

# Wireless Mobile & Base Station Test Sets

350

## GSM900, DCS1800, and PCS1900 Test Sets

HP 8922M  
HP 8922P

- Complete GSM/DCS/PCS mobile station test sets
- Designed to minimize production/service costs
- Built-in toolkit of instruments
- E-GSM and dual-band capability
- Fast and easy to use
- HSCSD Test Solution
- Accurate and repeatable GSM measurements
- Built-in IBASIC controller for easy automation



HP 8922M

### HP 8922 GSM Test Sets

The HP 8922 GSM MS Test Set is ideal for use in R&D, high-end service and manufacturing. The easy to use, rich and flexible feature set make it the instrument of choice for bench work. The speed, accuracy and repeatability of the HP 8922 make it ideal for use in incoming inspection and volume manufacturing. The HP 8922 includes a GSM base-station emulator and all the signalling and measurement capability to fully test a mobile without any additional equipment.

### GSM Radio Test Solutions

The HP 8922 contains a complete set of instrumentation for testing the RF sections of GSM radios. In addition to the frequency agile 0.3 GMSK RF generator, the RF analyzer has an agile local oscillator, coherent data demodulator, pulse demodulator, FM demodulator, global method analyzer for phase and frequency error, synthesized spectrum analyzer, and pulse power meter. The HP 8922 adds a bit-error-rate tester (BERT) for performing GSM receiver measurements, channel CODEC, and call control protocol to setup a phone call and maintain the link while performing measurements. Echo mode is facilitated by the voice CODEC for functional testing of a mobile, and the electrical man machine interface (EMMI) is implemented for controlling the mobile and supporting the digital audio interface (DAI). Flash memory on the HP 8922 allows easy upgrades.

### GSM Data and HSCSD Test Solution

The HP 8922 supports the ability to test GSM single slot data and High Speed Circuit Switched Data (HSCSD) mobiles. For use in R&D, Production and Service, options K09, K17 and K18 can test single slot, 2x1, 2x2, 9.6Kbps and 14.4Kbps mobiles.

### Complete Tool Set

Aside from their complete complement of GSM measurements, the HP 8922 contains general-purpose tools useful for module test, troubleshooting, and debugging activities. The tools include a digital oscilloscope, CW RF synthesizer, spectrum analyzer, CW RF frequency counter, CW and peak RF power meter, ac voltmeter, dc voltmeter, 1 kHz distortion/SINAD meter, audio frequency counter, and synthesized audio source. The sum of these capabilities makes the HP 8922 an extraordinarily powerful tool for the design manufacture and repair of GSM radio equipment.

### HP 83212D GSM/DCS1800/PCS1900 Mobile Test Software

The HP 83212D is an easy-to-use software solution for automatic testing of GSM900, DCS1800 and PCS1900 mobile stations. Running on the HP 8922's built-in IBASIC controller, the HP 83212D offers a comprehensive set of tests ideal for incoming inspection and repair of GSM phones. Its flexibility and modularity allow you to select and change test sequences, test parameters, and pass/fail limits without programming expertise. Procedures can be simply saved on RAM cards and distributed to colleagues, guaranteeing consistent test methods. All test results are displayed on the screen and can be documented with hard-copy printouts when an external printer is added. Three levels of testing are available with the HP 83212D: manual mobile station troubleshooting, quick functional checkout, and full parametric testing. Automating your measurements provides repeatable results while allowing the user to test more mobile stations in less time. This increase in throughput lowers your testing cost.

### HP 83220A/E DCS/PCS Test Sets

The HP 8922M tests GSM mobiles only. Adding an HP 83220A/E expands the capabilities of the HP 8922M to comprehensively test DCS1800 and PCS1900 equipment. The HP 83220E provides a cost-effective solution for mobile testing. The HP 83220A has the frequency range to test both mobiles and base stations. All features of the HP 8922 are retained.

### HP 8922P Dual-band Test Sets

Combine the HP 8922M with the HP 83220E and new firmware to form a complete dual-band (GSM 900/DCS 1800) test solution. All the original HP 8922 features are retained but now, with dual-band intra-cell handover capability, the latest GSM mobiles can be tested seamlessly, at all frequencies, through a single RF connector.

## HP 8922M Specifications

### RF Generator

**Frequency Range:** 10 MHz to 1000 MHz  
**Frequency Resolution:** 1 Hz  
**Switching Speed:** 577  $\mu$ s  
**0.3 GMSK Modulation:** External clock and data  
**Pulse Modulation:** Normal and 30 dB  
**Output Power:** -16 to -127 dBm

### RF Analyzer

**Frequency Range:** 10 MHz to 1000 MHz  
**Frequency Resolution:** 1 Hz (100 kHz in hop mode)  
**Switching Speed:** 577  $\mu$ s  
**Coherent Data Demodulation:** 0.3 GMSK at 270.833 Kb/s, 1 timeslot/frame  
**Analog Demodulation:** FM and pulse  
**Global Method:** rms and peak phase error, frequency error  
**Amplitude Envelope:** Rise, fall, and burst flatness over useful bits  
**Peak Transmitter Power:** +10 dBm to +45 dBm (-5 dBm to 41 dBm on HP 8922F/H)  
**Output RF Spectrum Measurements<sup>1</sup>:** Due to modulation and switching transients  
**CW Frequency Counter:** 10 MHz to 1000 MHz

### Spectrum Analyzer<sup>1</sup>

**Frequency Range:** 10 MHz to 1000 MHz  
**Frequency Accuracy and Stability:** Same as timebase  
**Display Range:** 80 dB  
**Other Features:** External trigger, marker

### Digital Oscilloscope

**Frequency Range:** 2 Hz to 50 kHz  
**Sweep Times:** 10  $\mu$ s to 100 ms in 1, 2, 5, 10 steps

### Audio Analyzer

**Frequency Range:** 20 Hz to 400 kHz  
**AC Voltage Range:** 0 to 30 V<sub>rms</sub>  
**DC Voltage Range:** 100 mV to 42 V  
**THD + Noise:** 1 kHz  $\pm$  5 Hz  
**Sinad:** 1 kHz  $\pm$  5 Hz

### Audio Source

**Frequency Range:** DC to 25 kHz  
**Output Level Range:** 0.1 mV<sub>rms</sub> to 4 V<sub>rms</sub>

### Reference Oscillator

**External Reference Input Frequency:** 13, 10, 5, 2, or 1 MHz  
**External Reference Output:** 10 and 13 MHz

### Remote Programming

**GPIO:** IEEE-488.2  
**RS-232:** 300, 1200, 2400, 4800, 9600, and 19200 baud

### Internal Programming

**Programming Language:** Hewlett-Packard Instrument BASIC  
**Program Storage:** 32 KB to 512 KB external memory cards

### General Specifications

**Size:** 426 mm W x 177 mm H x 574 mm D (16.75 in x 7 in x 23 in)  
**Weight:** 32 kg (70 lb)  
**Operating Temperature:** 0° to +55° C  
**Storage Temperature:** -40° to +75° C  
**Power:** 100, 120, 220, 240 Vac, 48 to 440 Hz,  $\pm$ 10% of line voltage

### GSM Functionality

**Broadcast Channel Capability:** BCCH + CCCH or BCCH + CCCH +SDCCCH/4  
**Control Channels:** BCCH + CCCH, BCCH + CCCH + SDCCCH/4, SDCCCH/8 (non-hopped), SACCH/FACCH  
**Traffic Channels:** TCH (FS/EFS)  
**Call Control Capabilities:** BS originated call (FS/EFS), MS originated call (FS/EFS), MS camp on, BS call disconnect, MS call disconnect  
**Timing:** Auto, manual, uplink-downlink offset measurement  
**Hopping:** Cyclic only, two MA tables with offsets  
**Digital Audio Interface (DAI):** Normal operation and test of acoustic devices and A/D & D/A  
**Electrical Man Machine Interface:** Control via GPIB  
**Speech Encoding/Decoding:** Full rate speech (FS)  
**Echo Mode:** HP 8922M: user selectable delay, 0 to 5 seconds  
**Bit/Frame Error Rate Measurements:** Class Ia, Ib, and II bits. New fast BER measurement has been added.  
**MS Power Output Level Control:** 0 to 19, 30, 31 with RF analyzer auto adjust  
**Measurement Coordination:** Flexible control of burst, ARFCN, and timeslot  
**SACCH MEAS Results:** RXLEV, RXQUAL, timing advance  
**SMS Cell Broadcast, IMSI attach/detach**  
**HSCSD Test Solution**

### GSM Reference

**External Reference Input Frequencies:** 13, 10, 5, 2, 1 MHz, bit clock, or frame clock

### HP 83220E Specifications

**Frequency Range:** 1805 to 1990 MHz

### Ordering Information

**HP 8922M** GSM MS Test Set  
**HP 8922P** Dual-band Test Set  
**HP 83220A** DCS/PCS Test Set with aux.ports  
**HP 83220E** DCS/PCS Test Set

#### Options for HP 8922

**Opt 001** High-Stability Timebase  
**Opt 006** Spectrum Analyzer  
**Opt 007** 3v/5v Test SIM Card  
**Opt 008** 3v/5v Test Micro SIM Card  
**Opt 012** HP 83212D GMS MS Test Software  
**Opt W30** 3 years Return Repair Service

#### Options for HP 83220A/E and 8922M

**Opt 0B1** Provides a total of two sets of Users Guides and Service Manuals (Users Guide only for A/E)  
**Opt AX4** Rackmount Flange Kit  
**Opt 0B3** Adds Service Manual

<sup>1</sup>Requires Option 006, Spectrum Analyzer, on HP 8922M

HP 8922M  
 HP 8922P

7