only the part being displayed. This is accomplished by the measuring window function. The window specification may include not only a frequency but a level. The frequency and level are not fixed but can be specified to arbitrary values for flexible analysis. In addition, since marker and sweep operations are possible in a range set by the frequency and level, the measuring time can be reduced greatly.



#### ■ 120 dB Dynamic Range CRT Display

The R3261/3361 Series are the first spectrum analyzers to have a dynamic range display of 120 dB. Since the dynamic range display of conventional displays was small when measuring frequency characteristics of filters or amps which use tracking generators, a single display was impossible. The R3261/3361 Series, however, can measure up to 110 dB in a single sweep.



#### ■ Burst Signal Analysis (Optional)

Among many of today's popular media such as VCRs, 8 mm video, DATs, laser disks, floppy disks and TV, there are many which use revolving heads or intermittent signals.

As a company devoted to producing measuring instruments, ADVANTEST has worked on producing equipment for the measurement of these intermittent (burst) signals from an early stage.

Functions for burst signal measurement are available as an option in the R3261/3361 Series, to further expand its signal analysis ability, and contribute to the development of the latest technologies such as AV equipment.

#### Applications

- Measurement of VCR, 8 mm video, and DAT heads, as well as tape noise
- Evaluation of element plate characteristics and noise in laser disks
- Noise evaluation in TV1H (horizontal line)
- Noise measurement of only picture signal in TV cameras

#### ■ Controller Function For Automatic Measuring (Optional)

An optional controller function can be installed into the R3261/3361 Series. It uses the easy-to-understand BASIC computer language, and can be used to control itself and another GPIB device connected to the GPIB port. Programs can be entered on a familiar, often-used terminal, or a personal computer in terminal mode. Parallel I/O devices can be controlled by means of the controller function, and automatic measurements with jigs are possible.

For small-scale systems, these functions are extremely effective in terms of cost and space.

Entered programs, measurement conditions, waveform data or other items can be saved on an IC memory card, so that when running the program, only the spectrum analyzer need be used.

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# Spectrum Analyzers

9 kHz to 2.6 GHz/3.6 GHz

## R3261/3361 Series (Continued from previous page)

### Specifications

Frequency	
Measuring frequency range:	
R3261C/3261D/3361C/3361D	R3261D/3361D
9 kHz to 2.6 GHz	9 kHz to 3.6 GHz

Central frequency setting resolution: 1 Hz

Central frequency display accuracy:

- $\pm(3\%$  of span + central frequency  $\times$  reference oscillator accuracy + 20 Hz) ... at span  $\leq$  2 MHz
- $\pm(2\%$  of span + central frequency  $\times$  reference oscillator accuracy + 50 Hz) ... at span  $\leq$  2 MHz

Reference oscillator:

Switching by internal or external input (10 MHz)

Internal reference oscillator stability:  $\pm 2 \times 10^{-8}$ /day,  $\pm 2 \times 10^{-7}$ /year aging

Temperature stability:  $\pm 5 \times 10^{-8}$  (0 to 50°C, +25°C reference)

Frequency span:

Linear mode: 1 kHz to 2.6 GHz (R3261D/3361D; 3.6 GHz) and zero

Log mode: 1, 2, or 3 decades selected between 10 kHz to 1000 MHz

Frequency span accuracy:  $\leq \pm 3\%$  of span Span > 2 MHz  
 $\leq 5\%$  of span Span  $\leq$  2 MHz

Frequency stability:

Residual FM: 50 kHz<sub>p-p</sub> or less Span > 10 MHz  
 2 kHz<sub>p-p</sub> or less 10 MHz  $\geq$  Span > 2 MHz  
 20 Hz<sub>p-p</sub> or less Span  $\leq$  2 MHz

Frequency drift: 300 Hz/min or less Span  $\leq$  2 MHz  
 (At stable temperature after 1 hr. warm-up)

Sideband noise:  $\leq -105$  dBc/Hz,  $f \leq 3.0$  GHz, 20 kHz offset  
 $\leq -101$  dBc/Hz,  $f \leq 3.6$  GHz, 20 kHz offset

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:  $\leq 15$ : 1 (60 dB:3 dB)

Bandwidth accuracy:  $\leq 20\%$

Marker accuracy:

Normal mode: Central frequency display accuracy + span accuracy

Counter mode: Display frequency  $\times$  reference oscillator accuracy  $\pm 1$  count (span  $\leq$  100 MHz)

### Amplitude

Amplitude measuring range:

R3261C/3261D/3361C/3361D	R3261CN/3361CN
-130 dBm to +25 dBm	-19 dB $\mu$ V to +132 dB $\leq$ V

Screen display range:

Log mode: 120 dB (10 dB/div), 80 dB (10 dB/div), 50 dB (5 dB/div), 20 dB (2 dB/div), 10 dB (1 dB/div)

Linear mode: 10 div

QP mode: 80 dB (10 dB/div) when measuring range is 70 dB

Display linearity:

Log mode:  $\pm 2.0/110$  dB,  $\pm 1.5/70$  dB,  $\pm 1.0/10$  dB,  $\pm 0.2/1$  dB

Linear mode:  $\pm 5\%$  of full scale

QP mode:  $\pm 2.0$  dB/70 dB,  $\pm 1.0/40$  dB

Reference level display range:

R3261C/3261D/3361C/3361D	R3261CN/3361CN
-109.9 to +40.0 dBm 0.715 $\mu$ V to 22.4 V	+0.1 to +150 dB $\mu$ V 1.01 $\mu$ V to 31.6 V

Reference level accuracy: (After automatic calibration)

	R3261C/3261D/3361C/3361D	R3261CN/3361CN
$\leq \pm 0.3$ dB	0 to -50 dBm	+110 to +60 dB $\mu$ V
$\leq \pm 0.7$ dB	+20 to -70 dBm	+130 to +40 dB $\mu$ V

Dynamic range:

Average noise level

R3261C/3261D/3361C/3361D	R3261CN/3361CN
-121 dBm + 1.55f(GHz)dB	-10 dB $\mu$ V + 1.55f(GHz)dB

Resolution bandwidth: 300 Hz, video band width: 1 Hz, input attenuator: 0 dB, and frequency: 10 MHz or more

Secondary and tertiary distortion:  $\leq -70$  at -30 dBm input, input attenuator: 0 dB, frequency: 10 MHz or more

Frequency response

R3261C/3261D/3361C/3361D	R3261CN/3361CN		
$\leq +0.5$ dB	100 kHz to 2 GHz	$\leq +0.5$ dB	100 kHz to 2 GHz
$\leq +1.0$ dB	9 kHz to 3.6 GHz	$\leq +1.5$ dB	9 kHz to 2.6 GHz

Log mode, input attenuator; 10 dB, temperature; 20 to 30°C

### Residual response

R3261C/3261D/3361C/3361D	R3261CN/3361CN
$\leq -100$ dBm Termination: 50 $\Omega$	$\leq 11$ dB $\mu$ V Termination: 75 $\Omega$

Input attenuator: 0 dB, termination, frequency: 500 kHz or more

Resolution bandwidth switching accuracy:

$\leq \pm 0.3$  dB after automatic calibration

Video filter: 1 Hz to 1 MHz; switchable in 1 or 10 steps

### Sweep

Sweep time: 50 ms to 1000 s and manual sweep

Sweep time accuracy:  $\leq 3\%$

Trigger modes: FREE RUN, LINE, VIDEO, EXT, TV-V, and SINGLE

### Input

Input impedance:

R3261C/3261D/3361C/3361D	R3261CN/3361CN
50 $\Omega$	75 $\Omega$

VSWR  $\leq 1.5$  100 kHz to 2 GHz at input attenuator  $\geq 10$  dB

VSWR  $\leq 2.0$  9 kHz to 3.6 GHz

Input connector: N type

Maximum input level:

R3261C/3261D/3361C/3361D	R3261CN/3361CN
+25 dBm (attenuator $\geq 30$ dB) $\pm 50$ VDC max.	+132 dB $\mu$ V/(input attenuator $\geq 30$ dB) $\pm 50$ VDC max.

Input attenuator: 0 to 50 dB in 10 dB steps

Input attenuator switching accuracy:  $\leq 1.0$  dB ( $\leq 2.0$  GHz),  $\leq 1.5$  dB ( $\leq 3.6$  GHz) with input attenuator 10 dB reference

Detection Modes: NORMAL, POSI, NEGA, and SAMPLE

Tracking Generator Specifications (R3361C/3361CN/3361D)

Frequency range: 9 kHz to 2.6 GHz (R3361C/3361CN)  
 9 kHz to 3.6 GHz (R3361D)

Output level range:

R3361C/3361D	R3361CN
0 to -50 dBm	+105 to 55 dB $\mu$ V

Setting in 1-dB steps

Output level accuracy:  $\leq \pm 0.5$  dB (30 MHz, -10 dBm, 20°C to 30°C)

Output level flatness:

R3361C/3361D	R3361CN
$\leq 0.7$ dB 100 kHz to 1.0 GHz $\leq 1.5$ dB 100 kHz to 2.6 GHz $\leq 2.0$ dB 9 kHz to 3.6 GHz	$\leq 0.7$ dB 100 kHz to 1.0 GHz $\leq 1.5$ dB 100 kHz to 2.0 GHz $\leq 2.0$ dB 9 kHz to 2.6 GHz
} at -10 dBm	
} at +95 dB $\mu$ V output	

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