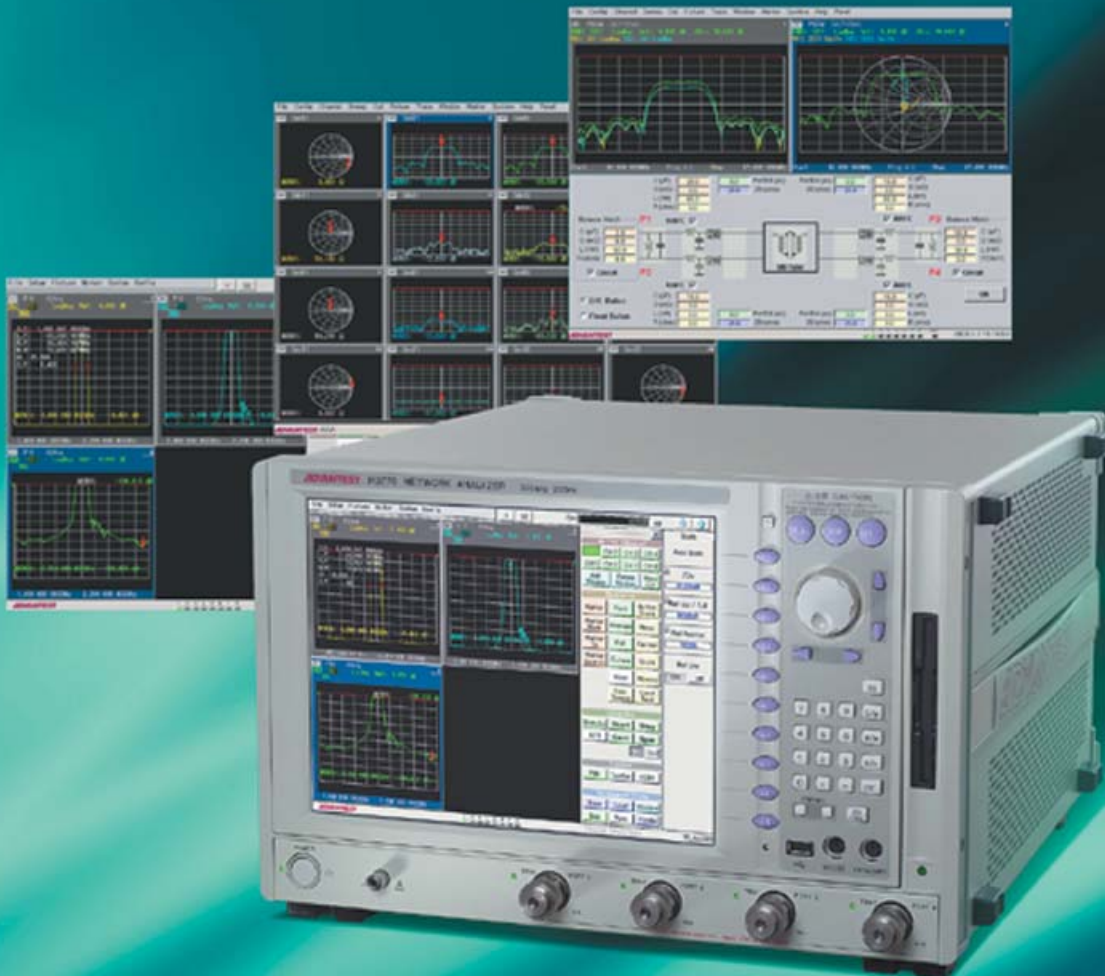




R3860A/3768/3770 Data Sheet



Specifications

The item with specification of 8 GHz model is applied to an R3860A 8 GHz model and R3768.

The item with specification of 20 GHz model is applied to an R3860A 20 GHz model and R3770.

Measurement functions

Measurement channels:	16
Display window:	16
Trace:	16 traces/channel (Max. 16 traces: Simultaneous display)
Measurement parameter	
2-port model:	S11, S21, S12, S22
3-port model:	S11, S22, S33, S21, S12, S31, S13, S23, S32
4-port model:	S11, S22, S33, S44, S21, S31, S41, S12, S32, S42, S13, S23, S43, S14, S24, S34
	Conversion to impedance (Z) and admittance (Y) is possible by the parameter conversion function.
Measurement format	
Rectangular-coordinates display:	Amplitude (linear/log), Phase, Group-delay, VSWR, Complex number (real/imaginary)
Smith chart:	Marker reading is linear/logarithmic amplitude, Phase, and a complex number (real/imaginary) R + jX, G + jB
Polar coordinates display:	Marker reading is linear/logarithmic amplitude, Phase, and a complex number (real/imaginary)

Signal source characteristics

Frequency	
Range:	8 GHz model: 300 kHz to 8 GHz 20 GHz model: 300 kHz to 20 GHz
Set-up resolution:	1 Hz
Accuracy:	±10 ppm (23 ±5°C)
Temperature stability:	±15 ppm (5 to 40°C, Typ.)
Passage of time:	±3 ppm/year (Typ.)

Output power

Range	
8 GHz 2-port model:	-9 dBm to +11 dBm (300 kHz to 0.5 GHz) -7 dBm to +13 dBm (0.5 GHz to 4.0 GHz) -10 dBm to +10 dBm (4.0 GHz to 6.0 GHz) -12 dBm to +8 dBm (6.0 GHz to 8.0 GHz)
8 GHz 2-port model, Output power extension (Electronic formula output ATT.):	-74 dBm to +6 dBm (300 kHz to 0.5 GHz) -72 dBm to +8 dBm (0.5 GHz to 4.0 GHz) -75 dBm to +5 dBm (4.0 GHz to 6.0 GHz) -77 dBm to +3 dBm (6.0 GHz to 8.0 GHz)
8 GHz 3/4-port model:	-9 dBm to +11 dBm (300 kHz to 0.5 GHz) -7 dBm to +13 dBm (0.5 GHz to 4.0 GHz) -12 dBm to +8 dBm (4.0 GHz to 6.0 GHz) -14 dBm to +6 dBm (6.0 GHz to 8.0 GHz)
8 GHz 3/4-port model, Output power extension (Electronic formula output ATT.):	-74 dBm to +6 dBm (300 kHz to 0.5 GHz) -72 dBm to +8 dBm (0.5 GHz to 4.0 GHz) -77 dBm to +3 dBm (4.0 GHz to 6.0 GHz) -79 dBm to +1 dBm (6.0 GHz to 8.0 GHz)

20 GHz 2-port model:	-10 dBm to +10 dBm (300 kHz to 4.0 GHz) -13 dBm to +7 dBm (4.0 GHz to 6.0 GHz) -15 dBm to +5 dBm (6.0 GHz to 8.0 GHz) -19 dBm to +1 dBm (8.0 GHz to 11 GHz) -20 dBm to 0 dBm (11 GHz to 15 GHz) -22 dBm to -2 dBm (15 GHz to 20 GHz)
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20 GHz 3/4-port model:	-12 dBm to +8 dBm (300 kHz to 4.0 GHz) -15 dBm to +5 dBm (4.0 GHz to 6.0 GHz) -17 dBm to +3 dBm (6.0 GHz to 8.0 GHz) -22 dBm to -2 dBm (8.0 GHz to 11 GHz) -23 dBm to -3 dBm (11 GHz to 15 GHz) -25 dBm to -5 dBm (15 GHz to 20 GHz)
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2nd signal source	
8 GHz model:	-5 dBm to +15 dBm (300 kHz to 0.5 GHz) -2 dBm to +18 dBm (0.5 GHz to 4.0 GHz) -3 dBm to +17 dBm (4.0 GHz to 6.0 GHz) -4 dBm to +16 dBm (6.0 GHz to 8.0 GHz)

2nd signal source	
8 GHz model, Output power extension (Electronic formula output ATT.):	-70 dBm to +10 dBm (300 kHz to 0.5 GHz) -67 dBm to +13 dBm (0.5 GHz to 4.0 GHz) -68 dBm to +12 dBm (4.0 GHz to 6.0 GHz) -69 dBm to +11 dBm (6.0 GHz to 8.0 GHz)

2nd signal source	
20 GHz model:	-6 dBm to +14 dBm (300 kHz to 2.0 GHz) -7 dBm to +13 dBm (2.0 GHz to 4.0 GHz) -8 dBm to +12 dBm (4.0 GHz to 6.0 GHz) -9 dBm to +11 dBm (6.0 GHz to 8.0 GHz) -12 dBm to +8 dBm (8.0 GHz to 20 GHz)

Resolution:	0.01 dB
Accuracy:	±0.5 dB (50 MHz, 0 dBm, 23 ± 5°C at TEST PORT1)
Flatness:	2.0 dBp-p (23 ± 5°C, at TEST PORT1)
Linearity:	±0.7 dB (23 ± 5°C)

Sweep functions	
Sweep type:	Linear, Log, Program, Power
Sweep time:	5 µs/point (RBW 400 kHz)
Number of points:	3 to 1601 points
Sweep trigger:	Continuation, single, hold, external

System characteristics

System dynamic range:	At the time of isolation calibration execution, Averages: 8 times, RBW 10 Hz (Typ.)
8 GHz model:	-123 dB (300 kHz to 700 MHz) -125 dB (700 MHz to 3.8 GHz) -124 dB (3.8 GHz to 6.0 GHz) -123 dB (6.0 GHz to 8.0 GHz)
20 GHz 2-port model:	-123 dB (300 kHz to 700 MHz) -125 dB (700 MHz to 8.0 GHz) -117 dB (8.0 GHz to 20 GHz)
20 GHz 3/4-port model:	-123dB (300 kHz to 700 MHz) -125 dB (700 MHz to 8.0 GHz) -113 dB (8.0 GHz to 20 GHz)

8 GHz model

Test port characteristics:	Full calibration execution time (Typ.) with N type calibration kit
Load match:	40 dB (300 kHz to 1 GHz) 39 dB (1 GHz to 2 GHz) 33 dB (2 GHz to 4 GHz) 29 dB (4 GHz to 8 GHz)
Source match:	40 dB (300 kHz to 1 GHz) 35 dB (1 GHz to 2 GHz) 30 dB (2 GHz to 3 GHz) 29 dB (3 GHz to 4 GHz) 26 dB (4 GHz to 6 GHz) 25 dB (6 GHz to 8 GHz)
Directivity:	40 dB (300 kHz to 2 GHz) 34 dB (2 GHz to 4 GHz) 30 dB (4 GHz to 8 GHz)
Reflective tracking:	0.011 dB (300 kHz to 2 GHz) 0.014 dB (2 GHz to 4 GHz) 0.019 dB (4 GHz to 6 GHz) 0.020 dB (6 GHz to 8 GHz)
Transmission tracking:	0.017 dB (300 kHz to 1 GHz) 0.014 dB (1 GHz to 2 GHz) 0.051 dB (2 GHz to 3 GHz) 0.056 dB (3 GHz to 4 GHz) 0.105 dB (4 GHz to 6 GHz) 0.119 dB (6 GHz to 8 GHz)

20 GHz model

Test port characteristics:	Full calibration execution time (Typ.) with 3.5 mm calibration kit
Load match:	40 dB (300 kHz to 1 GHz) 39 dB (1 GHz to 3 GHz) 35 dB (3 GHz to 4 GHz) 34 dB (4 GHz to 6 GHz) 30 dB (6 GHz to 8 GHz) 28 dB (8 GHz to 20 GHz)
Source match:	40 dB (300 kHz to 1 GHz) 37 dB (1 GHz to 2 GHz) 36 dB (2 GHz to 3 GHz) 32 dB (3 GHz to 4 GHz) 31 dB (4 GHz to 6 GHz) 27 dB (6 GHz to 8 GHz) 23 dB (8 GHz to 20 GHz)
Directivity:	40 dB (300 kHz to 3 GHz) 36 dB (3 GHz to 6 GHz) 31 dB (6 GHz to 20 GHz)
Reflective tracking:	0.006 dB (300 kHz to 3 GHz) 0.008 dB (3 GHz to 6 GHz) 0.012 dB (6 GHz to 20 GHz)
Transmission tracking:	0.017 dB (300 kHz to 1 GHz) 0.012 dB (1 GHz to 2 GHz) 0.027 dB (2 GHz to 3 GHz) 0.059 dB (3 GHz to 6 GHz) 0.089 dB (6 GHz to 8 GHz) 0.176 dB (8 GHz to 20 GHz)

Receiving part characteristics

Resolution bandwidth:	400 kHz, 200 kHz, 150 kHz, 100 kHz 100 kHz to 10 Hz (1, 1.5, 2, 3, 4, 5, 7 steps)
Stability	
Trace noise:	0.0025 dBrms (300 kHz to 10 MHz, RBW 1 kHz Typ.) 0.0025 dBrms (10 MHz to 990 MHz, RBW 100 kHz Typ.) 0.005 dBrms (990 MHz to 1.98 GHz, RBW 100 kHz Typ.) 0.010 dBrms (1.98 GHz to 3.96 GHz, RBW 100 kHz Typ.) 0.020 dBrms (3.96 GHz to 8.0 GHz, RBW 100 kHz Typ.) 0.040 dBrms (8 GHz to 15.84 GHz, RBW 100 kHz Typ.) 0.080 dBrms (15.84 GHz to 20 GHz, RBW 100 kHz Typ.)
Temperature stability:	0.01 dB/°C (300 kHz to 2.6 GHz, Typ.) 0.02 dB/°C (2.6 GHz to 8.0 GHz, Typ.) 0.03 dB/°C (8.0 GHz to 20 GHz, Typ.)
Passage time stability:	0.005 dB/week (Typ.)
Amplitude characteristics	
Amplitude resolution:	0.001 dB
Dynamic accuracy:	Maximum input to basic -20 dB input ±0.20 dB (0 to -10 dB, 300 kHz to 4 GHz) ±0.30 dB (0 to -10 dB, 4 GHz to 8 GHz) ±0.40 dB (0 to -10 dB, 8 GHz to 20 GHz) ±0.05 dB (-10 to -50 dB) ±0.10 dB (-50 to -60 dB) ±0.40 dB (-60 to -70 dB) ±1.00 dB (-70 to -90 dB)
Phase characteristics	
Phase resolution:	0.01°
Dynamic accuracy:	Maximum input to basic -20 dB input ±2.0° (0 to -10 dB, 300 kHz to 4 GHz) ±3.0° (0 to -10 dB, 4 GHz to 8 GHz) ±4.0° (0 to -10 dB, 8 GHz to 20 GHz) ±0.3° (-10 to -50 dB) ±0.4° (-50 to -60 dB) ±1.5° (-60 to -70 dB) ±4.0° (-70 to -80 dB) ±8.0° (-80 to -90 dB)
Group delay characteristics:	The group delay is calculated using the following formula: $\frac{\Delta\Phi}{(360 \times \Delta f)}$ ΔΦ: Phase difference Δf: Frequency difference (Aperture frequency)
Group delay time resolution:	1 pS
Aperture frequency:	[100/(measurement point - 1)] x [2% to 50%] of setting frequency range can be set
Accuracy:	Phase accuracy $\frac{360 \times \text{Aperture frequency (Hz)}}{\text{Phase accuracy}}$

Test port characteristics

Load match:	No system compensation 14 dB (300 kHz to 1 MHz) 20 dB (1 MHz to 1 GHz) 18 dB (1 GHz to 4.0 GHz) 12 dB (4.0 GHz to 8.0 GHz) 10 dB (8 GHz to 20 GHz)
Source match:	No system compensation 16 dB (300 kHz to 2.6 GHz) 14 dB (2.6 GHz to 4.0 GHz) 12 dB (4.0 GHz to 8.0 GHz) 8 dB (8 GHz to 20 GHz)
Directivity:	No system compensation 13 dB (300 kHz to 500 MHz) 23 dB (500 MHz to 1.2 GHz) 20 dB (1.2 GHz to 4.5 GHz) 12 dB (4.5 GHz to 18 GHz) 8 dB (18 GHz to 20 GHz)
Cross talk:	At Maximum output power 110 dB (300 kHz to 700 MHz) 120 dB (700 MHz to 4 GHz) 110 dB (4 GHz to 8 GHz) 105 dB (8 GHz to 16 GHz) 100 dB (16 GHz to 20 GHz)
Maximum input level:	+10 dBm (8 GHz model) +1 dBm (20 GHz model)
Noise level:	300 kHz to 10 MHz: RBW 1 kHz, more than 10 MHz: RBW 100 kHz. From the maximum input level.
8 GHz model:	-85 dB (300 kHz to 700 MHz) -90 dB (700 MHz to 8 GHz)
20 GHz model:	-78 dB (300 kHz to 700 MHz) -90 dB (700 MHz to 8 GHz) -75 dB (8 GHz to 20 GHz)
Input destructive level:	+21 dBm, 16 Vdc
Test port connector:	8 GHz model: N-connector (female) 20 GHz model: 3.5 mm connector (male)

Other functions

Display part	
Display:	12.1 inches SVGA TFT color liquid crystal display
Back light:	Luminosity half-life 40000H (Typ.)
Error compensation:	Normalize, 1-port calibration, 2-port calibration, 3-port calibration Averaging and smoothing Electric length compensation, phase offset compensation
Marker functions:	Multi-marker 16 pieces Δ marker, Search function, Marker → Function
Limit line functions:	Set-up is possible a maximum of 32 segments. PASS/FAIL display function
Save load function:	Floppy disk or HDD
Program execution environment:	Execution form by Visual Basic etc. can be operated.
FDD function:	MS-DOS FAT format 2 modes correspondence (DD 720 KB, HD 1.4 MB)

Connection with external apparatus

External display signal:	15-pin D-SUB connector (SVGA)
GPiB:	IEEE488.1, IEEE488.2 conformity
Parallel Port:	TTL level Output port (8 bits x 2-port) In/Out port (4 bits x 2-port) Accessories serial I/O
Serial port:	
Printer Port:	IEEE-1284-1994 conformity
LAN Port:	10 Base-T
Keyboard:	PS/2 101/106 keyboard
Mouse:	PS/2 mouse
External standard frequency input:	1 MHz, 2 MHz, 5 MHz, 10 MHz (±10 ppm) 0 dBm (50Ω)
Probe power:	±15 V ± 0.5 V, 300 mA

General specifications

Operating temperature:	Temperature range: +5 to +40°C Relative humidity 80% or less (No condensation)
Storage temperature:	-20 to +60°C
Power supply:	100 to 120 VAC, 50/60 Hz 220 to 240 VAC, 50/60 Hz (100 VAC system and 200 VAC system are switched automatically)
Dimensions	
R3860A:	Approx. 424 (W) x 266 (H) x 530 (D) mm
R3768/3770:	Approx. 424 (W) x 266 (H) x 450 (D) mm
Mass	
R3860A:	32 kg or less
R3768/3770:	28 kg or less
Power consumption:	500 VA or less
Accessories:	Operation manual, power supply cable

Please be sure to read the product manual thoroughly before using the products.
Specifications may change without notification.