

1.4 Specifications

The MS2601A specifications are listed below.

<Frequency>

- Measurement range
10 kHz to 2.2 GHz
- Setting range
0 to 2210 MHz
- Setting mode
Center-span, Start-span
- Center frequency
 - . Readout accuracy
 $\pm(100 \text{ Hz} + 2\% \text{ of frequency span} + \text{tuning frequency} \times \text{reference frequency accuracy})$
Frequency span ≥ 10 kHz, after automatic calibration
 - . Resolution 20 Hz
- Start frequency
 - . Readout accuracy
Same as center frequency readout accuracy
 - . Resolution 20 Hz
- Frequency span
 - . Setting range
1 kHz to 2000 MHz (1-2-5 sequence) and 2-digit, and 0 kHz settings
 - . Readout accuracy $\leq \pm 2\%$

- Resolution bandwidth
 - . 3 dB Bandwidth
 - 30 Hz to 1 MHz variable in 1, 3 sequence
 - . Accuracy $\pm 20\%$
 - . Selectivity
 - $\leq 15:1$ (60 dB/3 dB bandwidth ratio)
- Stability
 - . Residual FM
 - ≤ 20 Hzp-p/0.1 s (frequency span ≤ 500 kHz)
 - . Drift
 - ≤ 300 Hz/min. (frequency span ≤ 500 kHz, 1 hr after power-on, constant ambient temperature)
- Sideband noise
 - ≤ -80 dBc (resolution bandwidth 100 Hz, video bandwidth 1 Hz, 10 kHz away from signal)
- Reference oscillator
 - . Frequency 10 MHz
 - . Stability
 - Starting characteristics: $\leq \pm 5 \times 10^{-8}$ (20 min. after power-on with frequency 1 hr after power-on as reference)
 - Aging rate: $\leq \pm 2 \times 10^{-8}$ /day, $\leq \pm 1 \times 10^{-7}$ /year (referred to frequency after 24 hr operation)
 - Temperature characteristic: $\leq \pm 5 \times 10^{-8}$ (0° to 50°C referred to frequency at 25°C)
 - . External reference input
 - Frequency: 10 MHz
 - Level: 2 to 5 Vp-p

■ Marker

. NORMAL

Indicates marker point frequency

Readout accuracy: Same as center frequency accuracy

. Δ (delta)

Indicates frequency difference between two marker points

Readout accuracy: Same as frequency span accuracy

. Count

Indicates receiving signal frequency on the marker

. Resolution

1, 10, 100 Hz, switchable

. Accuracy

Readout frequency x reference oscillator frequency accuracy ±(2 counts or 20 Hz)

<Amplitude>

■ Measurement range

-130 to +20 dBm

■ CRT display range

. Scale

Scale line at top of screen is reference level

Vertical axis 8 divs at 10 dB/div

10 divs at other dB/div

- . LOG display
 - 10 dB/div: reference level -70 dB
 - 5 dB/div: reference level -50 dB
 - 2 dB/div: reference level -20 dB
 - 1 dB/div: reference level -10 dB
- . LIN display
 - 10%/div of reference level (units V)
- . Linearity
 - After automatic calibration (resolution bandwidth 100 Hz to 1 MHz)
 - LOG: ± 1 dB for 0 to -70 dB (10 dB/div, resolution bandwidth 100 Hz to 100 kHz)
 - +0.5 dB for 0 to -50 dB (5 dB/div)
 - ± 0.3 dB for 0 to -20 dB (2 dB/div)
 - ± 0.2 dB for 0 to -10 dB (1 dB/div)
 - LIN: $\pm 3\%$ of reference level (full scale)
- Frequency response
 - $\leq \pm 0.5$ dB (100 kHz to 2.0 GHz, input ATT 20 dB, temperature range from 20° to 30°C)
- Reference level accuracy
 - . Setting range
 - LOG: +20 to -100 dBm (resolution 0.1 dB)
 - LIN: 2240 mV to 2.2 μ V
 - . Accuracy
 - After automatic calibration (frequency 50 MHz, frequency span ≤ 2 MHz; resolution bandwidth, video bandwidth, sweep time and input attenuator settings in AUTO)
 - $\leq \pm 0.3$ dB (0 to -50 dBm)
 - $\leq \pm 0.75$ dB (+20 to -70 dBm)
- Resolution bandwidth switching deviation
 - $\leq \pm 0.3$ dB (after automatic calibration)

- Dynamic range
 - . Average noise level
 - ≤-120 dBm (resolution bandwidth 300 Hz, video filter 1 Hz, frequency 1 MHz to 2 GHz)
 - . 2nd and 3rd harmonics
 - ≤-75 dB (input level -30 dBm, input attenuator 0 dB, frequency 5 to 800 MHz)
 - . Residual response
 - ≤-100 dBm (frequency ≥500 kHz, input attenuator 0 dB, input 50 Ω termination)

- Marker
 - . NORMAL
 - Displays marker position level
 - . A (delta)
 - Displays level difference between two markers

- Video bandwidth
 - 1 Hz, 10 Hz, 100 Hz, 1 kHz, 10 kHz, 100 kHz, OFF

- Level units
 - dBm, dBμV, dBmV, V, dBμV (emf), dBμV/m

- QP detection
 - . 6 dB bandwidth
 - 200 Hz, 9 kHz, 120 kHz
 - . Electrical charging time constant
 - 45 ms (6 dB bandwidth 200 Hz, frequency range 10 to 150 kHz)
 - 1 ms (6 dB bandwidth 9 kHz, 120 kHz, frequency range 150 kHz to 1 GHz)

- . Electrical discharging time constant
 - 500 ms (6 dB bandwidth 200 Hz, frequency range 10 to 150 kHz)
 - 160 ms (6 dB bandwidth 9 kHz, frequency range 150 kHz to 30 MHz)
 - 550 ms (6 dB bandwidth 120 kHz, frequency range 30 MHz to 1 GHz)

- . Mechanical time constant
 - 160 ms (6 dB band width 200 Hz, 9 kHz, frequency range 10 to 30 MHz)
 - 100 ms (6 dB bandwidth 120 kHz, frequency range 30 MHz to 1 GHz)

■ RF input

- . Impedance
 - VSWR ≤ 1.5 (50 Ω , ATT ≥ 10 dB, frequency ≥ 30 kHz)
- . Maximum input
 - +25 dBm (ATT ≥ 10 dB), 50 Vdc

■ RF input attenuator

- . Attenuation
 - 0 to 50 dB, 10 dB steps
- . Switching accuracy
 - ± 1 dB (100 kHz to 1.5 GHz),
 - ± 2.0 dB (1.5 to 2 GHz)

<Sweep>

■ Time

- 50 ms to 100 s variable
- Variable in 1, 1.5, 2, 3, 5, 7 second step sequence

- Trigger
 - FREE RUN, LINE, VIDEO, SINGLE, EXT TRIGGER
- Sweep range
 - Normal: Entire range swept
 - Zone marker sweep: Range indicated by zone marker swept

<CRT display>

- CRT
 - 6 inch, magnetic deflection (amber)
- Display items
 - Scale (grid), waveform data, setting conditions, menu, functions
- Display method
 - Digital storage, 2 channels (A and B)
 - Horizontal axis 501 points
- Direct plotting
 - Data on CRT screen hard-copied onto plotter or printer via GP-IB
- Calibration
 - . ALL CAL
 - LEVEL CAL1, LEVEL CAL2, FREQ CAL calibrations
 - . LEVEL CAL1
 - Total level, LOG scale linearity error calibrations
 - . LEVEL CAL2
 - Resolution bandwidth switching deviation, reference level deviation calibrations
 - . FREQ CAL
 - LO frequency error, resolution bandwidth center frequency error calibrations

■ Function memory

Internal memory: 6 setting conditions

PMC (32 kbytes): 12 setting conditions, measured waveform

<External control>

■ GP-IB functions

All functions except power switch, INTENSITY, PMC management, direct plotting, and GP-IB address controllable

Interface: SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT1, C0

<External output>

■ TG output

. FIRST LOCAL

Frequency: 2.5214 to 4.7214 GHz

. SECOND LOCAL

Frequency: 2.5 GHz

■ X-Y-Z axes

X-axis output: Left end 0 V to right end approx. 10 V

Y-axis output: Bottom 0 V to top approx. 1 V

Z-axis output: TTL level

■ Check output signal

. Frequency 50 MHz

. Output level -2 dBm

. Output impedance 50 Ω

■ IF OUTPUT

- . Frequency 3.6 MHz
- . Output level
0 dBm (at reference level line on screen)
- . Output impedance 50 Ω

■ Video output

Composite, separate

■ Probe power supply

Power supply : +5, +15, -15 V

<Dc operation>

■ Dc power supply

Dedicated battery pack MZ144A or Dc-Dc converter
MZ145B)

<External memory>

■ PMC*

- . Memory card SRAM** card BS32C1-A-30
- . Dimensions 85.6H x 54W x 3.5D mm
- . Storage capacity 32 kbytes
- . Power supply Built-in back-up battery

* PMC: Plug-in-Memory Card

** SRAM: Static Random Access Memory

<General specifications>

- Operating temperature range 0° to 50°C
- Power requirement **V +10% or -15%, 50/60 Hz

- Power consumption <145 VA
- Dimensions and weight
 177H x 284W x 451D mm, ≤18.5 kg

<Option 01 (or 04)>

- PTA
 - . Software
 PTL high level language software: ROM base
 - . Keyboard 1 (Option 01 only)

<Option 02>

- RS-232C interface
 - . Baud rate 1200 baud