MS420□specifications

Functions		Specifications	Network analysis	Spectrum analysis
Measuring items		Magnitude, Phase, Delay, Magnitude and Phase, Magnitude and Delay	•	
		Level (R), Level (T), Spectrum (R), Spectrum (T) R: Reference input, T: Test input, Level: Measures the level only at frequency points displayed on the CRT, Spectrum: Displays the maximum value of the signal by making a measurement with frequency steps fine enough to acquire all frequencies in full sweep bandwidth		•
Frequency	Range	10Hz to 30MHz. Resolution: 0.01Hz	•	•
	Reference crystal oscillator	Frequency: 10MHz Stability: $\leqq 5 \times 10^{-8}$ after 10 minutes warm-up, based on the frequency after one hour warm-up $\pm 1 \times 10^{-7}$ (0 to 45°C)	•	•
Input	Channel	2 channels (R and T)	•	•
	Impedance	1MΩ: 1MΩ ±10% shunted by $\leqq$70pF (50pF typical) 75Ω: (MS420B); 50Ω: (MS420K); Return loss: $\geqq$30dB	•	•
	Range (IRG)	−40 to +20dBm, 10dB steps	•	•
	Connector	BNC	•	•
Dynamic range	Image rejection	$\geqq$70dB	•	•
	IF rejection	$\geqq$70dB	•	•
	Internal distortion	$\leqq$−60dB at 100Hz to 200kHz (Resolution bandwidth: $\leqq$300Hz) $\leqq$−70dB at 200kHz to 15MHz	•	•
	Average noise level	At level measurement when the input channel and impedance are T and 75Ω/50Ω.		•
		The best data for the network analysis is 10dB or more improvement over above values.	•	
Crosstalk	Between input R and T	$\geqq$100dB	•	
	Between synthesizer output and input T	$\geqq$120dB	•	•
Resolution bandwidth	3dB bandwidth	3Hz to 30kHz in 1,3 sequence. Accuracy: ±20% at $\geqq$30Hz	•	•
	Selectivity	< 20:1, shape factor 60dB/3dB		
Video bandwidth		3Hz to 30kHz in 1,3 sequence	•	•
Magnitude measurement	Range	100dB. Resolution: 0.01dB	•	
	Offset error	Frequency response and input range/resolution bandwidth switching errors can automatically be corrected by memorizing the calibration data (usually based on the through connection).		
	Linearity	0 to −50dB : ±0.15dB −50 to −60dB: ±0.5dB −60 to −70dB: ±1dB −70 to −80dB: ±2dB ±1dB (0 to −10dB) for resolution bandwidth 3Hz		
Level/ spectrum measurement	Range	−130 to +20dBm. Resolution: 0.01dB		•
	Offset error	Frequency response and input range errors can automatically be corrected by memorizing the standard data calibrated with the reference signal (synthesizer output)		
	Linearity	0 to −50dB : ±0.15dB −50 to −60dB: ±1dB −60 to −70dB: ±3dB ±1dB (0 to −10dB) for resolution bandwidth 3Hz		•
Phase measurement	Range	±180 degrees. Resolution: 0.1 deg.	•	
	Offset error	Frequency response and input range/ resolution bandwidth switching errors can automatically be corrected by memorizing the calibration data (usually based on the through connection).		
	Level characteristic	0 to −50dB: ±1.5 deg. −50 to −70dB: ±3 deg. at resolution bandwidth 3kHz.		
Delay measurement	Range	1 μs to 400 ms in 1, 2, 4 sequence	•	
	Resolution	Normal: 1/1000 of measurement range. Expand: 1/10000 of measurement range		
	Offset error	Frequency response can automatically be corrected by memorizing the calibration data (usually based on the through connection).		
	Level characteristic	(0.5% of full scale +0.5% of reading) at 0 to −50dB and resolution bandwidth $\geqq$10Hz for 1 μs range (1 to 30MHz)		

Resolution bandwidth	Frequency	Values relative to input range
10 Hz	100 Hz to 30MHz	−60dB
10 Hz	10kHz to 30MHz	−90dB
30 Hz	300 Hz to 30MHz	−70dB
30 Hz	10kHz to 30MHz	−85dB
100 Hz	1kHz to 30MHz	−80dB
300 Hz	3kHz to 30MHz	−80dB
1kHz	10kHz to 30MHz	−75dB
3kHz	30kHz to 30MHz	−70dB
10kHz	100kHz to 30MHz	−65dB
30kHz	300kHz to 30MHz	−60dB

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Synthesizer output	A output	−110 to +15dBm, Resolution: 0.01dB	•	•
	B output	−110 to +9dBm, Resolution: 0.01dB (power splitter output). Both outputs terminated.		
	Level accuracy	±0.3dB at +5dBm		
	Impedance	75Ω, Return loss: >30dB (MS420B). 50Ω, Return loss: >30dB (MS420K)		
	Connector	BNC		
Frequency measurement		Resolution: 1Hz. Accuracy: Reference frequency ±1Hz		•
Sweep mode	Frequency	LIN: START/STOP, CENTER/SPAN LOG: START/STOP	•	•
	Level	START/STOP/STEP		
Sweep points		251	•	•
Sweep time (ST)		500ms* to 24 hours/ SPAN *: Depends on measurement item and measurement conditions	•	•
Sweep range	AUTO	Automatic sweep over the full range	•	•
	MARKER	Measures only marker point or sweeps only the range between two markers.		
Sweep control		RESET, STOP, REPEAT START, SINGLE START	•	•
Automatic setting		SIGNAL TRACK: Automatically ganged to maximum received signal		•
		BW, ST: COUPLED TO FREQ Resolution bandwidth, video bandwidth and sweep time are automatically set to the optimum values by ganging with span width	•	•
		BW, ST: COUPLED TO SPAN Resolution bandwidth, video bandwidth and sweep time are automatically set to the optimum value by ganging with frequency		•
Calibration	INT	Non-linearity error correction	•	•
	X → S	Offset error correction		
Calculation	X − S	Automatic correction of offset error	•	•
	A − B	Arithmetic processing between A and B memories		
	Δ	Deviation between MAIN marker and Δ marker		
	ZERO	Deviation from reference value		
Display	CRT	6.5 inch electromagnetic deflection	•	•
	Trace	Same as the measuring items (rectangular coordinates)		
	Sub-trace	Same as the measuring items (rectangular coordinates) B, A, A − B. It is not performed for Magnitude/ Phase and Magnitude/ Delay		
	Markers	2 (MAIN marker and Δ marker)		
	Character	Marker point data, trace condition, measurement condition		
	Function memory	3 (Trace condition, measurement condition)	•	•
Rear panel INPUT/ OUTPUT	Video output	75Ω load, approx. 1 Vp-p (BNC)	•	•
	10MHz reference output	TTL level (BNC)		
	10MHz reference input	TTL level (BNC)		
	X → S switching signal	Open collector (36 pins)		
	GP-IB	Compatible with IEEE-488 (24 pins)		
Remote control		GP-IB (IEEE-488, IEC625-1, 24 pins) SH1, AH1, T6, L4, SR1, RL1, PP0, DC0, DT0, C28 All functions (except power and INTENSITY) of front panel are remotely controllable	•	•
Power		AC100V ± 10%, 50/60Hz, <330VA	•	•
Ambient temperature, rated range of use		0°C to +45°C	•	•
Dimensions and weight		221.5H, 426W, 451D mm, ≦35 kg	•	•

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