**Table 1-1. Specifications (1 of 3)**

Note: Specifications apply after 1-hour warm-up, over the temperature range 0 to 55°C (except specifications for harmonically related spurious signals, RF output level, pulse peak level accuracy, and amplitude modulation; which apply over the range 15 to 35 degrees C), after an AUTO PEAK operation has been performed. For additional information concerning the use of AUTO PEAK, refer to Section III. Specifications for output flatness, absolute level accuracy, and modulation apply only when internal leveling is used.

| Electrical Characteristics | Performance Limits | Conditions |
|---|---|---|
| **FREQUENCY** | | |
| Range | 2.0—18.0 GHz<br>(1.95—18.6 GHz overrange) | |
| Resolution | 1 kHz<br>2 kHz<br>3 kHz | 2.0 to 6.6 GHz<br>>6.6 to 12.3 GHz<br>>12.3 to 18.0 GHz |
| Accuracy and Stability | Same as reference oscillator | Except in FM deviation mode, 10 MHz/volt range |
| Reference Oscillator Frequency | 10 MHz | |
| Aging Rate | >1.5 x $10^{-9}$/day | After a 10 day warmup (typically 24 hours in a normal operating environment) |
| **SPECTRAL PURITY** | | |
| Single-sideband Phase Noise | ≤−60 dBc | CW mode, 1 Hz bandwidth<br>1 kHz offset |
| Harmonics | <−40 dBc | At +3 dBm |
| Subharmonics and multiples thereof | <−35 dBc | At +3 dBm |
| Spurious Signals, nonharmonically related, except power line and fan rotation related | <−60 dBc | CW and AM modes |
| Residual AM | <−50 dBc | In a 200 kHz post-detection bandwidth |
| **RF OUTPUT** | | |
| Output Power | +8 dBm to −120 dBm | +15° to +35°C |
| Resolution (digital display) | 0.1 dB | |
| Level Flatness | ±2 dB | At +3 dBm, +15° to +35°C |
| Absolute Level Accuracy | | +15° to +35°C |
| 2.0—12.0 GHz | ±4 dB | +8 to −60 dBm |
| | ±5.5 dB | <−60 to −120 dBm |
| >12.0—18.0 GHz | ±5.0 dB | +8 to −60 dBm |
| | ±6.5 dB | <−60 to −120 dBm |

**Table 1-1. Specifications (2 of 3)**

| Electrical Characteristics | Performance Limits | Conditions |
|---|---|---|
| **PULSE MODULATION** | | |
| ON-OFF Ratio | ≥70 dB | |
| Overshoot/Ringing | ≤20% | |
| Pulse IN Connector | BNC Female | |
| **AMPLITUDE MODULATION** | | |
| Depth | 0 to 75% | 15° to 35°C at 0 dBm maximum carrier level |
| Rate | 10 Hz—50 kHz, ±3 dB | 30% depth |
| Sensitivity | 30%/V and 100%/V (depending on range) | Maximum input 1 Vpk into 600Ω nominal; AM depth is linearly controlled by varying input level between 0 and 1V peak |
| Distortion | <8% | 50% modulation depth with 1 kHz rate a 0 dBm |
| AM IN Connector | BNC Female | |
| **FREQUENCY MODULATION** | | |
| Rate | | |
| | ±3 dB,100 Hz—2 MHz | 0.03 MHz/V Range |
| | ±3 dB,100 Hz—2 MHz | 0.1 MHz/V Range |
| | ±3 dB, 3 kHz—2 MHz | 0.3 MHz/V Range |
| | ±3 dB, 3 kHz—2 MHz | 1 MHz/V Range |
| | ±3 dB, 3 kHz—2 MHz | 3 MHz/V Range |
| Maximum peak deviation is 10 MHz | 50 Hz—2 MHz (typical) | 10 MHz/V Range (unlocked) |
| Maximum Peak Deviation: | | |
| | The smaller of 3 MHz or $f_{mod}$ x 5 | 2.0—6.6 GHz; 0.03, 0.1, 0.3, 1, 3 MHz/V range |
| | The smaller of 3 MHz or $f_{mod}$ x 10 | 6.6—12.3 GHz; .03, 0.1, 0.3, 1, 3 MHz/V range |
| | The smaller of 3 MHz or $f_{mod}$ x 15 | 12.3—18 GHz; .03, 0.1, 0.3, 1, 3 MHz/V range |
| Sensitivity | 1V peak for maximum deviation in each range | |
| Incidental AM | <5% at <100 kHz rate | Peak deviation <1 MHz |
| FM IN Connector | BMC Female | |

**Table 1-1. Specifications (3 of 3)**

| Electrical Characteristics | Specification |
|---|---|
| **DIGITAL SWEEP** | |
| Sweep Function | Start/Stop or ΔF (span) sweep |
| Sweep Modes | Manual, Auto, Single sweep |
| Step Size | Maximum of 9999 frequency points per sweep; minimum step size equals frequency resolution. Step size set directly or as number of frequency points per sweep. |
| Dwell Time | Set from 1 to 255 ms per frequency |
| Markers | 5 independent, fixed frequency markers set from front panel. Resolution and accuracy are identical to RF output. |
| **REAR PANEL CONNECTORS** | |
| Frequency Reference Output | 1V/GHz ramp; +18V maximum |
| Sweep Output | 0 to +10V ramp start to stop (maximum adjustable from +4V to +12V) |
| Tone Marker Output | 5 kHz sine wave output markers for sweeps |
| Z-axis Blanking/Marker Penlift | Provides Z-axis control for a CRT display compatible with recording devices that have penlift control. |
| Aux Connector | 14-pin connector for remote control of frequency increment, display blanking, sequential register recall, start and stop sweep, and more. |
| 10 MHz Output | 0 dBm (nominal) into 50 ohms |
| 100 MHz Output | 0 dBm (nominal) into 50 ohms |
| HP-IB Capability | All front panel controls, except the line power switch are HP-IB programmable |
| Output Data | Frequency and output level settings, error/malfunction messages, operational status codes, and learn mode strings |
| Interface Function Codes | SH1, AH1, T5, TE0, L3, LE0, SR1, RL1, PP1, DC1, DT1, C0, and E1. |
| **GENERAL** | |
| Operating Temperture | 0 to +55°C (see note at the beginning of this table) |
| Power | 100, 120, 220, or 240V, +5%, −10%, 48—66 Hz |
| E.M.I. | Conducted and radiated interference is within the requirements of methods CE03 and RE02 of MIL-STD 461A, VDE 0871, and CISPR publication 11. |
| Net Weight | 29 kg (64 lb) |
| Dimensions: Height<br>Width<br>Depth | 146 mm (5.7 in.)<br>425 mm (16.8 in.)<br>620 mm (24.4 in.)<br>For ordering cabinet accessories, module sizes are 5-1/4H, 1 MW, 23D, System II |
| Accessories | Power Cord, Operating and Service Manual and Type N (M) to SMA (F) adapter |

**Table 1-2. Supplemental Characteristics**

Supplemental characteristics are intended to provide information useful in applying the instrument by giving typical, but non-warranted, performance parameters. They apply to the 8673E in "Normal" mode, CW operation, and with AUTO PEAK on, except where noted.

## FREQUENCY

**Internal Reference:** The internal reference oscillator accuracy is a function of time base calibration ± aging rate, ± temperature effects, and ± line voltage effects. Typical temperature and line voltage effects are $<1 \times 10^{-7}/°C$ and $<5 \times 10^{-10}/+5\%$ to $-10\%$ line voltage change. Reference oscillator is kept at operating temperature in STANDBY mode with the instrument connected to mains power. The aging rate is $<1.5 \times 10^{-9}$/day after a 24 hour warmup.

**External Reference Input:** 5 or 10 MHz at a level of 0.1 to 1 Vrms into 50Ω. Stability and spectral purity of the microwave output will be partially determined by characteristics of the external reference frequency.

**Reference Outputs:** 10 MHz at a level of 0.2 Vrms into 50 ohms. 100 MHz at a level of 0.2 Vrms into 50 ohms.

## SPECTRAL PURITY

**Residual FM:** 250 Hz in a 50 Hz—15 kHz Post-detection bandwidth.

**Spurious Signals:** Power line and fan rotational related, are located at $<-40$ dBc.

## RF OUTPUT

For power settings >0 dBm, changes in frequency of several GHz in one step may require additional AUTO PEAK enabling to stabilize power at the desired level. Spurious output oscillations may occur for settings above +8 dBm.
External leveling device characteristics will determine output flatness, absolute level accuracy, and switching time in external leveling modes.

**Maximum Reverse Power:** 1W RF input; 1 MHz—20 GHz, 0 Vdc.

**Impedance:** 50 ohms.

**Source SWR:** ≤2.5:1.

## PULSE MODULATION

**Pulse Input:**

**Impedance:** 50 ohms nominal.

**Pulse Repetition Frequency:** 50 Hz to 1 MHz.

**Minimum Duty Cycle:** <0.001 for internally levelled performance, no restriction when unlevelled.

**Pulse Width:** ≥80 ns.

**Levels and Triggering:** Rising or falling edge triggered; >3V on, <0.5V off, Normal Mode; <0.05V on, >3V off, Pulse Complement Mode.

**Waveform:** any.

**Level Accuracy:** (relative to CW, 15°C to 35°C) ±2 dB, pulse width >100 ns.

**Rise/Fall Time:** <50 ns.

**Video Feedthrough:** $<-50$ dBc.

## AMPLITUDE MODULATION

**Incidental FM:** is the Incidental Phase Modulation times the Modulation Frequency, where Incidental Phase Modulation (at 30% depth) is <1.2 radians, from 2.0 to 18 GHz.

**AM Impedance:** 600 ohms.

## FREQUENCY MODULATION

**FM Distortion:** ≤5% at >20 kHz rate.
**Input Impedance:** 50 ohms.