ADVANTEST

R3754A/3754B
New Network Analyzer

New Network Analyzer Released

with Exceptional Cost/Performance!

R3754A/3754B

As reduced cost, downsizing, precision improvement, and power consumption reduction have advanced for information communication equipment and multimedia equipment, the high-frequency components used for them require new technology.

For test inspection of these parts, a unit capable of high accuracy, high reliability measurements is necessary to enable throughput improvement, price reduction, automation, including the test fixture, and basic performance improvement.

The Advantest network analyzer provides test cost reduction as well as offering the measurement solution. The R3754 Series is a high performance network analyzer with greatly enhanced functional performance and a low price.

Optimization for Each Application

Optimization has been made by setting the measurement frequency range to the limited bandwidth of 10 kHz to 150 MHz. The R3754 Series can be used for adjustment and test in the production and inspection processes of crystal, ceramic, LC, and sensor parts. Two types of display units are selectable according to the application. It is recommended to use the R3754A with monochrome display for the pre-process and the R3754B with color display for shipment inspection and receiving inspection.

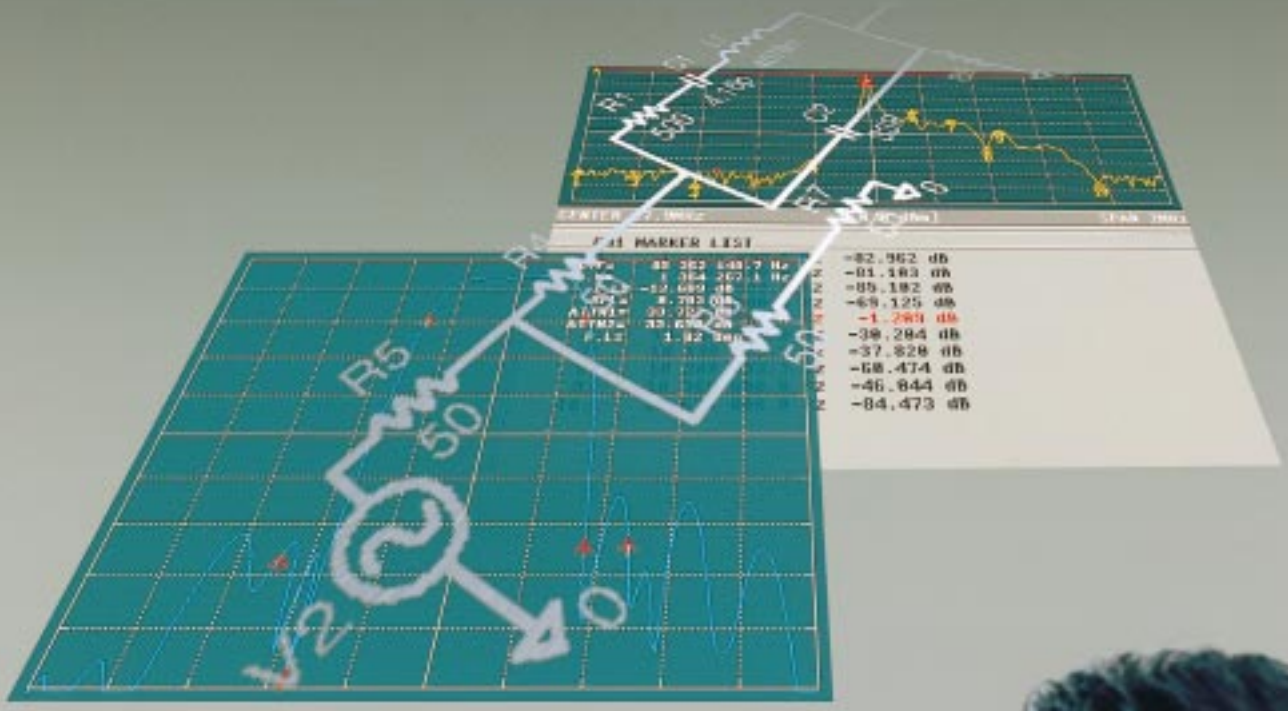
Doubled Maximum Sweep Speed and High Throughput

Advantest in the R3754 has doubled the sweep speed in comparison to our previous model. The newly developed measurement algorithm greatly improves the total throughput. The improved noise floor and increased maximum input level create a measurement dynamic range of 127 dB (a 13 dB increased over the previous model). It is possible to measure the high attenuation filter at high speed. A 15 dB improvement in the C/N suppress the trace noise and enhance the throughput and basic performance. Fluctuation in the trace has been reduced to 1/5 the amount in previous instruments. The required time to achieve the specification-guaranteed stabilization from power-on has also been reduced to 1/3.

Self-diagnostic Function Minimizing Down Time

The attitude of Advantest is: if the unit should have a fault, how is it possible to reduce the down time of the production line? One of the answers is the self-diagnostic function. The R3754 series is loaded with a powerful self-diagnostic function. Advantest's position is that in the event that any failure occurs, downtime must be minimized.

AMAZING COST/PERFORMANCE ACHIEVED



Sweep Speed 0.05 ms/point and Dynamic Range 127 dB Achieved

■ Excellent basic performance (1)

Sweep time: 50 μs/point
(2 times faster in comparison to previous Advantest model)

RBW step value: 27 steps
(3 times more in comparison to previous Advantest model)

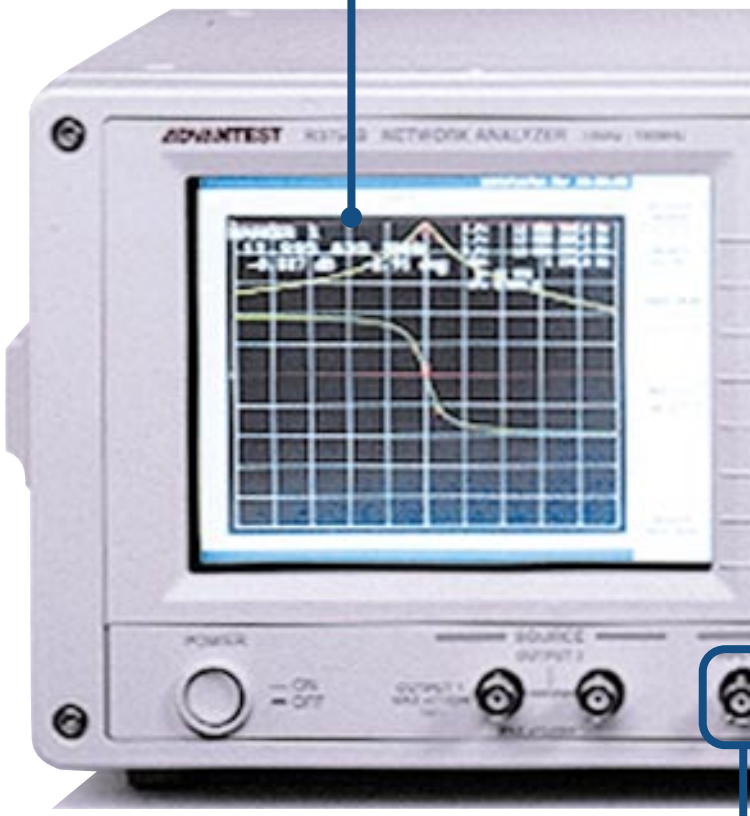
■ Excellent basic performance (2)

Noise floor: -122dBm
(7 dB improved in comparison to previous Advantest model)

Trace noise: typ. -0.0015dB
(2 times improved in comparison to previous Advantest model)

Stability: typ. -0.02dB/˚C
(2 times improved in comparison to previous Advantest model)

6.5-inch color TFT LCD
* 5-inch monochrome LCD is used in type A



R3754B

R3754A
(5-inch STN monochrome LCD)

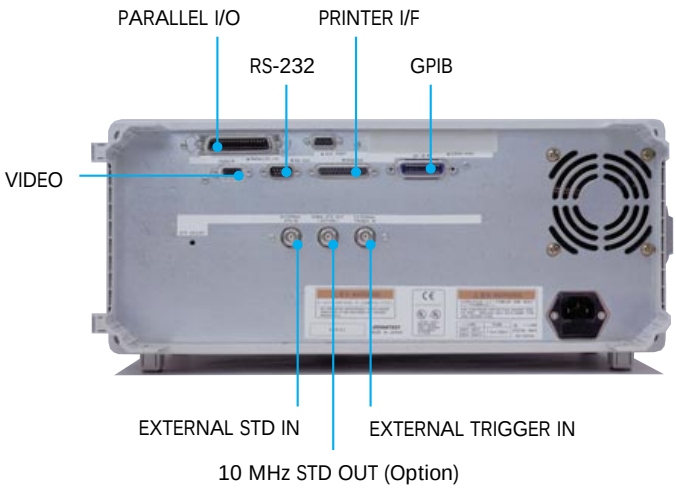
3 model FDD
For storage of waveform data and condition settings

BASIC controller function
- Built-in program editor
- Uses IBM-PC/AT compatible keyboards
- Built-in functions for high speed analysis

Self-diagnostic function
Specifies the fault location minimizing down time if there is a problem.

Single key analysis functions
- Filter analysis
- Equivalent circuit constant calculation
- RLA drive level measurement (option)

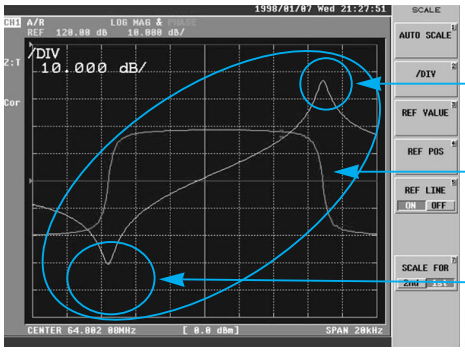
Input channels for various purposes
Up to three input channels are provided depending on the requirement.
The optimum channel count can be selected.
(2- or 3-channel input is optional.)



REAR PANEL

Excellent Basic Performance

Basic Performance (1)



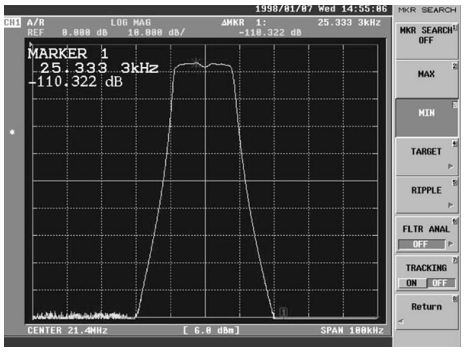
[Oscillator measurement]

Sweep time: 50 µs/point
(2 times faster in comparison by Advantest)

No. of RBW variables: 27 steps
(3 times more in comparison by Advantest)

The basic performance relating to the measurement speed has been greatly improved. The measurement conditions suitable for the device are further optimized to achieve compatibility of high-speed and high-stability measurements.

Basic Performance (2)



[Filter measurement]

Noise floor: -122 dBm
(7 dB improved in comparison to previous Advantest model)

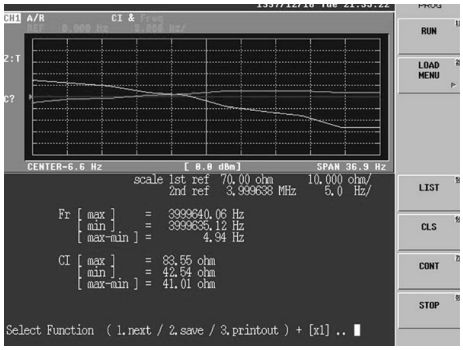
Trace noise: typ. -0.0015 dB
(2 times improved in comparison to previous Advantest model)

Stability: typ. -0.02 dB˚C
(2 times improved in comparison to previous Advantest model)

Measurement stability has been greatly improved.
A device with severe measurement conditions can be stably measured without decreasing the measurement speed.

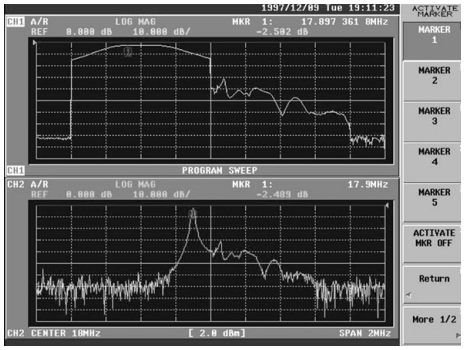
Measurement Efficiency Improvement by New Functions

RLA drive level measurement (Option 71)



The drive level measurement function in the Reactance Linear Approximation method (RLA method) allows high-speed, high-accuracy measurement of the crystal impedance and the resonance frequency fluctuation at only two points per level. This function enables quantum improvement of the throughput in the drive level measurement process. (Option 71)

Gate ON/OFF comparison measurement



The filter analysis function has been enhanced and the operability has been improved.

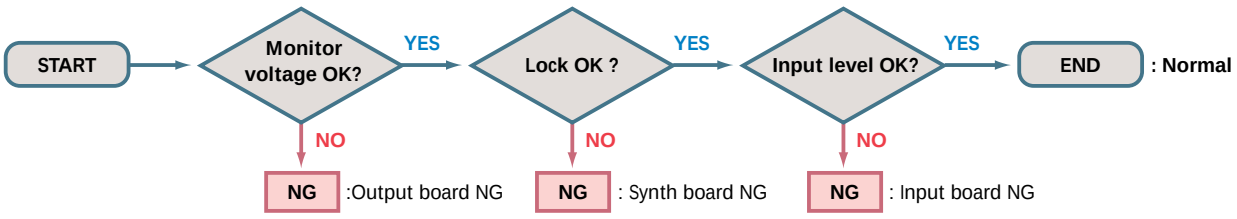
Gate function: Analyzes the characteristics with multiple reflection canceled.

Phase linearity: Phase linearity essential for the communication interface filter characteristics can be analyzed at high speed.

CDMA IF analysis: CDMA (IS-95) filters can be analyzed directly.

TDR analysis: Multiple reflection can be analyzed on the time axis. (Option 70)

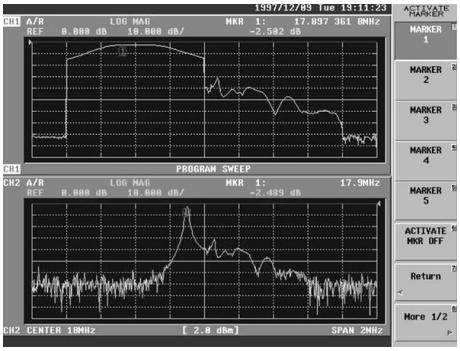
Self-diagnostic Function



On the production line, equipment failures are grave problems.
Advantest offers its products with warranties which take all possible measures to ensure product quality. However, if an equipment failure occurs, it must be remedied as soon as possible. To reduce the recovery time, the R3754 series comes with a self-diagnostic function which allows you to minimize the downtime through quick location of failures.

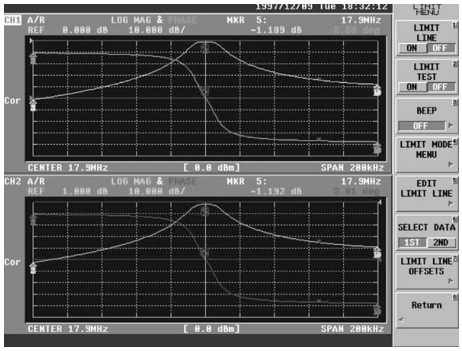
Suggestion of Test Cost Reduction by Speed Increase

Programmed sweep/segment-specified sweep



This function enables setting of optimal measurement conditions by allowing the segmentation of the swept frequency range. Up to 30 segments can be set for the span that include the frequency range, output level, and interface bandwidth, enhancing measurements for each device type. With use of the application software, it is possible to input the settings to commercially-available graphics software and perform the setup from the FD.

2-device simultaneous measurement



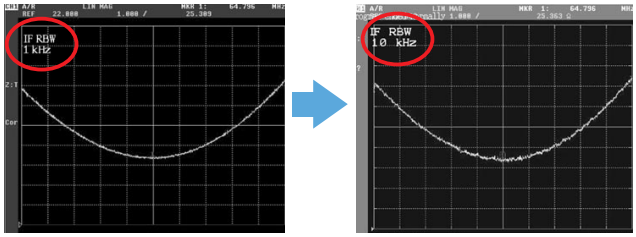
With use of the 3-channel input model (Option 11), the 2-channel/4-trace function enables 2-device simultaneous measurement. This improves the total throughput.

High-speed Measurement (1)

Data transfer duration
(repetition of frequency setting, sweep, and data transfer)

Sweep time is improved to 50µs/point, two times faster (compared by Advantest). The data transfer duration is shortened to greatly improve the system throughput.

High-speed Measurement (2)



Conventional
RBW 1kHz 1ms/point

R3754
RBW 10kHz 0.1ms/point

Sweep time reduction and measurement stability improvement are a trade-off relationship. Basic performance improvement can reduce the sweep time with stability equivalent to the conventional.

Extended Functions Suitable for System Use

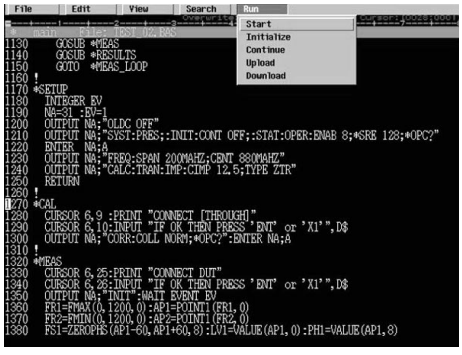
Design optimum for automation

R2131
Crystal Test
Handler

Design has been made with assumption of incorporating an automated unit. It is possible to easily realize compatibility with any type of automation.

Parallel I/O (option) GPIB (standard)
Printer (standard) VGA monitor output (standard)
RS232 (standard)

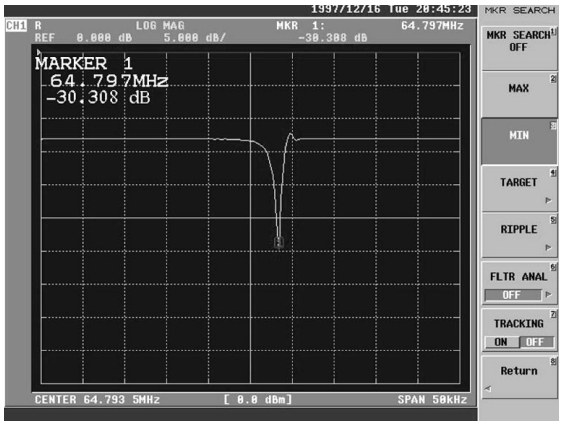
BASIC controller function/program editor



Optimum to the system use because it is possible to establish an automated adjustment/inspection system without using an external computer. It is possible to use the built-in programming editor for programming as well as using a PC in the MS-DOS environment.

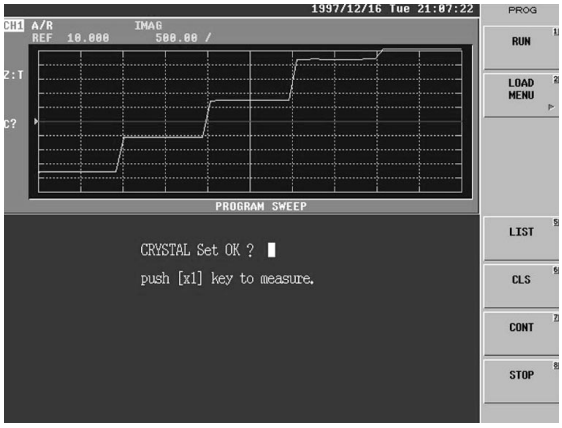
Offers Optimal features for Measurements at Pre-process

- **High-speed, high-accuracy measurement with low noise (-122 dBm)**
  Since non-contact measurements are made for blank selection, a crystal impedance (CI) increased, so that the influence of noise is readily appearant. It is then essential that the measuring unit has a low noise floor.
- **High-speed fr measurement by the synchronous high-speed sweep search function**
  The search execution function, which is synchronous with the sweep, further increases the measurement speed.

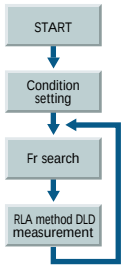


Drive Level Characteristic Measurement (Option 71)

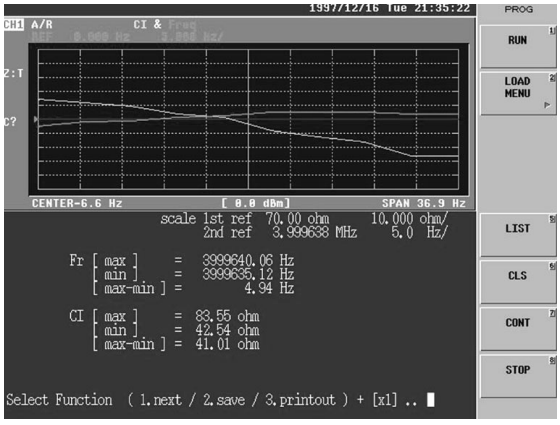
- **High-speed and high-accuracy measurement through the RLA-based DLD measurement functions**
  The Advantest method implements high-accuracy measurement without search error. The measurement range is from 0.5 nW to 500 µW (varying with CI). Optimum measurement conditions are set according to the device type, improving the measurement speed.



High-speed fr search waveform

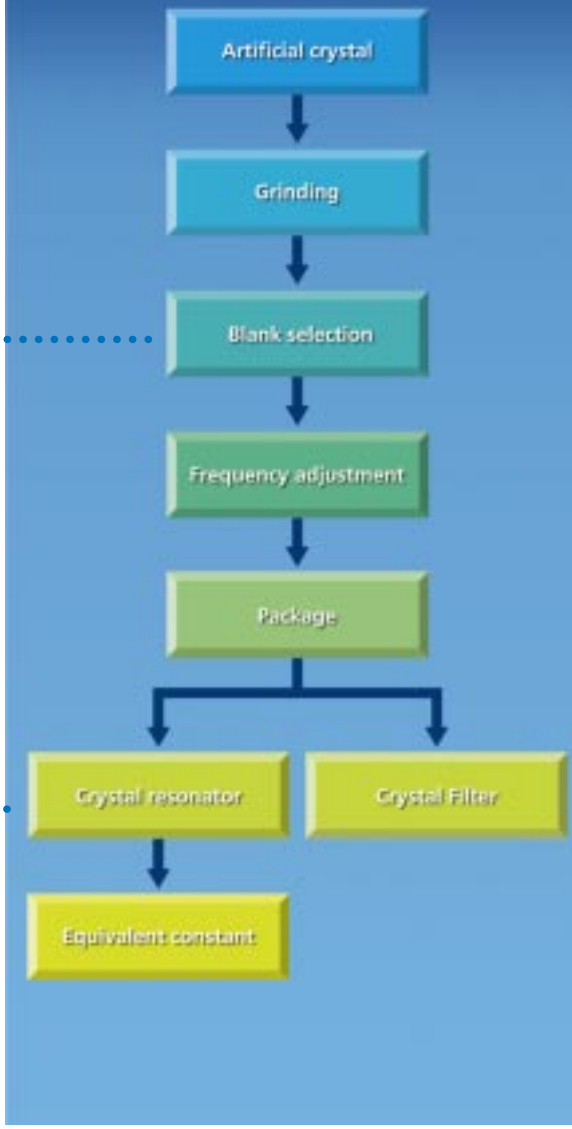


High-speed fr search applies the precise drive level resulting in high-speed measurement.

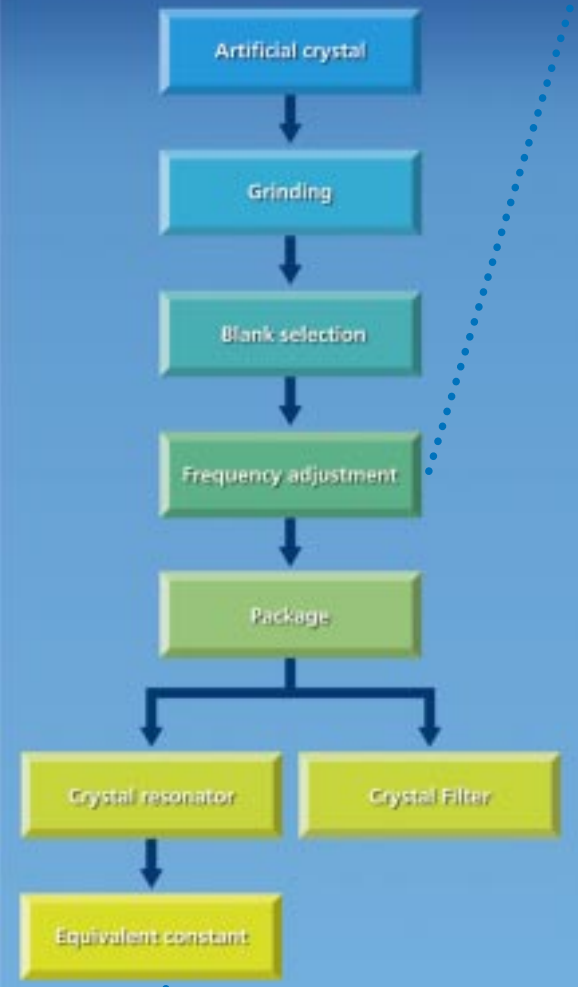


Measurement results are displayed as waveforms, enabling detailed analysis.

Crystal device manufacturing process and network analyzer application



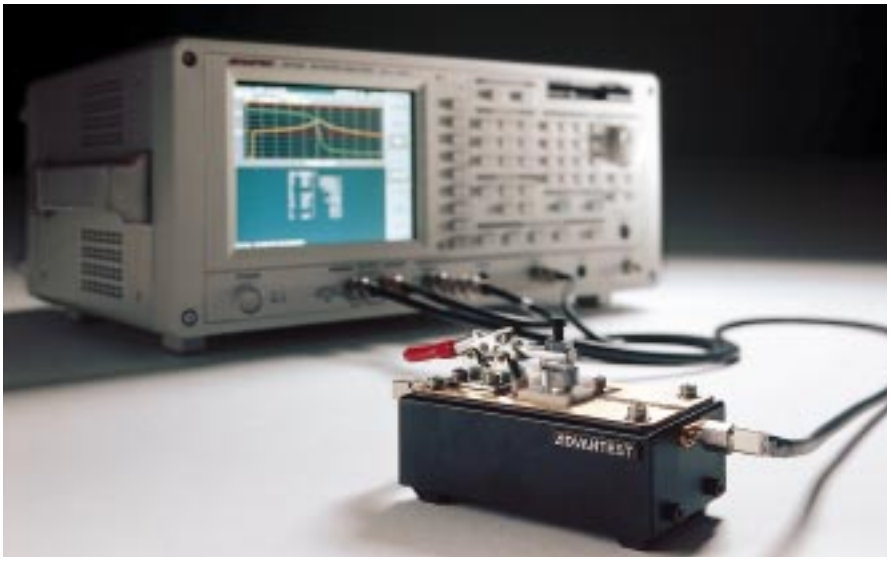
Crystal device manufacturing process and network analyzer application



Frequency Adjustment (Vacuum Evaporation)

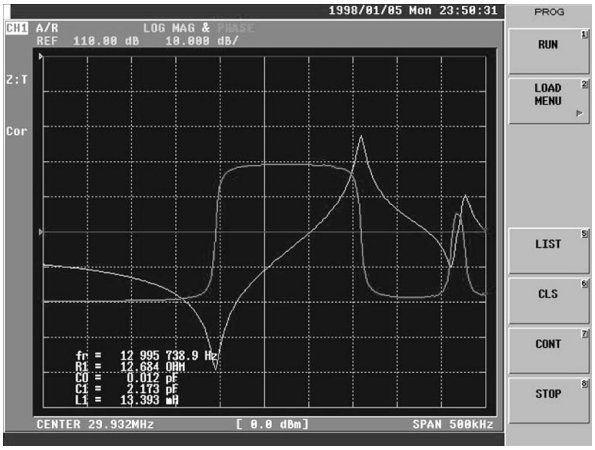
- **Frequency is adjusted at high speed with high precision by Advantest's frequency adjustment function.**

* It is possible to update vacuum evaporators with a network analyzer. Contact Advantest for more information.



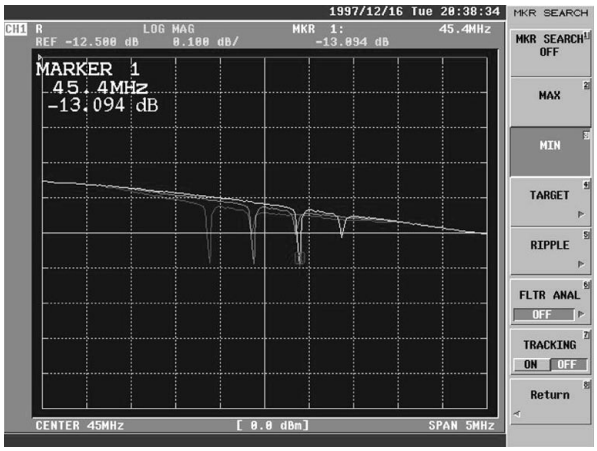
Equivalent Circuit Constant Analysis

- **Direct equivalent circuit constant analysis can greatly improve the analysis efficiency.** Compatibility with the 4-elements and the 6-elements equivalent circuit can improve the development efficiency of automation software.



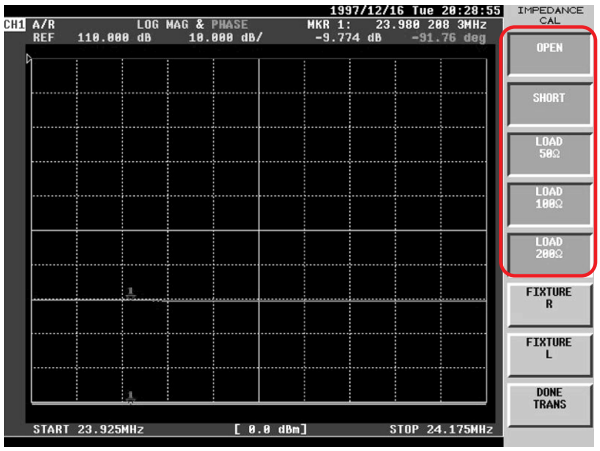
Offers Optimal Features for Measurements at Pre-Process

- **50 µs/point high-speed sweep + synchronous high-speed sweep search (concurrent processing of measurement and search)**
  Resonance frequency check can be simultaneously performed in the grinding process.
- **Low noise (-122 dBm) implements high-accuracy measurement of high-impedance devices.**
  High-speed, high-accuracy measurement can be performed for frequency selection of the ceramic base.
- **Direct filter analysis allows improvement of the measurement efficiency for frequency and impedance at the resonant and anti-resonant points.**

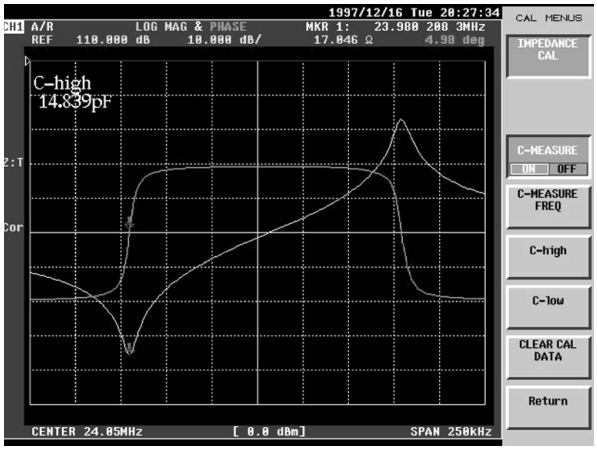


Measurement of the 3-terminal Resonator with a Built-in Load Capacity (Option 72)

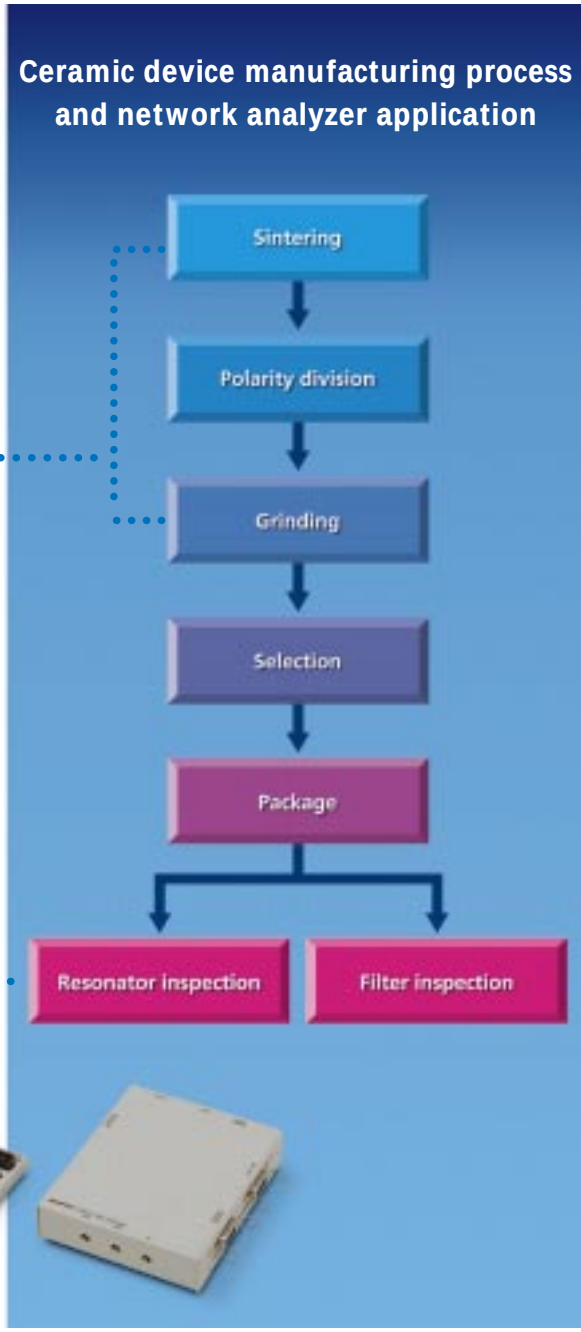
- **Dedicated high-precision calibration function**
  CAL kits of OPEN, SHORT, LOAD 50, LOAD 100 and LOAD 200 are available with the installed dedicated calibration algorithm.
  The load capacity and the resonator characteristics excluding load capacity can be measured with high accuracy.
  * The R17041 test fixture and calibration kit are optional.



High-accuracy CAL function exclusively for the 3-terminal resonator



3-terminal resonator measurement

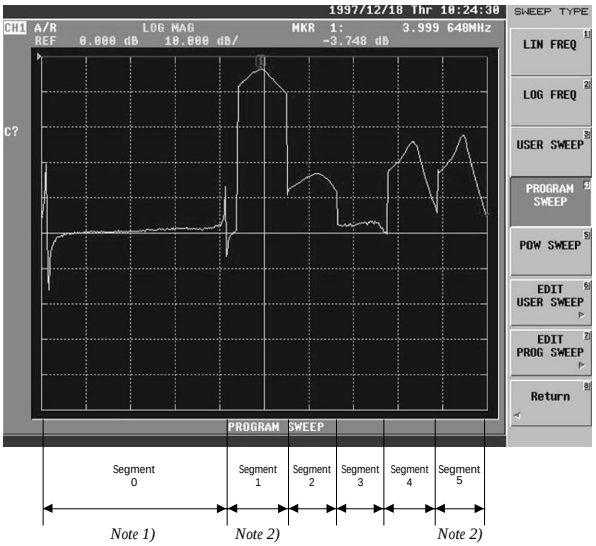


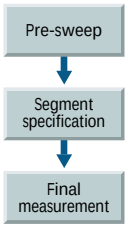
Ceramic device manufacturing process and network analyzer application

Filter/Resonator Spurious Measurement

- **User-specified segment measurement function**

Spurious measurements can be conducted over a wide band. Measurement of spurious data with in a selected segment enables high speed, high precision results.



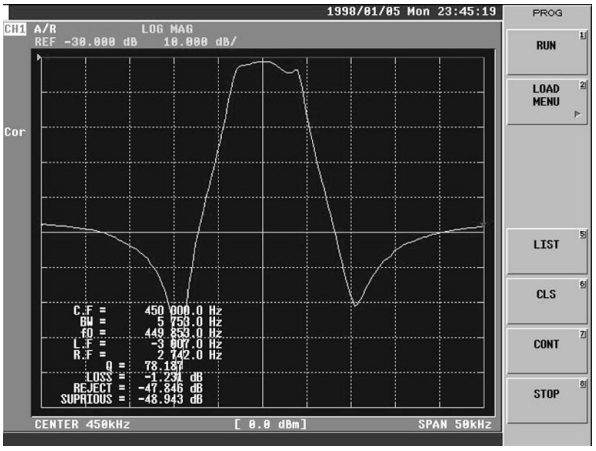


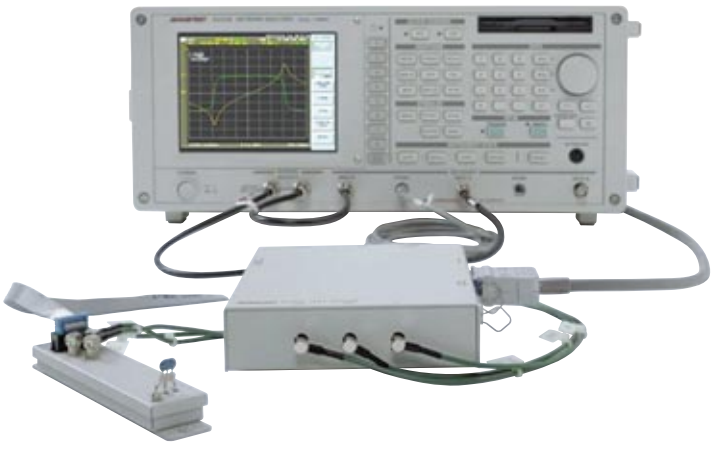
Note 1)
Only Segment 0 is swept. Sweep is executed at high speed to roughly measure the frequency of the primary oscillation or spurious emission.

Note 2)
Based on the pre-sweep measurement result, segments included with in the measurement range are specified and the spurious emission is re-measured.

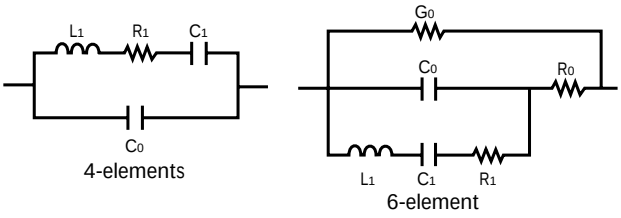
Ceramic Filter Measurement

- **Direct filter analysis function allows measuring all the filter characteristic items by a single-touch operation.**
- **Data transfer duration (repetition of frequency setting, sweep, and data transfer)**



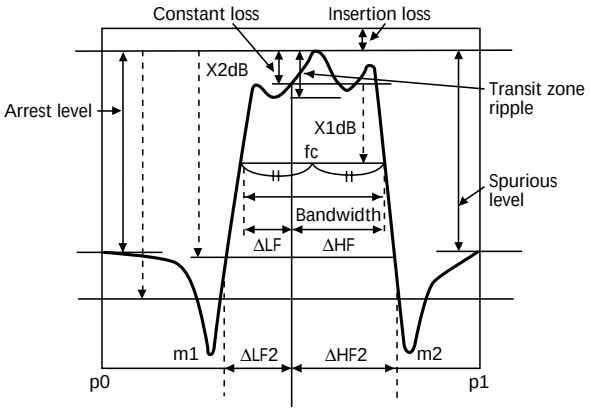


Direct Equivalent Circuit Constant Calculation Function



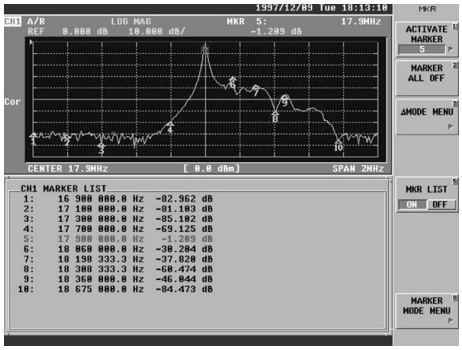
The resonator's equivalent circuit constant is directly measured. The 4-element and 6-element calculation functions are provided so that measurement results can be instantaneously obtained by direct operation in the manual mode. For automation, the software development efficiency is improved.

Direct Filter Analysis Function



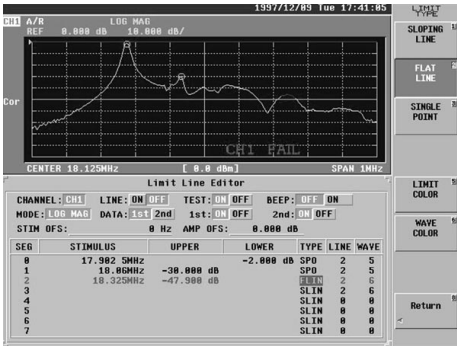
Filter characteristics can be measured directly. Measurement results can be instantaneously obtained in analysis of multi-item characteristics.

Multi-marker list



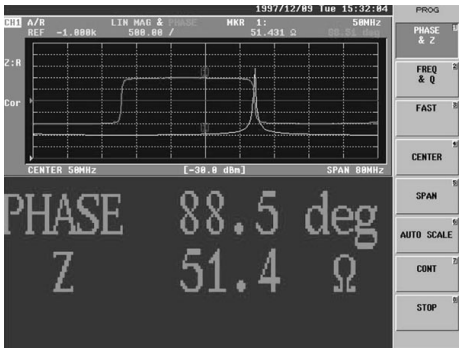
Up to 10 markers can be displayed for each channel. When large amount of information is required, as in the case of filter analysis, it is not necessary to change the marker positions which results in more efficient measurement.

Limit line function



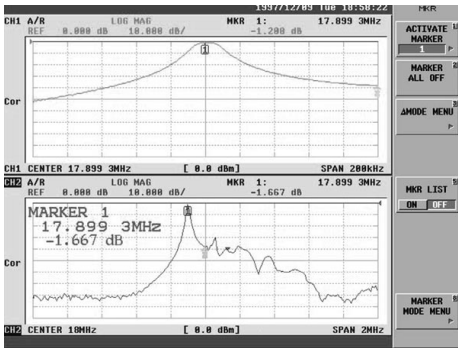
The standard value set with the limit line editor is judged for Pass/Fail. A beep can be sounded according to the judgment result or the result can be output to external equipment using the parallel I/O unit (Option 01). Also, use of the application software allows input of the set value for each device type to commercially-available graphics software and to make setup from FD.

Zoom display function (application software)



When it is necessary to make adjustments in a location at a distance from the measuring unit, the application software can be used to enlarge the displayed values.

256-color user edit



Production line operators look at the measuring unit screen for a long period of time. The ability to edit the screen colors helps to improve clarity and can also reduce eye strain.

Ordering Information

Main Unit

Product Name	Main Unit	Input Channel	Remarks
R3754A	5-inch monochrome LCD	RCH	Additional input channels are optional.
R3754B	6.5-inch color TFT LCD	RCH	Additional input channels are optional.

Option

Option Code	Function	Remarks
01	Parallel I/O (R3753H compatible)	Plus/minus logic change
02	Parallel I/O	Pin assignment is changed
03	Parallel I/O	Optical Isolation
10	2-ch input	RCH, ACH
11	3-ch input	RCH, ACH, BCH
70	TDR function	Time-axis waveform display
71	Drive level measurement function	RLA method
72	3-terminal resonator measurement function	R1704 and CAL Kit are required.
90	Japanese manual	Operation, Programming Guide, Programming Manual
91	English manual	Operation, Programming Guide, Programming Manual

* The operating manual is optional.

Accessory

Product Name	Model Name	Remarks
Fixture for 3ports measurement	R17041	Consists of the test fixture and switch box.
Crystal Test Adapter	A07010	π circuit applicable to SMD
Crystal Test Adapter	A07011	π circuit applicable to the read type
Reflection bridge	A17020 Series	100Hz to 1MHz
Impedance conversion transformer	R17000 Series	100Hz to 1MHz
Power splitter	VCR-111 (Tama Electric)	3-branch
Active probe	AP003 (Stack Electric)	DC to 1000MHz FET probe
Rack mount set		
Rail set		

Crystal Test Adapter

Main unit A07001 *1

Applicable Device	Change Kit	CAL Kit	π Circuit Adapter *2	
			Normal type	With built-in variable load capacity function
TSX-1	A07003-01	A07004-01	A07002-01	A07007-01
TSX-2	A07003-02	A07004-02	A07002-02	A07007-02
CP21B	A07003-03	A07004-03	A07002-03	A07007-03
CX-89F2	A07003-04	A07004-04	A07002-04	A07007-04
CX-91F	A07003-05	A07004-05	A07002-05	A07007-05
DSX631	A07003-06	A07004-06	A07002-06	A07007-06
DSX751	A07003-07	A07004-07	A07002-07	A07007-07
JIS43	A07003-08	A07004-08	A07002-08	A07007-08
JIS03	A07003-09	A07004-09	A07002-09	A07007-09

Name	Model	Capacity
Load capacity	A07005-01	5pF
	A07005-02	10pF
	A07005-03	15pF
	A07005-04	20pF
	A07005-05	25pF
	A07005-06	30pF
Contact pin	A07006	10-pins/set

*1: Select the main unit, the change kit, the CAL kit, and the adapter as a set.
*2: Select either the normal adapter or the adapter with the variable load capacity function built in.

Crystal Test Adapter A07001 to A07007

Crystal Test Adapter A07010

3ports ceramic resonator fixture to A07008

Specifications

Measurement Function

Measurement channel:	2 channels (4-trace display)
Measurement parameter:	R A/R, R, A (Option 10) A/R, B/R, A/B, R, A, B (Option 11)
Measurement format	
AC/DC display:	Logarithmic/linear amplitude, phase, group delay, real and imaginary portions of complex number parameters Z, R, X (impedance conversion measurement) Y, G, B (admittance conversion measurement) Phase extension display
Smith chart:	Logarithmic/linear amplitude and phase for marker reading, real and imaginary portions, R+jX, G+jB
Polar coordinates display:	Logarithmic/linear amplitude and phase for marker reading, real and imaginary portions

Signal Source Characteristics (23 ±5˚C)

Frequency characteristics		
Range:	10 kHz to 150 MHz	
Resolution:	0.1 Hz	
Accuracy:	±5 ppm (Typ.) ±1 ppm (Option 20)* (1 MHz or more, when 0 to +50°C, after 30 minutes warm-up)	
Stability:	±2 x 10^{-8}/day (Option 20)* (after 48 hours warm-up)	
Output characteristics		
Output characteristics:	+21 dBm to -43 dBm	
Resolution:	0.1 dB	
Accuracy:	±0.5 dB (0 dBm, 10 MHz)	
Linearity (50 MHz):	+21 dBm to -35 dBm	±0.5 dB
	-35 dBm to -43 dBm	±1.5 dB
Flatness (at 0 dBm output):	10 kHz to 300 kHz	±2.0 dB
	300 kHz to 150 MHz	±1.5 dB
Impedance (output port 1):	Nominal 50 Ω Return loss 13 dB or more (at 0 dBm output, Typ.)	
Signal purity		
Harmonic wave distortion:	≤-15 dBc	
Non-harmonic wave spurious:	≤-20 dBc or -60 dBm, whichever is larger	
Phase noise:	≤-95 dBc/Hz (10 kHz offset)	
Sweep characteristics		
Sweep parameter:	Frequency, signal level	
Range:	Same as the frequency sweep frequency characteristic Level sweep +21 dBm to -43 dBm	
Range setting:	Start/Stop or Center/Span	
Sweep type:	Linear/logarithmic frequency sweep, level sweep, sweep of a user-defined segment	
Sweep time:	Max. 0.05 ms/point (RBW 15 kHz)	
Measurement point:	3, 6, 11, 21, 51, 101, 201, 301, 401, 501, 601, or 1201 points	
Sweep trigger:	Continuous, Single, External	
Sweep mode:	Dual sweep (2-channel sweep in the same frequency range), alternate sweep (2-channel sweep in different frequency ranges)	
Output form		
Output:	Single Single, dual (Option 10, Option 11)	
Connector:	BNC (female), 50 Ω	
Power splitter		
(output port 2):	Option 10, Option 11	
Insertion loss :	6 dB (Typ.)	
(Option 10, Option 11)		
Level tracking :	<100 MHz	0.1 dB (Typ.)
(Option 10, Option 11)	≥100 MHz	0.2 dB (Typ.)
Equivalent output SWB :	<100 MHz	1.2 (Typ.)
(Option 10, Option 11)	≥100 MHz	1.4 (Typ.)

*BNC-BNC cable (A01036-0150) will be attached.

Reception Section Characteristics (23 ±5˚C)

Input characteristics			
Input channel:	1 ch, 2 ch (Option 10), 3ch (Option 11)		
Frequency range:	10 kHz to 150 MHz		
Impedance:	Nominal 50 Ω		
Return loss:	ATT 0 dB	20 dB or more	
	ATT 25 dB	25 dB or more	
Max. input level:	ATT 25 dB	AMP 0 dB	+5 dBm
	ATT 0 dB	AMP 0 dB	-20 dBm
	ATT 0 dB	AMP 16 dB	-36 dBm
Input destruction level:	+24 dBm, ±3 VDC		
Average noise level:	RBW 10 kHz	200 kHz to 500 kHz	-102 dBm
(ATT 0 dB, AMP 16 dB)		500 kHz to 150 MHz	-112 dBm
	RBW 3 kHz	60 kHz to 500 kHz	-107 dBm
		500 kHz to 150 MHz	-117 dBm
	RBW 1 kHz	20 kHz to 500 kHz	-112 dBm
		500 kHz to 150 MHz	-122 dBm
	RBW 300 Hz	10 kHz to 500 kHz	-117 dBm
		500 kHz to 150 MHz	-127 dBm
Resolution bandwidth			
(RBW):	3 Hz to 15 kHz (1, 1.5, 2, 3, 4, 5, or 7 steps)		
Input cross-talk:	10 kHz to 500 kHz	105 dB	
	500 kHz to 150 MHz	120 dB	
Signal source cross talk:	10 kHz to 500 kHz	105 dB	
	500 kHz to 150 MHz	120 dB	
Input connector:	BNC (female) 50 Ω		
Automatic offset correction			
Normalization function:	Compensates the frequency characteristics of the measurement system.		
Electric length correction:	Equivalent electric length or group delay time can be added to the measured phase or group delay time.		
Range:	-3 X 10^8 m to +3 X 10^8 m or +10 sec. to -10 sec.		
Amplitude characteristics			
(absolute characteristics)			
Measurement range:	ATT AUTO AMP 0 dB		+5 dBm to -115 dBm
(RBW 1 kHz	ATT 25 dB AMP 0 dB		+5 dBm to -90 dBm
(100 kHz or more)	ATT 0 dB AMP 0 dB		-20 dBm to -115 dBm
	ATT 0 dB AMP 16 dB		-36 dBm to -122 dBm
Display resolution:	0.001 dB/div		
Accuracy:	±0.5 dB (10 MHz, max. input level)		
Frequency response			
(at 0 dBm input):	10 kHz to 1 MHz		4 dBp-p
	1 MHz to 150 MHz		3.5 dBp-p
Dynamic accuracy:	0 to -10 dBm		±0.4 dB
(ATT 25 dBm, AMP 0 dB)	-10 to -60 dBm		±0.1 dB
(100 kHz or more)	-60 to -70 dBm		±0.2 dB
	-70 to -80 dBm		±0.6 dB
Amplitude characteristics			
(relative characteristics):	Option 10, Option 11		
Measurement range:	ATT AUTO	AMP 0 dB	±120 dB
ATT 25 dB AMP 0 dB	ATT 20 dB	AMP 0 dB	±95 dB
(100 kHz or more)	ATT 0 dB	AMP 0 dB	±95 dB
	ATT 0 dB	AMP 16 dB	±86 dB
Display resolution:	0.001 dB/div		
Accuracy:	±0.5 dB (10 MHz, max. input level)		
Frequency response:	10 kHz to 1MHz		3 dBp-p
(at 0 dBm input)	1 MHz to 150 MHz		2 dBp-p
Dynamic accuracy:	0 to -10 dBm		±0.1 dB
(ATT 25 dB, AMP 0 dB)	-10 to -60 dBm		±0.05 dB
(100 kHz or more)	-60 to -70 dBm		±0.1 dB
	-70 to -80 dBm		±0.3 dB
	-80 to -90 dBm		±0.9 dB
Phase characteristics (relative characteristics)**			
Measurement range:	±180˚		
	Continuous display possible for more than ±180˚ by the display expansion function		
Resolution:	0.01˚		
Dynamic accuracy:	0 to -10 dBm	±3.0˚	
(ATT 25 dB, AMP 0 dB)	-10 to -50 dBm		±1.5˚
(100 kHz or more)	-50 to -60 dBm		±2.0˚
	-60 to -70 dBm		±2.4˚
	-70 to -80 dBm		±3.6˚

** With a measurement range setting which includes 32.5 MHz, absolute measured phase characteristic values for are not guaranteed.
They are guaranteed when the unit is used with a measurement range setting between 10 kHz and 32.5 MHz, or between 32.5 MHz and 150 MHz.

Phase characteristics (relative)	Option 10, Option 11	
Measurement range:	±180°	
	Continuous display possible for more than ±180 deg. by the display expansion function	
Resolution:	0.01°	
Frequency response :	10 kHz to 1 MHz	20° p-p
(at 0 dBm input)	1 MHz to 150 MHz	15° p-p
Dynamic accuracy:	0 to -10 dBm	±1.0°
(ATT 25 dB, AMP 0 dB)	-10 to -50 dBm	±0.3°
(100 kHz or more)	-50 to -60 dBm	±0.5°
	-60 to -70 dBm	±1.0°
	-70 to -80 dBm	±3.0°
	-80 to -90 dBm	±8.0°

Delay characteristics	
Range:	Calculated using the following equation: $r=\frac{\Delta\text{Ø}}{360 \times \Delta f}$ ΔØ: Phase, Δf: Aperture frequency (Hz)
Measurement range:	1 ps to 250 s
Group delay time resolution:	1 ps
Aperture frequency:	Equivalent to Δf $\frac{100 \times 2\%}{\text{Measurement point} - 1}$ $\frac{100 \times 2\%}{\text{Measurement point} - 1}$ With this resolution, it is possible to set from this value through about 100% of the frequency span.
Accuracy:	$\frac{\text{Phase accuracy}}{360 \times \text{Aperture frequency (Hz)}}$

Error correction functions	
Normalization:	Corrects the frequency response (amplitude, phase) during transfer measurement.
1-port calibration:	Corrects the bridge direction, the frequency response, and the source matching error. Error correction requires Short, Open, and Load.
Data averaging:	Averages data (vector values) for each sweep. Averaging count can be set from 2 to 999.
Transfer full calibration:	High accuracy measurement possible using transfer normalization in transfer measurement. Error correction requires Short and Load.

Connection with External Equipment

External display signal output:	15-pin D-sub connector (VGA)
GPIB data output and remote control:	Conforming to IEEE 488
Printer port:	25-pin D-sub
Serial port:	Based on RS-232
Keyboard:	IBM-PC/AT compatible
External reference frequency input:	Available frequencies 1, 2, 5 and 10 MHz ±10 ppm, 0 dBm (50 Ω) or more
Parallel I/O output : (Option 01)	TTL level, 8-bit output (2 ports), 4-bit I/O (2 ports)
Probe power: (Option 10, Option 11)	±12 V
External trigger signal input:	BNC connector (female)

Display Section

Display unit:	R3754A 5-inch STN monochrome LCD R3754B 6.5-inch color TFT LCD
Resolution:	640 X 640 dots
Display mode:	AC-DC logarithmic/linear coordinates, polar coordinates, Smith chart (inductance/admittance indication)
Display format:	Single channel, dual channel (overlay display, split display)
Measurement condition display:	Start/stop, center/span, scale/DIV reference level, marker value, soft key functions, warning message.
Reference line position:	Vertical axis memory top section (100%) to bottom section (0%)
Auto scale:	The optimum reference level and scale value are automatically set for the current measurement.
Backlight:	ON/OFF, no adjustment for the R3754A
Contrast:	Contrast control provided for R3754A

Marker Functions

Marker display:	Marker readings can be converted to display values corresponding to the respective measurement formats.
Multi-marker:	10 individual markers can be set for each channel.
Delta marker:	Any of the10 markers can be specified as the reference marker enabling delta value measurements between markers.
Marker couple:	Markers of each channel can be set in coupled or independent form.
Specific section analysis:	Marker search possible for a section specified by the delta marker.
MKR search:	MAX search, MIN search, NEXT search
Marker track:	Search is performed for each sweep.
Target search:	It is possible to calculate the bandwidth, center frequency, Q at the X dB down point. It is also possible to search the phase 0 degree frequency value and the ±X° frequency width. deg. frequency width.
MKR→:	MKR→Reference value, MKR→START, MKR→STOP, MKR→CENTER
Limit line function:	Limit line can be set for up to 31 segments. Pass/Fail judgments can be performed for each segment.
Direct analysis function:	Resonator analysis, etc.

Instrument State Functions

Save register:	Allows storing condition settings and CAL data in battery backed internal memory.
Data save/recall:	Allows storing/loading data to/from FDD

Programming Functions

BASIC control function:	Standard control function allows the control of the main unit as well as other measurement equipment with the GPIB interface.
Built-in functions:	Allows high-speed analysis of measurement data.
FDD function:	Based on the MS-DOS format FD. Storage capacity (DD: 720 Kbytes, HD: 1.2 Mbytes, 1.44 Mbytes)

General Specifications

Operating environment	
FDD used:	Temperature range +5 to +40°C, humidity range 80% or less (no condensation)
No FDD used:	Temperature range 0 to +50°C, humidity range 80% or less (no condensation)
Storage environment:	-20°C to +60°C
Power supply:	100 VAC to 120 VAC, 220 VAC to 240 VAC, 48 Hz to 66 Hz, 100 VAC and 200 VAC systems are automatically changed.
Power consumption:	200 VA or less
External dimensions:	Approx. 424 (W) X 177 (H) X 300 (D)
Mass:	12 kg or less