

RF Test Sets for Wireless Communications

*Hewlett-Packard
has the RF test set
for your wireless
test requirements*

**Reducing the
time it takes to
get the job done**



High performance test solutions...



...Tailored to your needs...

**. . .Rely on Hewlett-Packard test equipment
to ensure the quality of your communications
products and systems.**

Testing RF communications equipment requires more than good RF test sets. Hewlett-Packard has the knowledge and products to complement your organization — optimizing your resources. We have the test hardware, software, computers, system integrators, consultants, training classes, etc. to provide you with what you need to be successful. From offering single instruments to setting up complete test lines/programs — we can work with you to meet *YOUR* needs.

Mobile Test

Check product specific configuration guides for detailed option configuration information

		CELLULAR					CORDLESS		PCS (PCN)			
Wireless Systems	Land mobile Trunked Pagers Analog cordless	AMPS TACS NMT	TDMA IS-136 IS-54B	CDMA IS-95/95A	GSM900	PDC	PHS	DECT	DCS1800	GSM-Based (PCS1900)	TDMA-Based (IS-136)	CDMA-Based (J-STD-008)
Service Test	HP 8920A HP 11807A Software		HP 8920B-800 HP 83206A HP 8920B	HP 8924C	HP 8922S HP 83212C Software	HP 8920DT HP 83201B HP 8920B HP 83215A/B		HP 8923B	HP 83220E HP 8922S HP 83212C Software	HP 83220E HP 8922S HP 83212C Software	HP 83206A HP 8920B HP 83236B	HP 8924C HP 83236B
Manufacturing Test	HP 8920B HP 11807E Software		HP 11807E Software	HP 83217A Software	HP 8922M HP 83212C Software	HP 11807F Software			HP 83220A/E HP 8922M HP 83212C Software	HP 83220E HP 8922M HP 83212C Software	HP 11807E Software	

Infrastructure Test

Check product specific configuration guides for detailed option configuration information

		CELLULAR				CORDLESS		PCS (PCN)			
Wireless Systems	Land mobile Trunked Pagers Analog cordless	AMPS TACS	TDMA IS-136 (CDPD option available)	CDMA IS-95A/97 (CDPD option available)	GSM900	PHS	DECT	DCS1800	GSM Based (PCS1900)	TDMA-Based (IS-136)	CDMA-Based (IS-95A/97)
Service & Manufacturing Test	HP 8920A	HP 8921A ¹ HP 11807B Software	HP 8921A-500 HP 83204A-001 HP 8921A ¹ HP 11807B Software	HP 8921A-600 HP 83205A-001 HP 8921A ¹ HP 8935	HP 8590 E-Series ² HP 85715B Measurement Personality	HP 8920DT HP 83201B HP 8920B HP 83215A/B HP 11807F Software	HP 8923B	HP 8590 E-Series ² HP 85722B Measurement Personality	HP 8590 E-Series ² HP 85722B-H19 Measurement Personality	HP 8921A-501 HP 83204A-001 HP 8921A ¹ HP 83236B HP 11807B Software	HP 8935 HP E-Series Software

3 ¹ The HP 8921A can also be used with HP 11807A software to test many analog and digital cellular mobile radios.
² RF spectrum analyzer, refer to the HP catalog for details.

...Around the world

*Global Sourcing
available from
Hewlett-Packard.*

*Global Sourcing...
What is it?*

Worldwide consistency in product quality

Count on it! The HP product you use to build your testing solution in Europe, the U.S. or Asia Pacific is available worldwide. You can be assured that a test plan developed around Hewlett-Packard instruments at one site can be duplicated around the world — maximizing your test engineering investment and minimizing the amount of time it takes to get a new test capability on line.

Worldwide consistency in quality test support

Hewlett-Packard has a global support organization offering you product support, consulting and training regardless of your location. You benefit from Hewlett-Packard's worldwide presence when your testing schedule demands a close relationship with your equipment supplier after the sale — not just before the sale.

Worldwide consistency as a partner/supplier

Working with one supplier with standardized purchasing and support processes around the globe simplifies your procurement process. You benefit from standardized ordering, terms and conditions, pricing, and warranty interactions that streamline your procurement and equipment management efforts.



Mobile Test

LAND MOBILE
TRUNKED
PAGERS
ANALOG
CELLULAR
ANALOG
CORDLESS

Service



HP 8920A **RF Communications Test Set**

- Intuitive call processing interface for cellular phone test
- Functions of more than 20 complete instruments
- Frequency range 400 kHz to 1000 MHz
- Portable and lightweight
- Optional full-span spectrum analyzer, tracking generator and adjacent channel power meter
- Built-in IBASIC computer

The HP 8920A RF Communications Test Set is a full-feature, one-box test set designed to meet service and repair needs in the RF wireless communications market.

Single keystroke transmitter and receiver testing simplifies radio test. Signaling for multiple formats is supported, including tone sequential, digital paging (CCITT, POCSAG, ZVEI, etc.), DTMF, trunking, and cellular signaling.

For cellular phone test, the new call processing interface emulates a base station, allowing you to automatically establish and maintain a cellular link between the test set and cellular phone.

The built-in controller allows you to automate measurements and test routines, and control external instruments. Combined with the HP 11807A software, it provides a self-contained, automated radio test solution.

HP 11807A Software

Land Mobile

- AM
- North American FM
- European ♦M

Trunked

- LTR
- EDACS
- MPT 1327

Analog Cellular

- AMPS/EAMPS/NAMPS
- TACS/ETACS
- JTACS/NTACS
- NMT 450/900

Mfg.



HP 8920B RF Communications Test Set

- All of the standard HP 8920A features
- Fast measurement speed
- Accuracy of stand-alone instruments
- Simplified programming with high-level HP-IB commands for call processing
- Firmware updates via front panel
- PCMCIA memory card format
- New, intuitive call processing interface with AMPS authentication for cellular phone test

The HP 8920B takes you another step forward in manufacturing productivity. Processing speed improvements more than double the computing speed over the HP 8920A for initial transceiver measurements and HP-IB commands. This means lower cost per test and higher throughput from your production line. With accuracy as good as stand-alone instruments, you can be sure of passing more good radios and of consistently finding those that are out of specification.

The HP 8920B meets your test needs on multiple radio test lines; testing land mobile, trunked, cordless, and cellular phones while meeting your need for fast parametric tests.

***LAND MOBILE
TRUNKED
PAGERS
ANALOG
CELLULAR
ANALOG
CORDLESS***

HP 11807E Software

Land Mobile

- AM
- North American FM
- European ♦M

Trunked

- LTR
- EDACS

Analog Cellular

- AMPS/EAMPS/NAMPS
- TACS/ETACS
- JTACS/NTACS
- NMT 450/900

CELLULAR TEST

- TDMA

Service
& Mfg.



DCCH IS-136

HP 8920B RF Communications Test Set with Options 001, 004, 006, 051, 800

- All of the standard HP 8920B features
- TDMA dual-mode DAMPS (IS-54B) and DCCH (IS-136) phone test capability
- DCCH (IS-136) measurements such as:
 - DCCH authentication
 - SMS and caller ID
 - Mobile reported parameters for MAHO
 - Power control commands
 - Unique programming of FACCH, SACCH
- PCS upgrade path

High-quality digital cellular measurements have never been easier — a real bonus for users immersed in the rapidly changing technologies of digital cellular radios.

From programming a test sequence to troubleshooting phones, the new call processing subsystem simplifies even the most complex DCCH (IS-136) measurements. RF measurements include:

- Analog/digital tests for TIA/EIA IS-19B, IS-54B, and IS-136 phones
- Error vector magnitude (EVM)
- 10-burst error vector magnitude
- Magnitude error/phase error
- I/Q origin offset
- Carrier frequency error
- Bit error rate (BER) loop-back mode
- TX power levels 0 through 10
- Adjacent channel power

HP 11807E Software

- AMPS/EAMPS/NAMPS
- TACS/ETACS
- JTACS/NTACS
- NMT 450/900
- TDMA (DAMPS) Dual-mode Cellular Tests using the TIA Adapter
- AMPS/EAMPS/NAMPS/TDMA (DAMPS) Dual-mode Cellular Tests
- AMPS/NAMPS/DAMPS/DCCH

Mobile Test

CELLULAR TEST

• CDMA

Service
& Mfg.



14.4 Kb
Vocoder Support

HP 8924C CDMA Mobile Station Test Set

- High accuracy and speed for manufacturing test
- Analog and IS-95/95A and J-STD-008 CDMA digital phone test capability
- Both functional and parametric phone testing
- CDMA base station simulator
- PCS support optional

The HP 8924C CDMA Mobile Station Test Set provides the key set of measurements necessary to manufacture high-quality, dual-mode CDMA mobile telephones that comply with the TIA/EIA IS-95/95A and J-STD-008 air interface standard. Acting as a calibrated, high-performance, CDMA base station, the HP 8924C is optimized to provide high-accuracy measurements with the speed required for efficient manufacturing. In addition to its CDMA functionality, the HP 8924C includes full AMPS, NAMPS, and TACS analog phone test capability. With the HP 8924C, you save space and cost by making both analog cellular and CDMA digital cellular measurements with the same test set.

HP 83217A Software

- AMPS/NAMPS/CDMA
- TACS/ETACS/CDMA
- NTACS/JTACS/CDMA
- PCS CDMA/AMPS/NAMPS

PCS

• TDMA • CDMA

Service
& Mfg.



Upgrade
Existing Systems

HP 83236B PCS Interface

- North American, Korean, and international-band PCS interface (1710-1990 MHz)
- Cost-effective PCS upgrade
- Upgrade existing HP 8920B, HP 8924C systems in the field

Extend TDMA and CDMA phone test capabilities to PCS-band frequencies by adding the HP 83236B PCS Interface to existing HP 8920B Option 800 - TDMA and HP 8924C - CDMA mobile test solutions. HP 83236B hardware can be integrated with existing RF test systems in the field. Adding the HP 83236B to existing mobile test systems is a low-cost way to obtain PCS-band measurement capability.

CELLULAR TEST

• GSM900

Service



GSM Phase II
Compatible

HP 8922S GSM Mobile Station Service Test Set

- Stand-alone GSM tester
- GSM Phase II compatible
- Easy to use
- Tool-kit of instruments
- Accurate and repeatable measurements
- Spectrum analyzer option
- PCS1900/DCS1800 upgrade path

The HP 8922S is a stand-alone GSM mobile station tester tailored to the demanding needs of incoming inspection and mobile repair.

It includes a GSM base station emulator and all the signaling capability to fully test a mobile without additional equipment. By emulating a GSM base station, the HP 8922S is able to verify that a mobile can establish and maintain a GSM link over the air. Once a link has been established, tests such as transmitter phase and frequency error, transmitted power, and receiver sensitivity can be performed.

Reducing complexity and focusing on ease-of-use, the HP 8922S provides a cost effective solution for servicing GSM radios.

The HP 83212C measurement software ensures consistent quality by automating phone test.

HP 83212C Software

- GSM900

Mfg.



HP 8922M GSM Mobile Station Test Set

- All of the standard HP 8922S features
- HP-IB measurement throughput 40% faster than HP 8922S
- Designed for high-volume manufacturing test
- PCS1900/DCS1800 upgrade path
- More GSM phones are tested with the HP 8922 than any other test set

Fulfilling the needs of the GSM mobile manufacturer, the HP 8922M maximizes production throughput and minimizes the cost per test. It offers the highest testing speed in its class while guaranteeing accurate and repeatable measurements.

The HP 8922M performs all the measurements that the HP 8922S performs. Its performance is peaked for manufacturing with additional flexibility in areas such as protocol logging, available demodulation ports, and pulse modulation capabilities.

HP 83212C Software

- GSM900

Mobile Test



PCS

- **DCS1800**
- **PCS1900**

*PCS1900
Software*

HP 8922M/S GSM Mobile Station Test Set

HP 83220A/E DCS/PCS MS Test Set

- All of the standard HP 8922M/S features
- Tool-kit of instruments
- Fast and accurate testing of DCS1800 and PCS1900 mobiles

The HP 8922M/S can be expanded to provide fast and accurate testing of DCS1800 and PCS1900 mobile radios with the addition of the HP 83220A/E. The resulting system comprehensively tests DCS1800 and PCS1900 mobile radios across their frequency bands. All the features of the RF generator, RF analyzer and general instrumentation of the HP 8922 series are retained.

HP 83212C Software

- GSM900
- DCS1800
- PCS1900

Mobile Test

CORDLESS
• **DECT**

CELLULAR TEST • PDC
CORDLESS • PHS



HP 8920DT **Digital RF Communications System**

- Configurations for mobile (PDC/PHS) or base station (PHS) test
- Operates stand-alone or with an external computer
- Fast testing using DSP technology
- Performs sequential list or repeats selected tests

The HP 8920DT is designed around the HP 8920B Communications Test Set to test 800 and 1500 MHz PDC radios and PHS radios in the manufacturing environment. The basic HP 8920DT configuration can perform most in-channel RCR-specified tests. The system can also be configured for out-of-channel tests.

The basic HP 8920DT system consists of the HP 8920B, HP 83215A/B frequency converter, and HP 83201B cellular adapter. The HP 83215A PDC/PHS interface and HP 83215B PHS-only interface provide accurate frequency conversion to bring the test signals into the range of the HP 8920B. The HP 83201B TDMA Cellular Adapter adds the specific digital signal processing needed for PDC and PHS.

HP 11807F Software

- PDC/PHS



HP 8923B DECT Test Set

- Repeatability and measurement speed for high-volume testing
- Performance for testing both portable parts and fixed parts
- Key DECT measurements complying with DECT CTR-06 standard
- Interface ports for ease of integration

The HP 8923B DECT Test Set delivers the key RF measurements required for high-volume production testing of Digital Enhanced Cordless Telecommunications (DECT) equipment as well as the measurement accuracy required in R&D applications. The HP 8923B measures the following parameters to the ETSI CTR-06 standards: carrier power, power versus time (top 40 dB of power time mask), center frequency accuracy, frequency deviation, frequency drift, timing jitter, and bit and word error rates. All HP 8923B functions are accessible over HP-IB allowing easy integration into automated test systems. The HP 8923B allows very high measurement speed with no sacrifice in measurement integrity.

Infrastructure Test

Service



**PCS and
CELLULAR
TEST**
• **CDMA**

NEW!

HP 8935 CDMA Cellular/PCS Base Station Test Set

- Designed for the base station environment
- Waveform quality rho (\square), frequency error, code domain power, timing, and phase analysis
- New, dedicated, one-button user interface keys
- Analog and digital (CDMA) capabilities
- Firmware upgradeable (via PCMCIA to Flash Memory)
- Automation software to increase measurement repeatability and enhance technician efficiency
- Built-in AWGN source for calibrated E_b/N_o settings

The HP 8935 CDMA Base Station Test Set is the next generation in CDMA test equipment. The HP 8935 is a full featured, one-box test set designed to meet the needs of installation teams, service providers, and network equipment manufacturers.

Building on the success of our third generation of base station test equipment, and incorporating HP's pioneering efforts in CDMA measurement techniques, this new generation of test gear heavily incorporates feedback from cellular and PCS users. For example, the HP 8935 utilizes a new, larger, bright electroluminescent display for easily read data. A new convenient connector section allows unobtrusive, out-of-the-way hook up. A suitcase form factor provides better portability.

The new "rugged design" includes a membrane keypad, gasketed display, stand up operation, filtered airflow, and a ruggedized exterior to help protect the HP 8935 from bumps and shocks.

More importantly, the new HP 8935 incorporates a less intimidating, more user friendly interface with Windows*-like pull down menus and one-key measurement execution. This new interface, coupled with HP 8935's faster measurement speed and automated software for Lucent, Nortel, and Samsung PCS base stations (additional NEMs forthcoming), results in less off-line time and improved system performance. Errors due to test variability are reduced, and measurement data can be output to a printer or to the PCMCIA memory card. Additionally, the HP 8935's firmware is user upgradeable with a PCMCIA card to Flash Memory. New features and capabilities can be added without returning the unit to a service center.

To complete the PCS CDMA parametric test solution, HP also offers a new PCS CDMA technician training program to provide install teams and service providers with a comprehensive understanding of base station test.

*Windows is a U.S. trademark of Microsoft Corp.

Infrastructure Test

Service
& Mfg.



CELLULAR TEST • AMPS/TACS

TDMA,
CDMA, CDPD, and
PCS Upgrades
are Available

HP 8921A Cell Site Test Set

- Reduced cell site maintenance time with automated testing
- Standardized testing with proven test procedures
- Ease of setup with graphical displays
- Complete testing using manufacturers' procedures
- Can be upgraded for TDMA or CDMA, CDPD and PCS

Install and maintain AMPS, NAMPS, TACS, ETACS, and UTACS cell site radio equipment with the HP 8921A Cell Site Test Set and the HP 11807B Cell Site Test Software.

The HP 8921A/11807B test solution uses the HP 8921A's built-in IBASIC controller to fully automate base station test procedures with the HP 11807B software test packages.

Developed from manufacturers' recommended maintenance procedures, the HP 11807B Cell Site Test Software ensures complete test and adjustment of cell sites as recommended by the manufacturers. By using the standardized maintenance procedures, each cell site receives the same high-quality test and adjustment.

Manufacturer-specific connection kits containing all necessary cables, connectors, and interface/switch boxes (where required) are also available to simplify "start-up" testing.

HP 11807B Software

- Motorola Base Station Test
- GE Base Station Test
- Lucent Base Station Test
- Ericsson Base Station Test
- Nortel Base Station Test
- Hughes GMH Base Station Test
- AMPS Call Analysis, Logging, and Monitoring

CELLULAR TEST

• TDMA

Service
& Mfg.



HP 8921A Option 500 TDMA Cell Site Test System

- All of the standard HP 8921A features
- Both analog and digital test capabilities
- $\pi/4$ DQPSK signal generation and analysis
- CDPD Mobile Data Base Station (MDBS) test option
- PCS upgrade path

The HP 8921A adds the HP 83204A to provide testing of TDMA (IS-136) base station equipment. This unit adds $\pi/4$ DQPSK signal generation and analysis to the powerful analog features of the standard HP 8921A. A dedicated screen provides control of the TDMA source and provides selection of several measurement modes, making all test results visible on one screen. CDPD Mobile Data Base Station (MDBS) test features and PCS test capability can be added to existing HP 8921A Option 500 TDMA test capabilities in the field.

HP 11807B Cell Site Test Software fully automates TDMA base station test procedures, reducing maintenance time.

Manufacturer-specific connection kits containing all necessary cables, connectors, and interface/switch boxes (where required) are also available to simplify "start-up" testing.

HP 11807B Software

- Lucent Base Station Test
- Ericsson Base Station Test
- Nortel Base Station Test

CDPD and
PCS Upgrade
Available

CELLULAR TEST

• CDMA

Service
& Mfg.



HP 8921A Option 600 CDMA Cell Site Test System

- All HP 8921A standard features
- Waveform quality ρ (rho), frequency error, code domain power, timing, and phase analysis measurements
- Average power and CDMA channel power measurements
- Built-in AWGN source for calibrated E_b/N_0 settings
- CDPD Mobile Data Base Station (MDBS) test option
- PCS upgrade path

Option 600 for the HP 8921A adds the HP 83205A CDMA Cellular Adapter to the cell site test set to provide testing of CDMA (IS-95A & IS-97) base station equipment. This system provides signal generation and analysis of QPSK/OQPSK signals. The system measures the power in each Walsh coded signal, the code channel timing, and the code channel phase relative to the pilot.

CDPD Mobile Data Base Station (MDBS) test features and PCS test capability can be added to existing HP 8921A Option 600 CDMA test capabilities in the field.

The HP 8921A Option 600 retains its full capability for testing analog base stations.

Infrastructure Test



CELLULAR TEST

• CDPD

Service
& Mfg.



HP 83204A TDMA/CDPD Cellular Adapter

HP 83205A CDMA/CDPD Cellular Adapter

- The *ONLY* RF parametric CDPD tester available today referencing CDPD 1.1 RF specifications
- CDPD options for existing HP 8921A AMPS, TDMA or CDMA test solutions
- MDBS measurements for forward channel transmitter and reverse channel receiver RF parameters
- System-level tests consisting of sniffer measurements and display of PDUs
- Simple, intuitive user interface for increased technician efficiency

The HP 8921A has optional Cellular Digital Packet Data (CDPD) capabilities for installing and maintaining CDPD Mobile Data Base Station (MDBS) RF infrastructure equipment.

CDPD MDBS test capability is designed to quickly and accurately test key RF parameters on both the forward channel transmitter and the reverse channel receiver. In addition, a sniffer receiver test verifies proper sniffer functionality. Measurement procedures and default pass/fail limits are taken directly from the CDPD system specification 1.1.

CDPD capability can be ordered with TDMA, CDMA, or analog test systems by selecting the desired "500" or "600" option to the HP 8921A. Existing HP 8921As can be retrofitted with CDPD measurement capability.

PCS

- **TDMA**
- **CDMA**

**Service
& Mfg.**



*Upgrade
Existing HP 8921A
Systems*

HP 83236B PCS Interface

- North American, Korean, and international band PCS test solution (1710 to 1990 MHz)
- Upgrades for existing HP 8921A systems in the field
- Cost-effective PCS upgrade

PCS infrastructure test solutions for TDMA and CDMA build on the successful cellular band HP 8921A test solutions by adding the HP 83236B PCS Interface to extend testing to the North American, Korean, and international PCS bands (1710 to 1990 MHz). For GSM-based PCS infrastructure equipment testing refer to the HP 85722B literature (special option H19).

The HP 83236B PCS Interface translates PCS signals to the RF range of the HP 8921A, enabling the same TDMA or CDMA measurements performed in the cellular band. Power measurements are performed directly in the HP 83236B to maximize power measurement accuracy and speed.

Adding the HP 83236B to existing HP 8921A systems is a cost-effective solution for PCS-band measurement capability. The HP 83236B can be combined with existing HP 8921A systems in the field.

HP 11807B Software

- Lucent Base Station Test
 - TDMA
 - CDMA

For more information on Hewlett-Packard Test & Measurement products, applications or services please call your local Hewlett-Packard sales offices. A current listing is available via Web through Access HP at <http://www.hp.com>.

If you do not have access to the internet please contact one of the HP centers listed below and they will direct you to your nearest HP representative.

United States:

Hewlett-Packard Company
Test and Measurement Call Center
P.O. Box 4026
Englewood, CO 80155-4026
1 800 452 4844

Canada:

Hewlett-Packard Canada Ltd.
5150 Spectrum Way
Mississauga, Ontario
L4W 5G1
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Europe:

Hewlett-Packard
European Marketing Centre
P.O. Box 999
1180 AZ Amstelveen
The Netherlands
(31 20) 547 9900

Japan:

Hewlett-Packard Japan Ltd.
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9-1, Takakura-Cho, Hachioji-Shi,
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Cover inset photo (right) courtesy of Motorola.