

# Agilent 8924C CDMA Mobile Station Test Set

Data Sheet



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

**30 MHz to 1000 MHz, 1700 MHz to 2000 MHz**

The Agilent Technologies 8924C 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 8924C additionally offers CDMA mobile testing from 1700 to 2000 MHz. Acting as a calibrated, high performance CDMA base station, the 8924C verifies not only the parametric characteristics of CDMA phones, but also the functional aspects of phone performance.

The 8924C'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 8924C 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 8924C's voice echo mode. For testing a variety of protocol formats, the 8924C offers six user selectable protocol stacks: IS-95, IS-95A, TSB-74, J-STD-008, ARIB T53, and KOREAN PCS. The 8924C also supports a number of service options, including 9600 BPS and 14,400 BPS traffic channel configurations.



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

Active cell site emulation in the 8924C is supplied by Sector A. The Sector A source supports the following CDMA channels: pilot, sync, paging, traffic, and orthogonal channel noise source (OCNS). In addition, the 8924C has a second sector for testing softer hand-offs. Sector B is a partial sector that has a pilot channel, a traffic channel, and an OCNS channel. An additive white Gaussian noise (AWGN) Source is also included to provide the interference generated by adjacent cells in a working CDMA network. The 8924C 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 8924C provides an average power measurement based on new DSP technology. A DSP based channel power measurement enables the 8924C to achieve accurate low level CDMA power measurements. Access probe power measurements are also available. The 8924C 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.

### **Hand-off Verification**

To speed testing, the 8924C supports hard handoffs between RF channels. CDMA to analog handoffs from both cellular and PCS bands are also supported. With two configurable CDMA sectors, the 8924C can verify the ability of a CDMA mobile to support softer hand-offs. Two 8924C test sets can be synchronized for complete idle and soft hand-off testing.

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

The 8924C 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 8924C supports mobile terminated SMS.

### **Automated Software**

The new E8290A PoST (point of service test) software makes the 8924C 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 NTF (no trouble found), and improves customer care.

The 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 8924C. 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 8924C's entire operating environmental range unless otherwise noted. Specifications are subject to change without notice.

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

## 8924C 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

**Hand-off Support:** Hand-off 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 1999.999999 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° C  $\pm 10^\circ$  C

$\pm 2.0$  dB, at 0° C to 55° 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° C  $\pm 10^\circ$  C

$\pm 2.0$  dB, at 0° C to 55° 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 (*setable in 0.01 dB increments*)

### Spectral Purity

All specifications are for  $\leq -2.5$  dBm output level at Duplex Out or  $\leq -16.5$  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 MHz  $< f_c \leq 1000$  MHz

$< 4$  Hz for 250 MHz  $\leq f_c \leq 500$  MHz

$< 7$  Hz for 30 MHz  $\leq f_c < 250$  MHz

###### With the 83236B:

$< 7$  Hz for 810 MHz  $\leq f_c \leq 960$  MHz

$< 10$  Hz for 1710 MHz  $\leq f_c \leq 1990$  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

#### Maximum 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)*

*DC Coupled: DC to 75 kHz (typical -3 dB BW)*

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

$\leq 10$  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

**Center Frequency Accuracy in DC FM Mode (external source impedance <1 k $\Omega$ ):**  $\pm 500$  Hz (after DCFM zero), *typically*  $\pm 50$  Hz

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

**Resolution:**

50 Hz for <10 kHz deviation

500 Hz for  $\geq 10$  kHz deviation

**Audio Source** (both internal sources)**Frequency**

**Range:** dc to 25 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 %; 20 Hz to 25 kHz in an 80 kHz BW

**Resolution:**

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

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

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

Level <10V:  $\pm 50$  mV

**Offset in DC Coupled Mode:** <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 output 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  $\pm 1$   $\mu W$  from 15° C to 35° C

$\pm 10\%$  of reading  $\pm 1$   $\mu W$  from 0° C to 55° C

**With the 83236B:**

$\pm 5\%$  of reading  $\pm 2.5$   $\mu W$  at 23° 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,  $f_c \geq 30$  MHz)

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

**Accuracy (20 Hz to 25 kHz rates, deviation  $\leq 25$  kHz):**  $\pm 4$  % of reading plus residual FM and noise contribution

**Bandwidth (3 dB):** 2 Hz to 70 kHz (DCFM measurements also available)

**THD+Noise:**  $< 1\%$  for  $\geq 5$  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  $\mu$ W 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  $\geq 10$  kHz:** 10 Hz

## Spectrum Analyzer

**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)**

**Standard:**

Span	Bandwidth
$< 50$ kHz	300 Hz
$< 200$ kHz	1 kHz
$< 1.5$ MHz	3 kHz
$< 18$ MHz	30 kHz
$\geq 18$ MHz	300 kHz

Plus full span capability

**With the 83236B:**

Span	Bandwidth
$< 50$ 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  $\leq -30$  dBm)

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

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

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

**Other Features:** Peak hold, marker with frequency and level readout, 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  $\pm$  frequency offset cannot be  $< 30$  MHz or  $> 1000$  MHz

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

**Sweep Modes:** Normal and Inverted

## Adjacent Channel Power

### Relative Measurements

**Level Range:**

**RF In/Out:** -10 dBm to +35 dBm

**ANT In:** -40 dBm to +20 dBm

**Dynamic Range: Typical values for channel offsets**

Offset	Residual BW	Dynamic Range
12.5 kHz	8.5 kHz	-65 dBc
20 kHz	4 kHz	-68 dBc
25 kHz	16 kHz	-68 dBc
30 kHz	16 kHz	-68 dBc
60 kHz	30 kHz	-65 dBc

**Relative Accuracy:**  $\pm 2.0$  dB

### Absolute Measurements

**Level:** Results of absolute power in watts or dBm are determined by adding the ACP ratio from the Spectrum Analyzer to the carrier power measurement obtained from the input section RF power detector.

**Level Range:**

**RF In/Out:** -10 dBm to +35 dBm

**Antenna In:** Not available

**Dynamic Range: Typical values for channel offsets**

Offset	Residual BW	Dynamic Range
12.5 kHz	8.5 kHz	-65 dBc
20 kHz	14 kHz	-68 dBc
25 kHz	16 kHz	-68 dBc
30 kHz	16 kHz	-68 dBc
60 kHz	30 kHz	-65 dBc

**Absolute Accuracy:** Is the sum of the RF Power Measurement Accuracy found in the RF Analyzer section and the ACP Relative Accuracy of  $\pm 2.0$  dB.

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

## Audio Analyzer

### Frequency Measurement

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

**Accuracy:**  $\pm 0.02\%$  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

$f \geq 100$  kHz: 1 Hz

### AC Voltage Measurement

**Measurement Range:** 0 to 30 Vrms

**Accuracy (20 Hz to 15 kHz,  $\geq 1$  mV):**  $\pm 3\%$  of reading

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

With a load ( $\leq 600 \Omega$ ) connected to

“Audio In Hi”: 150  $\mu$ V

Without load: 480  $\mu$ V

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

**Nominal Input Impedance:** Switchable between 1 M  $\Omega$  in parallel with 95 pF or 600  $\Omega$  floating.

**Resolution:**

4 digits for inputs  $\geq 100$  mV

3 digits for inputs  $< 100$  mV

### 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  $\pm 5\%$

**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 dB 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  $\pm 5\%$

**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 dB 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)

**Componder:** None

## 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, rms \*SQRT2

## Oscilloscope

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

**3 dB Bandwidth:** Typically >100 kHz

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

## Signaling

**Capability for Generating and Analyzing the Following**

**Formats:** AMPS, EAMPS, NAMPS, TACS, JTACS, NTACS, ETACS, NMT-450S, NMT-900S, LTR, EDACS, MPT 1327.

**Function Generator Waveforms:** Sine, square, triangle, ramp, dc, White Gaussian and White Uniform noise.

**Function Generator Frequency Range and Level:** Same as audio source

## 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)

## 8924C CDMA MODE SPECIFICATIONS

### Call Processing Functionality

#### User Settable Parameters

**Protocol Stack:** J-STD-008, KOR PCS, ARIB T-53, IS-95, IS-95A, TSB-74

**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, BASE\_ID, Country Code, Network Code, SRCH\_WIN\_A, SRCH\_WIN\_N, SRCH\_WIN\_R, 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, PAM\_SZ, NUM\_STEP, MAX\_REQ\_SEQ, and MAX\_RSP\_SEQ.

**Paging Channel Parameters:** Paging Data Rate (full or half rate), NUM\_PAGES.

**Threshold Parameters:** T\_ADD, T\_DROP, T\_COMP, and T\_TDROP.

### 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 Softer (between two sectors)

CDMA Soft (requires two units)

CDMA to Analog (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 Hand-off, Hard Hand-off, Service Option 002/009.

SMS In Progress, MS Acknowledge Received. All indicators are also available over GPIB.

**Speech Encoding:** None (No vocoder)

**Speech Echo Mode:** Three user selectable fixed delays: 0 seconds, 2 seconds, and 5 seconds.

### CDMA Data Source:

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

### Closed Loop Change Modes:

Step n Up (up to 150 bits)

Step n Down (up to 150 bits)

Ramp of n Up followed by n Down power (max. 150)

**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 8924C, 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.

**Adjacent Cell Mobile Reporting:** Displays status, PN offset, strength, and keep bit for all pilots found by the CDMA mobile and reported via pilot strength messages. Also displays the current user set PN offsets and strengths of Sector A and Sector B to aid in verifying mobile performance.

**Neighbor List Support:** Automatically generates a list of seven neighbors based on the user entry of Sector A PN offset, Sector B PN offset, and Pilot Increment.

**Mobile Station Identification:** 10-digit phone number (IS-95 mode only), MIN (IS-95 mode only with hex entry), IMSI (MCC + MNC + MSIN), or AUTO (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:

**IMSI Mode:** Class 0, Type 3 only

**Auto Mode:** The phone's registration subclass 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, TSB74 and ARIB T-53 Modes:** ESN, MCC, MNC, MSIN, Dual-mode, Slot Class, Slot Index, Protocol Revision, Power Class, Transmit Mode, and Called Number.

**J-STD-008 and Korean PCS 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 A 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

##### Sector B with Selectable PN Offset:

Pilot Channel at Walsh Code 0

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

## 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)

**RF Out Only:** -109 dBm/1.23 MHz to -10.01 dBm/1.23 MHz (-13 dBm/1.23 MHz max. if AWGN only)



**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  $25\text{ }^{\circ}\text{C} \pm 10\text{ }^{\circ}\text{C}$

$\pm 2.3$  dB, at  $0\text{ }^{\circ}\text{C}$  to  $55\text{ }^{\circ}\text{C}$

*$\pm 1.3$  dB typically*

**AWGN On:**

$\pm 2.6$  dB, at  $25\text{ }^{\circ}\text{C} \pm 10\text{ }^{\circ}\text{C}$

$\pm 2.8$  dB, at  $0\text{ }^{\circ}\text{C}$  to  $55\text{ }^{\circ}\text{C}$

**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 8924C to provide low-transient amplitude transitions.*

**Composite Signal Output Power:** Equal to the sum of the individually settable power levels for AWGN, Sector A, and Sector B.

**Maximum Individual Signal Dynamic Range:** The maximum dynamic range of any CDMA channel (AWGN, Sector A: Pilot, Sync, Paging, Traffic, or OCNS, Sector B: Pilot, 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 A OCNS Channel Relative Level Range:**

Automatically calculated from other Sector A channel relative levels to provide the set Sector A power.

**Sector B OCNS Channel Relative Level Range:**

Automatically calculated from other Sector B channel relative levels to provide the set Sector B power.

**Individual Channel Amplitude Resolution:** 0.01 dB

**Relative CDMA Channel Level Accuracy:**

**AWGN to Traffic Channel:**  $<0.2$  dB,  $\pm 5\text{ }^{\circ}\text{C}$  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  $\pm 5\text{ }^{\circ}\text{C}$  from the last temperature at which PCB\_CAL was run.

## CDMA Modulation

**Modulation Type:** QPSK per TIA IS-95A/J-STD-008

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

**Carrier Feedthrough:** Better than -30 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

400 Hz tone

Audio Chirp (3 second sweep from 10 Hz to 3.75)

Tones and chirp conform to IS-96A (Service Option 1), IS-127 (Service Option 3), and CDG-27 (Service Option 32768) vocoder standards

## CDMA Analyzer

### CDMA Average Power Measurement

**Note:** To achieve the specified accuracy when measuring power at the RF In/Out port of the 8924C or the 83236B, the internal signal generator level must be 40dB below the measured power or less than -20 dBm at the 8924C's Duplex Output 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 8924C

**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 ½ of a CDMA frame (eight power control groups) in full, half, quarter, or one-eighth rate modes**Measurement Update Rate:** *Typically 1.5 readings per second***Measurement Accuracy (after power meter zero):****Standard:**

±5% ±1 µW at 25 °C ±10 °C

±10% ±1 µW from 0 °C to +55 °C

**With the 83236B:**

±5% ±2.5 µW at 23 °C ±10 °C

±10% ±2.5 µW from 0 °C to +55 °C

**CDMA Tuned Channel Power and Access Probe Power Measurements****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 8924C**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 two readings per second***Measurement Accuracy:****Relative Mode** (Uncalibrated against average power):

0 to -10 dB relative level: ±0.1 dB

-10 to -20 dB relative level: ±0.2 dB

-20 to -40 dB relative level: ±0.5 dB

**Calibrated Mode** (Calibrated against average power):**Standard:** ±1.0 dB at ±10 °C from the calibration temperature**With the 83236B Cellular bands** (source level <-35 dBm/1.23 MHz): ±1.0 dB at ±10 °C from the calibration temperature**With the 83236B PCS bands** (source level <-35 dBm/1.23 MHz): ±1.6 dB at ±10 °C from the calibration temperature**Temperature Drift:** *Typically 0.1 dB per 10 °C temperature change***Measurement Period:** Measures power in a 1.23 MHz bandwidth over ½ 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 to 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 IS-95A/J-STD-008

**$\rho$  (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 1.5 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 Parameters 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

**Confidence Limit Range:** User definable from 80.0% to 99.9% and Off

**Confidence Limit Statistical Model:** Meets TIA/EIA-98-B 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 specified confidence.

**Passed:** Measured FER passed the specified FER limit with specified 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 8924C to the nominal TIA/EIA-98-B test conditions for the minimum power measurement and then maximum power measurement. Restores the 8924C to the instrument state active before the measurement is initiated.

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

**Measurement Rate:** *Approximately 7 seconds per measurement*

### CDMA Reverse Channel Spectrum Display

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

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

Span	Bandwidth
<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  $\leq -30$  dBm and/or 60 dB range)

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

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

### CDMA Triggers

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

## 8924C CDMA COMMON SPECIFICATIONS

### Remote Programming

**GPIB:** Agilent Technologies 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 RS-232 ports available in standard mode, one RS-232 port 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 8924C'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:** 19.6608 MHz, 10 MHz, 1.2288 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,  $< \pm 0.1$  ppm per year ( $\pm 85$  Hz at 850 MHz in one year)

**Warm-up:**  $\pm 0.1$  ppm in 5 minutes,  $\pm 0.01$  ppm in 15 minutes

**Temperature:**  $< 0.01$  ppm

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

**Rear Panel BNC Connectors:**

**Output Frequency:** 10 MHz

**Output Level:** 0 dBm  $\pm 3$  dB into 50  $\Omega$

### 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 8924C (order 8924 CRT Option R58 for latest version; contact Agilent Technologies if unit contains firmware revision A.02.37 or less).

## General Specifications

### Dimensions (HxWxD):

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

**With the 83236B:** 254 H x 426 W x 574 D mm  
(12 x 16.75 x 24.75 inches) using the optional bench-top cabinet

### Weight:

**Standard:** 27 kg, 59 lbs

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

### CRT Image Size: 7 x 10 cm

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

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

### Power:

**8924C:** 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:** 24 months

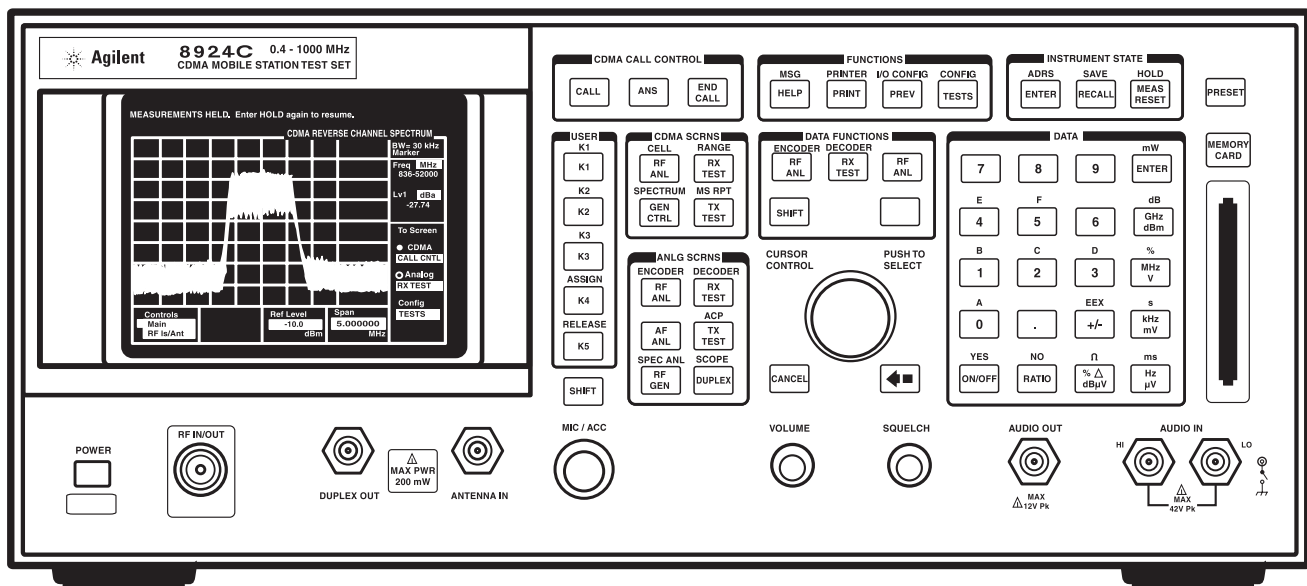
### EMI:

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

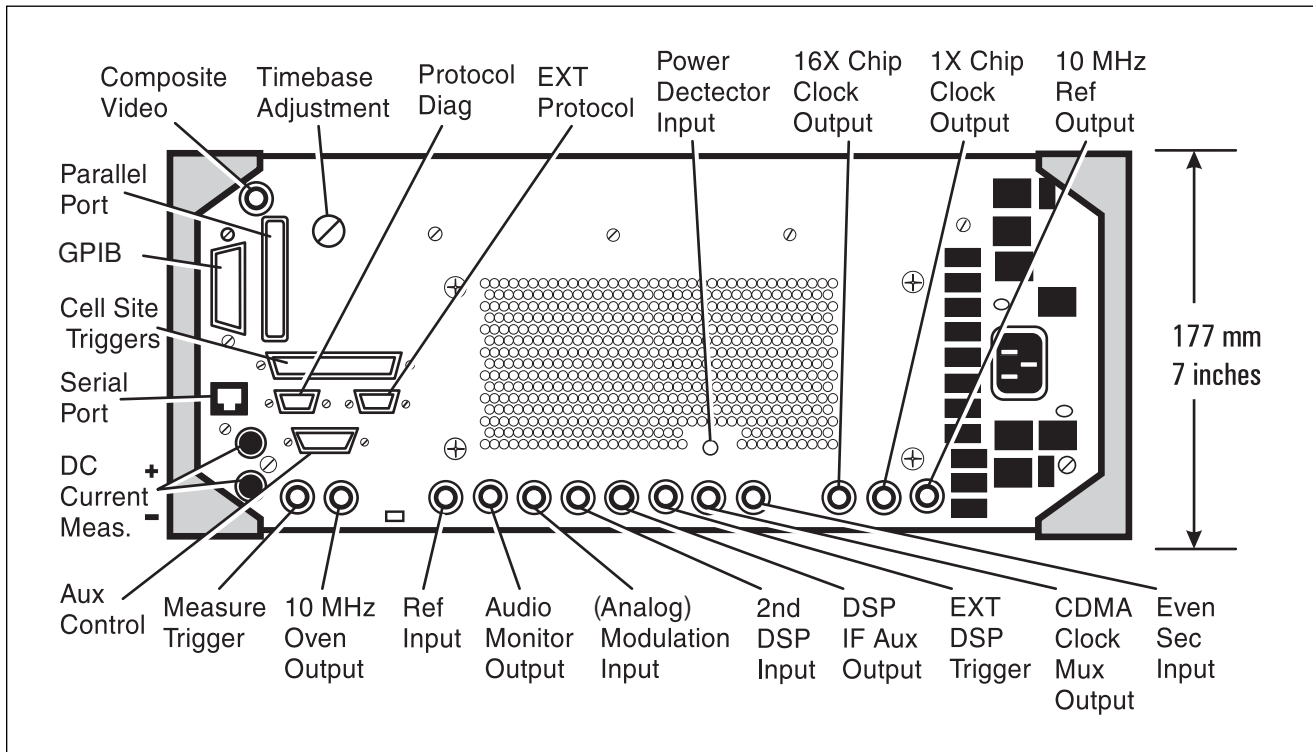
**With the 83236B:** Conducted and Radiated interference meets IEC 801-3.

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

## Front Panel



## Rear Panel



### Front Panel Inputs

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

### Rear Panel Inputs

Modulation Input (analog): BNC  
 Measurement Trigger [input for oscilloscope]: BNC  
 Reference Input: BNC  
 Second DSP Auxillary [Baseband] Input: Not functional  
 Even Second Input: BNC  
 External DSP [Input]: BNC  
 Power Detector [input for 83236B]: SMA  
 DC Current Measure [input]: Dual banana jacks

### Rear Panel Digital Ports

Aux. Control: 15-pin sub-min D [Open loop power trigger output]  
 Parallel Printer Port: Centronics 25-pin sub-min D  
 Serial Port (RS-232): RJ-11

Ext. Protocol: Not functional  
 Protocol Diag: Not functional  
 GPIB Port: 24-pin GPIB

### Front Panel Outputs

RF Input/Output: Type N  
 Duplex Output: BNC  
 Audio Output: BNC

### 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  
 16X Chip [19.6608 MHz Clock] Output: BNC  
 1X Chip [1.2288 MHz Clock] Output: BNC  
 DSP IF Aux [3.6864 MHz] Output: BNC  
 Cellsite/Triggers: 37-pin sub-min D [protocol logging output]

## 83217A CDMA Dual-Mode Mobile Station Test Software Test List

### Option 001

#### AMPS/NAMPS/CDMA

CDMA RX/TX Quick General Test  
CDMA RX/TX Voice Quality  
CDMA Call Processing Registration  
CDMA Call Processing Origination  
CDMA Call Processing Page  
CDMA Call Processing Release  
CDMA Call Processing Digital to Analog  
Hand-off  
CDMA Call Processing Talk Time  
CDMA Call Processing Check  
CDMA CP Softer Hand-off Add and Drop Check  
CDMA RX Sensitivity and Dynamic Range  
CDMA RX Traffic Channel FER with AWGN  
CDMA RX Sensitivity Level Search  
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 TX Spectrum Emissions  
AMPS/NAMPS CP Call Processing  
Registration  
AMPS/NAMPS CP Call Processing Page  
AMPS/NAMPS CP Call Processing Release  
AMPS/NAMPS CP Call Processing Origination  
AMPS/NAMPS Call Processing Hook Flash  
AMPS/NAMPS CPA Flow Chart  
(manual phone test)  
AMPS/NAMPS TX Functional Test  
(no audio connections)  
AMPS/NAMPS TX Frequency Error  
AMPS/NAMPS TX RF Output Power  
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 TX DTMF Frequency Error  
AMPS/NAMPS TX Switch Channels  
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

#### JTACS/NTACS/CDMA

CPA Registration  
CPA Page  
TXA Frequency Error  
TXA Carrier Power  
TXA Peak Frequency Deviation  
TXA Audio Frequency Response  
TXA Audio Distortion  
TXA Signaling Tone / DST  
TXA FM Hum and Noise  
TXA SAT / DSAT  
TXA RVC Data Deviation  
TXA Compressor Response  
TXA Current Drain  
RXA Expander  
RXA Audio Frequency Response  
RXA Audio Distortion  
RXA Hum and Noise  
RXA SINAD  
RXA FVC Order Message Error Rate  
CPA Release  
CPA Origination  
OTA No Audio Functional  
TXA Quick General  
RXA Quick General  
CPA Flow Chart  
TXA Switch Channels  
CPA Hook Flash  
TXA DTMF Frequency Error  
CPD Registration  
CPD Origination  
CPD Page  
TXD Waveform Quality and Freq. Acc.  
TXD Open Loop Power Range  
TXD Closed Loop Power Control  
TXD Maximum RF Output Power  
TXD Min. Controlled Output Power  
RXD Traffic Channel FER  
RXD Sensitivity and Dynamic Range  
CPD Softer Hand-off  
CPD CDMA Voice Quality  
TXD Spectrum Emissions  
CPD CDMA Release  
CPD Digital to Analog Hand-off  
CPD Talk Time  
RXD Sensitivity Level Search

### Option 004

#### CDMA/PCS/AMPS/NAMPS

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

## E8290A Point of Service Test (PoST) Software Test List

### CDMA Tests

- 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 Hand-off
- CDMA Voice Quality
- CDMA Spectrum Emissions
- CDMA Talk Time
- CDMA Sensitivity Level Search
- CDMA Digital to Analog Hand-off

### Analog Tests

- 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 Tests, continued

- 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

### Other Tests

- 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."

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

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