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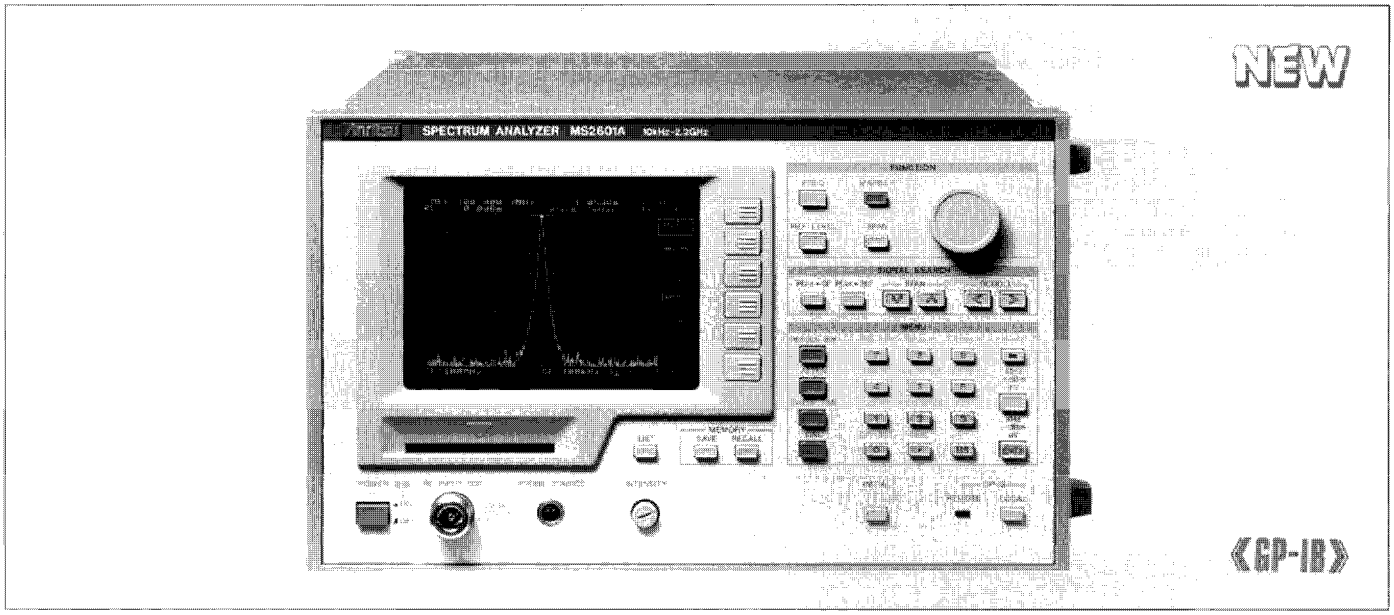
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SPECTRUM ANALYZER
MS2601A/J
10 kHz to 2.2 GHz



The MS2601A/J is a wide-band spectrum analyzer which covers the video to VHF/UHF bands. The synthesized local oscillator and automatic calibration, which uses a highly-accurate signal source, enable accurate frequency and level measurement. In addition, the MS2601A/J has new and original functions such as the zone marker and scroll function, that shorten measurement time. Furthermore, Plug-in Memory Cards (PMCs) for storing measurement conditions and waveform data offer excellent operability.

Advanced functions

- **High-level built-in automatic calibration**
  The MS2601A/J automatically calibrates itself using the calibration signal from the built-in signal source each time the CAL key is pressed. The calibration data is processed at high speed by a 16-bit microprocessor and the compensation value is added to the displayed measured value. The reliability of measurements has been greatly improved and the measurement error has been reduced to about one third of conventional models resulting in a general level measurement accuracy of 1 dB.
  Furthermore, when the working temperature changes drastically, an accurate measurement can be made just by pressing the CAL key.
- **Digital technology supports high-accuracy measurement**
  Digital technology including a synthesized local signal has been used to greatly improve the level measurement accuracy.
  Also, the signal peak-level frequency can be measured with 1 Hz resolution even at a 2.2 GHz full sweep. Furthermore, in addition to having a QP detector, three resolution bandwidths, and time constants based on CISPR standards, the antenna calibration coefficients are automatically calculated to facilitate the best EMI measurement.
- **IC cards for spectrum analyzers**
  The age of spectrum analyzers operated by IC cards has now arrived. The MS2601A/J uses IC memory cards called PMCs to store measurement conditions and waveform data. For example, once the test procedures are stored in the PMCs, measurements can be made under the same conditions at any time.
  You can keep your hard-earned measurement conditions as your personal know-how. Also, if these PMCs are used with the Personal Test Automation (PTA) program memory, automatic measurement can be packaged in a card.
- **PTA widens realm of automatic measurements**
  The PTA function is a high-level language for measurement and a computer integrated in a spectrum analyzer. Programs for measurement, operation, and display, etc. can be input to the MS2601A/J via the keyboard or a personal computer. Thus, the spectrum analyzer can be configured quickly into automatic test equipment. PTA supports complicated measurements as well as preparation of final test results. The MS2601A/J can be used as a frequency counter, power meter, and real-time computer for measurement operations, or as ATE combining these functions, as well as a spectrum analyzer. Also, various support software is available to enable connection to factory automation LANs (Local Area Networks).

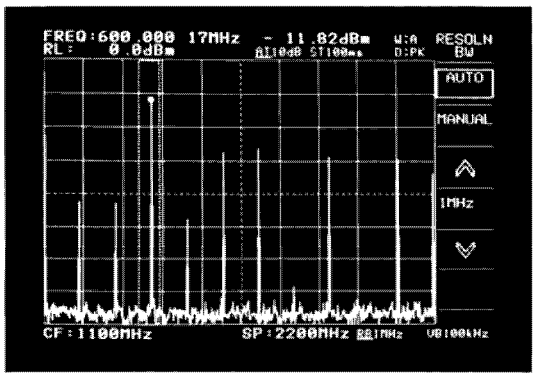
Main applications

- Measuring transmission quality such as spurious emissions from radio communication equipment
- Measuring electromagnetic interference (EMI)
- Testing high-frequency parts such as RF converters and tuners
- Measuring various devices such as filters and ICs

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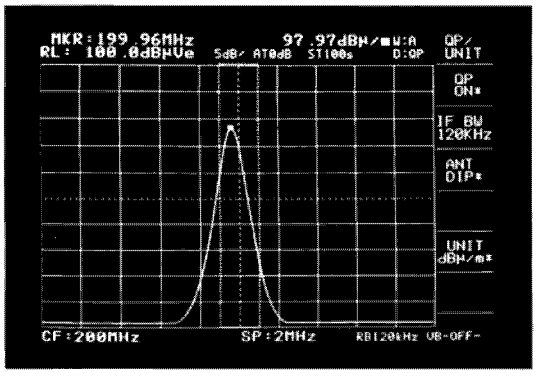
Correct frequency count even at 2.2 GHz-span sweep

The zone markers can be aligned with the desired signal even while observing the entire signal at full span sweep. A 2.2 GHz signal frequency can be measured at 1 Hz resolution.



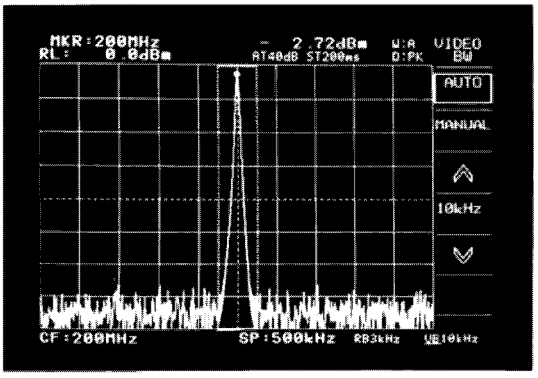
EMI measurement

In addition to providing a QP detector and three resolution bandwidths and time constants based on CISPR standards, antenna calibration coefficients are automatically calculated to facilitate easy EMI measurement.



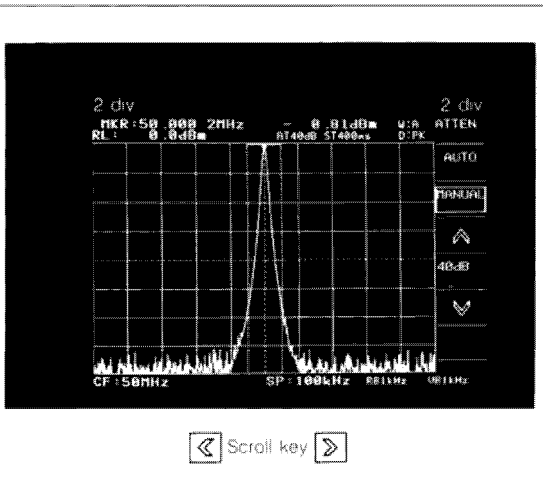
Zone marker easily locates signals

This zone marker function (patent pending) has been developed by Anritsu to reduce the measurement time. Simply enter zone markers around the signal frequency and the peak value within that zone will be measured with 0.03 dB resolution and displayed, even if the exact frequency varies. This eliminates troublesome marker adjustment to the signal peak each time you want to read the frequency and level. The frequency-adjustment capability for an oscillator under test has been increased remarkably, and the frequency display remains visible during adjustment.



Frequency axis scroll function

Sometimes the signal on the left or right of the displayed portion must be examined in detail during a slow sweep. Just press the scroll key to move the display two divisions left or right on the screen. This permits areas beyond the edge of the screen to be displayed without waiting for a new sweep to display the entire waveform.



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MS2601A/J Specifications

				MS2601A	MS2601J
Frequency	Measurement frequency range			9 kHz to 2.2 GHz	
	Readout modes			Center-span, start-span	
	Center frequency/ start frequency	Setting range		0 to 2210 MHz (readout resolution 20 Hz)	
		Readout accuracy		±(100 Hz + 2% of frequency span + tuning frequency × reference frequency accuracy) at frequency span ≧10 kHz, after automatic calibration	
	Frequency span	Setting range		1 kHz to 2200 MHz for horizontal 10 divisions, 2-digit (10 to 98) variable, and 0 Hz (fixed tuning) 1 kHz to 2000 MHz, 1-2-5 sequence at step keys	
		Readout accuracy		±2%	
	Resolution	Resolution bandwidth		30 Hz to 1 MHz (3 dB bandwidth), variable in 1-3 sequence, can be selected manually or automatically coupled to frequency span	
		Resolution bandwidth accuracy		±20%	
		Selectivity		≦15 : 1 (ratio of 60 dB and 3 dB bandwidth)	
	Stability	Residual FM		≦20 Hz p-p/0.1 s (frequency span ≦500 kHz)	
		Drift		≦300 Hz/min (frequency span ≦500 kHz, after 1-hour warm-up at constant ambient temperature)	
	Sideband noise			≦ −80 dBc (at 100 Hz resolution bandwidth, 1 Hz video bandwidth, 10 kHz from signal)	
	Reference oscillator	Frequency		10 MHz	
		Stability	Starting characteristic	≦5 × 10^{-8} (after 20-minute warm-up, referred to frequency after 1-hour warm-up)	
			Aging rate	≦2 × 10^{-8}/day, ≦1 × 10^{-7}/year (referred to frequency after 24-hour warm-up)	
			Temperature characteristic	≦5 × 10^{-8} (referred to frequency at 25°C)	
		External reference input		Frequency: 10 MHz, level: 2 to 5 Vp-p	
	Markers	NORMAL	Function	Displays frequency at tunable marker	
			Readout accuracy	Same as center frequency	
		Δ(delta)	Function	Displays frequency difference between reference marker and tunable marker	
			Readout accuracy	Same as frequency span accuracy	
		COUNT	Function	Displays received signal frequency at marker	
			Resolution	1 Hz, 10 Hz, 100 Hz selectable	
			Readout accuracy	Tuning frequency × reference frequency accuracy ±(2 counts or 20 Hz, whichever is greater)	
Amplitude	Measurement range			−130 to +20 dBm	−124 to +20 dBm
	Display	Divisions		8 divisions on vertical axis when top line is reference level and scale is 10 dB/div 10 divisions on vertical axis for other scales	
		LOG	10 dB/div	0 to −70 dB, referred to reference level	
			5 dB/div	0 to −50 dB, referred to reference level	
			2 dB/div	0 to −20 dB, referred to reference level	
			1 dB/div	0 to −10 dB, referred to reference level	
		LIN		10%/div of reference level (calibrated in voltage, unit: V)	
		Linearity		LOG: ±0.2 dB/0 to −10 dB, ±0.3 dB/0 to −20 dB, ±0.5 dB/0 to −50 dB, (resolution bandwidth of 100 Hz to 1 MHz), ±1 dB/0 to −70 dB, (resolution bandwidth of 100 Hz to 100 kHz), after automatic calibration LIN: ±3% of reference level (fullscale)	
	Frequency response			±0.5 dB (100 kHz to 2.0 GHz), input ATT at 20 dB, temperature range 20° to 30°C)	±0.5 dB (100 kHz to 1.5 GHz), input ATT at 20 dB, temperature range 20° to 30°C
	Reference level	Setting range		LOG: +20 to −100 dBm (setting resolution 0.1 dB) LIN: 2240 mV to 70.8 μV	LOG: +20 to −100 dBm (setting resolution 0.1 dB) LIN: 2750 mV to 87.1 μV
		Accuracy		±0.3 dB (0 to −50 dBm), ±0.75 dB (+20 to −70 dBm) after automatic calibration at frequency of 50 MHz and frequency span ≦2 MHz (resolution bandwidth, video bandwidth, sweep time, and input ATT settings at AUTO)	
	Resolution bandwidth switching deviation			±0.3 dB (after automatic calibration)	
	Dynamic range	Average noise level		≦ −120 dBm (frequency 1 MHz to 2 GHz) with 0 dB input ATT, 300 Hz resolution bandwidth, 1 Hz video bandwidth	≦ −114 dBm (frequency 1 MHz to 2 GHz) with 0 dB input ATT, 300 Hz resolution bandwidth, 1 Hz video bandwidth
		2nd and 3rd harmonic distortion		≦ −75 dB (frequency 5 to 800 MHz) when 0 dB input ATT and −30 dBm input level	
		Residual response		≦ −100 dBm (frequency ≧500 kHz) when 0 dB input ATT and 50 Ω input termination	≦ −95 dBm (frequency ≧500 kHz) when 0 dB input ATT and 75 Ω input termination

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Model				MS2601A	MS2601J
Amplitude	Marker	NORMAL		Displays level at tunable marker	
		Δ(delta)		Displays level difference between tunable marker and reference marker	
	Video bandwidth			1 Hz, 10 Hz, 100 Hz, 1 kHz, 10 kHz, 100 kHz, OFF (selected manually or automatically coupled to resolution bandwidth)	
	Level unit			dBm, dBμV, dBmV, V, dBμV (emf), dBμV/m	
	QP detection			The charge, discharge, and display time constants conforming to CISPR standards are provided at 200 Hz, 9 kHz, and 120 kHz resolution bandwidth	
	RF input	Impedance		50 Ω VSWR ≦1.5 (input ATT ≧10 dB, frequency ≧30 kHz), N-type connector	75 Ω VSWR ≦1.5 (input ATT ≧10 dB, frequency 30 kHz to 2 GHz), NC-type connector
		Maximum input level		+25 dBm (input ATT ≧10 dB), DC: ±50 V	
	Input ATT		Attenuation	0 to 50 dB, in 10 dB steps (selected manually or automatically coupled to reference level)	
			Switching accuracy	±1 dB (100 kHz to 1.5 GHz), ±2.0 dB (1.5 to 2 GHz)	
Sweep	Sweep time			50 ms to 100 s variable in 1, 1.5, 2, 3, 5, 7 sequence Selected manually or automatically coupled to frequency span, resolution bandwidth, and video bandwidth	
	Trigger			FREE RUN, LINE, VIDEO, SINGLE, EXT TRIGGER	
	Sweep range			Normal: sweeps entire range Zone sweep: sweeps range between zone markers	
CRT display	CRT			Six-inch electromagnetic deflection type (amber display color)	
	Display items			Graticule (grid), waveform data, setting conditions, menu, title	
	Waveform data display method			Digital storage, two channels (A and B), horizontal axis: 501 points	
Direct plotting				Screen data hard-copied to X-Y plotter or dot-matrix printer (compatible models only) via GP-IB	
Function memory				Internal memory: save/recall 6 setting conditions PMC (32 kB): save/recall 12 setting conditions and measurement data	
External control				GP-IB (IEEE488, IEC625-1, 24 pins) (All functions except power switch, CRT intensity, PMC control, GP-IB address, and direct plotting controlled) Interface: SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT1, C0	
External output	Video output			Composite and separate	
	X-Y-Z outputs			X-axis output: Left edge 0 V to right edge approx. 10 V Y-axis output: Lower edge 0 V to upper edge approx. 1 V Z-axis output: TTL level	
	IF output			Frequency: 3.6 MHz, output level: 0 dBm (at reference level line on CRT)	
	CHECK signal output			Frequency: 50 MHz, output level: −2 dBm	
	TG output			FIRST LOCAL frequency: 2.5214 to 4.7214 GHz, SECOND LOCAL frequency: 2.5 GHz	
	Probe power supply			+5 V, +15 V, −15 V	
Power*				AC 100 V $^{+10}_{-15}$%, 50/60 Hz, ≦145 VA (DC operation with MZ144A Battery Pack or MZ145B DC/DC Converter)	
Dimensions and weight				177H × 284W × 451D mm, <18.5 kg	
Ambient temperature, rated range of use				0° to 50°C	

* Specify one nominal line voltage between 100 and 250 V when ordering.

Options

● Option 01: PTA (with external keyboard)

PTA model		PTA-S201
Display	Number of display characters	57 characters × 25 lines (small) 48 characters × 25 lines (medium) 41 characters × 25 lines (large)
	Displayable characters	Upper-case and lower-case characters, numerals, special symbols, and cursor
	Character font	7 × 11 dot matrix (small) 9 × 13 dot matrix (medium) 10 × 13 dot matrix (large)
	Graphic	4 screens, 400 × 575 dots
Keyboard	Character keys	Upper-case and lower-case characters, numerals, and special symbols
	Editing keys	DEL, INS, <, >, ∧, ∨
	Command keys	RUN, STEP, RETURN, RES

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PTA model		PTA-S201
PTL	Program area	200 kbytes
	Commands	Basic commands (18 types) and GP-IB statements (2 types)
	Functions	Arithmetic functions, logical functions, and system functions
	System subroutines	Display subroutines and GP-IB subroutines
	Variables	Numeric, string, and system variable
	Interfaces	GP-IB and I/O port
PMC	Storage capacity	128 kbytes
	Program file	75 programs

• Option 02: RS-232C Interface

Communication mode	Start-stop, full-duplex
Baud rate	300, 600, 1200, 2400, 4800 bps
Data bit	7, 8
Parity bit	Odd, even and none
Start bit	1 bit
Stop bit	1, 1.5 and 2 bits
Control items	All items except power on/off, CRT intensity, PMC management, direct plotting and RS-232C parameters
Connector	DP-25P or equivalent

• Option 04: PTA (without keyboard)

• Option 05: Following changes to specifications

Option			MS2601A Option 05	MS2601J Option 05
Frequency	Measurement range		100 Hz to 2.2 GHz	
Amplitude	Frequency response		±0.5 dB (100 Hz to 2.0 GHz), input ATT at 20 dB, temperature range 20° to 30°C	±0.5 dB (100 Hz to 1.5 GHz), input ATT at 20 dB, temperature range 20° to 30°C
	Dynamic range	Average noise level	Following added to standard model ≦ −80 dBm (1 to 10 kHz) ≦ −100 dBm (10 to 100 kHz) ≦ −110 dBm (100 kHz to 1 MHz) At 0 dB input ATT, 30 Hz RBW, 1 Hz VBW	Following added to standard model ≦ −74 dBm (1 to 10 kHz) ≦ −94 dBm (10 to 100 kHz) ≦ −104 dBm (100 kHz to 1 MHz) At 0 dB input ATT, 30 Hz RBW, 1 Hz VBW
	RF input	Impedance	50 Ω VSWR ≦1.5 At ≧10 dB input ATT, ≧100 Hz frequency	75 Ω VSWR ≦1.5 At ≧10 dB input ATT, 100 Hz to 2 GHz frequency
		Maximum input level	+25 dBm (≧10 dB input ATT) DC ±0 V	
	Input ATT switching accuracy		±1.0 dB (1 kHz to 1.5 GHz) ±2.0 dB (1.5 to 2.0 GHz)	

Ordering information

Please specify model/order number, name and quantity when ordering.

Model/Order No.	Name		Remarks
	Main frame		
MS2601A	Spectrum Analyzer		RF input: 50 Ω
MS2601J	Spectrum Analyzer		RF input: 75 Ω
	MS2601A standard accessories		
J0025A	Coaxial Cord, 1 m:	1 pc	N-P-5W•5D-2W•N-P-5W
J0104	Coaxial Cord, 1 m:	1 pc	UG-88U•RG55/U•N-P-55U
J0017	Power Cord, 2.5 m:	1 pc	
F0012	Fuse, 3.15 A:	2 pcs	T3.15A250V
P0001	Memory Card, 32 kbyte:	1 pc	BS32C1-A-30
W0270AE	MS2601A/J Operation Manual:	1 copy	
W0270BE	MS2601A/J Service Manual:	1 copy	
	MS2601J standard accessories		
J0308	Coaxial Cord, 1 m:	1 pc	BNC-P620•3C-2WS•NC-P-3W
J0121	Coaxial Cord, 1 m:	1 pc	NCP-3W•3C-2WS•NCP-3W
J0017	Power Cord, 2.5 m:	1 pc	
F0012	Fuse, 3.15 A:	2 pcs	T3.15A250V
P0001	Memory Card, 32 kbyte:	1 pc	BS32C1-A-30
W0270AE	MS2601A/J Operation Manual:	1 copy	
W0270BE	MS2601A/J Service Manual:	1 copy	

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Model/Order No.	Name	Remarks
	Options	
MS2601-01	PTA	With external PTA Keyboard
MS2601-02	RS-232C Interface	
MS2601-04	PTA	Without PTA Keyboard
MS2601-05	DC Coupled Input	Frequency range: 100 Hz to 2.2 GHz (with MA8601A)
	Optional instruments and parts	
P0001	Memory Card, 32 kbyte	BS32C1-A-30
P0002	Memory Card, 128 kbyte	BS128C1-C-56
MA8601A	DC Block Adaptor	50 Ω
MA8601J	DC Block Adaptor	75 Ω
G0044	PTA Keyboard	
MH680A	Tracking Generator	0.1 to 2000 MHz
MH648A	Pre-amplifier	0.1 to 1200 MHz
MZ144A	Battery Pack	
MZ145B	DC/DC Converter	
MP534A	Dipole Antenna	25 to 520 MHz
MP651A	Dipole Antenna	470 to 1200 MHz, 50 Ω (N)
3104P	Biconical Antenna	20 to 200 MHz, 50 Ω
6502	Loop Antenna	10 kHz to 30 MHz, 50 Ω
MP635A	Log-periodic Antenna	80 to 1000 MHz
MP666A	Log-periodic Antenna	200 to 2000 MHz
MB18A	Pole	for MP666A
MB9A	Tripod	
MB19A	Tripod	With a pole, for MP635A/MP666A
MN423B	Artificial Mains Network	CISPR Pub.1, 150 kHz to 30 MHz
MN424B	Artificial Mains Network	FCC Part 15, 450 kHz to 30 MHz
MN425B	Artificial Mains Network	VDE 0876, 10 kHz to 30 MHz
MP414B	Loop Antenna	9 kHz to 30 MHz, 3 bands
MP415B	Rod Antenna	9 kHz to 30 MHz, 3 bands
MZ126A	Band Selector	For MP414B
MP612A	RF Fuse Holder	DC to 1000 MHz, 50 Ω
MP613A	Fuse Element	5 pc/set, for MP612A
MP640A	Branch	40 dB, DC to 1.7 GHz
MP654A	Coupler	30 dB, 0.8 to 3 GHz
J0063	Fixed Attenuator for High Power Measurement	10 W, DC to 12.4 GHz
J0079	Fixed Attenuator for High Power Measurement	30 W, DC to 9 GHz
MP526A	High-Pass Filter	For 60 MHz band
MP526B	High-Pass Filter	For 150 MHz band
MP526C	High-Pass Filter	For 250 MHz band
MP526D	High-Pass Filter	For 400 MHz band
MP526G	High-pass Filter	For 27 MHz band
UA455A	Video Plotter	
B0215	Rack Mount	
J0007	GP-IB Cable, 1 m	408JE-101
J0008	GP-IB Cable, 2 m	408JE-102
B0213	Carrying Case	With casters
B0214	Carrying Case	Without casters
B0225	Carrying Bag	With casters
B0226	Carrying Bag	Without casters
B0025	Protective Front Cover	
B0029	Stacking Feet	
B0038	Front Handle Kit	
B0231	CRT Hood	
MP520A	CM Directional Coupler	25 to 500 MHz, 75 Ω (NC)
MP520B	CM Directional Coupler	25 to 1000 MHz, 75 Ω (NC)
MP520C	CM Directional Coupler	25 to 500 MHz, 50 Ω (N)
MP520D	CM Directional Coupler	100 to 1000 MHz, 50 Ω (N)
MP614A	50/75 Ω Impedance Transformer	10 to 1000 MHz
MB009	50/75 Ω Impedance Transformer	DC to 2000 MHz, loss: 6.2 dB
MA2601B	EMI Probe	5 to 1000 MHz
MA2601C	EMI Probe	1 to 50 MHz
KT-10	EMI Clamp	
MB18B	Pole	For MP651A
Z0047	Plotter Paper	5 rolls/set, for UA455A
GD9411	Plotter	Graphtec product
PACKET V series	Personal Technical Computer	
MH037A	BCD Converter	
P6201	FET Probe	Sony-Tektronix product
MZ7004A	Portable Test Rack	

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