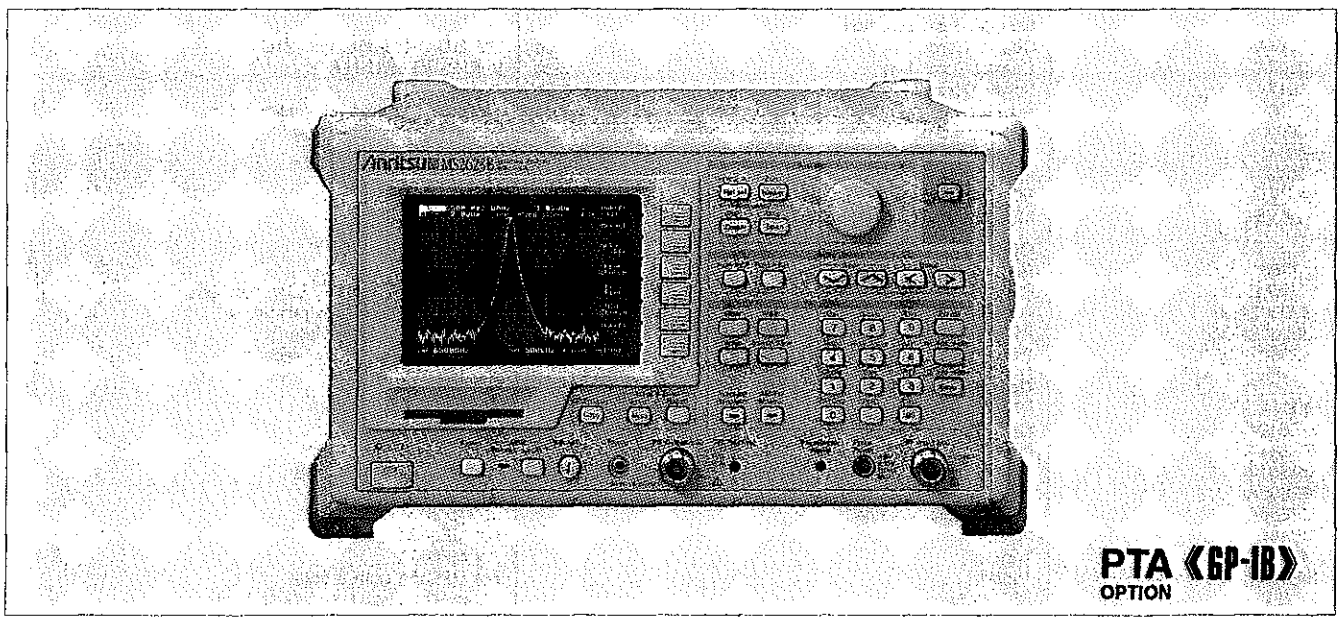
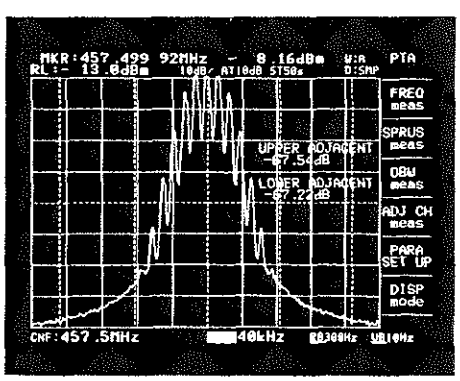
SPECTRUM ANALYZER
MS2612B/2613B/2621B/2622B/2623B
100 Hz (9 kHz) to 2.2/4.6/6.5 GHz



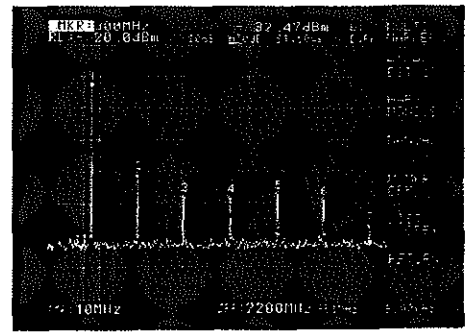
Anritsu takes great pride in the MS2612B/2613B/2621B/2622B/2623B, which feature top-class essential functions in a compact frame and accommodate the higher frequencies of mobile communications systems. In addition to continuous sweeping over the RF and preselector bands, these models also offer one-touch measurement of adjacent channel power and occupied bandwidth.

Features
- Easy measurement of adjacent channel leakage power and occupied bandwidth
- Wide dynamic range measurement of harmonics by using wideband preselector (1.7 to 6.5 GHz)
- Easy-to-use continuous-sweep function
- Automatic/manual setting of up to 10 markers using multimarker function
- Error correction over full frequency band using normalize function
- Marker readout correction using level offset function
- Built-in tracking generator (MS2621B/2622B/2623B)

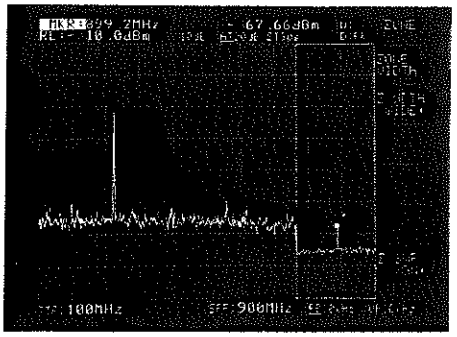
Functions
- **Frequency range from 100 Hz/9 kHz to 4.6/6.5 GHz**
  A wide frequency range ensures harmonic measurements in mobile communication systems. A newly developed electronic switch (patent pending) enables continuous sweeping of the RF and preselector bands, so that the fundamental signal and harmonics can be viewed on a single screen. In the preselected bands above 1.7 GHz, measurements with a dynamic range of 100 dB or more are possible.
- **Measurement of adjacent channel leakage power and occupied bandwidth**
  This series provides functions for measurement of adjacent channel leakage power, occupied bandwidth and spurious components with which are equipped as standard.
- **Multimarker**
  The multimarker function is composed of highest 10, harmonics and manual setting functions. Up to 10 markers can be set on the measured waveform.
  Highest 10: Set markers automatically in sequence to 10 highest peaks on measured waveform
  Harmonics: Set markers automatically to frequency integer multiples of fundamental signal
  Manual: Sets markers manually on measured waveform



Adjacent channel power


Multimarkers

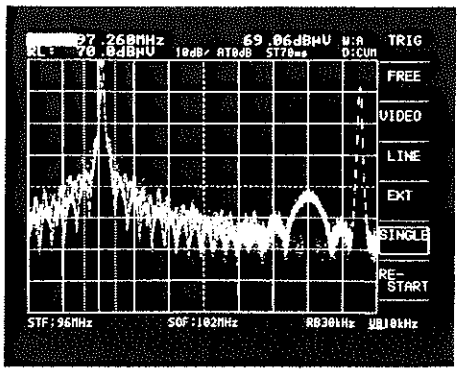
- **Easy operation using a zone marker**
  Zone marker is a feature unique to Anritsu spectrum analyzers which greatly enhance ease of operation. By simply placing the zone marker around a signal, the marker tunes in on the signal peak. The operator no longer has to adjust a marker to the signal peak or perform several peak searches. In addition, the zone width can be set freely.
- **Zone sweeping function cuts measurement time**
  Sweeps can be limited to the region enclosed by the zone marker. When spurious components near the carrier are to be observed, the spurious components alone can be enclosed by zone markers and zone sweeping can be performed, This greatly reduces the measurement time even at a narrow resolution bandwidth.



Zone marker sweeping

- **Superior basic performance**
  An auto-calibration function enables overall level accuracy of ± 1 dB. With a dynamic range of 75 dB, a resolution bandwidth of 30 Hz and a 1 Hz frequency resolution, this series enables highly accurate level and frequency measurement.
- **Normalize function**
  The residual frequency response of the measurement system can be eliminated by this function. Comparison of two normalized trace or pass/fail test with the limit line can also be possible using subtrace function.

- **Advanced operation and display function**
  This series spectrum analyzers provides averaging of great use in measurement of very weak signal levels in noise. Maximum/minimum hold, overwriting and total of five display functions are provided for analysis.



Cumulative display

- **PTA (optional)**
  This series incorporate controller functions. Through the PTA (Personal Test Automation) feature, the spectrum analyzer alone can be used for the development and execution of application programs in a high-level language (BASIC).
  In addition, it is easy to construct a system in which measurement data is processed internally at high speed and external equipment are controlled via a parallel I/O port or GP-IB. Function keys and numeric keys can be redefined according to needs, transforming the spectrum analyzer into a specialized measurement instrument.
- **PMCs as a standard feature**
  Four different static protected Anritsu PMCs (Plug-in Memory Cards) are available ranging from 32 KB to 256 KB. PMCs can be used to save/recall setting conditions and waveform data (10 sets with 32 KB PMC, and 40 sets with 128 KB PMC). Furthermore, PMCs can be used to save/recall PTA programs, and to save data files during program execution.

Specifications

	Model		MS2621B	MS2612B, MS2622B	MS2613B, MS2623B
Frequency	Measurement range		9 kHz to 2.2 GHz	100 Hz to 4.6 GHz (with pre-selector: ≧1.7 GHz)	100 Hz to 6.5 GHz (with pre-selector: ≧1.7 GHz)
	Setting range		0 to 2.21 GHz (stop frequency: ≧1 kHz)	0 to 4.61 GHz (0 to 2.01 GHz, 1.7 to 4.61 GHz)	0 to 6.51 GHz (0 to 2.01 GHz, 1.7 to 6.51 GHz)
			Display resolution: 20 Hz Setting mode: CENTER-SPAN, START-SPAN, START/STOP *Set frequency span (stop frequency - start frequency) to 2-digit value (10 to 98). Fractions are rounded up.		
	Display accuracy		±(100 Hz + frequency span × 2% + display frequency × reference frequency accuracy) *In CENTER-SPAN or START-SPAN mode, after auto-calibration, provided that frequency span is ≧10 kHz and sweep time is ≦100 s		
	Span		0 Hz, 1 kHz to 2.2 GHz	0 Hz, 1 kHz to 4.6 GHz	0 Hz, 1 kHz to 6.5 GHz
			Setting range: 10 div are displayed on horizontal axis. Can be set to the two most significant digits (10 to 98) or 0 kHz (fix). When step key is used, setting can be made in 1-2-5 sequence. Display accuracy: ±2% (sweep time: ≦100 s)		
	Resolution		Bandwidth: 30 Hz to 1 MHz (3 dB bandwidth) RBW can be set in 1-3 sequence. Setting can be made manually, or automatically according to frequency span setting. Accuracy: ±20% Selectivity: ≦15:1 (60 dB/3 dB bandwidth)		
	Marker	Normal	Function: displays frequency at marker Display accuracy: same as center frequency display accuracy		
		Delta	Function: displays difference in frequencies between reference marker and turnable marker Display accuracy: same as center frequency display accuracy		
		Count	Resolution: 1 Hz, 10 Hz, 100 Hz Accuracy: display frequency × reference frequency accuracy ± (2 counts or 20 Hz)		
		Zone width setting range	1 to 501 points (odd number only)		

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■ SPECRUM ANALYZERS

	Model		MS2621B	MS2612B, MS2622B	MS2613B, MS2623B
Frequency	Stability	Residual FM	≦20 Hzp-p/0.1 s (frequency span ≦500 kHz)		
		Drift	±300 Hz/min. (after 1-hr warm-up at constant ambient temperature, provided that frequency span is ≦500 kHz and sweep time is ≦100 s)		
	Sideband noise		≦ −80 dBc *When resolution bandwidth is 100 Hz and video bandwidth is 1 Hz, at frequency, which is 10 kHz apart from signal	≦ −80 dBc (9 kHz to 4.6 GHz) *When resolution bandwidth is 100 Hz and video bandwidth is 1 Hz, at frequency, which is 10 kHz apart from signal	≦ −80 dBc (9 kHz to 4.6 GHz), ≦ −76 dBc (4.6 to 6.5 GHz) *When resolution bandwidth is 100 Hz and video bandwidth is 1 Hz at frequency, which is 10 kHz apart from signal
	Reference oscillator	Frequency	10 MHz		
		Stability	Start-up characteristics: $\pm 5 \times 10^{-8}$ (frequency after 20-min. warm-up, relative to frequency after 1-hr warm-up) Aging rate: $\leqq \pm 2 \times 10^{-8}$/day, $\leqq \pm 1 \times 10^{-7}$/year (relative to frequency after 24-hr warm-up)		
		Temperature characteristics	$\leqq \pm 5 \times 10^{-8}$ (relative to 25°C, 0° to 50°C)		
		External reference input	10 MHz, 2 to 5 Vp-p		
Amplitude	Measurement range		−130 to +20 dBm	−130 to +20 dBm, ≦ −60 to +20 dBm (at 100 Hz)	
	Scale		8 div are displayed on vertical axis when scale is set to 10 db/div. For all other scale setting, 10 div are displayed on vertical axis. (Top line on CRT is reference level.) LOG: 10 dB/div (−80 dB relative to reference level), 5 dB/div (−50 dB relative to reference level), 2 dB/div (−20 dB relative to reference level), 1 dB/div (−10 dB relative to reference level) LIN: 10% reference level/div (calibrated in voltage, unit: V)		
	Linearity	LOG	±0.2 dB (0 to −10 dB, resolution bandwidth: 100 Hz to 1 MHz), ±0.3 dB (0 to −20 dB, resolution bandwidth: 100 Hz to 1 MHz), ±0.5 dB (0 to −50 dB, resolution bandwidth: 100 Hz to 1MHz), ±1.0 dB (0 to −70 dB, resolution bandwidth: 100 Hz to 100 kHz) after automatic calibration		
		LIN	±3% relative to reference level (full scale) after automatic calibration		
	Frequency response		Within ±0.5 dB (100 kHz to 2.0 GHz) Within ±1.5 dB (9 kHz to 2.2 GHz) *When input ATT is 20 dB and ambient temperature range is 20° to 30°C	Within ±0.5 dB (9 kHz to 2.0 GHz) Within ±1.0 dB (100 Hz to 9 kHz) Within ±1.5 dB (2 to 4.6 GHz) *When input ATT is 20 dB and ambient temperature range is 20° to 30°C	Within ±0.5 dB (9 kHz to 2.0 GHz) Within ±1.0 dB (100 Hz to 9 kHz) Within ±1.5 dB (2 to 6.5 GHz) *When input ATT is 20 dB and ambient temperature range is 20° to 30°C
	Reference level accuracy	Setting range	LOG: −100 to +20 dBm (setting resolution; 0.1 dB), 2.20 μV to 2240 mV, LIN: 70.8 μV to 2240 mV		
		Accuracy	±0.3 dB (0 to −50 dBm, at room temperature), ±0.4 dB (0 to −50 dBm, 0°to 50°C), ±0.75 dB (+20 to −70 dBm, 0° to 50°C) after automatic calibration *When frequency is 50 MHz, frequency span is ≦2 MHz, and resolution bandwidth, video bandwidth, sweep time, and input ATT is set to AUTO		
	Resolution bandwidth switching deviation		±0.3 dB (after automatic calibration)		
	Marker	Normal	Displays level at settable marker		
		Delta	Displays difference in levels between settable marker and reference marker		
		Zone marker width setting range	1 to 501 points, odd numbers only		
		Noise measurement	Noise per 1 Hz bandwidth (dBm/Hz, dBc/Hz) and adjacent channel leakage power (dBm/ch, dBc/ch) can be measured.		
	Dynamic range	Average noise level	≦ −120 dBm (1 MHz to 2 GHz) *When input ATT is 0 dB, resolution bandwidth is 300 Hz, and video filter is 1 Hz	≦ −80 dBm (1 to 10 kHz), ≦ −100 dBm (10 to 100 kHz), ≦ −110 dBm (100 kHz to 1 MHz) *When input ATT is 0 dB, resolution bandwidth is 30 Hz, and video filter is 1 Hz ≦ −120 dBm (1 MHz to 1.7 GHz), ≦ −115 dBm (1.7 to 4.6/6.5 GHz) *When input ATT is 0 dB, resolution bandwidth is 300 Hz, and video filter is 1 Hz	
		2nd/3rd order harmonic distortion	≦ −75 dBc (5 to 800 MHz) *When input level is −30 dBm and input ATT is 0 dB	≦ −75 dBc (5 to 850 MHz, input level: −30 dBm, input ATT: 0 dB), ≦ −100 dBc (0.85 to 2.3 GHz, input level: −20 dBm, input ATT: 0 dB)	≦ −75 dBc (5 to 850 MHz, input level: −30 dBm, input ATT: 0 dB), ≦ −100 dBc (0.85 to 3.25 GHz, input level: −20 dBm, input ATT: 0 dB)
		Residual response	≦ −100 dBm (≧500 kHz) *Input ATT: 0 dB, input terminal resistance: 50Ω		
	Video bandwidth		1 Hz to 100 kHz (in 1-10 sequence), OFF *Can be set manually, or automatically according to resolution bandwidth		
	Units for level measurements		dBm, dBμV, dBmV, V, dBμV (emf), dBμV/m		
	LOG/LIN switching loss		≦ ±1.0 dB (after calibration, at room temperature)		

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Model			MS2621B	MS2612B, MS2622B	MS2613B, MS2623B
Amplitude	Quasi-peak detection	6 dB bandwidth	200 Hz, 9 kHz, 120 kHz (±30%, at room temperature)		
		Time constants for quasi-peak detection	Charge-time constant: 45 ms (for 6 dB bandwidth at 200 Hz), 1 ms (for 6 dB bandwidth at 9 kHz/120 kHz) Discharge-time constant: 160 ms (for 6 dB bandwidth at 9 kHz), 500 ms (for 6 dB bandwidth at 200 Hz), 550 ms (for 6 dB bandwidth at 120 kHz)		
		Display time constant	160 ms (for 6 dB bandwidth at 200 Hz/9 kHz), 100 ms (for 6 dB bandwidth at 120 kHz)		
		Display	LOG scale, 5 dB/div, 10 div, linearity: ±1 dB (for 0 to −40 dB, CW signal, at room temperature)		
		Pulse response characteristics (response relative to CISPR pulse, at room temperature)	See table below		
		Field strength measurement	Antenna correction coefficients for correct display and measurement of field strengths (dBμV/m) can be selected for certain antennas. Antenna correction coefficients have been stored in memory for the following antennas: MP534A/MP651A Dipole Antenna, MP635A/MP666A Log-Periodic Antenna, MP414B Loop Antenna The user may define and store antenna coefficients (for one antenna) via GP-IB interface.		
		QP ON/OFF switching loss	±1.0 dB (reference level: −40 dB, after calibration, at room temperature)		
	RF input	Maximum input level	AC: +25 dBm (input ATT: ≧10 dB), DC: ±50 V	AC: +25 dBm (input ATT: ≧10 dB), DC: ±0 V	
		Input impedance	50Ω, VSWR: ≦2 (input ATT; ≧10 dB, frequency; ≧30 kHz), N-type connector		
		Input attenuator	Attenuation: 0 to 50 dB, in 10 dB steps (can be set manually, or automatically according to reference level)		
		Input attenuator switching accuracy	±1 dB (100 kHz to 1.5 GHz) ±2 dB (9 kHz to 2.2 GHz)	±1 dB (100 kHz to 2.0 GHz) ±2 dB (9 kHz to 4.6 GHz)	±1 dB (100 kHz to 2.0 GHz) ±2 dB (9 kHz to 6.5 GHz)
Sweep	Sweep range	Normal	Sweeps full range		
		Zone sweep	Sweeps only in the range indicated by zone marker (zone marker width range: 25 to 501 points, odd numbers only)		
	Sweep time	Setting range	50 ms to 1000 s variable in 1-1.5-2-3-5-7 sequence Range can be selected manually, or automatically according to frequency span, resolution bandwidth, and video bandwidth. It can also be set from 50 ms to 1000 s according to the two most significant digits via GP-IB. (Fractions are rounded.)		
		Accuracy	±15% (50 ms to 100 s), ±30% (100 s to 1000 s) *At room temperature		
	Trigger		FREE RUN, LINE, VIDEO, SINGLE, EXT TRIGGER		
Video control signal input	Input level		TTL level (L: video signal OFF, H: video signal ON)		
	Control signal timing (video bandwidth: OFF)		See table below		
	Input connector		BNC connector		
Monitor output of AM/FM demodulator			Can receive AM/FM signal with built-in loud-speaker and earphone (3.5φ jack) AM output: ≧1.5 Vp-p (input level; −10 dBm, carrier wave; 50 MHz, modulated wave; 1 kHz, 30% modulation factor, load impedance; 8Ω, at max. voice level; −10 dBm) FM output: ≧0.8 Vp-p (input level; −10 dBm, carrier wave; 50 MHz, modulated wave; 1 kHz, frequency deviation; 3.5 kHz, load impedance; 8Ω, at max. voice level; −10 dBm)		

Pulse response characteristics (response relative to CISPR pulse, at room temperature)

Repeat frequency	Response: 120 kHz bandwidth	Response: 9 kHz bandwidth	Response: 200 Hz bandwidth
1 kHz	−8.0±1.0 dB	−4.5±1.0 dB	—
100 Hz	Reference	Reference	−4.0±1.0 dB
60 Hz	—	—	−3.0±1.0 dB
25 Hz	—	—	Reference
20 Hz	+9.0±1.0 dB	+6.5±1.0 dB	—
10 Hz	+14.0±1.5 dB	+10.0±1.5 dB	+4.0±1.0 dB
5 Hz	—	—	+7.5±1.5 dB
2 Hz	+26.0±2.0 dB	+20.5±2.0 dB	+13.0±2.0 dB
1 Hz	+28.5±2.0 dB	+22.5±2.0 dB	+17.0±2.0 dB

Control signal timing (video bandwidth: OFF)

RBW	1 MHz	300 kHz	100 kHz	30 kHz	10 kHz
Set-up time	≧10 μs	≧15 μs	≧20 μs	≧70 μs	≧220 μs
Hold time	≧15 μs				
Hold-up time	≧1 μs				

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■ SPECRUM ANALYZERS

Model			MS2621B	MS2612B, MS2622B	MS2613B, MS2623B
Tracking generator*1	Frequency range		9 kHz to 2.0 GHz	9 kHz to 4.6 GHz	9 kHz to 6.5 GHz
	Output level		−50 to 0 dBm (setting resolution: 0.1 dB)		
	Output level accuracy		Within ±0.5 dB (−10 dBm output level, 50 MHz, 20° to 30°C)		
	Output level flatness		Within +0.5/−1.5 dB (100 kHz to 2 GHz, −10 dBm output level, relative to the level at 50 MHz)	Within +0.5/−3.5 dB (100 kHz to 4.6/6.5 GHz, −10 dBm output level, relative to the level at 50 MHz)	
	Output level linearity		Within ±1.0 dB (100 kHz to 2 GHz, 0 to −30 dBm), within ≦±2.0 dB (100 kHz to 2 GHz, −30 to −50 dBm) *Compared to −10 dBm output level	Within ±1.0 dB (100 kHz to 4.6/6.5 GHz, 0 to −30 dBm) Within ±2.0 dB (100 kHz to 4.6/6.5 GHz, −30 to −50 dBm) *Compared to −10 dBm output level	
	Spurious	Harmonics	≦−20 dBc	≦−20 dBc (100 kHz to 1.7 GHz), −30 dBc (1.7 to 4.6/6.5 GHz)	
		Non-harmonics	≦−15 dBc	≦−15 dBc (100 kHz to 1.7 GHz), −30 dBc (1.7 to 4.6/6.5 GHz)	
	Tracking generator feed-through		≦−105 dBm *Spectrum analyzer input, and tracking generator output: 50 Ω termination	≦−105 dBm (100 kHz to 1.7 GHz), −100 dBm (1.7 to 4.6/6.5 GHz) *Spectrum analyzer input, and tracking generator output: 50 Ω termination	
	Output connector		N-type, impedance: 50 Ω, VSWR: ≦1.5 (output level: ≦−10 dBm)	N-type, impedance: 50 Ω, VSWR: ≦1.5 (9 kHz to 1.7 GHz); ≦2 (1.7 GHz to 4.6/6.5 GHz) *Output level: ≦−10 dBm	
	Tracking adjustment variable width		≧±1.2 kHz		
CRT display	CRT		6-inch, green (high intensity)		
	Display items		Scale, waveform data, setting conditions, menu, title		
	Waveform data display method		Digital storage method, horizontal data points: 501 points, display channel: A/B (2 channels) Storage: NORMAL, AVERAGE, MAX-HOLD, MIN-HOLD, CUMULATIVE (A channel only), OVERWRITE (A channel only), simultaneously sweeping A/B channels		
	Detection method		PEAK, SAMPLE, DIP		
	Direct plotting		Can hard-copy screen data to the specified plotters or printers via GP-IB (RS-232C for option 02) Plotters: HP-GL, GP-GL compatible Printers: Epson's VP-850 (or compatible models), Hewlett-Packard's 2225 (or compatible models)		
Automatic calibration			ALL CAL: calibrates LEVEL CAL 1, LEVEL CAL 2, and FREQ CAL functions LEVEL CAL1: calibrates total gain deviation and LOG linearity error LEVEL CAL 2: calibrates resolution bandwidth, reference level, and LOG/LIN switching deviation FREQ CAL: calibrates local frequency error, center frequency deviation of resolution bandwidth QP CAL: calibrates ON/OFF switching deviation of quasi-peak detection		
Function memory			Internal memory: can save and recall 6 setting conditions Memory card: can save and recall 12 sets of setting conditions and measurement data in 32 Kbyte PMC (96 sets for 128 Kbyte PMC)		
Auxiliary input and output	IF output		3.6 MHz, 0 dBm±4 dB (at reference level), BNC connector		
	Output for check		50 MHz, −2 dBm±3 dB, BNC connector		
	X, Y, and Z axis output		X axis: 0 V (left edge) to 10 V±1 V (right edge), BNC connector, terminated at ≧100 kΩ Y axis: 0 V (lower edge) to 1 V±0.3 V (upper edge), BNC connector, terminated at ≧100 kΩ Z axis: TTL level (when sweeping, at low level), BNC connector		
	2.5 GHz output		Level: −20 to −10 dBm, spurious: < −20 dB (2.5 GHz±50 MHz × n, n=1, 2···)		
	Video output		Composite: 1 Vp-p±0.3 V (BNC connector), separate: use compatible UA455A Video Plotter (compatible models), 8-pin DIN connector		
	Probe power source		+5 V, +15 V, −15 V (each ±10%, each 110 mA max.), 4-pole connector		
	External trigger input		TTL level (rising edge active), BNC connector		
	External reference signal input		10 MHz, 2 to 5 Vp-p, input impedance: ≧2 kΩ, BNC connector		
External control			GP-IB (conforms to IEEE-488 and IEC625-1) *Except power switch, intensity knob, memory card control, GP-IB address, tracking, and direct plotting Interface: SH1, AH1, T6, L4, SR1, RL1, PR0, DC1, DT1, C0	GP-IB (conforms to IEEE-488 and IEC625-1) *Except power switch, intensity knob, memory card control, GP-IB address, preselector adjustment, tracking, and direct plotting Interface: SH1, AH1, T6, L4, SR1, RL1, PR0, DC1, DT1, C0	
Power			100 Vac $^{+10}_{-15}$ %, 50/60 Hz, ≦190 VA	100 Vac $^{+10}_{-15}$ %, 50/60 Hz, ≦170 VA (MS2612B/2613B), ≦250 VA (MS2622B/2623B)	
Operating temperature			0°to 50°C		
Dimensions and mass			177H × 320W × 451D mm <22 kg (except options)	177H × 320W × 451D mm <21 kg (MS2612B/2613B), <23 kg (MS2622B/2623B) *Except options	

*1 MS2621B, MS2622B, and MS2623B are built-in tracking generator