

# Agilent 8924E

## CDMA Mobile Station Service Test Set—30 MHz to 1000 MHz, 1700 MHz to 2000 MHz

Technical Specifications

- **Agilent 83236B PCS Interface**
- **Agilent 83217A CDMA Dual-Mode Mobile Station Test Software**
- **Agilent E8290A CDMA Dual-Mode Point of Service Test (PoST) Software**

The Agilent Technologies 8924E CDMA mobile station test set provides the key set of measurements to verify the performance of dual-mode CDMA mobile phones operating from 500 to 1000 MHz. With the Agilent Technologies 83236B PCS Interface, the 8924E additionally offers CDMA mobile testing from 1700 to 2000 MHz. Acting as a calibrated, high performance CDMA base station, the 8924E verifies not only the parametric characteristics of CDMA phones, but also the functional aspects of phone performance.

The 8924E's full AMPS, NAMPS, EAMPS, TACS, NTACS, ETACS and JTACS test capability saves you space, cost, and training expenses by allowing you to make both analog and CDMA digital measurements with the same instrument.

For complete, call processing verification, the 8924E supports both mobile and base station initiated call connect and disconnect. Once a phone call is established, verifying the overall functionality of a CDMA mobile is simple using the 8924E's voice echo mode. For testing a variety of protocol formats, the 8924E offers six user selectable protocol stacks: IS-95, IS-95A, TSB-74, J-STD-008, ARIB T53, and KOREAN PCS. The 8924E also supports a number of service options, including 9600 BPS and 14,400 BPS traffic channel configurations.



**Agilent Technologies**  
Innovating the HP Way

### **High Accuracy CDMA Source for CDMA Receiver Test**

The 8924E provides active cell site emulation by supporting the following CDMA channels: pilot, sync, paging, traffic, and orthogonal channel noise source (OCNS). An additive white Gaussian noise (AWGN) source is also included to provide the interference generated by adjacent cells in a working CDMA network. The 8924E measures receiver frame-error-rate (FER) at all four data rates used in the CDMA system: full, half, quarter, and one-eighth. Confidence limit technology is used to reduce receiver test time to an absolute minimum.

### **CDMA Transmitter Measurements**

The 8924E provides an average power measurement based on new DSP technology. A DSP based channel power measurement enables the 8924E to achieve accurate low level CDMA power measurements. Access probe power measurements are also available. The 8924E measures transmitted waveform quality by using the IS-98A/J-STD-018 recommended correlated power method, also known as the rho ( $\rho$ ) measurement. In addition, the rho measurement reports the frequency error, modulation phase and amplitude error, and the carrier feedthrough.

### **Handoff Verification**

To speed testing, the 8924E supports hard hand-offs between RF channels. CDMA to analog hand-offs from both cellular and PCS bands are also supported.

### **Authentication and Short Message Service Support**

The 8924E provides the necessary features for testing a CDMA mobile station's ability to perform call processing functions with authentication for Korea and the United States. Also, the 8924E supports mobile terminated SMS.

### **Automated Software**

The Agilent Technologies E8290A PoST (point of service test) software makes the 8924E an automated CDMA test solution. The E8290A quickly provides accurate phone performance and quality data at the point of sale. This PC-based solution is very easy to use, reduces churn, reduces no trouble found (NTF), and improves customer care.

The Agilent Technologies 83217A CDMA dual-mode mobile station test software can also be used to automate CDMA and analog mobile phone measurements. The 83217A solution does not require a PC. Rather, automatic tests can be completely set up using the front panel of the 8924E. Options are available to meet your test needs for CDMA, AMPS, NAMPS, JTACS, NTACS, U.S. PCS, and Korean PCS phones.

**Specifications** describe the instrument's warranted performance and apply after a 30 minute warm-up. These specifications are valid over the 8924E's entire operating environmental range unless otherwise noted.

**Supplemental Characteristics** (*shown in italics*) are intended to provide additional information, useful in applying the instrument by giving typical expected, but non-warranted performance.

## 8924E Analog Mode Specifications

### Call Processing Functionality

**Standards:** AMPS, NAMPS, TACS, JTACS, and NTACS

**Registration Support:** Zone Registration

**Call Control:** BS call originate and disconnect, MS call originate, and disconnect

**Authentication:** Registration, paging, origination, SSD update, and unique challenge

**Orders:** Power levels 0 through 7, maintenance, and alert

**Handoff Support:** Handoff to new frequency, between narrow channel and wide channel

### Signal Generator

#### RF Frequency

**Range:**

**Standard:** 30 MHz to 1000 MHz

**With the 83236B:**

800 MHz to 960 MHz

1710 MHz to 1785 MHz

1805 MHz to 1910 MHz

1930 MHz to 1990 MHz

*Usable from 1700 to 1999.99999 MHz*

**Accuracy and Stability:** Same as reference oscillator  $\pm 0.015$  Hz

**Switching Speed:**  $< 150$  ms to be within 100 Hz of carrier frequency

**Resolution:** 1 Hz

#### Output

#### RF IN/OUT Connector

**Level Range:**

**Standard:**  $-127$  dBm to  $-10.5$  dBm into  $50 \Omega$

**With the 83236B:**  $-130$  dBm to  $-20$  dBm into  $50 \Omega$

**Level Accuracy:**

**Standard:**  $\pm 1.2$  dB (Level  $\geq -127$  dBm)

*Typically  $\pm 1.0$  dB for all levels*

**With the 83236B:**

$\pm 1.8$  dB, at  $25^\circ\text{C} \pm 10^\circ\text{C}$

$\pm 2.0$  dB, at  $0^\circ\text{C}$  to  $55^\circ\text{C}$

*$\pm 1.0$  dB typically*

**Reverse Power:**

**Standard:** 3 W

**With the 83236B:** 10 W

**SWR: Standard:**  $< 1.5:1$

**With the 83236B:**  $< 1.2:1$

#### DUPLEX OUT/RF OUT Only Connector

**Level Range:**

**Standard:**  $-127$  dBm to  $+3.5$  dBm into  $50 \Omega$

**With the 83236B:**  $-130$  dBm to  $-10$  dBm into  $50 \Omega$

**Level Accuracy:**

**Standard:**  $\pm 1.0$  dB

**With the 83236B:**

$\pm 1.8$  dB, at  $25^\circ\text{C} \pm 10^\circ\text{C}$

$\pm 2.0$  dB, at  $0^\circ\text{C}$  to  $55^\circ\text{C}$

*$\pm 1.0$  dB typically*

**Reverse Power:** 200 mW maximum

**SWR: Standard:**  $< 2.0:1$  (level  $< -7.5$  dBm)

**With the 83236B:**  $< 1.6:1$

**Resolution:** 0.1 dB (settable in 0.01 dB increments)

#### Spectral Purity

All specifications are for  $\leq -2.5$  dBm output level at DUPLEX OUT or  $\leq -15$  dBm output level at RF IN/OUT

**Harmonics:**  $< -30$  dBc

**Non-Harmonic Spurious:**  $< -60$  dBc (at  $> 5$  kHz offset from carrier)

**Residual FM (CCITT, rms):**

**Standard:**

$< 7$  Hz for  $500 \text{ MHz} < f_c < 1000 \text{ MHz}$

$< 4$  Hz for  $250 \text{ MHz} \leq f_c \leq 500 \text{ MHz}$

$< 7$  Hz for  $30 \text{ MHz} \leq f_c < 250 \text{ MHz}$

**With the 83236B:**

$< 7$  Hz for  $810 \text{ MHz} < f_c < 960 \text{ MHz}$

$< 10$  Hz for  $1710 \text{ MHz} < f_c < 1990 \text{ MHz}$

**SSB Phase Noise:**

**Standard:**  $< -116$  dBc/Hz (for  $> 20$  kHz offsets at a 1000 MHz carrier frequency)

**With the 83236B:**  $< -100$  dBc/Hz at  $> 20$  kHz offsets

#### FM

**FM Deviation (rates  $> 25$  Hz):**

**Standard:**

100 kHz; 30 to  $< 249$  MHz

50 kHz; 249 to  $< 501$  MHz

100 kHz; 501 to 1000 MHz

**With the 83236B:**

100 kHz; 800 MHz to 960 MHz, 1710 MHz to 1785 MHz;

1805 MHz to 1910 MHz, 1930 MHz to 1990 MHz

**FM Rate (1 kHz reference):**

**Internal:** DC to 25 kHz (1 dB BW)

**External:** AC Coupled: 20 Hz to 75 kHz (typical  $-3$  dB BW)

**FM Accuracy (1 kHz rate):**

$< 10$  kHz deviation:  $\pm 3.5\%$  of setting  $\pm 50$  Hz

$> 10$  kHz deviation:  $\pm 3.5\%$  of setting  $\pm 500$  Hz

**FM Distortion (THD+Noise, 0.3 to 3 kHz BW):**

<0.5 % at >4 kHz deviation and 1 kHz rate

**External Modulation Input Impedance:** 600  $\Omega$  nominal

**Resolution:**

50 Hz for <10 kHz deviation

500 Hz for  $\geq 10$  kHz deviation

## Audio Source

**Frequency**

**Range:** 300 Hz to 10 kHz

**Accuracy:** 0.025 % of setting

**Resolution:** 0.1 Hz

**Output Level**

**Range:** 0.1 mV to 4 Vrms

**Maximum Output Current:** 20 mA peak

**Output Impedance:** <2.5  $\Omega$  (at 1 kHz)

**Accuracy:**  $\pm 2\%$  of setting plus resolution

**Residual Distortion (THD + Noise, level  $\geq 200$  mVrms):**

<0.125%; 300 Hz to 10 kHz in an 80 kHz BW

**Resolution:**

Level  $\leq 0.01$  V:  $\pm 50$   $\mu$ V

Level  $\leq 0.1$  V:  $\pm 0.5$  mV

Level  $\leq 1$  V:  $\pm 5$  mV

Level <10 V:  $\pm 50$  mV

## RF Analyzer

**RF Frequency Measurement****Measurement Range:**

**Standard:** 30 MHz to 1000 MHz

**With the 83236B:**

800 MHz to 960 MHz

1710 MHz to 1785 MHz

1805 MHz to 1910 MHz

1930 MHz to 1990 MHz

Usable from 1700 to 1999.999999 MHz

**Level Range:**

**Standard:**

RF IN/OUT: -10 dBm to +35 dBm (0.1 mW to 3 W)

ANT In: -36 dBm to +20 dBm

**With the 83236B:**

RF IN/OUT: -10 dBm to +40 dBm (0.1 mW to 10 W)

**Accuracy:**  $\pm 1$  Hz plus timebase accuracy

**Minimum Resolution:** 1 Hz

## RF Power Measurement

Note: To achieve the specified accuracy when measuring power at the RF IN/OUT port, the internal signal generator level must be 40 dB below the measured power or less than -20 dBm at the DUPLEX OUT port.

**Frequency Range:**

**Standard:** 30 MHz to 1000 MHz

**With the 83236B:**

800 MHz to 960 MHz

1710 MHz to 1785 MHz

1805 MHz to 1910 MHz

1930 MHz to 1990 MHz

**Input Connector:** RF IN/OUT connector only

**Measurement Range:**

**Standard:** -10 dBm to +35 dBm (0.1 mW to 3 W)

**With the 83236B:** -13 dBm to +40 dBm (50  $\mu$ W to 10 W)

**Accuracy (after power meter zero):**

**Standard:**

$\pm 5\%$  of reading  $\pm 0.01$   $\mu$ W from 15  $^{\circ}$ C to 35  $^{\circ}$ C

$\pm 10\%$  of reading  $\pm 0.01$   $\mu$ W from 0  $^{\circ}$ C to 55  $^{\circ}$ C

**With the 83236B:**

$\pm 5\%$  of reading  $\pm 2.5$   $\mu$ W at 23  $^{\circ}$ C  $\pm 10$   $^{\circ}$ C

$\pm 10\%$  of reading  $\pm 2.5$   $\mu$ W

**SWR:**

**Standard:** <1.5:1

**With the 83236B:** <1.2:1

**Resolution:**

**Standard:**

Power <10W: 1 mW

Power <100 mW: 0.1 mW

Power <10 mW: 0.01 mW

**With the 83236B:** 0.01 dB or 10  $\mu$ W

## FM Measurement

**Frequency Range:**

**Standard:** 30 MHz to 1000 MHz

**With the 83236B:**

800 MHz to 960 MHz

1710 MHz to 1785 MHz

1805 MHz to 1910 MHz

1930 MHz to 1990 MHz

**Deviation Range:** 20 Hz to 75 kHz

**Sensitivity:** 2  $\mu$ V (15 kHz IF BW, High Sensitivity Mode, 0.3 to 3 kHz BW)<sup>1</sup> Typically <1  $\mu$ V (12 dB SINAD,  $f_c$  >30 MHz)

1. Possible degradation in the 1700 to 1999 MHz bandwidth

**Accuracy (20 Hz to 25 kHz rates, deviation <25 kHz):**  
±4 % of reading plus residual FM and noise contribution

**Bandwidth (3 dB):** 2 Hz to 70 kHz

**THD+Noise:** <1% for >5 kHz Deviation and 1 kHz rate in a 0.3 to 3 kHz BW<sup>1</sup>

**Input Level Range for Specified Accuracy:**

**Standard:**

–28 to +35 dBm at RF IN/OUT (1.6 µW to 3 W)

–50 to +14 dBm at Ant In

**With the 83236B:** –36 dBm to +40 dBm

**Residual FM and Noise (0.3 to 3 kHz, rms):**

**Standard:** <7 Hz

**With the 83236B:** <10 Hz

**Resolution:**

*Deviation <10 kHz: 1 Hz*

*Deviation ≥10 kHz: 10 Hz*

## **Spectrum Analyzer (Option 102 required)**

**Frequency Range:** (Center frequency coupled to RF Analyzer setting)

**Standard:** 30 MHz to 1000 MHz

**With the 83236B:**

800 MHz to 960 MHz

1710 MHz to 1785 MHz

1805 MHz to 1910 MHz

1930 MHz to 1990 MHz

**Frequency Span/Resolution Bandwidth (coupled):**

<b>Standard:</b>	<u>Span</u>	<u>Bandwidth</u>
	<50 kHz	300 Hz
	<200 kHz	1 kHz
	<1.5 MHz	3 kHz
	<18 MHz	30 kHz
	>18 MHz	300 kHz

**With the 83236B:**

	<u>Span</u>	<u>Bandwidth</u>
	<50 kHz	300 Hz
	<200 kHz	1 kHz
	<1.5 MHz	3 kHz

**Display:** Log with 10 dB/division, 2 dB/division, or 1 dB/division

**Display Range:** 80 dB

**Reference Level Range:** +50 to –50 dBm

**Residual Responses:** <–70 dBm (no input signal, 0 dB attenuation)

**Image Rejection:** >50 dB

**Non-harmonic Spurious Responses:** >70 dB (for input signals ≤–30 dBm)

**Level Accuracy:** ±2.5 dB

**Log Scale Linearity:** ±2 dB (for input levels <–30 dBm and/or 60 dB range)

**Displayed Average Noise Level:** <–114 dBm (≤50 kHz spans)

**Other Features:** Peak hold, marker with frequency and level read-out, marker to peak, marker to next peak, trace comparison A-B

## **Tracking Generator**

(Not available when used with the 83236B)

**Frequency Range:** 30 MHz to 1000 MHz

**Frequency Offset:** Frequency span endpoints ± frequency offset cannot be <30 MHz or >1000 MHz

**Output Level Range:** Same as signal generator

**Sweep Modes:** Normal and Inverted

## **Audio Analyzer**

### **Frequency Measurement**

**Measurement Range:** 20 Hz to 400 kHz

**Accuracy:** ±0.02% plus resolution plus reference oscillator accuracy

**External Input:** 20 mV to 30 Vrms

**Resolution:**

*f <10 kHz: 0.01 Hz*

*f <100 kHz: 0.1 Hz*

*f ≥100 kHz: 1 Hz*

### **AC Voltage Measurement**

**Measurement Range:** 0 to 30 Vrms

**Accuracy (20 Hz to 15 kHz, >1 mV):** ±3% of reading

**Residual THD+Noise (15 kHz BW):**

With a load (<=600 Ω) connected to Audio In Hi: 150 µV

Without load: 480 µV

**3 dB Bandwidth:** Typically 2 Hz to 100 kHz

**Nominal Input Impedance:** Switchable between 1 M Ω in parallel with 95 pF or 600 Ω floating

**Resolution:**

*4 digits for inputs ≥100 mV*

*3 digits for inputs <100 mV*

1. Possible degradation in the 1700 to 1999 MHz bandwidth.

## DC Voltage Measurement

**Voltage Range:** 100 mV to 42 V

**Accuracy:**  $\pm 1.0\%$  of reading plus DC offset

**DC Offset:**  $\pm 45$  mV

**Resolution:** 1 mV

## Distortion Measurement

**Fundamental Frequency Range:** 300 Hz to 10 kHz

**Input Level Range:** 30 mV to 30 Vrms

**Display Range:** 0.1% to 100%

**Accuracy:**  $\pm 1$  dB for frequencies from 300 to 1500 Hz, measured with the 15 kHz LPF (0.5 to 100% distortion)

$\pm 1.5$  dB for frequencies from 300 Hz to 10 kHz, measured with the  $>99$  kHz LPF (1.5 to 100% distortion)

**Residual THD + Noise:**  $-60$  dB or 150  $\mu$ V, whichever is greater for frequencies from 300 Hz to 1500 Hz measured with the 15 kHz LPF

$-57$  dBc or 450  $\mu$ V, whichever is greater for frequencies from 300 Hz to 10 kHz measured with the  $>99$  kHz LPF

**Resolution:** 0.1% distortion

## SINAD Measurement

**Fundamental Frequency Range:** 300 Hz to 10 kHz

**Input Level Range:** 30 mV to 30 Vrms

**Display Range:** 0 to 60 dB

**Accuracy:**  $\pm 1$  dB for frequencies from 300 to 1500 Hz, measured with the 15 kHz LPF (0 to 46 dB SINAD)

$\pm 1.5$  dB for frequencies from 300 Hz to 10 kHz, measured with the  $>99$  kHz LPF (0 to 36 dB SINAD)

**Residual THD + Noise:**  $-60$  dB or 150  $\mu$ V, whichever is greater for frequencies from 300 Hz to 1500 Hz measured with the 15 kHz LPF

$-57$  dBc or 450  $\mu$ V, whichever is greater for frequencies from 300 Hz to 10 kHz measured with the  $>99$  kHz LPF

**Resolution:** 0.01 dB

## Audio Filters

**High Pass Filters:**  $<20$  Hz, 50 Hz, and 300 Hz

**Low Pass Filters:** 300 Hz, 3 kHz, 15 kHz,  $>99$  kHz

**Other Filters:** C-Message Weighting Filter, and 6 kHz Bandpass Filter

**Optional Filters:** Option 011, CCITT Weighting Filter replaces the C-Message filter (for TACS phones)

## Variable Frequency Notch Filter

**Frequency Tuning Range:** 300 Hz to 10 kHz

**Notch Depth:**  $>60$  dB

**Notch Width:** Typically  $\pm 5\%$  of the notch center frequency

**Audio Detectors:** RMS, Pk+, Pk-, Pk+hold, Pk-hold, Pk $\pm$ /2, Pk $\pm$ /2 hold, Pk $\pm$ max, Pk $\pm$ max hold

## Oscilloscope

**Frequency Range ( $-3$  dB BW):** 2 Hz to 50 kHz

Typically  $>100$  kHz

**Scale/Division:** 10 mV to 10 V

**Amplitude Accuracy (20 Hz to 10 kHz):**  $\pm 1.5\%$  of reading  $\pm 0.1$  division

**Time/Division:** 10  $\mu$ s to 100 ms

**Trigger Delay:** 20  $\mu$ s to 3.2 seconds

**Internal DC Offset:**  $\leq 0.1$  division ( $\geq 50$   $\mu$ V/division sensitivity)

## Signaling

**Capability for Generating and Analyzing the Following Formats:** AMPS, NAMPS, TACS, JTACS, NTACS, EAMPS, ETACS

## DC Current Meter

**Measurement Range:** 0 to 10A (Usable to 20A)

**Accuracy:** The greater of  $\pm 10\%$  of reading after zeroing or 30 mA (levels  $>100$  mA)



# Agilent 8924E CDMA Mode Specifications

## Call Processing Functionality

### User Settable Parameters

**Protocol Stack:** IS-95, IS-95A, TBS-74, ARIB-T53, Korean PCS, and J-STD-008

**Channel Standards:** MS AMPS, US PCS, Korean PCS 0, Korean PCS 1, Japan CDMA, MS NAMPS Upper/Middle/Lower, MS TACS, MS ETACS, MS NTACS, MS JTACS, and User Defined (PCS bands require the 83236B PCS Interface)

**Base Station Parameters:** NID, SID, Country Code, Network Code, CDG Esc Mode on/off, Register SID, Register NID, and Power-On Registration on/off

**Access Probe Parameters:** NOM\_PWR, NOM\_PWR\_EXT, INIT\_PWR, PWR\_STEP, NUM\_STEP, MAX\_REQ\_SEQ, and MAX\_RSP\_SEQ.

**Paging Channel Parameters:** Paging Data Rate (full or half rate)

### Service Option Support:

Service Option 001 (Normal Voice)

Service Option 002 (9600 bps Data Loopback)

Service Option 003 (EVRC 9600 bps Voice)

Service Option 006 SMS for Rate Set 1 (9600 bps)

Service Option 014 SMS for Rate Set 2 (14,400 bps)

Service Option 009 (14.4 kbps Data Loopback)

Service Option 32768 (14.4 kbps Voice)

**Call Control:** BS call originate, BS call disconnect, MS call originate, MS call disconnect.

### Hand-off Support:

CDMA to CDMA Hard (RF frequency)

CDMA to Analog cellular (intra band)

CDMA PCS to Analog cellular

**CDMA to Analog Hand-off:** Execute, System Type, Channel, SAT, and Power Level

**Authentication:** Registration, paging, origination, SSD update, data burst, and unique challenge

**Short Message Service:** Mobile terminated on paging or traffic channel

**Call Status Indicators:** Transmitting (cell active), Registering, Page Sent, Access Probe Received, Connected, Softer Handoff, Hard Handoff, Service, Option 002/009, SMS In Progress, MS Acknowledge Received. All indicators are also available over GPIB.

**Speech Encoding:** None

**Speech Echo Mode:** Fixed delay to 0 seconds

### CDMA Data Source:

Pseudorandom data (CCITT 2<sup>15-1</sup> pattern)

Voice Echo

1 kHz tone

400 Hz tone

Audio Chirp (3 second sweep from 5 Hz to 3.75 kHz)

### Closed Loop Power Control:

Supports True Closed Loop Power Control

Open Loop (Alternating 0 and 1 power control bits)

Always Up

Always Down

Off (no puncturing, requires special mode in mobile)

**Open Loop Power Control:** Supported through varying the level of CDMA Generator. CDMA analyzer auto-ranges to the ideal RF power level for the nominally expected open loop response.

**Ideal Mobile Power Display:** Reports the ideal open loop power for the mobile's transmitter based upon the forward link power set on the 8924E, the current protocol mode, and the set values of NOM\_PWR, NOM\_PWR\_EXT (J-STD-008 mode only), and INIT\_PWR.

**Mobile Station FER Reporting:** User selectable number of frames (from predefined list). Report by number of frames or by user defined number of errors.

**Neighbor List Support:** Automatically generates a list of 7 neighbors based on the user entry of the CDMA Sector PN offset using a fixed value of 12 for the internal parameter Pilot Increment.

**Mobile Station Identification:** Uses power-on or user initiated registration to obtain the mobile ID.

**Registration:** Supports mobile power-on registration, timer based registration (registration period parameter settable from 29 to 85, 12.18 to 199515 seconds), implicit, or user initiated registration (modulates SID to force the mobile to perform a zone based registration) via GPIB command or front panel button.

**IMSI Support:** Class 0 only in TSB-74 and J-STD-008 protocols:

**Auto Mode:** The phone's registration sub class is used by the instrument to page the phone

**Mobile Database:** Upon registration, the database contains the following information:

**IS-95 Mode:** ESN, MIN1, MIN2, Phone Number, Dual-Mode, Slot Class, Slot Index, Protocol Revision, Power Class, Transmit Mode, and Called Number

**IS-95A, ARIB T-53, and TSB74 Modes:** ESN, MCC, MNC, MSIN, Dual-Mode, Slot Class, Slot Index, Protocol Revision, Power Class, Transmit Mode, and Called Number

**Korean PCS, and J-STD-008 Modes:** ESN, MCC, MNC, MSIN, Slot Class, Slot Index, Protocol Revision, Band Class, EIRP Class, Operation Modes, and Called Number

### Retrievable Mobile Parameters:

**IS-95/IS-95A Modes:** MUX1\_REV\_(1 to 8, 11 to 14), MUX1\_FOR\_(1 to 14), PAG\_(1 to 7), ACC\_(1 to 8), and LAYER2\_RTC(1 to 5)

**TSB-74/J-STD-008 Modes:** In addition to the above parameters, these parameters are available: MUX2\_REV\_(1 to 25), and MUX2\_FOR\_(1 to 26)

**Protocol Logging:** Two rear panel serial ports allow logging of paging/access channel messages and forward/reverse traffic channel messages. Requires an external PC running terminal emulation software connected to the rear panel serial ports.

## CDMA Signal Generator

### CDMA Channels

#### Additive White Gaussian Noise

#### Sector Power with Selectable PN Offset:

Pilot Channel at Walsh Code 0

Sync Channel at Walsh Code 32

Paging Channel at Walsh Code 1

Traffic Channel with selectable Walsh Code

OCNS Channel with selectable Walsh Code

### Frequency

#### Frequency Range:

**Standard:** 501 MHz to 1000 MHz

*Usable from 30 MHz to 248.9 MHz*

#### With the 83236B:

800 MHz to 960 MHz

1710 MHz to 1785 MHz

1805 MHz to 1910 MHz

1930 MHz to 1990 MHz

*Usable from 1700 to 1999.999999 MHz*

#### Frequency Resolution: 1 Hz

**Frequency Accuracy:** Same as reference oscillator accuracy  
 $\pm 0.015$  Hz

**AWGN Bandwidth:** *Nominal bandwidth of 1.8 MHz*

### Amplitude

#### Composite Signal Output Level Range:

##### Standard:

RF IN/OUT:  $-109$  dBm/1.23 MHz to  $-21.5$  dBm/1.23 MHz

DUPLEX OUT:  $-109$  dBm/1.23 MHz to  $-7.5$  dBm/1.23 MHz

##### With the 83236B:

RF IN/OUT:  $-109$  dBm/1.23 MHz to  $-20.01$  dBm/1.23 MHz  
( $-23$  dBm/1.23 MHz max. if AWGN only is on)

RF OUT Only:  $-109$  dBm/1.23 MHz to  $-10.01$  dBm/1.23 MHz  
( $-13$  dBm/1.23 MHz max. if AWGN only is on)

#### Composite Signal Output Level Accuracy: (Using the IS-98A sensitivity setup)

##### Standard:

AWGN Off:  $\pm 1.5$  dB

*$\pm 1.0$  dB typically*

AWGN On:  $\pm 2.0$  dB

##### With the 83236B:

AWGN Off:

$\pm 2.1$  dB, at  $25$  °C  $\pm 10$  °C

$\pm 2.3$  dB, at  $0$  °C to  $55$  °C

*$\pm 1.3$  dB typically*

AWGN On:

$\pm 2.6$  dB, at  $25$  °C  $\pm 10$  °C

$\pm 2.8$  dB, at  $0$  °C to  $55$  °C

#### Attenuator Hold:

**Standard:**  $-15$  dB from attenuator setting when hold is enabled

**With the 83236B:** Up to  $-60$  dB from attenuator setting when hold is enabled depending upon the initial setting level. Holds mechanical attenuator in the 83236B and uses the electronic attenuator in the 8924E to provide low glitch amplitude transitions.

**Composite Signal Output Power:** Equal to the sum of the individually settable power levels of the CDMA sector and AWGN

**Maximum Individual Signal Dynamic Range:** The maximum dynamic range of any CDMA channel (AWGN, or CDMA Sector: Pilot, Sync, Paging, Traffic, or OCNS) is from 0 dB to  $-30$  dB relative to the total composite output power. Paging and Traffic channels may have more or less dynamic range depending on the data rate in use.

**AWGN Bandwidth:** *Typically  $>1.8$  MHz bandwidth. Because the reported total composite power and AWGN power is in terms of dBm in a 1.23 MHz bandwidth, the actual broadband output power as seen by a power meter on the front panel will be higher than reported on the front panel.*

**Sector CDMA OCNS Channel Relative Level Range:** Automatically calculated from other Sector channel relative levels to provide the set Sector power

**Individual Channel Amplitude Resolution:** 0.01 dB

#### Relative CDMA Channel Level Accuracy:

**AWGN to Traffic Channel:**  $<0.2$  dB,  $\pm 5$  °C from the last temperature at which PCB\_CAL was run for values of  $E_b/N_t$  from 1 dB to 10 dB

**Between any Two CDMA Channels:**  $<0.2$ , dB  $\pm 5$  °C from the last temperature at which PCB\_CAL was run



## CDMA Modulation

**Modulation Type:** QPSK per TIA/EIA-98-B

**Residual  $\rho$ :** Better than 0.97, typically >0.98

**Carrier Feedthrough:** Better than -25 dBc, typically better than -30 dBc

**Adjacent Channel Spectral Purity:** <-45 dBc at  $\pm 895$  kHz offset from carrier frequency relative to the total carrier power in a 1.23 MHz bandwidth.

**Rate Set Support:** Rate set 1 (9600 bps traffic (8 kbps voice))  
Rate set 2 (14.4 kbps traffic (13 kbps voice))

**Data Rate Transmission Modes:** IS-95A/J-STD-008 defined base station modes including full rate, half rate, quarter rate, one-eighth rate data transmission, and variable rate with equally weighted, randomly spaced occurrences of each rate.

### Data Generator Patterns:

Pseudorandom data (CCITT 2<sup>15</sup>-1 pattern)

1 kHz tone (IS-96A vocoder only)

400 Hz tone (IS-96A vocoder only)

Audio Chirp (3 second sweep from 5 Hz to 3.75 kHz, IS-96A vocoder only)

Tones and chirp conform to IS-96A (Service Option 1), IS-127 (Service Option 3), and CDG-27

## CDMA Analyzer

### CDMA Average Power Measurement

**Note:** To achieve the specified accuracy when measuring power at the RF IN/OUT port of the Agilent 8924E or the 83236B, the internal signal generator level must be 40 dB below the measured power or less than -20 dBm at the 8924E's DUPLEX OUT port or the 83236B's RF OUT Only port.

#### Input Frequency Range:

**Standard:** 30 MHz to 1000 MHz

**With the 83236B:**

800 MHz to 960 MHz

1710 MHz to 1785 MHz

1805 MHz to 1910 MHz

1930 MHz to 1990 MHz

Usable from 1700 to 1999.999999 MHz

#### Input Connector:

**Standard:** RF IN/OUT connector on the 8924E

**With the 83236B:** RF IN/OUT connector on the 83236B

**Measurement Bandwidth:** Provides an accurate measure of the total power for all present signals within  $\pm 2$  MHz of the specified operating frequency. If other signals are present outside of this frequency range, reduced measurement accuracy will result.

#### Maximum Input Level:

**Standard:** +35 dBm (3 W continuous)

**With the 83236B:** +37 dBm (5 W continuous)

#### Measurement Range:

**Standard:** -10 dBm to +35 dBm

Usable to -20 dBm with degraded accuracy

**With the 83236B:** -13 dBm to +37 dBm

**Measurement Method:** Reports the overall average power for all active power control groups captured

**Measurement Period:** Measures over 1/2 of a CDMA frame (eight power control groups) in full, half, quarter or one-eighth rate modes

**Measurement Update Rate:** Typically 1.2 readings per second

#### Measurement Accuracy (after power meter zero):

**Standard:**

$\pm 5\% \pm 1 \mu\text{W}$  at 25 °C  $\pm 10$  °C

$\pm 10\% \pm 1 \mu\text{W}$  from 0 °C to +55 °C

**With the 83236B:**

$\pm 5\% \pm 2.5 \mu\text{W}$  at 23 °C  $\pm 10$  °C

$\pm 10\% \pm 2.5 \mu\text{W}$  from 0 °C to +55 °C

## CDMA Tuned Channel Power and Access Probe Power Measurement

#### Input Frequency Range:

**Standard:** 30 MHz to 1000 MHz

**With the 83236B:**

800 MHz to 960 MHz

1710 MHz to 1785 MHz

1805 MHz to 1910 MHz

1930 MHz to 1990 MHz

Usable from 1700 to 1999.999999 MHz

#### Input Connector:

**Standard:** RF IN/OUT connector on the 8924E

**With the 83236B:** RF IN/OUT connector on the 83236B

**Measurement Bandwidth:** Measures the total power in a 1.23 MHz bandwidth centered on the active reverse channel center frequency.

#### Maximum Input Level:

**Standard:** +35 dBm (3 W continuous)

**With the 83236B:** +37 dBm (5 W continuous)

#### Measurement Range:

**Standard:** -50 dBm to +30 dBm, usable to -60 dBm

**Measurement Update Rate:** Typically 2 readings per second

**Measurement Accuracy:****Relative Mode** (Uncalibrated against average power):0 to -10 dB relative level:  $\pm 0.1$  dB-10 to -20 dB relative level:  $\pm 0.2$  dB-20 to -40 dB relative level:  $\pm 0.5$  dB**Calibrated Mode** (Calibrated against average power):**Standard:**  $\pm 1.0$  dB at  $\pm 10$  °C from the calibration temperature, typically  $\pm 0.5$  dB**With the 83236B Cellular Bands** (source level  $< -35$  dBm/1.23 MHz):  $\pm 1.0$  dB at  $\pm 10$  °C from the calibration temperature, typically  $\pm 0.5$  dB**With the 83236B PCS Bands** (source level  $< -35$  dBm/1.23 MHz):  $\pm 1.6$  dB at  $\pm 10$  °C from the calibration temperature, typically  $+1.0$  dB**Temperature Drift:** Typically 0.1 dB per 10 °C temperature change**Measurement Period:** Measures power in a 1.23 MHz bandwidth over 1/2 of a CDMA frame (eight power control groups) in full, half, quarter, or one-eighth rate modes.**Calibrate:** Calibrates the channel power measurement over the entire operating frequency range of the currently selected RF Channel Standard. This calibration requires the user to connect the DUPLEX OUT Port to the RF IN/OUT port (or to connect the RF OUT Only Port to the RF IN/OUT Port when using the 83236B) before initiating the calibration.**Alternate Channel Standard:** Allows the selection of a second channel standard to be calibrated when the channel power calibration is performed. Also allows calibrating the entire cell band, PCS band, or all bands at one time. This allows switching between two standards without having to recalibrate after each RF Channel Standard change.**Uncalibrated Flag:** Displays "Uncal" under the Channel Power measurement whenever the unit detects that the channel power calibration has not been run for the currently set RF Channel Standard.**Access Probe Power Measurement Triggering:** Measurement automatically triggers above -55 dBm.**CDMA Modulation Measurement****Input Frequency Range:****Standard:** 30 MHz to 1000 MHz**With the 83236B:**

800 MHz to 960 MHz

1710 MHz to 1785 MHz

1805 MHz to 1910 MHz

1930 MHz to 1990 MHz

*Usable from 1700 to 1999.999999 MHz***Modulation Measurement Format:** OQPSK per TIA/EIA-98-B **$\rho$  (rho) Measurement Input Level Range:****Standard:** -20 dBm to +35 dBm*Usable to -25 dBm with degraded accuracy***With the 83236B:** -25 dBm to +37 dBm*Usable to -28 dBm with degraded accuracy***Range of  $\rho$  Measurement for specified accuracy:** 0.45 to 1.00 **$\rho$  Measurement Interval:****Traffic Channel  $\rho$ :** 1.042 msec (5 Walsh symbols)**Test Mode  $\rho$ :** 1.25 msec (6 Walsh symbols)**Measurement Update Rate:** Typically 1.7 readings per second **$\rho$  Measurement Accuracy:**  $\rho \pm 0.003$ **Frequency Error Measurement Range:**  $\pm 1$  kHz**Frequency Error Measurement Accuracy:**  $\pm 30$  Hz**Other Reported Parameter with  $\rho$  Measurement:** Transmit Time Error ( $\tau$ , time offset), Frequency Error, Carrier Feedthrough, Amplitude Error, and Phase Error**CDMA Frame Error Rate Measurement****FER Measurement Method:** Data loopback per Service Option 002 or Service Option 009 supporting confidence limits as outlined in TIA/EIA-98-B**Supported Data Rates for FER Measurement:** Full, Half, Quarter, or One-eighth Rate**95% Confidence Limit:** On or off**Confidence Limit Statistical Model:** Meets IS-98A statistical model parameters**FER Reported Parameters:** Measured FER, Number of Errors, Number of Frames tested, and one of the following: Passed Confidence limit, Failed Confidence limit, or Max Frames (test indeterminate)**Conditions for Terminating FER Test (with confidence limits on):****Max Frames:** Maximum number of frames to test completed, indicative of an indeterminate test result**Failed:** Measured FER failed the specified FER limit with 95% confidence**Passed:** Measured FER passed the specified FER limit with 95% confidence**FER Measurement Indicators:** Testing, Passed, Failed, and Max Frames. All indicators are available over GPIB.

## One Button Min/Max Power Measurement

**Measurement Method:** Automatically sets the 8924E to the nominal IS-98A/J-STD-018 test conditions for the minimum power measurement and then maximum power measurement. Restores the 8924E to the instrument state active before the measurement in initiated.

**Measurement Output:** Maximum TX power and minimum TX power measured

**Measurement Rate:** Approximately 7.5 to 8 seconds per measurement

## CDMA Reverse Channel Spectrum

Option 102 required

**Frequency Range:** Fixed to the active CDMA reverse channel setting. Not independently adjustable.

**Frequency Span/Resolution Bandwidth (coupled, maximum span of 5 MHz):**

<u>Span</u>	<u>Bandwidth</u>
<50 kHz	300 Hz
<200 kHz	1 kHz
<1.5 MHz	3 kHz
5 MHz	30 kHz

**Display:** Log with 10 dB/division

**Display Range:** 80 dB

**Reference Level Range:** +50 to -50 dBm

**Residual Responses:** <-70 dBm (no input signal, 0 dB attenuation)

**Image Rejection:** >50 dB

**Non-harmonic Spurious Responses:** >70 dB (for input signals  $\leq -30$  dBm)

**Level Accuracy:**  $\pm 2.5$  dB

**Log Scale Linearity:**  $\pm 2$  dB (for input levels  $< -30$  dBm and/or 60 dB range)

**Displayed Average Noise Level:**  $< -114$  dBm (<50 kHz spans)

**Other Features:** Peak hold, marker with frequency and level read-out, marker to peak, marker to next peak, trace comparison A-B.

## CDMA Triggers

**Output Trigger Signals:** Open loop power trigger (line toggles whenever the output level of the 8924E's CDMA source is changed)

## Agilent 8924E Common Specifications

### Remote Programming

**GPIB:** Agilent Technologies's implementation of IEEE Standard 488.2

**Remote Front Panel Lockout:** Allows remote user to disable the front panel display to improve GPIB measurement speed

**Functions Implemented:** SH1, AH1, T6, L4, SR1, RL1, LE0, TE0, PP0, DC1, DT1, C4, C11, E2

**RS-232:** 3-wire RJ-11 connector used for serial data in and out (no hardware handshake capability, two available in standard mode, one available with the 83236B)

**Baud Rates:** 300, 600, 1200, 2400, 4800, 9600, and 19200 selectable

**Centronics Port:** Industry standard parallel printer port for hardcopies of test results or screen dumps

### Timebase Subsystem

(For proper operation, this reference must be locked to either the 8924E's high stability 10 MHz timebase output on the rear panel or to an external, high quality reference)

**Locking Range:**  $\pm 10$  ppm

**Input:** Rear panel coaxial BNC

**Accepted Input Frequencies:** 19.6608 MHz, 15 MHz, 10 MHz, 9.8304 MHz, 5 MHz, 4.9152 MHz, 2.4576 MHz, 2 MHz, 1.2288 MHz, and 1 MHz

**Outputs (All on Rear Panel):**

**Coaxial BNC's:** 10 MHz

**Frame Clock BNC Output (CDMA Mode Only):** User selectable output of one of the following clocks via this BNC:

- 1.25 msec
- 20 msec frame clock
- 26.67 msec short sequence clock
- 80 msec clock
- Every even second (PP2S)

**TTL Sub Min. D Connector:** Individual pins for 1.25 msec, 20 msec frame clock, 26.67 msec short sequence clock, 80 msec clock, and every even second (PP2S)

## Ovenized Reference

**Aging Rate:** <0.005 ppm pk-pk/day, <±0.1 ppm per year (±85 Hz at 850 MHz in one year)

**Warm-up:** ±0.1 ppm in 5 minutes, ±0.01 ppm in 15 minutes

**Temperature:** <0.01 ppm

**Supply Voltage:**  $2 \times 10^{-9}$  (±1%)

**Rear Panel BNC Connectors:**

**Output Frequency:** 10 MHz

**Output Level:** 0 dBm ±3 dB into 50 Ω

## Store/Recall

**Available RAM:** *Approximately 928 Kbytes of user available RAM. When running the 83217A Dual-mode CDMA Mobile Station Test Software, about 280 Kbytes of RAM is available for save/recall use.*

## Memory Card

**Card Compatibility:** Single industry standard PCMCIA slot that accepts type I and type II SRAM and ROM cards

**Storage Capability:** Allows for the storage and retrieval of IBASIC programs, IBASIC program parameter and results data, input of new calibration data, and long-term storage of Store/Recall information

**Firmware Upgrades:** Accepts PCMCIA memory cards to allow automatic loading of new firmware for the Host CPU, Protocol CPU, DSP, and Channel Card CPU's without opening the 8924E. (Order 8924CRT Option R58 for latest version.)

## General Specifications

**Dimensions (H × W × D):**

**Standard:** 177H × 426W × 629D mm (7 × 16.75 × 24.75 inches)

**With the 83236B:** 254H × 426W × 629D mm (10 × 16.75 × 24.75 inches) Using the optional desktop rack mount kit

**Weight:**

**Standard:** 27 kg, 59 lbs

**With the 83236B:** 32.6 kg, 72 lbs

**CRT Size:** 7 × 10 cm

**Operating Temperature:** 0 °C to +55 °C

**Storage Temperature:** -55 °C to +75 °C

**Power:**

**8924E:** 100 V to 240 V, 50/60 Hz, *nominally 400 VA*

**83236B:** 90 V to 132 V, 198 V to 264 V, 47 to 63 Hz, 100 VA maximum

**Calibration Interval:** One year

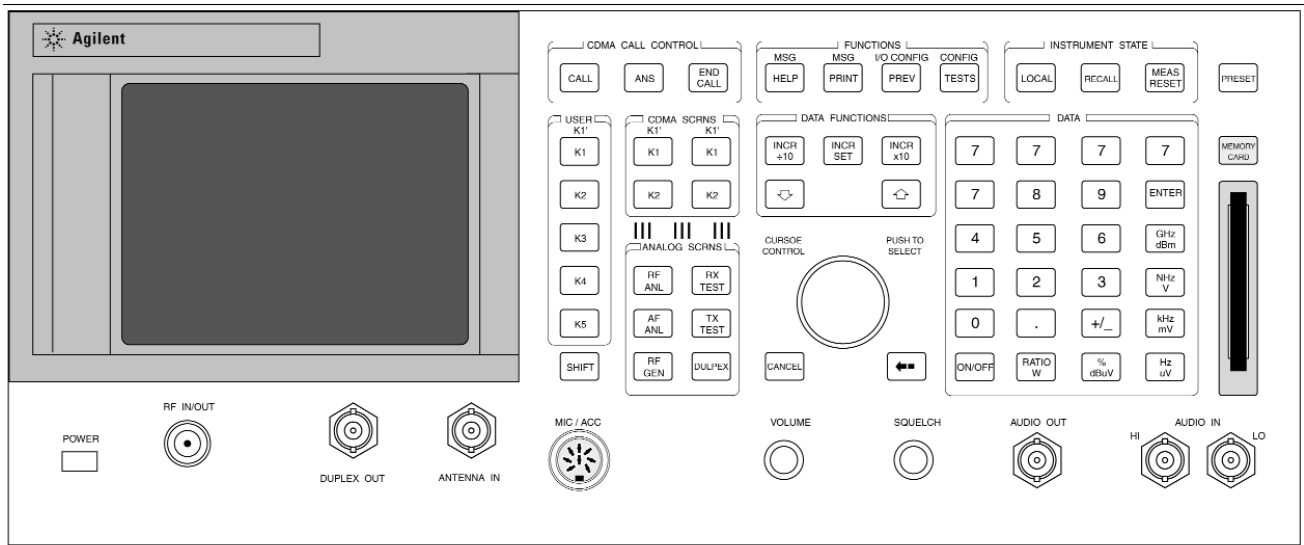
**EMI:**

**Standard:** Conducted and Radiated interference meets CISPR-11, IEC 801-2, IEC 801-3, and IEC 801-4

**With the 83236B:** Conducted and Radiated interference meets IEC 801-3

**Leakage:** *At RF Generator output levels <-40 dBm, typical radiated leakage is <1 μV induced in a resonant dipole antenna 25 mm (one inch) away from any surface except the rear panel. Spurious leakage levels are typically <5 μV in a resonant dipole antenna 25 mm (one inch) away from any surface except the rear panel. Spurious leakage levels at the rear panel are typically <5 μV in a resonant dipole antenna at a distance of 250 mm (ten inches).*

## Front Panel



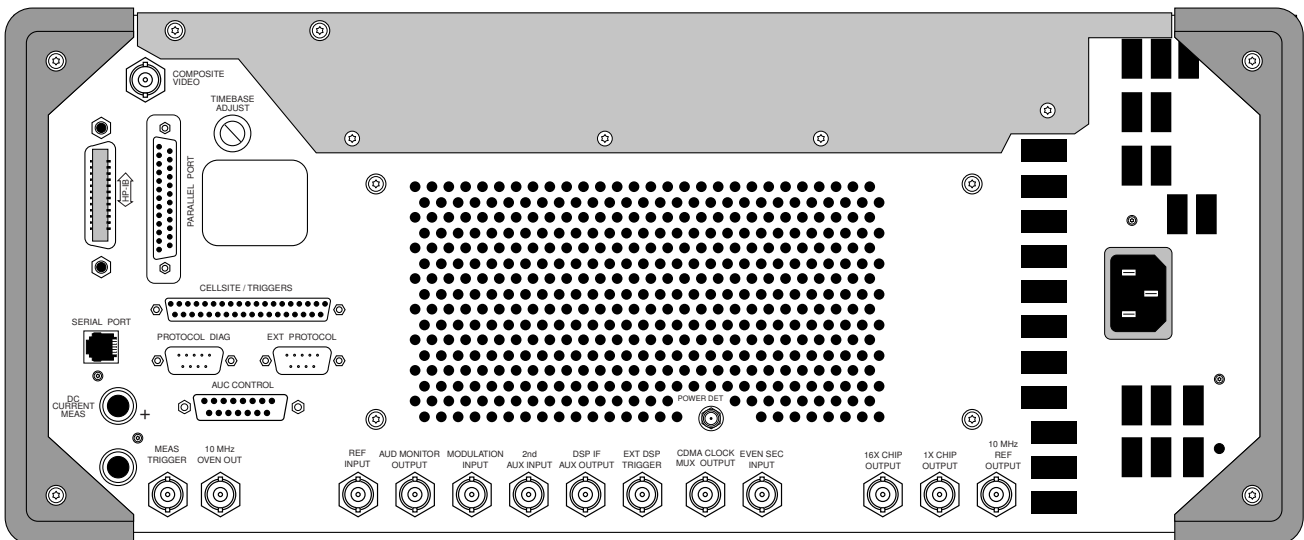
### Front Panel Inputs:

RF Input/Output: Type N  
 Antenna Input: BNC  
 Microphone/Accessory: 8-pin DIN  
 Audio Input: Dual BNC's

### Front Panel Outputs:

RF Input/Output: Type N  
 DUPLEX OUT: BNC  
 Audio Output: BNC

## Rear Panel



### Rear Panel Inputs:

Modulation Input (Analog): BNC  
 Reference Input: BNC  
 Power Detector (Input for 83236B): SMA  
 DC Current Measure (Input): Dual banana jacks

### Rear Panel Digital Ports:

Parallel Printer Port: Centronics 25 pin sub-min D  
 Serial Port (RS-232): RJ-11  
 Protocol Diag: Not functional

### Rear Panel Outputs:

CRT Video Output: BNC  
 Audio Monitor Output: BNC  
 10 MHz Oven Output: BNC  
 10 MHz Reference Output: BNC  
 CDMA (Frame) Clock Multiplexer Output: BNC  
 Cellsite/Triggers: 37 pin sub-min D (protocol logging output)

## **Agilent 83217A Test List**

### **Option 001**

#### **AMPS/NAMPS/CDMA**

CDMA Quick General Test  
CDMA Call Processing Check  
CDMA Softer Handoff Add and Drop Check  
CDMA RX Sensitivity and Dynamic Range  
CDMA RX Demodulation of Traffic Channel with AWGN  
CDMA TX Modulation Quality (includes frequency accuracy)  
CDMA TX Open Loop Power Control Accuracy  
CDMA TX Closed Loop Power Control Range  
CDMA TX Maximum RF Output Power  
CDMA TX Minimum Controlled Output Power  
CDMA/AMPS Digital to Analog Handoff  
AMPS/NAMPS Call Processing Registration  
AMPS/NAMPS Call Processing Page  
AMPS/NAMPS Call Processing Release  
AMPS/NAMPS Call Processing Origination  
AMPS/NAMPS Call Processing Hook Flash  
AMPS/NAMPS Flow Chart (manual phone test)  
AMPS/NAMPS TX Frequency Error  
AMPS/NAMPS TX RF Output Power  
AMPS/NAMPS TX Modulation Deviation Limiting  
AMPS/NAMPS RX Audio Frequency Response  
AMPS/NAMPS RX Audio Distortion  
AMPS/NAMPS TX Signaling Tone/DST  
AMPS/NAMPS RX Hum and Noise  
AMPS/NAMPS TX SAT/DSAT  
AMPS/NAMPS TX RVC Data Deviation  
AMPS/NAMPS TX Current Drain  
AMPS/NAMPS TX DTMF Frequency Error  
AMPS/NAMPS TX Quick General Test  
AMPS/NAMPS RX Expander Response  
AMPS/NAMPS RX Audio Frequency Response  
AMPS/NAMPS RX Audio Distortion  
AMPS/NAMPS RX Hum and Noise  
AMPS/NAMPS RX Sensitivity (SINAD)  
AMPS/NAMPS RX FVC Order Message Error Rate  
AMPS/NAMPS RX Quick General Test  
NAMPS RX MRI Performance

### **Option 003**

#### **NTACS/JTACS/CDMA**

JTACS/NTACS Registration  
JTACS/NTACS Page  
JTACS/NTACS TX Frequency Error  
JTACS/NTACS TX Carrier Power  
JTACS/NTACS TX Peak Frequency Deviation  
JTACS/NTACS TX Audio Frequency Response  
JTACS/NTACS TX Audio Distortion  
JTACS/NTACS TX Signaling Tone/DST  
JTACS/NTACS TX FM Hum and Noise  
JTACS/NTACS TX SAT/DSAT  
JTACS/NTACS TX RVC Data Deviation  
JTACS/NTACS TX Compressor Response  
JTACS/NTACS TX Current Drain  
JTACS/NTACS RX Expander  
JTACS/NTACS RX Audio Frequency Response  
JTACS/NTACS RX Audio Distortion  
JTACS/NTACS RX Hum and Noise  
JTACS/NTACS RX SINAD  
JTACS/NTACS RX FVC Order Message Error Rate  
JTACS/NTACS Release  
JTACS/NTACS Origination  
JTACS/NTACS No Audio Functional  
JTACS/NTACS TX Quick General  
JTACS/NTACS RX Quick General  
JTACS/NTACS Flow Chart  
JTACS/NTACS TX Switch Channels  
JTACS/NTACS Hook Flash  
JTACS/NTACS TX DTMF Frequency Error  
CDMA Registration  
CDMA Origination  
CDMA Page  
CDMA TX Waveform Quality and Freq. Acc.  
CDMA TX Open Loop Power Control  
CDMA TX Closed Loop Power Control  
CDMA TX Maximum RF Output Power  
CDMA TX Min. Controlled Output Power  
CDMA RX Traffic Channel FER  
CDMA RX Sensitivity and Dynamic Range  
CDMA Softer Handoff  
CDMA RX/TX CDMA Quick General  
CDMA Voice Quality  
CDMA TX Spectrum Emissions  
CDMA Release  
CDMA/AMPS Digital to Analog Handoff



## **Option 004 (Requires 83236B PCS Interface) CDMA/PCS/AMPS/NAMPS**

AMPS/NAMPS Registration  
AMPS/NAMPS Page  
AMPS/NAMPS TX Frequency Error  
AMPS/NAMPS TX RF Power Output  
AMPS/NAMPS TX Modulation Deviation Limiting  
AMPS/NAMPS TX Audio Frequency Response  
AMPS/NAMPS TX Audio Distortion  
AMPS/NAMPS TX Signaling Tone/DST  
AMPS/NAMPS TX FM Hum and Noise  
AMPS/NAMPS TX SAT/DSAT  
AMPS/NAMPS TX RVC Data Deviation  
AMPS/NAMPS TX Compressor Response  
AMPS/NAMPS TX Current Drain  
AMPS/NAMPS RX Expander  
AMPS/NAMPS RX Audio Frequency Response  
AMPS/NAMPS RX Audio Distortion  
AMPS/NAMPS RX Hum and Noise  
AMPS/NAMPS RX SINAD  
AMPS/NAMPS RX FVC Order Message Error Rate  
AMPS/NAMPS Release  
AMPS/NAMPS Origination  
AMPS/NAMPS No Audio Functional  
AMPS/NAMPS TX Quick General  
AMPS/NAMPS RX Quick General  
AMPS/NAMPS Flow Chart  
AMPS/NAMPS TX Switch Channels  
AMPS/NAMPS Hook Flash  
AMPS/NAMPS TX DTMF Frequency Error  
AMPS/NAMPS RX MRI  
CDMA Registration  
CDMA Origination  
CDMA Page  
CDMA TX Waveform Quality and Freq. Acc.  
CDMA TX Open Loop Power Range  
CDMA TX Closed Loop Power Control  
CDMA TX Maximum RF Output Power  
CDMA TX Minimum Controlled Output Power  
CDMA RX Traffic Channel FER  
CDMA RX Sensitivity and Dynamic Range  
CDMA Softer Handoff  
CDMA RX/TX CDMA Quick General  
CDMA Voice Quality  
CDMA TX Spectrum Emissions  
CDMA Release  
CDMA/AMPS Digital to Analog Handoff

## **Agilent E8290A Test List**

### **E8290A Point of Service Test (PoST)**

CDMA Registration  
CDMA Origination  
CDMA Page  
CDMA Base Station Release  
CDMA Quick General  
CDMA Waveform Quality and Frequency Accuracy  
CDMA Open Loop Power Range  
CDMA Closed Loop Power Control  
CDMA Maximum RF Output Power  
CDMA Minimum RF Output Power  
CDMA Traffic Channel FER with AWGN  
CDMA Sensitivity and Dynamic Range  
CDMA Softer Handoff  
CDMA Voice Quality  
CDMA Spectrum Emissions  
CDMA Talk Time  
CDMA Sensitivity Level Search  
CDMA Digital to Analog Handoff  
Analog Registration  
Analog Page  
Analog Origination  
Analog Base Station Release  
Analog TX Quick General  
Analog RX Quick General  
Analog No Audio Functional  
Analog TX Frequency Error  
Analog TX RF Power Output  
Analog TX Modulation Deviation Limiting  
Analog TX Audio Frequency Response  
Analog TX Audio Distortion  
Analog Signaling Tone/DST  
Analog TX FM Hum and Noise  
Analog SAT/DSAT  
Analog RVC Data Deviation  
Analog Compressor Response  
Analog Current Drain  
Analog Expander Response  
Analog RX Audio Frequency Response  
Analog RX Audio Distortion  
Analog RX Hum and Noise  
Analog SINAD  
Analog FVC Order Message Error Rate  
Analog No Audio Functional  
Analog Switch Channels  
Analog Hook Flash  
Analog DTMF Frequency Error  
Analog NAMPS MRI  
Change Global Parameters  
Change Channel For  
Change Channel List  
Access to a User DLL

**Agilent Technologies' Test and Measurement Support, Services, and Assistance**

Agilent Technologies aims to maximize the value you receive, while minimizing your risk and problems. We strive to ensure that you get the test and measurement capabilities you paid for and obtain the support you need. Our extensive support resources and services can help you choose the right Agilent products for your applications and apply them successfully. Every instrument and system we sell has a global warranty. Support is available for at least five years beyond the production life of the product. Two concepts underlie Agilent's overall support policy: "Our Promise" and "Your Advantage."

**Our Promise**

"Our Promise" means your Agilent test and measurement equipment will meet its advertised performance and functionality. When you are choosing new equipment, we will help you with product information, including realistic performance specifications and practical recommendations from experienced test engineers. When you use Agilent equipment, we can verify that it works properly, help with product operation, and provide basic measurement assistance for the use of specified capabilities, at no extra cost upon request. Many self-help tools are available.

**Your Advantage**

"Your Advantage" means that Agilent offers a wide range of additional expert test and measurement services, which you can purchase according to your unique technical and business needs. Solve problems efficiently and gain a competitive edge by contracting with us for calibration, extra-cost upgrades, out-of-warranty repairs, and on-site education and training, as well as design, system integration, project management, and other professional services. Experienced Agilent engineers and technicians worldwide can help you maximize your productivity, optimize the return on investment of your Agilent instruments and systems, and obtain dependable measurement accuracy for the life of those products.

By internet, phone, or fax, get assistance with all your test and measurement needs.

**Online Assistance**

[www.agilent.com/find/assist](http://www.agilent.com/find/assist)

**Phone or Fax**

United States:

(tel) 1 800 452 4844

Canada:

(tel) 1 877 894 4414

(fax) (905) 206 4120

Europe:

(tel) (31 20) 547 2323

(fax) (31 20) 547 2390

Japan:

(tel) (81) 426 56 7832

(fax) (81) 426 56 7840

Latin America:

(tel) (305) 269 7500

(fax) (305) 269 7599

Australia:

(tel) 1 800 629 485

(fax) (61 3) 9210 5947

New Zealand:

(tel) 0 800 738 378

(fax) (64 4) 495 8950

Asia Pacific:

(tel) (852) 3197 7777

(fax) (852) 2506 9284

Product specifications and descriptions in this document subject to change without notice.

Copyright © 1998, 2000 Agilent Technologies

Printed in U.S.A. 9/00

5968-4089E

For more information, visit our website at:  
[www.agilent.com/find/8924support/](http://www.agilent.com/find/8924support/)



**Agilent Technologies**

Innovating the HP Way