

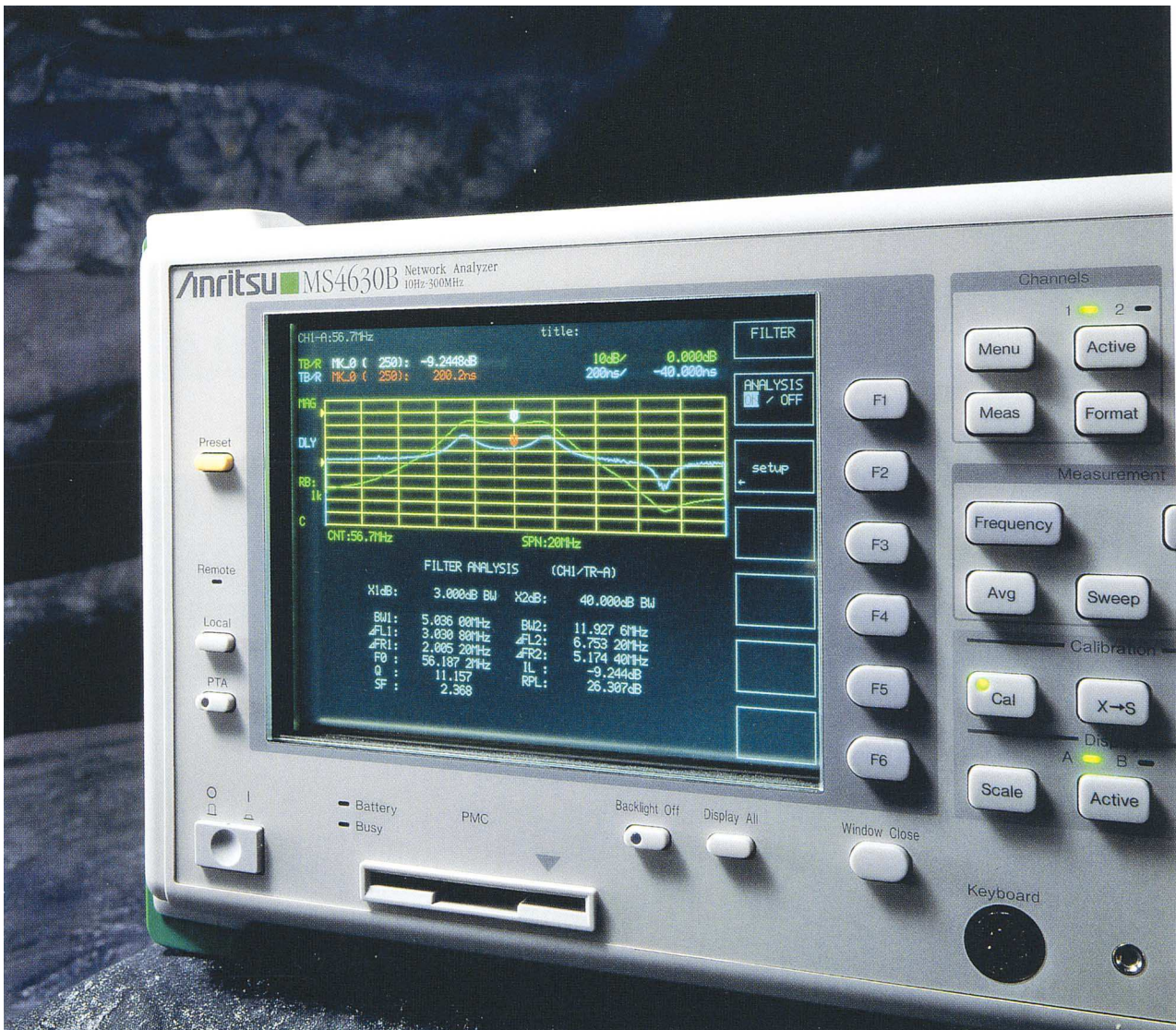
Discover What's Possible™

Anritsu

MS4630B

Network Analyzer

10 Hz to 300 MHz

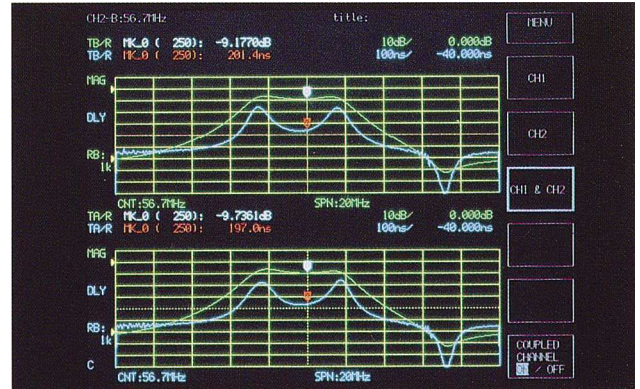


High-Speed Evaluation of IF Filters, Resonators, etc.

Greatly Increased Production/Inspection Capacity

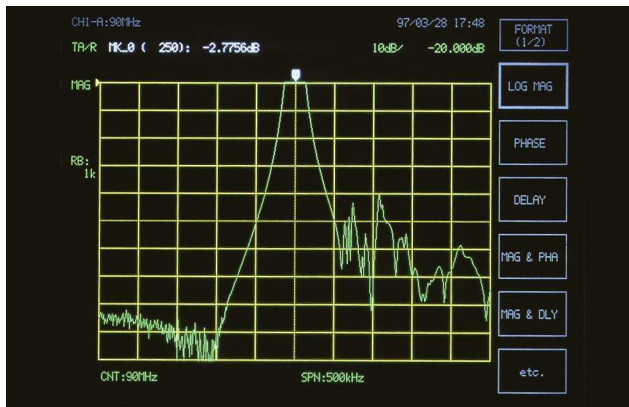
The MS4630B is suitable for electronics production lines demanding fast and accurate device measurements. It is particularly well suited to accurate high-speed, evaluation of IF filter resonance and group delay characteristics, as well as evaluating the impedance characteristics of resonators in AV equipment and personal computers.

A fast sweep speed of 150 μ s/measurement point is achieved using a high-speed synthesizer and digital signal processing (DSP) technologies. The post-processing data analysis functions have been strengthened with improved data-processing macros that have greatly increased the total production throughput. In addition, the dynamic range has been improved to 120 dB (RBW:1 kHz) while the weight of the analyzer has been dramatically reduced. Compatibility has been maintained between PTA and GPIB software commands, maintaining any current investment in PTA software. Furthermore, the GPIB and PTA processing speed is 30% faster compared with our ordinary network analyzers.



High Dynamic Range

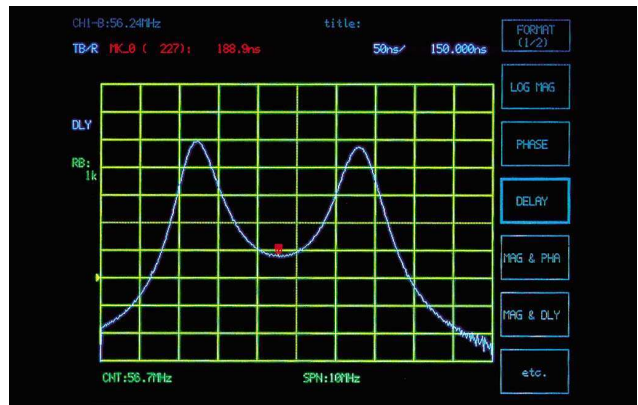
The high dynamic range of 120 dB (RBW:1 kHz) permits fast and accurate out-of-band measurement of filter.



Filter out-of-band attenuation measurement

High-Accuracy Group Delay Measurement

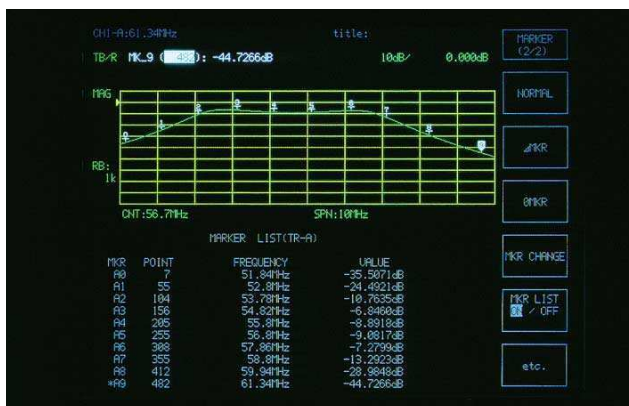
The group delay characteristics can be measured with a high degree of accuracy at a resolution of 1/10,000 of the measurement range.



Group delay characteristics

Multi-Marker Function

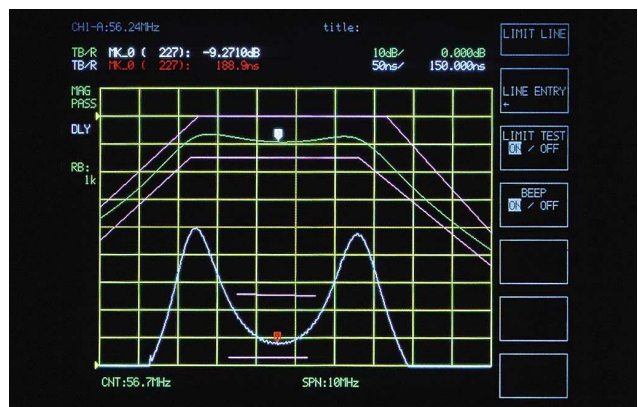
Up to 10 markers can be set independently for each channel. The marker list function can be used to display all tabular data and waveform information simultaneously at each marker.



Multi-markers

Limit test Function

Device pass/fail evaluation can be performed in real-time using the single and segmented limit functions.



Filter pass/fail evaluation using limit test

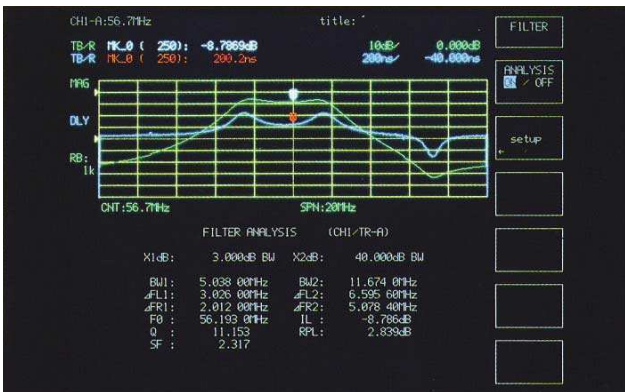
Better Productivity

Filter Measurement

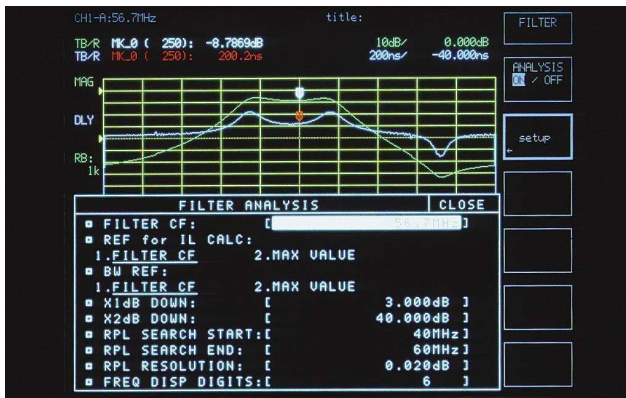
• Filter Analysis Functions

Filter characteristics such as 3 dB bandwidth, center frequency (fo), in-band ripple, out-of-band attenuation, etc., are digitally processed and analyzed at high speed. User can easily enter or change default values using filter setup menu.

The frequency, output level, waiting time and RBW can be set in each measurement point. This is useful to shorten the measurement time in filter measurements.



Measurement using filter functions



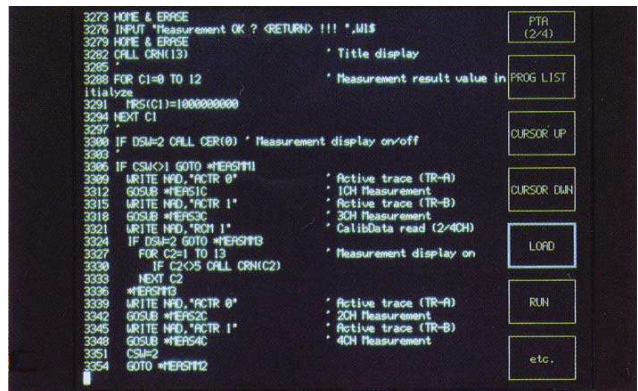
Setup menu for filter functions

• Improved Measurement Performance using PTA (Personal Test Automation)

Frequency/Level Setting: Frequency and power level at Port 1 can be easily controlled, allowing for effective in-band and out-of-band measurements.

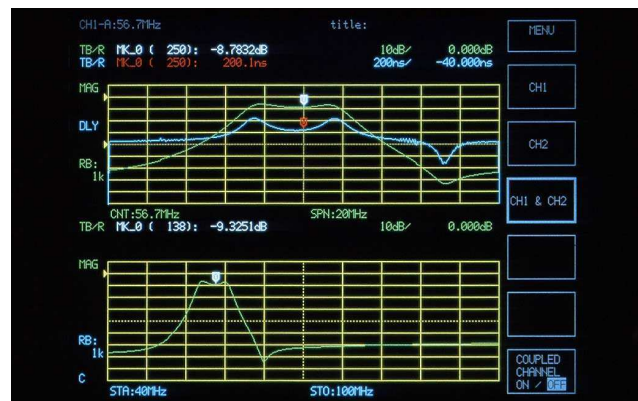
Ripple Extraction: In addition to the normal min./max. ripple, there are four other functions such as the SAW filter slope ripple.

Filter Functions: These permit complex analysis, such as extracting for multiple bandwidth, out-of-band attenuation of filters or group delay measurement.



• Simultaneously In-Band and Spurious Response Data Display

Previously, spurious detection and passband measurement required switching of the measurement setup. The MS4630B alternate sweeping function permits simultaneous display of the measured passband and spurious band data. The very short switching time greatly improves the measurement efficiency.



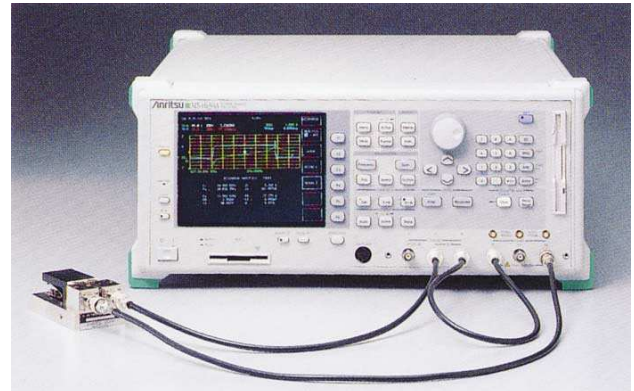
Spurious measurement using alternate sweeping

Resonator Measurement

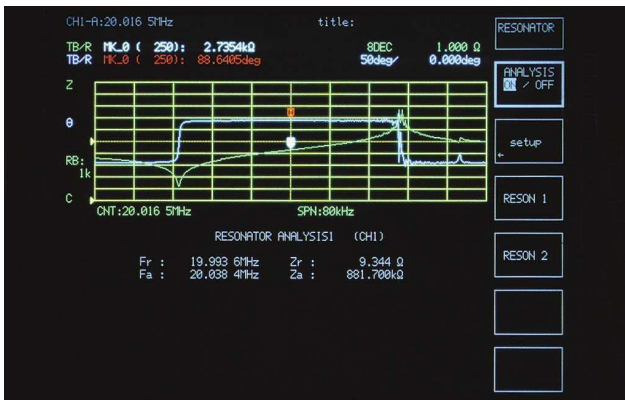
• High-Speed Measurement of Resonator Characteristics

The MS4630B has a number of dedicated waveform analysis functions to improve the evaluation efficiency of resonators. Resonator 1 analyzes the resonance frequency (F_r) and the resonance impedance (Z_r). Resonator 2 is able to measure resonator equivalence in addition to the parameters for Resonator 1.

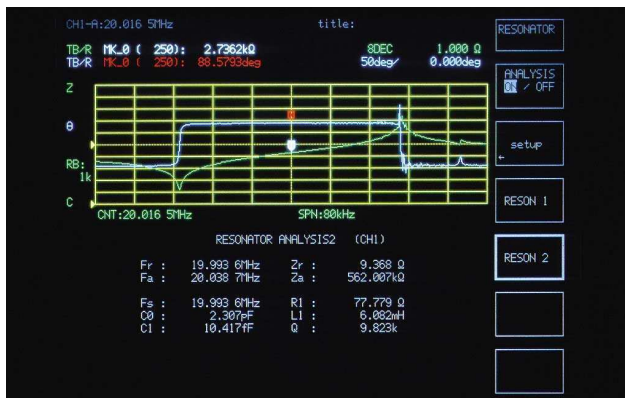
• **Measuring Crystal Resonators using π -Network**
 Crystal resonators can be tested more easily by combining the MS4630B with a π -circuit jig such as the MA1506A. The floating admittance around the jig can be eliminated using the MS4630B π -network calibration function and the jig calibration standard, permitting high-accuracy measurement.



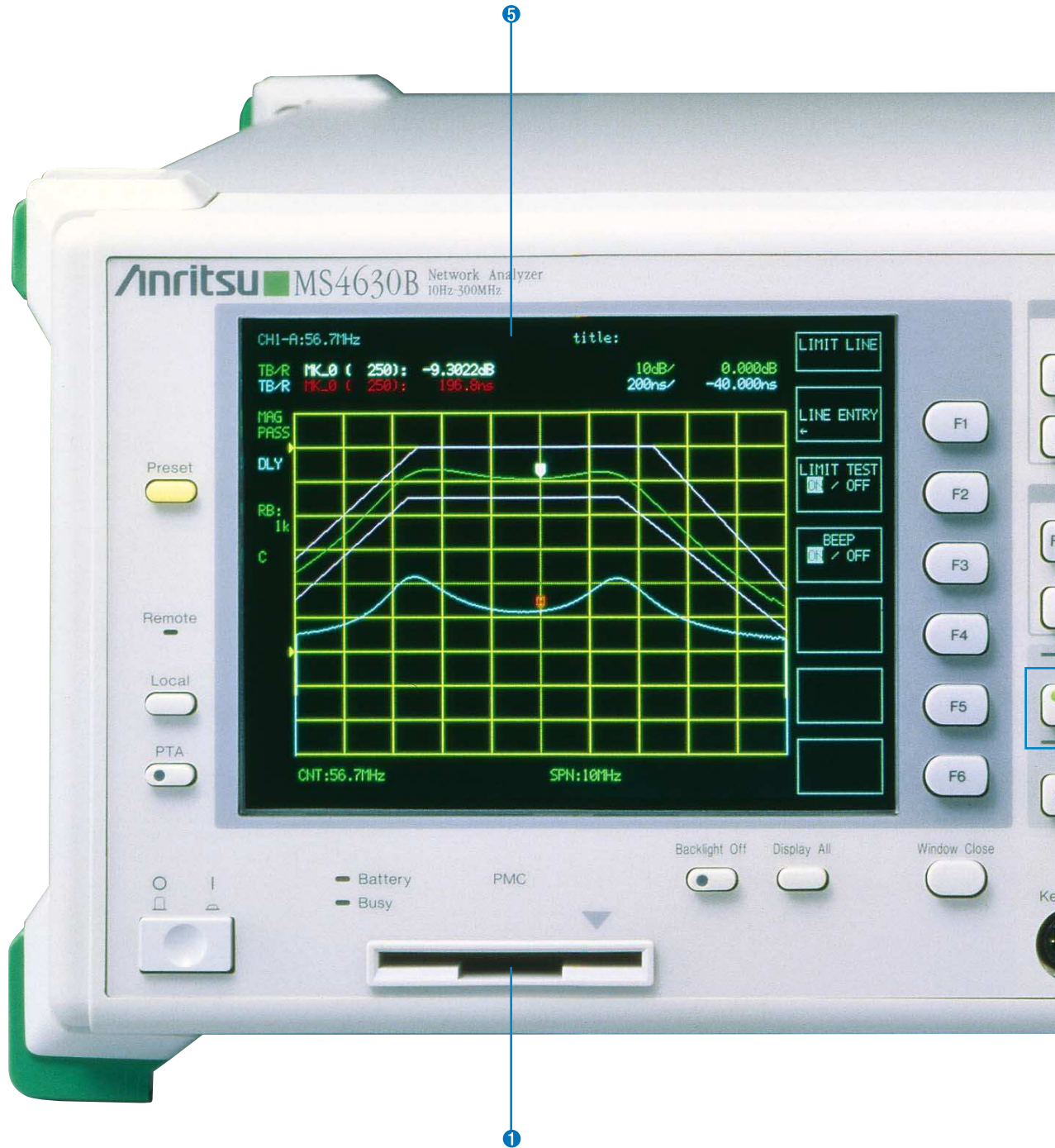
Measurement using π -network



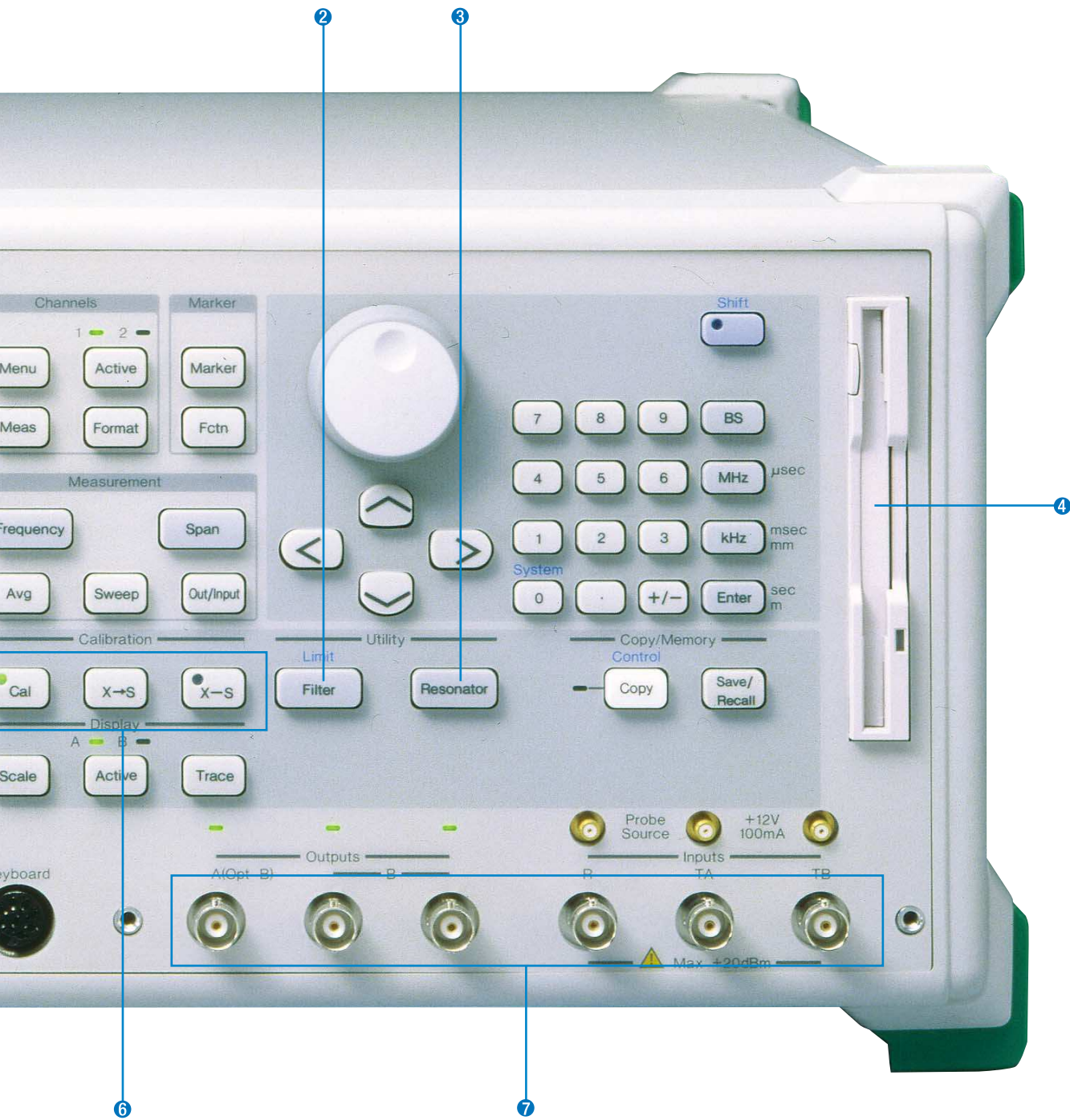
Resonator 1 measurement



Resonator 2 measurement



- ❶ PMC slot (Option)
This slot is compatible with high-reliability memory cards (Anritsu original).
- ❷ Filter key
Filter characteristics (passband, attenuation band, IL, fo, Q, SF) are evaluated instantly with a single key stroke.
- ❸ Resonator key
Resonator characteristics (max., min., 0 Phase, equivalence constant) are evaluated instantly with this key.
- ❹ FD drive
Calibration data, measured data and PTA programs can be saved to 3.5" FD (MS-DOS format).
- ❺ 6.5" Color LCD
- ❻ Full range of calibration functions with flexible post-processing capability.
- ❼ Input and output connectors for maximum 3 channels



Specifications

Measurement items	Transmission characteristics (ratio measurement): Amplitude, phase, group delay Reflection/impedance characteristics: Amplitude, phase (with external transducer) Level characteristics: Absolute amplitude																					
Frequency	Range: 10 Hz to 300 MHz Resolution: 0.01 Hz Accuracy (standard) Aging rate: $\leq 1 \times 10^{-6}$ /day (15 minutes after power-on) Temperature characteristics: $\leq \pm 5 \times 10^{-6}$ (0° to +50°C) Accuracy (Option 13: High-stability reference oscillator) Aging rate: $\leq \pm 2 \times 10^{-9}$ /day (24 h after power-on) Temperature characteristics: $\leq \pm 5 \times 10^{-9}$ (0° to +50°C)																					
Input	Channel No. Standard: 2 (R, TA); Option 12: 3 (R, TA, TB) Impedance: 50 Ω , 1 M Ω switchable (when combined with MA4605A: 75 Ω , 1 M Ω) Input range (IRG): 0/+20 dBm Max. input power AC: +20 dBm; DC ± 2.2 V (50 Ω) AC: 0 dBm; DC: ± 20 V (1 M Ω) Connector: BNC-J Probe source: +12 ± 1 V, 100 mA (with protective circuit for shorts)																					
Average noise level	≤ -120 dBm (RBW: 1 kHz, 1 to 300 MHz), ≤ -110 dBm (RBW: 1 kHz, 80 kHz to 1 MHz)																					
Crosstalk	Between channels: ≥ 120 dB (80 kHz to 300 MHz), ≥ 110 dB (up to 80 kHz) Between transmitter and receiver: ≥ 125 dB																					
Resolution bandwidth	3, 10, 30, 100, 500 Hz, 1, 2, 3, 4, 5, 10, 20 kHz and automatic setting																					
Output	Output level range Output A: 0 to +21 dBm; Option 10: -70 to +21 dBm Output B: -6 to +15 dBm (-9.5 to +11.5 dB when Option 14 added); Option 10: -76 to +15 dBm (-79.5 to +11.5 dB when Option 14 added) Output resolution: 0.01 dB Output level accuracy: $\leq \pm 1.0$ dB (frequency: 100 MHz, Output A: +10 dBm) Output level linearity: $\leq \pm 0.5$ dB (0 dBm reference, frequency: 100 MHz, Output A: 0 to +21 dBm) Output level deviation: $\leq \pm 1.5$ dB (output A: +10 dBm, 100 MHz reference) Step error: ± 0.5 dB (Option 10) Output impedance: 50 Ω (when combined with MA4605A: 75 Ω) Connector: BNC-J																					
Amplitude measurement	Measurement range: ≥ 120 dB Measurement resolution: 0.001 dB Display scale: 0.01 dB/div to 50 dB/div (1-2-5 sequence) Dynamic accuracy <table border="1"> <thead> <tr> <th>Level relative to IRG</th> <th>80 kHz to 100 MHz</th> <th>10 kHz to 300 MHz</th> </tr> </thead> <tbody> <tr> <td>0 to -10 dB</td> <td>± 0.20 dB</td> <td>± 0.20 dB</td> </tr> <tr> <td>-10 to -60 dB</td> <td>± 0.05 dB</td> <td>± 0.05 dB</td> </tr> <tr> <td>-60 to -70 dB</td> <td>± 0.10 dB</td> <td>± 0.30 dB</td> </tr> <tr> <td>-70 to -80 dB</td> <td>± 0.30 dB</td> <td>± 1.00 dB</td> </tr> <tr> <td>-80 to -90 dB</td> <td>± 1.20 dB</td> <td>± 4.00 dB</td> </tr> <tr> <td>-90 to -100 dB</td> <td>± 4.00 dB</td> <td>-</td> </tr> </tbody> </table>	Level relative to IRG	80 kHz to 100 MHz	10 kHz to 300 MHz	0 to -10 dB	± 0.20 dB	± 0.20 dB	-10 to -60 dB	± 0.05 dB	± 0.05 dB	-60 to -70 dB	± 0.10 dB	± 0.30 dB	-70 to -80 dB	± 0.30 dB	± 1.00 dB	-80 to -90 dB	± 1.20 dB	± 4.00 dB	-90 to -100 dB	± 4.00 dB	-
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Phase measurement	Measurement range: $\pm 180^\circ$ Measurement resolution: 0.001° Display scale: 0.01° to 50° /div (1-2-5 sequence) Dynamic accuracy <table border="1"> <thead> <tr> <th>Level relative to IRG</th> <th>80 kHz to 100 MHz</th> <th>10 kHz to 300 MHz</th> </tr> </thead> <tbody> <tr> <td>0 to -10 dB</td> <td>$\pm 1.5^\circ$</td> <td>$\pm 1.5^\circ$</td> </tr> <tr> <td>-10 to -60 dB</td> <td>$\pm 0.3^\circ$</td> <td>$\pm 0.3^\circ$</td> </tr> <tr> <td>-60 to -70 dB</td> <td>$\pm 0.8^\circ$</td> <td>$\pm 2.0^\circ$</td> </tr> <tr> <td>-70 to -80 dB</td> <td>$\pm 2.0^\circ$</td> <td>$\pm 6.0^\circ$</td> </tr> <tr> <td>-80 to -90 dB</td> <td>$\pm 6.0^\circ$</td> <td>$\pm 20.0^\circ$</td> </tr> <tr> <td>-90 to -100 dB</td> <td>$\pm 20.0^\circ$</td> <td>-</td> </tr> </tbody> </table>	Level relative to IRG	80 kHz to 100 MHz	10 kHz to 300 MHz	0 to -10 dB	$\pm 1.5^\circ$	$\pm 1.5^\circ$	-10 to -60 dB	$\pm 0.3^\circ$	$\pm 0.3^\circ$	-60 to -70 dB	$\pm 0.8^\circ$	$\pm 2.0^\circ$	-70 to -80 dB	$\pm 2.0^\circ$	$\pm 6.0^\circ$	-80 to -90 dB	$\pm 6.0^\circ$	$\pm 20.0^\circ$	-90 to -100 dB	$\pm 20.0^\circ$	-
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Group delay measurement	<p>DRG: $\Delta\theta/(360 \times \Delta F)$ *$\Delta\theta$: phase measurement range; ΔF: frequency span x smoothing aperture (%); smoothing aperture: 20% to $\left(\frac{2}{\text{number measurement points}}\right) \times 100\%$</p> <p>Measurement resolution: $2.78 \times 10^{-5}/\Delta F$ Display scale: 1 ps/div to 50 ms/div Dynamic accuracy: Phase measurement accuracy/(360 x aperture frequency)</p>
Calibration, correction	<p>Calibration types: Frequency response, 1 port, 1 path-2 port, frequency response/isolation calibration, π-NET calibration</p> <p>Calibration data interpolation: Measurement frequency, when number of measurement points changed, based on calibration data before change, new calibration data interpolation calculation possible (except at log frequency measurement and 1001 measurement points)</p> <p>Normalize: X-S Electrical length calibration Range: 0 to ± 999999.9999999 m, Resolution: 100 nm Phase offset range: $\pm 180^\circ$</p>
Sweeping	<p>Frequency sweep: LIN (CENTER/SPAN, START/STOP), LOG (START/STOP) Level sweep: LIN (START/STOP/STEP) List sweep: Frequency, level, RBW, the individual setting in the waiting time Number of measurement points: 11, 21, 51, 101, 251, 501, 1001 Break point: Anywhere between 1 and 1001 Sweep time: 150 μs/point, 38 ms/250 points full sweep (RBW: 20 kHz, normalize calibration, 1 trace) Setting range: 1 ms to 27.5 h Sweep functions Sweep range: Full sweep, part sweep (between markers) Sweep control: REPEAT/SINGLE, STOP/CONT Sweep trigger: INT/EXT (RISE, FALL, LEVEL)</p>
Display	<p>Max. display screens: 2 channels, 4 traces Display format: LOG MAG (M), PHASE (P), DELAY (D), M/P, M/D, LIN MAG (LIN), LIN/P, LIN/D, REAL (R), IMAG (I), R/I, Z, Z/θ, Q,Z/Q, POLAR, VSWR, IMPD (Z/θ, Rs + Ls/Cs, Q/D, R + jx), ADMT (Y/θ, Rp + Lp/Cp, Q/D, G + jB) Display: 640 x 480 dots, 16.5 cm color LCD</p>
Markers	<p>Marker functions: NORMAL MKR, Δ MKR, 0 MKR, MKR \rightarrow MAX, MKR \rightarrow MIN, MKR \rightarrow CF, Δ \rightarrow SPAN, MKR \rightarrow +PEAK, MKR \rightarrow -PEAK, MKR TRACK + PEAK, MKR TRACK-PEAK, MKR CHANGE, MKR OFFSET</p> <p>Setting: Set marker position to frequency or point Multi-marker: Max. 10 markers for each trace Filter function: F0, IL, passband (L, R), attenuation band (L, R), Ripple, Q, SF Resonator function RESON 1: Fr, Fa, Zr, Za (0 PHASE), Fm, Fn, Zm, Zn (MAX/MIN) RESON 2: Fs, Fr, Fa, Zr, Za, Q, equivalence constant (R1, L1, C1, C0)</p>
Trace data calculation	<p>Averaging functions Method: SUM, MAX, MIN, Count: 1 to 1000 Measurement data memory (max. 1001 points each memory in same format as display format) Main trace (MT) memory: 2 each (XMEM) for Channel 1 and Channel 2 Calibration S memory: 2 each (SMEM) for Channel 1 and Channel 2 Image memory: 2 each (IMEM) for Channel 1 and Channel 2 Sub-trace (ST): Following calculation between MT and ST (traces calculation of same data as display format) MT \rightarrow ST, MT = MT-ST, MT = ST Limit line: Single or segment (10) limit line, pass/fail evaluation against limit line</p>
Measurement parameters auto-setting	<p>Receive bandwidth and sweep time: Receive bandwidth set automatically for set sweep time Automatically set to give minimum sweep time at set receive bandwidth</p>
Auxiliary media	<p>Saving/recalling data: Measurement parameters, measured data, calibration data, PTA application programs saved/recalled to/from FD, PMC and Internet memory</p> <p>Function memory FD: 100 functions max. PMC: 100 functions max. (depends on PMC capacity)</p> <p>Drive and capacity Internet memory: 512 kB (non-volatility) 3.5 inch FDD: 1 Capacity: 720 KB (2DD), 1.44 MB (2HD), MS-DOS format (BMP, text file) Option 01: PMC (32 to 512 KB)</p>

Printing	Printing is available using video plotter, printer and FD (bitmap format).
Back-panel I/O	<p>Frequency: 5/10 MHz \pm10 ppm Level: \geq0.7 Vp-p (AC coupling) Input impedance: 50 Ω (connector: BNC-J) Reference oscillator output Frequency: 10 MHz Level: TTL (DC coupling, connector: BNC-J) External trigger input: TTL Level (connector: BNC-J) GPIO: IEEE488.2 (24-pin Amphenol connector) I/O Port: Parallel interface for PTA (36-pin Amphenol connector) RGB output: For external monitor (15-pin D-SUB connector) Video output: Separate (8-pin DIN) Centronics (Option 02): Parallel interface for printer (25-pin D-SUB connector) RS-232C (Option 02): Serial interface (9-pin D-SUB connector)</p>
External control	Standard: GPIB and PTA; Option 02: RS-232C
Power	100 to 120/200 to 240 Vac ($-15\%/+10\%$, 250 Vac max., 100/200 V system auto-switching), 47.5 to 63 Hz, \leq 180 VA (max.)
Dimensions and mass	426 (W) x 177 (H) x 451 (D) mm, \leq 15 kg
Environmental conditions	Temperature range: 0° to +50°C (operating; FDD: +4° to +50°C), -20° to +60°C (storage)
EMC	EN61326: 1997/A2: 2001 (Class A) EN61000-3-2: 2000 (Class A) EN61326: 1997/A2: 2001 (Annex A)
LVD	EN61010-1: 2001 (Pollution Degree 2)

Ordering Information

Model/Order No.	Name	Remarks
MS4630B	Main frame Network Analyzer	10 Hz to 300 Hz
	Standard accessories	
	Power cord, 2.6 m : 1 pc	
F0013	Fuse, 5 A : 2 pcs	
W1534AE	MS4630B operation manual (main frame) : 1 copy	
W1535AE	MS4630B operation manual (remote control) : 1 copy	
	Options	
MS4630B-01	PMC interface	
MS4630B-02	RS-232C, Centronics interface	Printer output, external control
MS4630B-10	Output attenuator	70 dB, mechanical type
MS4630B-12	3 channel receiver	
MS4630B-13	High stability reference oscillator	Aging rate: $\leq \pm 2 \times 10^{-8}$ /day
MS4630B-14	3 branch output	For 3 channel receiver
	Optional accessories	
SC4284	Reflection Bridge	10 to 1000 MHz BNC-J, 50 Ω , unbalanced
SC4288	Reflection Bridge	10 to 1000 MHz BNC-P, 50 Ω , unbalanced
SC6267	Reflection Bridge	10 to 1000 MHz BNC-J, 75 Ω , unbalanced
SC6289	Reflection Bridge	10 to 1000 MHz BNC-P, 75 Ω , unbalanced
MA2201A	Reflection Bridge	10 Hz to 250 kHz, 600 Ω , balanced, MA214 terminal
MA2203A	Reflection Bridge	10 Hz to 250 kHz, 900 Ω , balanced, MA214 terminal
MA2301A	Reflection Bridge	2 kHz to 2 MHz, 75 Ω , balanced, MA214 terminal
MA2302A	Reflection Bridge	2 kHz to 2 MHz, 135 Ω , balanced, MA214 terminal
MA2303A	Reflection Bridge	2 kHz to 2 MHz, 150 Ω , balanced, MA214 terminal
MA2204A	Impedance Probe	30 Hz to 300 kHz, 2 Ω to 1 M Ω
MA2403A	Impedance Probe	30 kHz to 30 MHz, 2 Ω to 1 M Ω
MA414A	Impedance Measurement Kit	For MA2403A
MA1506A	π Network	DC to 125 MHz, for resonator measurement
MA4605A	Impedance Adapter (for MS4630B)	10 Hz to 300 MHz, 50/75 Ω , unbalanced
P0005	Memory card (32 KB)	
P0006	Memory card (64 KB)	
P0007	Memory card (128 KB)	
P0008	Memory card (256 KB)	
P0009	Memory card (512 KB)	
MC3305A	PTA Key Board (JIS type)	
MC3306A	PTA Key Board (ASCII type)	
B0329C	Front cover (1MW4U)	
B0333C	Rack mount kit	
B0334C	Carrying case	hard type
	Optional instruments	
ME010 series	Test Fixture	PIN, SMD, tip-inductor, etc.
VP-870	Printer	EPSON product, for GPIB



Specifications are subject to change without notice.

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