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ADVANTEST®
ADVANTEST CORPORATION

MAINTENANCE MANUAL

R3261/3361 SERIES

SPECTRUM ANALYZER

QSO VERIFIED BY PA1WBU AMATEUR RADIO STATION

MANUAL NUMBER MEG00 9201

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KEY	BLG-015673	7-23	7-23a	7-110 to 7-111
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ALC CONT BLC-015680

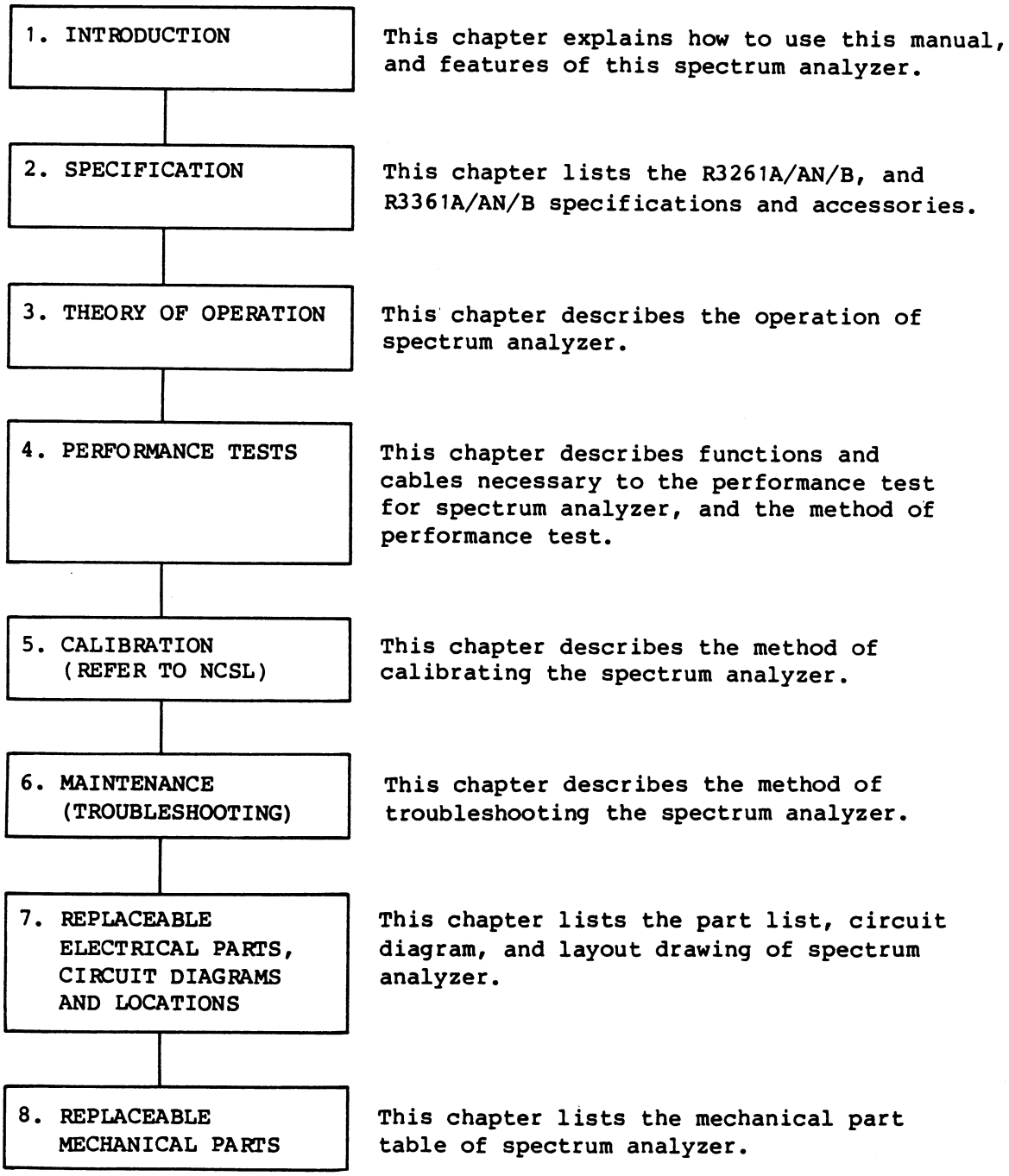
1/1 ALC CONTROL 7-115

BATT. holder BLB-016053 / RF Block WBL-3361RF 7-116
BATT. holder / RF Block (sheet 2) 7-116 (2)

1. INTRODUCTION

This chapter explains how to use this manual, and features of this spectrum analyzer.

1.1 How to Use This Manual



1.2 Overview

The R3261/3361 Series spectrum analyzer, which employs a synthesized local oscillator for assuring highly stable spectrum analyzer, features wide frequency range from 9kHz to 2.6GHz (R3261A/AN, R3361A/AN),
9kHz to 3.6GHz (R3261B, R3361B),
wide input range from -130dBm to +25dBm (R3261A/B, R3361A/B),
-19dBμ to +132dBμ (R3261AN, R3361AN),
wide measurement display range of 115dB
and high resolution of 30Hz, low residual FM of $20Hz_{p-p}$, less noise sideband of -105dBc/Hz (20kHz output from carrier) as well as full remote-control GPIB, and the memory card function for saving/recalling data and panel settings.

The R3361A/AN/B contains a tracking generator that facilitates frequency characteristic measurement.

Features

① This analyzer permits sweeping over a wide frequency range from 9kHz to 3.6GHz (R3261B,3361B).

② A maximum frequency resolution of 30Hz enables analysis of adjacent signals and spurious response.

③ High-precision frequency measurement
A reference crystal oscillator with an aging rate of 2×10^{-8}/day is installed to measure very weak signals (which cannot be measured by any counter) at a resolution of 1Hz in the counter mode.

④ Use of a memory card permits saving/recalling of front panel settings.

⑤ The field strength can be viewed and read directly after compensating the antenna calibration coefficient and that the QR value based on the CISPR standard can be observed directly.

⑥ Various enhanced functions supported by digital indications
Brief information needed for spectrum analysis is displayed on the CRT together with signal traces. The digital memory screen provides flickerless display. Various marker functions assures accurate and easy reading even in the manual mode.

⑦ Two channels of completely independent digital memories enable simultaneous display of two screens.

⑧ A full-remote-control GPIB is used as a powerful system component.

⑨ The built-in tracking generator of the R3361A/AN/B enables direct viewing of frequency attenuation of 115dB or more.

2. SPECIFICATIONS

This chapter lists the R3261A, R3261AN, R3261B, R3361A, R3361AN, and R3361B specifications and accessories.

2.1 R3261A Specifications

(1) Frequency Specifications

Measurable bandwidth : 9kHz to 2.6GHz

Center frequency setting increment
: 1Hz

Center frequency indication accuracy
: ±(3% of the span + center frequency x reference oscillator accuracy + 20Hz)
(span ≦ 2MHz)
±(2% of the span + center frequency x reference oscillator accuracy + 50kHz)
(span > 2MHz)

Reference oscillator : Internal or external input (10MHz)

Internal reference oscillator accuracy
: ±(2 x 10^{-8} per day)
±(1 x 10^{-7} per year)

Frequency span
LIN mode : 1kHz to 2.6GHz, and 0
LOG mode : 1, 2, or 3 decades of span can be selected within the range from 10kHz to 1000MHz.

Frequency span accuracy
LIN mode : ±3% of the span (span > 2MHz)
±5% of the span (span ≦ 2MHz)

Frequency stability
Residual FM : 50kHz p-p or less (span > 10MHz)
2kHz p-p or less (10MHz ≧ span > 2MHz)
20Hz p-p or less (span ≦ 2MHz)
Frequency drift : 300Hz/min. or less (span ≦ 2MHz, at a constant temperature after an hour of warming up)

Side band noise : ≦-105dBc/Hz (20kHz offset)

Resolution
3dB bandwidth : 30Hz to 1MHz, switched at 1 to 3 steps

6dB bandwidth : 200Hz, 9kHz, 120kHz
Selectivity : ≦15: 1 (60dB : 3dB)
Bandwidth accuracy : ±20%

Marker accuracy
Normal mode : Center frequency indication accuracy + span accuracy
Counter mode : Indicated frequency x reference oscillator accuracy ±1 count

(2) Amplitude Specifications

Amplitude measurement range
: -130dBm to +25dBm

Screen display range
LOG mode : 120dB (10dB/div)
: 80dB (10dB/div)
: 50dB (5dB/div)
: 20dB (2dB/div)
: 10dB (1dB/div)
LIN mode : 10div
QP mode : 80dB (10dB/div)
Provided the measurement range is 70dB

Linearity display
LOG mode : ±2.0dB/110dB, ±1.5dB/70dB, ±1.0dB/10dB, ±0.2dB/1dB
LIN mode : ±5% of the fullscale
QP mode : ±2.0dB/70dB, ±1.0dB/40dB

Reference level indication range
: -109.9dBm to +40.0dBm
0.715μV to 22.4V

Reference level accuracy : ±0.3dB 0 to -50dBm
±0.7dB +20 to -70dBm

Dynamic range
Average noise level : -121dBm + 1.55f(GHz)dB
(Resolution bandwidth 300Hz, video bandwidth 1Hz, input attenuator 0dB, frequency 1MHz)
Secondary, tertiary distortion
: ≦ -70dB -30dBm input
(Input attenuator 0dB, frequency 10MHz or more)
Frequency response : ±0.5dB 100kHz to 2GHz
±1.0dB 9kHz to 2.6GHz
(LOG mode, input attenuator 10dB, 20 to 30°C)

Residual response : ≤ -100dBm (Input attenuator 0dB, 50Ω terminator, frequency 500kHz or more)

Resolution bandwidth switching accuracy:
: ±0.3dB (after automatic calibration)

Video filter : 1Hz to 1MHz (switched 1 to 10 steps)

(3) Sweep Specifications

Sweep time : 50msec to 1000sec and Manual sweeping

Sweep time accuracy : ≤ 3%

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

(4) Input Specifications

Input impedance : Approx. 50Ω
VSWR ≤ 1.5 (100kHz ≤ f ≤ 2GHz)
VSWR ≤ 2.0 (9kHz ≤ f ≤ 2.6GHz)
(Input attenuator ≥ 10dB)

Input connector : N connector

Maximum input level : +25dBm (input attenuator ≥ 30dB)
±50VDC max

Input attenuator : 0 to 50dB (10dB steps)

Input attenuator switching accuracy
: ±1.0dB (≤2.0GHz)
±1.5dB (≤2.6GHz)
(Input attenuator 10dB standard)

Detection mode : NORMAL, POSI, NEGA, SAMPLE

(5) Output Specifications

External memory function : IC memory card

Video output : Approx. 1Vp-p, approx 75Ω, composite

Sound monitor output : The AM and FM sound can be monitored with an approximately 8Ω earphone.

Power supply for probes : ±15V, 4-pin connector

Recorder output : X axis approx. -5 to +5V, output impedance approx. 10kΩ
Y axis approx. 0 to +4V, output impedance approx. 220Ω

GPIB data output/ Remote control : The built-in GPIB interface allows data output and remote control.

Direct plot : Also, the built-in GPIB interface allows an output of on-screen data to the R9833 plotter to have a hardcopy.

(6) Indication Specifications

Indicated items : Waveforms, setting conditions, grid, label

CRT display unit : 5.5 inch

Trace : Two screens of A and B

WRITE : Signal response from the analyzer is indicated at every sweeping.

VIEW : The WRITE waveform contained in the memory, or other contents in the memory are displayed.

MAX HOLD : Indication of the maximum signal level of repeat sweeping

AVG : Indication of the average of repeat sweeping

(7) General Specifications

Using ambient condition : Less than 0 to 50°C and 85%RH

Storage temperature range : -20 to +60°C

Power supply : The power voltage of the analyzer is set at the delivery according to the customer's ordering information.

Option No.	Standard	44
Line voltage (V)	90 to 132	198 to 250

48 to 66Hz

Power consumption : 220VA or less

Dimensions : Approx. 330(W) x 177(H) x 450(D) mm

Weight : Approx. up to 15kg

(8) Options and Accessories

Option

OPTION 04	Occupied bandwidth measurement/neighboring channel leakage power measurement
OPTION 15	Controller function (Parallel I/O, Serial I/O)
OPTION 12	Gated Sweep Measurement

Separate accessory

R3551	EMI preselector
R16211	Carring case
A02804	Front cover
A09505	Memory card (32k byte, 5 pieces)
A09506	Memory card (128k byte, 5 pieces)
A02034	Panel Mount Kits
A02255	Rack Mount Kits (JIS)
A02455	Rack Mount Kits (EIA)

2.2 R3261AN Specifications

(1) Frequency Specifications

Measurable bandwidth : 9kHz to 2.6GHz

Center frequency setting increment
: 1Hz

Center frequency indication accuracy
: ±(3% of the span + center frequency x reference oscillator accuracy + 20Hz)
(span ≦ 2MHz)
±(2% of the span + center frequency x reference oscillator accuracy + 50kHz)
(span > 2MHz)

Reference oscillator : Internal or external input (10MHz)

Internal reference oscillator accuracy
: ±(2 x 10^{-8} per day)
±(1 x 10^{-7} per year)

Frequency span
LIN mode : 1kHz to 2.6GHz, and 0
LOG mode : 1, 2, or 3 decades of span can be selected within the range from 10kHz to 1000MHz.

Frequency span accuracy
LIN mode : ±3% of the span (span > 2MHz)
±5% of the span (span ≦ 2MHz)

Frequency stability
Residual FM : 50kHz p-p or less (span > 10MHz)
2kHz p-p or less (10MHz ≧ span > 2MHz)
20Hz p-p or less (span ≦ 2MHz)
Frequency drift : 300Hz/min. or less (span ≦ 2MHz, at a constant temperature after an hour of warming up)

Side band noise : ≦-105dBc/Hz (20kHz offset)

Resolution
3dB bandwidth : 30Hz to 1MHz, switched at 1 to 3 steps

6dB bandwidth : 200Hz, 9kHz, 120kHz
Selectivity : ≦15: 1 (60dB : 3dB)
Bandwidth accuracy : ±20%

Marker accuracy
Normal mode : Center frequency indication accuracy + span accuracy
Counter mode : Indicated frequency x reference oscillator accuracy ±1 count

(2) Amplitude Specifications

Amplitude measurement range
: -19dBμ to +132dBμ

Screen display range
LOG mode : 120dB (10dB/div)
: 80dB (10dB/div)
: 50dB (5dB/div)
: 20dB (2dB/div)
: 10dB (1dB/div)
LIN mode : 10div
QP mode : 80dB (10dB/div)
Provided the measurement range is 70dB

Linearity display
LOG mode : ±2.0dB/110dB, ±1.5dB/70dB, ±1.0dB/10dB, ±0.2dB/1dB
LIN mode : ±5% of the fullscale
QP mode : ±2.0dB/70dB, ±1.0dB/40dB

Reference level indication range
: +0.1dBμ to +150dBμ
1.01μV to 31.6V

Reference level accuracy : ±0.3dB +110 to +60dBμ
±0.7dB +130 to +40dBμ

Dynamic range
Average noise level : -10dBμ + 1.55f(GHz)dB
(Resolution bandwidth 300Hz, video bandwidth 1Hz, input attenuator 0dB, frequency 1MHz)
Secondary, tertiary distortion
: ≤ -70dB -30dBm input
(Input attenuator 0dB, frequency 10MHz or more)
Frequency response : ±0.5dB 100kHz to 2GHz
±1.5dB 9kHz to 2.6GHz
(LOG mode, input attenuator 10dB, 20 to 30°C)
Residual response : ≤ +11dBμ (Input attenuator 0dB, 75Ω terminator, frequency 500kHz or more)

Resolution bandwidth switching accuracy
: ±0.3dB (after automatic calibration)

Video filter : 1Hz to 1MHz (switched 1 to 10 steps)

(3) Sweep Specifications

Sweep time : 50msec to 1000sec and Manual sweeping

Sweep time accuracy : ≦ 3%

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

(4) Input Specifications

Input impedance : Approx. 75Ω
VSWR ≦ 1.5 (100kHz ≦ f ≦ 2GHz)
VSWR ≦ 2.0 (9kHz ≦ f ≦ 2.6GHz)
(Input attenuator ≧ 10dB)

Input connector : N connector

Maximum input level : +132dBμ (input attenuator ≧ 30dB)
±50VDC max

Input attenuator : 0 to 50dB (10dB steps)

Input attenuator switching accuracy
: ±1.0dB (≦2.0GHz)
±1.5dB (≦2.6GHz)
(Input attenuator 10dB standard)

Detection mode : NORMAL, POSI, NEGA, SAMPLE

(5) Output Specifications

External memory function : IC memory card

Video output : Approx. 1Vp-p, approx 75Ω, composite

Sound monitor output : The AM and FM sound can be monitored with an approximately 8Ω earphone.

Power supply for probes : ±15V, 4-pin connector

Recorder output : X axis approx. -5 to +5V, output impedance approx. 10kΩ
Y axis approx. 0 to +4V, output impedance approx. 220Ω

GPIB data output/ Remote control : The built-in GPIB interface allows data output and remote control.

Direct plot : Also, the built-in GPIB interface allows an output of on-screen data to the R9833 plotter to have a hardcopy.

(6) Indication Specifications

Indicated items : Waveforms, setting conditions, grid, label

CRT display unit : 5.5 inch

Trace : Two screens of A and B

WRITE : Signal response from the analyzer is indicated at every sweeping.

VIEW : The WRITE waveform contained in the memory, or other contents in the memory are displayed.

MAX HOLD : Indication of the maximum signal level of repeat sweeping

AVG : Indication of the average of repeat sweeping

(7) General Specifications

Using ambient condition : Less than 0 to 50°C and 85%RH

Storage temperature range : -20 to +60°C

Power supply : The power voltage of the analyzer is set at the delivery according to the customer's ordering information.

Option No.	Standard	44
Line voltage (V)	90 to 132	198 to 250

48 to 66Hz

Power consumption : 220VA or less

Dimensions : Approx. 330(W) x 177(H) x 450(D) mm

Weight : Approx. up to 15kg

(8) Options and Accessories

Option

OPTION 04	Occupied bandwidth measurement/neighboring channel leakage power measurement
OPTION 15	Controller function (Parallel I/O, Serial I/O)
OPTION 12	Gated Sweep Measurement

Separate accessory

R3551	EMI preselector
R16211	Carring case
A02804	Front cover
A09505	Memory card (32k byte, 5 pieces)
A09506	Memory card (128k byte, 5 pieces)
A02034	Panel Mount Kits
A02255	Rack Mount Kits (JIS)
A02455	Rack Mount Kits (EIA)

2.3 R3261B Specifications

(1) Frequency Specifications

Measurable bandwidth : 9kHz to 3.6GHz

Center frequency setting increment
: 1Hz

Center frequency indication accuracy
: ±(3% of the span + center frequency x reference oscillator accuracy + 20Hz)
(span ≤ 2MHz)
±(2% of the span + center frequency x reference oscillator accuracy + 50kHz)
(span > 2MHz)

Reference oscillator : Internal or external input (10Hz)

Internal reference oscillator accuracy
: ±(2 x 10^{-8} per day)
±(1 x 10^{-7} per year)

Frequency span
LIN mode : 1kHz to 3.6GHz and 0
LOG mode : 1, 2, or 3 decades of span can be selected within the range from 10kHz to 1000MHz.

Frequency span accuracy
LIN mode : ±3% of the span (span > 2MHz)
±5% of the span (span ≤ 2MHz)

Frequency stability
Residual FM : 50kHz p-p or less (span > 10MHz)
2kHz p-p or less (10MHz ≥ span > 2MHz)
20Hz p-p or less (span ≤ 2MHz)
Frequency drift : 300Hz/min. or less (span ≤ 2MHz, at a constant temperature after an hour of warming up)

Side band noise : ≤ -105dBc/Hz f ≤ 3.0GHz
≤ -101dBc/Hz f ≤ 3.6GHz
(20kHz offset)

Resolution
3dB bandwidth : 30Hz to 1MHz, switched 1 to 3 steps
6dB bandwidth : 200Hz, 9kHz, 120kHz
Selectivity : ≤15: 1 (60dB : 3dB)
Bandwidth accuracy : ±20%

Marker accuracy
Normal mode : Center frequency indication accuracy + span accuracy
Counter mode : Indicated frequency x reference oscillator accuracy ±1 count

(2) Amplitude Specifications

Amplitude measurement range
: -130dBm to +25dBm

Screen display range
LOG mode : 120dB (10dB/div)
: 80dB (10dB/div)
: 50dB (5dB/div)
: 20dB (2dB/div)
: 10dB (1dB/div)
LIN mode : 10div
QP mode : 80dB (10dB/div)
Provided the measurement range is 70dB

Linearity display
LOG mode : ±2.0dB/110dB, ±1.5dB/70dB, ±1.0dB/10dB, ±0.2dB/1dB
LIN mode : ±5% of the fullscale
QP mode : ±2.0dB/70dB, ±1.0dB/40dB

Reference level indication range
: -109.9dBm to +40.0dBm
0.715μV to 22.4V

Reference level accuracy : ±0.3dB 0 to -50dBm
±0.7dB +20 to -70dBm

Dynamic range
Average noise level : -121dBm + 1.55f(GHz)dB
(Resolution bandwidth 300Hz, video bandwidth 1Hz, input attenuator 0dB, frequency 1MHz)
Secondary, tertiary distortion
: ≤ -70dB -30dBm input
(Input attenuator 0dB, frequency 10MHz or more)
Frequency response : ±0.5dB 100kHz to 2GHz
±1.0dB 9kHz to 3.6GHz
(LOG mode, input attenuator 10dB, 20 to 30°C)
Residual response : ≤ -100dBm (Input attenuator 0dB, 50Ω terminator, frequency 500kHz or more)

Resolution bandwidth switching accuracy
: ±0.3dB (after automatic calibration)

Video filter : 1Hz to 1MHz (switched 1 to 10 steps)

(3) Sweep Specifications

Sweep time : 50msec to 1000sec and Manual sweeping

Sweep time accuracy : ≤ 3%

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

(4) Input Specifications

Input impedance : Approx. 50Ω
VSWR ≤ 1.5 (100kHz ≤ f ≤ 2GHz)
VSWR ≤ 2.0 (9kHz ≤ f ≤ 3.6GHz)
(Input attenuator ≥ 10dB)

Input connector : N connector

Maximum input level : +25dBm (input attenuator ≥ 30dB)
±50VDC max

Input attenuator : 0 to 50dB (10dB steps)

Input attenuator switching accuracy
: ±1.0dB (≤ 2.0GHz)
±1.5dB (≤ 3.6GHz)
(Input attenuator 10dB standard)

Detection mode : NORMAL, POSI, NEGA, SAMPLE

(5) Output Specifications

External memory function : IC memory card

Video output : Approx. 1Vp-p, approx 75Ω, composite

Sound monitor output : The AM and FM sound can be monitored with an approximately 8Ω earphone.

Power supply for probes : ±15V, 4-pin connector

Recorder output : X axis approx. -5 to +5V, output impedance approx. 10kΩ
Y axis approx. 0 to +4V, output impedance approx. 220Ω

GPIB data output/ Remote control : The built-in GPIB interface allows data output and remote control.

Direct plot : Also, the built-in GPIB interface allows an output of on-screen data to the R9833 plotter to have a hardcopy.

(6) Indication Specifications

Indicated items : Waveforms, setting conditions, grid, label

CRT display unit : 5.5 inch

Trace : Two screens of A and B

WRITE : Signal response from the analyzer is indicated at every sweeping.

VIEW : The WRITE waveform contained in the memory, or other contents in the memory are displayed.

MAX HOLD : Indication of the maximum signal level of repeat sweeping

AVG : Indication of the average of repeat sweeping

(7) General Specifications

Using ambient condition : Less than 0 to 50°C and 85%RH

Storage temperature range : -20 to +60°C

Power supply : The power voltage of the analyzer is set at the delivery according to the customer's ordering information.

Option No.	Standard	44
Line voltage (V)	90 to 132	198 to 250

48 to 66Hz

Power consumption : 220VA or less

Dimensions : Approx. 330(W) x 177(H) x 450(D) mm

Weight : Approx. up to 15kg

(8) Options and Accessories

Option

OPTION 04	Occupied bandwidth measurement/neighboring channel leakage power measurement
OPTION 15	Controller function (Parallel I/O, Serial I/O)
OPTION 12	Gated Sweep Measurement

Separate accessory

R3551	EMI preselector
R16211	Carring case
A02804	Front cover
A09505	Memory card (32k byte, 5 pieces)
A09506	Memory card (128k byte, 5 pieces)
A02034	Panel Mount Kits
A02255	Rack Mount Kits (JIS)
A02455	Rack Mount Kits (EIA)

2.4 R3361A Specifications

(1) Frequency Specifications

Measurable bandwidth : 9kHz to 2.6GHz

Center frequency setting increment
: 1Hz

Center frequency indication accuracy
: ±(3% of the span + center frequency x reference oscillator accuracy + 20Hz)
(span ≦ 2MHz)
±(2% of the span + center frequency x reference oscillator accuracy + 50kHz)
(span > 2MHz)

Reference oscillator : Internal or external input (10MHz)

Internal reference oscillator accuracy
: ±(2 x 10^{-8} per day)
±(1 x 10^{-7} per year)

Frequency span
LIN mode : 1kHz to 2.6GHz and 0
LOG mode : 1, 2, or 3 decades of span can be selected within the range from 10kHz to 1000MHz.

Frequency span accuracy
LIN mode : ±3% of the span (span > 2MHz)
±5% of the span (span ≦ 2MHz)

Frequency stability
Residual FM : 50kHz p-p or less (span > 10MHz)
2kHz p-p or less (10MHz ≧ span > 2MHz)
20Hz p-p or less (span ≦ 2MHz)
Frequency drift : 300Hz/min. or less (span ≦ 2MHz, at a constant temperature after an hour of warming up)

Side band noise : ≦-105dBc/Hz (20kHz offset)

Resolution
3dB bandwidth : 30Hz to 1MHz, switched 1 to 3 steps
6dB bandwidth : 200Hz, 9kHz, 120kHz
Selectivity : ≦15: 1 (60dB : 3dB)
Bandwidth accuracy : ±20%

Marker accuracy
  Normal mode : Center frequency indication accuracy + span accuracy
  Counter mode : Indicated frequency x reference oscillator accuracy ±1 count (Excepting TG mode)

(2) Amplitude Specifications

Amplitude measurement range
: -130dBm to +25dBm

Screen display range
  LOG mode : 120dB (10dB/div)
: 80dB (10dB/div)
: 50dB (5dB/div)
: 20dB (2dB/div)
: 10dB (1dB/div)
  LIN mode : 10div
  QP mode : 80dB (10dB/div)
Provided the measurement range is 70dB

Linearity display
  LOG mode : ±2.0dB/110dB, ±1.5dB/70dB, ±1.0dB/10dB, ±0.2dB/1dB
  LIN mode : ±5% of the fullscale
  QP mode : ±2.0dB/70dB, ±1.0dB/40dB

Reference level indication range
: -109.9dBm to +40.0dBm
0.715µV to 22.4V

Reference level accuracy : ±0.3dB 0 to -50dBm
±0.7dB +20 to -70dBm

Dynamic range
  Average noise level : -121dBm + 1.55f(GHz)dB (Resolution bandwidth 300Hz, video bandwidth 1Hz, input attenuator 0dB, frequency 1MHz)
  Secondary, tertiary distortion
: ≦ -70dB -30dBm input (Input attenuator 0dB, frequency 10MHz or more)
  Frequency response : ±0.5dB 100kHz to 2GHz
±1.0dB 9kHz to 2.6GHz
(LOG mode, input attenuator 10dB, 20 to 30°C)
  Residual response : ≦ -100dBm (Input attenuator 0dB, 50Ω terminator, frequency 500kHz or more)

Resolution bandwidth switching accuracy
: ±0.3dB (after automatic calibration)

Video filter : 1Hz to 1MHz (switched 1 to 10 steps)

(3) Sweep Specifications

Sweep time : 50msec to 1000sec and Manual sweeping

Sweep time accuracy : ≦ 3%

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

(4) Input Specifications

Input impedance : Approx. 50Ω
VSWR ≦ 1.5 (100kHz ≦f ≦ 2GHz)
VSWR ≦ 2.0 (9kHz ≦ f ≦ 2.6GHz)
(Input attenuator ≧ 10dB)

Input connector : N connector

Maximum input level : +25dBm (input attenuator ≧ 30dB)
±50VDC max

Input attenuator : 0 to 50dB (10dB steps)

Input attenuator switching accuracy
: ±1.0dB (≦2.0GHz)
±1.5dB (≦2.6GHz)
(Input attenuator 10dB standard)

Detection mode : NORMAL, POSI, NEGA, SAMPLE

(5) Tracking generator specifications

Frequency range : 9kHz to 2.6GHz

Output level range : 0dBm to -50dBm Setting can be done in steps of 1dB.

Output level accuracy : ±0.5dB (30MHz, -10dBm, +20 to +30°C)

Output level flatness : ±0.7dB (100kHz to 1.0GHz)
±2.0dB (9kHz to 2.6GHz)
(-10dBm output)

Output level switching accuracy
: ±1.0dB (9kHz to 1.0GHz)
±2.0dB (9kHz to 2.6GHz)
(-10dBm reference)

Output spuriousness : Harmonics spurious level ≦ -20dB
Non-harmonics spurious level ≦ -30dB
(Output level 0dBm)

TG leakage : ≦ -110dBm

Output impedance : Approx. 50Ω

Output VSWR : ≦ 1.5 (100kHz to 2.0GHz)
≦ 2.0 (9kHz to 2.6GHz)
(At ≦ -10dBm output)

Output connector : N-connector

(6) Output Specifications

External memory function: IC memory card

Video output : Approx. 1Vp-p, approx. 75Ω, composite

Sound monitor output : The AM and FM sound can be monitored with an approximately 8Ω earphone.

Power supply for probes : ±15V, 4-pin connector

Recorder output : X axis approx. -5 to +5V, output impedance approx. 10kΩ
Y axis approx. 0 to +4V, output impedance approx. 220Ω

GPIB data output/
Remote control : The built-in GPIB interface allows data output and remote control.

Direct plot : Also, the built-in GPIB interface allows an output of on-screen data to the R9833 plotter to have a hardcopy.

(7) Indication Specifications

Indicated items : Waveforms, setting conditions, grid, label

CRT display unit : 5.5 inch

Trace : Two screens of A and B

WRITE : Signal response from the analyzer is indicated at every sweeping.

VIEW : The WRITE waveform contained in the memory, or other contents in the memory are displayed.

MAX HOLD : Indication of maximum signal level during repeated sweeping

AVG : Indication of average signal level during repeated sweeping

(8) General Specifications

Using ambient condition : Less than 0 to 50°C and 85%RH

Storage temperature range : -20 to +60°C

Power supply : The power voltage of the analyzer is set at the delivery according to the customer's ordering information.

Option No.	Standard	44
Line voltage (V)	90 to 132	198 to 250

48 to 66Hz

Power consumption : 220VA or less

Dimensions : Approx. 330(W) x 177(H) x 450(D) mm

Weight : Approx. up to 17kg

(9) Options and Accessories

Option

OPTION 04	Occupied bandwidth measurement/neighboring channel leakage power measurement
OPTION 15	Controller function (Parallel I/O, Serial I/O)
OPTION 12	Gated Sweep Measurement

Separate accessory

R3551	EMI preselector
R16211	Carring case
A02804	Front cover
A09505	Memory card (32k byte, 5 pieces)
A09506	Memory card (128k byte, 5 pieces)
A02034	Panel Mount Kits
A02255	Rack Mount Kits (JIS)
A02455	Rack Mount Kits (EIA)

2.5 R3361AN Specifications

(1) Frequency Specifications

Measurable bandwidth : 9kHz to 2.6GHz

Center frequency setting increment
: 1Hz

Center frequency indication accuracy
: ±(3% of the span + center frequency x reference oscillator accuracy + 20Hz)
(span ≦ 2MHz)
±(2% of the span + center frequency x reference oscillator accuracy + 50kHz)
(span > 2MHz)

Reference oscillator : Internal or external input (10MHz)

Internal reference oscillator accuracy
: ±(2 x 10^{-8} per day)
±(1 x 10^{-7} per year)

Frequency span
LIN mode : 1kHz to 2.6GHz and 0
LOG mode : 1, 2, or 3 decades of span can be selected within the range from 10kHz to 1000MHz.

Frequency span accuracy
LIN mode : ±3% of the span (span > 2MHz)
±5% of the span (span ≦ 2MHz)

Frequency stability
Residual FM : 50kHz p-p or less (span > 10MHz)
2kHz p-p or less (10MHz ≧ span > 2MHz)
20Hz p-p or less (span ≦ 2MHz)
Frequency drift : 300Hz/min. or less (span ≦ 2MHz, at a constant temperature after an hour of warming up)

Side band noise : ≦-105dBc/Hz (20kHz offset)

Resolution
3dB bandwidth : 30Hz to 1MHz, switched 1 to 3 steps
6dB bandwidth : 200Hz, 9kHz, 120kHz
Selectivity : ≦15: 1 (60dB : 3dB)
Bandwidth accuracy : ±20%

Marker accuracy
Normal mode : Center frequency indication accuracy + span accuracy
Counter mode : Indicated frequency x reference oscillator accuracy ±1 count
(Excepting TG mode)

(2) Amplitude Specifications

Amplitude measurement range
: -19dBμ to +132dBμ

Screen display range
LOG mode : 120dB (10dB/div)
: 80dB (10dB/div)
: 50dB (5dB/div)
: 20dB (2dB/div)
: 10dB (1dB/div)
LIN mode : 10div
QP mode : 80dB (10dB/div)
Provided the measurement range is 70dB

Linearity display
LOG mode : ±2.0dB/110dB, ±1.5dB/70dB, ±1.0dB/10dB, ±0.2dB/1dB
LIN mode : ±5% of the fullscale
QP mode : ±2.0dB/70dB, ±1.0dB/40dB

Reference level indication range
: +0.1dBμ to +150dBμ
1.01μV to 31.6V

Reference level accuracy : ±0.3dB +110 to +60dBμ
±0.7dB +130 to +40dBμ

Dynamic range
Average noise level : -10dBμ + 1.55f(GHz)dB
(Resolution bandwidth 300Hz, video bandwidth 1Hz, input attenuator 0dB, frequency 1MHz)
Secondary, tertiary distortion
: ≤ -70dB -30dBm input
(Input attenuator 0dB, frequency 10MHz or more)
Frequency response : ±0.5dB 100kHz to 2GHz
±1.5dB 9kHz to 2.6GHz
(LOG mode, input attenuator 10dB, 20 to 30°C)
Residual response : ≤ +11dBμ (Input attenuator 0dB, 75Ω terminator, frequency 500kHz or more)

Resolution bandwidth switching accuracy
: ±0.3dB (after automatic calibration)

Video filter : 1Hz to 1MHz (switched 1 to 10 steps)

(3) Sweep Specifications

Sweep time : 50msec to 1000sec and Manual sweeping

Sweep time accuracy : ≤ 3%

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

(4) Input Specifications

Input impedance : Approx. 75Ω
VSWR ≤ 1.5 (100kHz ≤f ≤ 2GHz)
VSWR ≤ 2.0 (9kHz ≤ f ≤ 2.6GHz)
(Input attenuator ≥ 10dB)

Input connector : N connector

Maximum input level : +132dBμ (input attenuator ≥ 30dB)
±50VDC max

Input attenuator : 0 to 50dB (10dB steps)

Input attenuator switching accuracy
: ±1.0dB (≤2.0GHz)
±1.5dB (≤2.6GHz)
(Input attenuator 10dB standard)

Detection mode : NORMAL, POSI, NEGA, SAMPLE

(5) Tracking generator specifications

Frequency range : 9kHz to 2.6GHz

Output level range : 105dBμ to +55dBμ Setting can be done in steps of 1dB.

Output level accuracy : ±0.5dB (30MHz, +95dBμ, +20 to +30°C)

Output level flatness : ±0.7dB (100kHz to 1.0GHz)
±1.5dB (100kHz to 2.0GHz)
±2.0dB (9kHz to 2.6GHz)
(+95dBμ output)

Output level switching accuracy
: ±1.0dB (9kHz to 1.0GHz)
±2.0dB (9kHz to 2.6GHz)
(+95dBμ reference)

Output spuriousness : Harmonics spurious level ≤ -20dB
Non-harmonics spurious level ≤ -30dB
(Output level +105dBμ)

TG leakage : ≤ +1dBμ

Output impedance : Approx. 75Ω

Output VSWR : ≤ 1.5 (100kHz to 2.0GHz)
≤ 2.0 (9kHz to 2.6GHz)
(At ≤ +95dBμ output)

Output connector : N-connector

(6) Output Specifications

External memory function: IC memory card

Video output : Approx. 1Vp-p, approx. 75Ω, composite

Sound monitor output : The AM and FM sound can be monitored with an approximately 8Ω earphone.

Power supply for probes : ±15V, 4-pin connector

Recorder output : X axis approx. -5 to +5V, output impedance approx. 10kΩ
Y axis approx. 0 to +4V, output impedance approx. 220Ω

GPIB data output/
Remote control : The built-in GPIB interface allows data output and remote control.

Direct plot : Also, the built-in GPIB interface allows an output of on-screen data to the R9833 plotter to have a hardcopy.

(7) Indication Specifications

Indicated items : Waveforms, setting conditions, grid, label

CRT display unit : 5.5 inch

Trace : Two screens of A and B

WRITE : Signal response from the analyzer is indicated at every sweeping.

VIEW : The WRITE waveform contained in the memory, or other contents in the memory are displayed.

MAX HOLD : Indication of maximum signal level during repeated sweeping

AVG : Indication of average signal level during repeated sweeping

(8) General Specifications

Using ambient condition : Less than 0 to 50°C and 85%RH

Storage temperature range : -20 to +60°C

Power supply : The power voltage of the analyzer is set at the delivery according to the customer's ordering information.

Option No.	Standard	44
Line voltage (V)	90 to 132	198 to 250

48 to 66Hz

Power consumption : 220VA or less

Dimensions : Approx. 330(W) x 177(H) x 450(D) mm

Weight : Approx. up to 17kg

(9) Options and Accessories

Option

OPTION 04	Occupied bandwidth measurement/neighboring channel leakage power measurement
OPTION 15	Controller function (Parallel I/O, Serial I/O)
OPTION 12	Gated Sweep Measurement

Separate accessory

R3551	EMI preselector
R16211	Carring case
A02804	Front cover
A09505	Memory card (32k byte, 5 pieces)
A09506	Memory card (128k byte, 5 pieces)
A02034	Panel Mount Kits
A02255	Rack Mount Kits (JIS)
A02455	Rack Mount Kits (EIA)

2.6 R3361B Specifications

(1) Frequency Specifications

Measurable bandwidth : 9kHz to 3.6GHz

Center frequency setting increment
: 1Hz

Center frequency indication accuracy:
±(3% of the span + center frequency x reference oscillator accuracy + 20Hz)
(span ≤ 2MHz)
±(2% of the span + center frequency x reference oscillator accuracy + 50kHz)
(span > 2MHz)

Reference oscillator : Internal or external input (10Hz)

Internal reference oscillator accuracy
: ±(2 x 10^{-8} per day)
±(1 x 10^{-7} per year)

Frequency span
LIN mode : 1kHz to 3.6GHz and 0
LOG mode : 1, 2, or 3 decades of span can be selected within the range from 10kHz to 1000MHz.

Frequency span accuracy
LIN mode : ±3% of the span (span > 2MHz)
±5% of the span (span ≤ 2MHz)

Frequency stability
Residual FM : 50kHz p-p or less (span > 10MHz)
2kHz p-p or less (10MHz ≥ span > 2MHz)
20Hz p-p or less (span ≤ 2MHz)
Frequency drift : 300Hz/min. or less (span ≤ 2MHz, at a constant temperature after an hour of warming up)

Side band noise : ≤ -105dBc/Hz f ≤ 3.0GHz
≤ -101dBc/Hz f ≤ 3.6GHz
(20kHz offset)

Resolution
3dB bandwidth : 30Hz to 1MHz, switched 1 to 3 steps
6dB bandwidth : 200Hz, 9kHz, 120kHz
Selectivity : ≤ 15: 1 (60dB : 3dB)
Bandwidth accuracy : ±20%

Marker accuracy
Normal mode : Center frequency indication accuracy + span accuracy
Counter mode : Indicated frequency x reference oscillator accuracy ±1 count (Excepting TG mode)

(2) Amplitude Specifications

Amplitude measurement range
: -130dBm to +25dBm

Screen display range
LOG mode : 120dB (10dB/div)
: 80dB (10dB/div)
: 50dB (5dB/div)
: 20dB (2dB/div)
: 10dB (1dB/div)
LIN mode : 10div
QP mode : 80dB (10dB/div)
Provided the measurement range is 70dB

Linearity display
LOG mode : ±2.0dB/110dB, ±1.5dB/70dB, ±1.0dB/10dB, ±0.2dB/1dB
LIN mode : ±5% of the fullscale
QP mode : ±2.0dB/70dB, ±1.0dB/40dB

Reference level indication range
: -109.9dBm to +40.0dBm
0.715μV to 22.4V

Reference level accuracy : ±0.3dB 0 to -50dBm
±0.7dB +20 to -70dBm

Dynamic range
Average noise level : -121dBm + 1.55f(GHz)dB (Resolution bandwidth 300Hz, video bandwidth 1Hz, input attenuator 0dB, frequency 1MHz)
Secondary, tertiary distortion
: ≦ -70dB -30dBm input (Input attenuator 0dB, frequency 10MHz or more)
Frequency response : ±0.5dB (100kHz to 2GHz)
±1.0dB (9kHz to 3.6GHz)
(LOG mode, input attenuator 10dB, 20 to 30°C)
Residual response : ≦ -100dBm (Input attenuator 0dB, 50Ω terminator, frequency 500kHz or more)

Resolution bandwidth switching accuracy
: ±0.3dB (after automatic calibration)

Video filter : 1Hz to 1MHz (switched 1 to 10 steps)

(3) Sweep Specifications

Sweep time : 50msec to 1000sec and Manual sweeping

Sweep time accuracy : ≤ 3%

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

(4) Input Specifications

Input impedance : Approx. 50Ω
: VSWR ≤ 1.5 100kHz ≤ f ≤ 2GHz
: VSWR ≤ 2.0 9kHz ≤ f ≤ 3.6GHz
: Input attenuator ≥ 10dB reference

Input connector : N connector

Maximum input level : +25dBm (input attenuator ≥ 30dB)
±50VDC max

Input attenuator : 0 to 50dB (10dB steps)

Input attenuator switching accuracy
: ±1.0dB (≤2.0GHz)
±1.5dB (≤3.6GHz)
Input attenuator 10dB standard

Detection mode : NORMAL, POSI, NEGA, SAMPLE

(5) Tracking generator specifications

Frequency range : 9kHz to 3.6GHz

Output level range : 0dBm to -50dBm Setting can be done in steps of 1dB.

Output level accuracy : ±0.5dB (30MHz, -10dBm, +20 to +30°C)

Output level flatness : ±0.7dB (100kHz to 1.0GHz)
±2.0dB (9kHz to 3.6GHz)
(-10dBm output)

Output level switching accuracy
: ±1.0dB (9kHz to 1.0GHz)
±2.0dB (9kHz to 2.6GHz)
±3.0dB (9kHz to 3.6GHz)
(-10dBm reference)

Output spuriousness : Harmonics spurious level ≤ -20dB
Non-harmonics spurious level ≤ -30dB
(Output level 0dBm)

TG leakage : ≤ -110dBm (frequency ≤ 3.0GHz)
: ≤ -100dBm (frequency ≤ 3.6GHz)

Output impedance : Approx. 50Ω

Output VSWR : ≤ ±1.5 (100kHz to 2.0GHz)
≤ ±2.0 (9kHz to 3.6GHz)
(At ≤ -10dBm output)

Output connector : N-connector

(6) Output Specifications

External memory function: IC memory card

Video output : Approx. 1Vp-p, approx. 75Ω, composite

Sound monitor output : The AM and FM sound can be monitored with an approximately 8Ω earphone.

Power supply for probes : ±15V, 4-pin connector

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