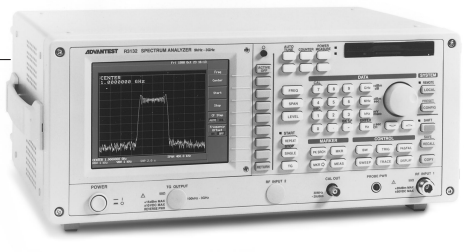
ADVANTEST

R3132/3162
Spectrum Analyzer

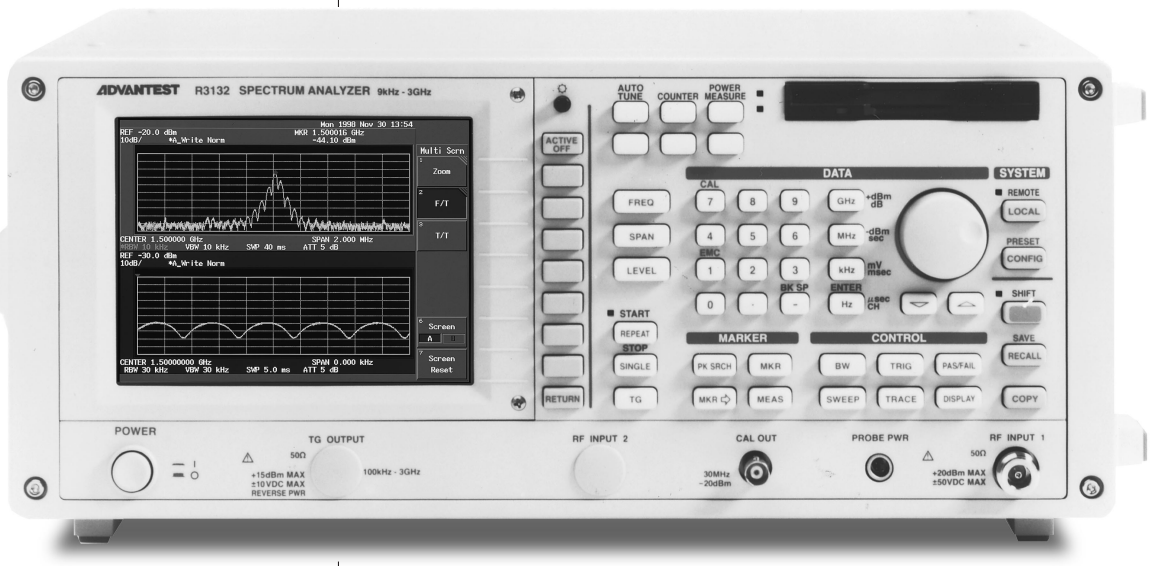
R3132 : 9kHz to 3GHz

R3162 : 9kHz to 8GHz

One Spectrum Analyzer For Versatile Applications



R3132/3162



The R3132/3162 series spectrum analyzers offer the measurement capabilities and performance.
For various applications, such as Cable TV, EMC measurement and Digital Mobile Communications, the R3132/ 3162 can be customized by selection from available options.

Features

- **Frequency range :** R3132 : 9kHz to 3GHz
  R3162 : 9kHz to 8GHz
- **Signal purity :** 105dBc/Hz 20kHz offset
  100dBc/Hz 10kHz offset
- **Total level accuracy :** Maximum ±1.5dB
- **High-speed GPIB effective for system construction**
- **High speed measurement :** 20 traces per second
- **6.5-inch TFT color LCD**
- **Built-in frequency counter**
- **3GHz tracking generator (option)**
- **Floppy disc for data saving**
- **Large numeric display for measurement results (In counter and power measurement mode)**
- **Input impedance 75Ω model :** R3132N

Options

- **Narrow-band resolution bandwidth :**
  30Hz, 100Hz, 300Hz and 200Hz (EMI bandwidth)
- **High-stability frequency reference :**
  Aging rate 1×10^{-7}/year
- **High-speed time domain sweep :**
  50µs/10div. (100ns resolution)
- **Tracking generator :** 100kHz to 3GHz

Basic functions

Basic functions are reinforced so that R3132/3162 can be used in various fields. For example, the internal automatic calibration function guarantees the total level accuracy of ±1.5dB, level correction factor can be stored in the internal memory, DDS is employed to improve frequency reading accuracy, and frequency span error is lowered to less than 1%.
The R3132/3162 offer wider dynamic range and lower 2nd and 3rd distortion by improving 1dB compression point.
As a result of increasing the sweep repetition cycles by improving the synthesized local oscillator, 20 traces/second (typ.) data rewriting becomes possible, enabling far more real-time waveform measurement. high speed GPIB increase, the throughput of automatic measurement.

For many applications

For EMI precompliance measurement, 6-dB bandwidth filters for 9kHz, 120kHz and 1MHz as well as QP detector are equipped as standard. Optional 200Hz narrow RBW filter can be added.
For high-speed time domain measurement function which is indispensable for mobile communications, optional 50µs sweep is effective.
By using the double-screen display function, you can specify the rising/falling edge of TDMA waveform and display the magnified image.
The R3132/3162 series spectrum analyzer has ACP and OBW operation function indispensable for evaluating the transmission characteristic of radio system.
With various other functions such as AUTO TUNE, 1Hz resolution frequency counter, dBc/Hz, %AM, and PASS/FAIL test by limit value, the R3132/3162 series can easily perform several types of measurements.
Even for signals which are lower in level than the average noise level, the preamplifier ensures level calibrated, high-accuracy measurement.
For measuring the attenuation characteristic of filters or the frequency characteristic of cables, etc., built-in tracking generator is available as option. Because the output level can be set in a wide range, it is possible to measure amplifier gain, frequency response, etc.

Easy-operation interface

The high-resolution, 6.5-inch TFT color LCD realizes easy-to-see display of data. VGA output is provided for external display.
Measured waveform data and setting condition can be saved in or recalled from the internal memory. Using the floppy disc drive which is equipped as standard, you can manage more number of measurement data. Text data or Bitmap data on floppy disc are also useful for making documents on a personal computer.
As the hard-copy function is provided to ESC/P. ESC/P-R and PCL, measured data can be printed out on general-purpose printers.
GPIB and RS232 are equipped as standard.

R3132 Specifications

Frequency

Frequency range : 9kHz to 3GHz

Frequency reading accuracy : ± (Reading of frequency × Frequency reference accuracy + Span × 1% + Resolution bandwidth × 15% + 60Hz)
(Start, stop, center frequency, marker frequency)

Counter
- **Resolution :** 1Hz to 1kHz
- **Accuracy :** ± (Marker frequency × Frequency reference accuracy + 1LSD)

Frequency reference accuracy:
- **Stability :** $\pm 2 \times 10^{-6}$/year, $\pm 1 \times 10^{-7}$/year (Option)
  $\pm 1 \times 10^{-5}$ (0°C to 50°C)

Frequency span
- **Range :** 1kHz to 3GHz, 0Hz
- **Accuracy :** ≤±1%

Residual FM : ≤60Hzp-p × 0.1s

Signal purity : ≤-105dBc/Hz (20kHz offset)
≤-100dBc/Hz (10kHz offset)

Resolution bandwidth (3dB)

Range :	1kHz to 3MHz,	1-3-10 sequence,	30Hz to 300Hz (Option)
Accuracy :	<± 20 %,	1kHz to1MHz	
	<± 25 %,	3MHz	
6dB bandwidth :	1MHz, 120kHz,	9kHz,	200Hz (Option)

Video bandwidth : 10Hz to 3MHz 1-3-10 sequence

Amplitude range

Measuring range : +30dBm to the average of displayed noise level

Maximum input level
(Input ATT ≥5dB)
- **Preamplifier OFF :** +30dBm, ±50VDC max.
- **Preamplifier ON :** +13dBm, ±50VDC max.

Indication range 10 × 10div
- **Log:** 10, 5, 2, 1dB/div
- **Linear:** 10% of the reference level/div.

Reference level range
- **Preamplifier OFF (Input ATT: 0 to 50 dB)**
  - **Log:** -64dBm to +40dBm (0.1dB step)
  - **Linear:** 141.1µV to 22.36V
- **Preamplifier ON (Input ATT : 0 to 10 dB)**
  - **Log:** -84.4dBm to -20.4dBm (0.1dB step)
  - **Linear:** 13.47µV to +22.35mV

Input ATT range : 0 to 50dB (5dB step)

Dynamic range

Average noise level : RBW 1 kHz, VBW 10Hz, input ATT 0 dB, for 1 MHz or more
- **Preamplifier OFF :** -118dBm + 2f (GHz) dB
- **Preamplifier ON :** -132dBm + 3f (GHz) dB

1dB gain compression : At 10MHz or more
- **Preamplifier OFF :** >0dBm (mixer input level)
- **Preamplifier ON :** >-30dBm (RF input level)

Spurious response : Preamplifier OFF
- 2nd-order harmonic distortion :
  ≤-80dBc (Mixer input -30dBm, f ≥ 100MHz)
- 2 signal, 3rd-order intermodulation distortion :
  ≤-80dBc (Mixer input -30dBm, f ≥ 100MHz, Offset > 10kHz)

Residual response : When input ATT 0dB and 50Ω terminated
- **Preamplifier OFF :** ≤-100dBm
- **Preamplifier ON :** ≤-105dBm

Amplitude accuracy

Frequency response After auto calibration
- **Preamplifier OFF :** ≤±0.5dB (100kHz to 3GHz, ATT=0dB)
  ≤±1dB (100kHz to 2.7GHz)
  ≤±2dB (9kHz to 3GHz)
- **Preamplifier ON :** ≤±1dB (100kHz to 2.7GHz)
  ≤±2dB (9kHz to 3GHz)

Calibration signal level accuracy :
-20dBm±0.3dB

IF gain error : ≤±0.5dB after auto calibration

Scale indication accuracy After auto calibration
- **Log :** ≤±0.5dB (0 to -20dB)
  ≤±1.5dB/90dB
  ≤±1dB/10dB
  ≤±0.2dB/1dB
- **Linear :** ±5% of reference level

Input ATT switching error : ≤±0.3dB (for 0 to 50dB, with respect to 30 MHz/10dB)

Resolution bandwidth switching level error :
≤±0.5dB after auto calibration

Total level accuracy : ±1.5dB (REF=-50 to 0dBm, ATT=10dB, 2dB/div, RBW=300kHz, f >100kHz, after auto calibration)

Sweep

Sweep time : 20ms to 1000s, 50µs to 1s (Option)
- **Accuracy :** <±1%

Trigger mode : FREE RUN, LINE, VIDEO, EXT, TV

Sweep mode : REPEAT, SINGLE

I/O

RF input
- **Connector :** N type female
- **Impedance :** R3132 ; 50Ω (nominal), R3132N ; 75Ω (nominal)

VSWR
- **Preamplifier OFF :** <1.5 : 1 (100kHz to 2GHz)
  <2 : 1 (9kHz to 3GHz)
  Input ATT : 5 to 50dB
- **Preamplifier ON :** <2.5 : 1 (9kHz to 3GHz)

Probe power : ±12V, 4pin connector

Calibration output signal : BNC female
30MHz, -20dBm

10MHz reference input : BNC female, 50Ω
0dBm to +16dBm

External trigger input : BNC female

Sound output (demodulated audio) :
Small monophonic jack

GPIB interface : IEEE-488 specification BUS connector

Serial interface : D-sub 9pin

Printer interface : D-sub 25pin, ESC/P, ESC/P-R, PCL

Video out : VGA (15pin, female)

Floppy disc : 3.5 inch, MS-DOS format

General specification

Operating temperature : 0 to +50 °C
Humidity RH 85% or less

Storage temperature : -20 to +60 °C, RH 85% or less

Power supply : 100/200 VAC switchable
100VAC : 100 to 120VAC, 50 to 60Hz
200VAC : 200 to 240VAC, 50 to 60Hz

Dimensions : 424 (W) × 177 (H) × 300 (D)mm
(without feet and connectors)

R3162 Specifications

Frequency

frequency range : 9kHz to 8GHz

Frequency range	Band
9kHz to 3.4GHz	0
3.2GHz to 7.5GHz	1-
6.5GHz to 8GHz	1+

Frequency reading accuracy : ± (Reading of frequency × Frequency reference accuracy + Span × 1% + Resolution bandwidth × 15% + 60Hz)
(Start, stop, center frequency, marker frequency)

Counter
- Resolution : 1Hz to 1kHz
- Accuracy : ± (Marker frequency × Frequency reference accuracy + 1LSD)

Frequency reference accuracy :
- Stability : $\pm 2 \times 10^{-6}$/year, $\pm 1 \times 10^{-7}$/year (Option)
  $\pm 1 \times 10^{-8}$ (0°C to 50°C)

Frequency span
- Range : 1kHz to 8GHz, 0Hz
  ≤±1%

Residual FM : ≤60Hzp-p × 0.1s

Signal purity : ≤-105dBc/Hz (20 kHz offset)
≤-100dBc/Hz (10 kHz offset)

Resolution bandwidth (3dB)
- Range : 1kHz to 3MHz, 1-3-10 sequence, 30Hz to 300Hz (Option)
- Accuracy : <± 20 %, 1kHz to1MHz
  <± 25 %, 3MHz
- 6dB bandwidth : 1MHz, 120kHz, 9kHz, 200Hz (Option)

Video bandwidth : 10Hz to 3MHz 1-3-10 sequence

Amplitude range

Measuring range : +30dBm to the average of displayed noise level

Maximum input level
(Input ATT ≥5dB)
- Preamplifier OFF : +30dBm, 0VDC max.
- Preamplifier ON : +13dBm, 0VDC max.

Indication range 10 × 10div
- Log: 10, 5, 2, 1dB/div
- Linear: 10% of the reference level/div.

Reference level range
- Preamplifier OFF (Input ATT: 0 to 75dB)
  - Log: -64dBm to +40dBm (0.1dB step)
  - Linear: 141.1µV to 22.36V
- Preamplifier ON (Input ATT: 0 to 10dB)
  - Log: -84.4dBm to -20.4dBm (0.1dB step)
  - Linear: 13.47µV to +22.35mV

Input ATT range : 0 to 75dB (5dB step)

Dynamic range

Average noise level : RBW 1 kHz, VBW 10Hz, input ATT 0 dB, for 1MHz or more
- Preamplifier OFF : Band 0 : -118 dBm + 2f (GHz) dB
  Band 1- : -115dBm
  Band 1+ : -115dBm
- Preamplifier ON : -132dBm + 3f (GHz) dB (At 1MHz to 3.4GHz)

1dB gain compression : At 10MHz or more
- Preamplifier OFF : >0dBm (mixer input level)
- Preamplifier ON : >-30dBm (RF input level)

Spurious response : Preamplifier OFF
- 2nd-order harmonic distortion :

Frequency range	Mixer input	Distortion level
100MHz to 1.8GHz	-30dBm	≤-80dBc
1.8GHz to 3.4GHz	-10dBm	≤-80dBc
>3.4GHz	-10dBm	≤-100dBc

- 2 signal, 3rd-order intermodulation distortion :
  ≤-80dBc (Mixer input -30dBm, f ≥ 100MHz, Offset > 10kHz)

Image/multiple/band external response : ≤-70dBc

Residual response : When input ATT 0dB and 50Ω terminated
- Preamplifier OFF : ≤-100dBm (1MHz to 3.4GHz)
  ≤-90dBm (>3.4GHz)
- Preamplifier ON : ≤-105dBm (1MHz to 3.4GHz)

Amplitude accuracy

Frequency response After auto calibration,
After pre-selector peak adjustment
- Preamplifier OFF : ≤±0.5dB (100kHz to 3GHz, ATT=0dB)
  ≤±1dB (100kHz to 2.7GHz)
  ≤±2dB (9kHz to 3.4GHz)
  ≤±2dB (3.2GHz to 8GHz)
- Preamplifier ON : ≤±1dB (100kHz to 2.7GHz)
  ≤±2dB (9kHz to 3.4GHz)

Calibration signal level accuracy :
-20dBm±0.3dB

IF gain error : ≤±0.5dB after auto calibration

Scale indication accuracy After auto calibration
- Log : ≤±0.5dB (0 to -20dB)
  ≤±1.5dB/90dB
  ≤±1dB/10dB
  ≤±0.2dB/1dB
- Linear : ±5% of reference level

Input ATT switching error : ≤±0.3dB (for 0 to 50dB, with respect to 30 MHz/10dB)

Resolution bandwidth switching level error :
≤±0.5dB after auto calibration

Total level accuracy : ±1.5dB (REF=-50 to 0dBm, ATT=10dB, 2dB/div, RBW=300kHz, f >100kHz, after auto calibration)

Sweep

Sweep time : 20ms to 1000s, 50µs to 1s (Option)
- Accuracy : <±1%

Trigger mode : FREE RUN, LINE, VIDEO, EXT, TV

Sweep mode : REPEAT, SINGLE

I/O

RF input
- Connector : N type female
- Impedance : 50Ω (nominal)

VSWR
- Preamplifier OFF : <2 : 1 (9kHz to 8GHz)
  Input ATT : 10 to 75dB
- Preamplifier ON : <2.5 : 1 (9kHz to 3.4GHz)

Probe power : ±12 V, 4pin connector

Calibration output signal : BNC female, 50Ω
30MHz, -20dBm

10 MHz reference input : BNC female, 50Ω
0dBm to +16dBm

External trigger input : BNC female

Sound output (demodulated audio) :
Small monophonic jack

GPIB interface : IEEE-488 specification BUS connector

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Printed in Japan

Bulletin No.R3132/3162Z-331E Jan. '99A