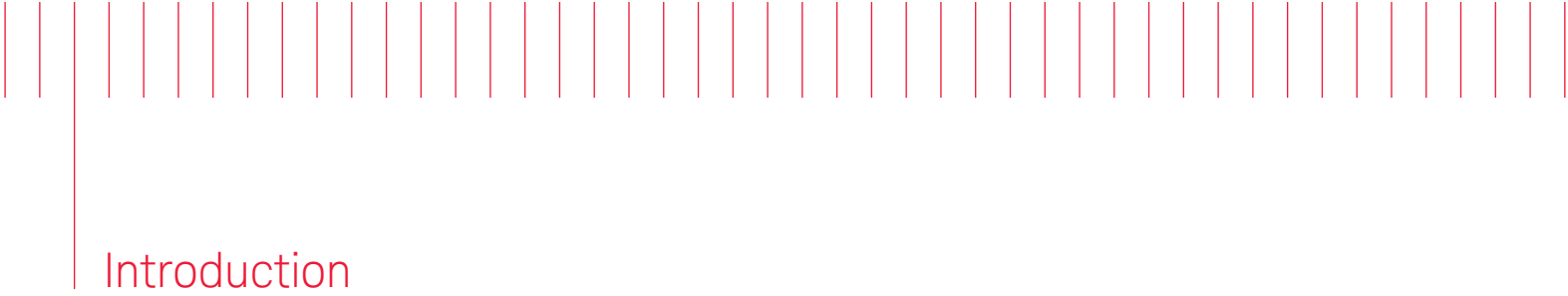


Keysight cdma2000®

X-Series Measurement Application

N9072A & W9072A

Technical Overview



## Introduction

- Perform IS-95 or cdmaOne and cdma2000® forward link and reverse link RF transmitter measurements per 3GPP2 specifications
- Perform one-button tests with pass/fail limit per 3GPP2 standard
- Use hardkey/softkey manual user interface or SCPI remote user interface
- Use hardkey/softkey manual user interface or SCPI remote user interface
- Leverage built-in context sensitive help
- Move application between X-Series signal analyzers with transportable licensing

## cdma2000 Measurement Application

The cdma2000 measurement application transforms the X-Series signal analyzers into CDMA standard-based transmitter testers. The application provides fast one-button RF conformance measurements to help you design, evaluate, and manufacture your IS-95 or cdmaOne and cdma2000 devices.

The cdma2000 measurement application is just one in a common library of more than 25 measurement applications in the Keysight Technologies, Inc. X-Series, an evolutionary approach to signal analysis that spans instrumentation, measurements and software. The X-Series analyzers, with upgradable CPU, memory, disk drives, and I/O ports, enable you to keep your test assets current and extend instrument longevity. Proven algorithms, 100% code-compatibility, and a common UI across the X-Series create a consistent measurement framework for signal analysis that ensures repeatable results and measurement integrity so you can leverage your test system software through all phases of product development. In addition to fixed, perpetual licenses for our X-Series measurement applications, we also offer transportable licenses which can increase the value of your investment by allowing to you transport the application to multiple X-Series analyzers.

### Choosing Between X-Series Applications and 89600 VSA Software

X-Series measurement applications provide embedded format-specific, one button measurements for X-Series analyzers. With fast measurement speed, SCPI programmability, pass/fail testing and simplicity of operation, these applications are ideally suited for design verification and manufacturing. 89600 VSA software is a comprehensive set of tools for demodulation and vector signal analysis. These tools enable you to explore virtually every facet of a signal and optimize your most advanced designs. Use the 89600 VSA software with a variety of Keysight hardware platforms to pinpoint the answers to signal problems in R&D.

[www.keysight.com/find/89600vsa](http://www.keysight.com/find/89600vsa)

### Try Before You Buy!

Free 30-day trials of X-Series measurement applications provide unrestricted use of each application's features and functionality on your X-Series analyzer. Redeem a trial license online today:

[www.keysight.com/find/X-Series\\_trial](http://www.keysight.com/find/X-Series_trial)

## cdma2000 Technology Overview

cdma2000 is one of the wireless transmission format technologies that meets the IMT-2000 requirements for a Third Generation (3G) global wireless communications system. It uses direct sequence modulation with digital codes to spread its spectrum. cdma2000, also known as IMT-CDMA Multi-Carrier or 1xRTT (Single-Carrier Radio Transmission Technology), is derived from IS-95. The IS-95A revision

was first published in May 1993 as a solution for voice communication. The IS-95B revision standard can support a data rate of up to 115 kbps by bundling up to eight channels. The IS-95A and IS-95B are combined into the cdmaOne family.

cdma2000 1x (IS-2000) incorporates a number of improvements that result in roughly twice the spectral

efficiency of IS-95. It supports circuit-switched voice communications as well as a packet data rate up to 307 kbps in a single 1.25 MHz channel for low-speed mobility, and up to 2 Mbps for fixed installations.

Key differences of IS-95 or cdmaOne and cdma2000 are summarized in Table 1.

Table 1. Differences in 1x EV-DO Rel. 0, Rev. A and Rev. B standards

|               | IS-95/cdmaOne                                |                                               | cdma2000                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                        |
|---------------|----------------------------------------------|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|               | Forward link                                 | Reverse link                                  | Forward link                                                                                                                                                                                                                                                                                                                                                                                     | Reverse link                                                                                                                                                                                                                                                                                                                                                           |
| Modulation    | BPSK                                         | BPSK                                          | QPSK                                                                                                                                                                                                                                                                                                                                                                                             | HPSK                                                                                                                                                                                                                                                                                                                                                                   |
| Chip rate     | 1.2288 Mcps                                  | 1.2288 Mcps                                   | 1.2288 Mcps (SR1)<br>3.6864 Mcps (SR3)                                                                                                                                                                                                                                                                                                                                                           | 1.2288 Mcps (SR1)<br>3.6864 Mcps (SR3)                                                                                                                                                                                                                                                                                                                                 |
| Data rate     | 1.2 kbps<br>2.4 kbps<br>4.8 kbps<br>9.6 kbps | 1.8 kbps<br>3.6 kbps<br>7.2 kbps<br>14.4 kbps | <ul style="list-style-type: none"> <li>– RC1: 9.6, 4.8, 2.4, and 1.2 kbps</li> <li>– RC2: 14.4, 7.2, 3.6 and 1.8 kbps</li> <li>– RC3 is based on 9,600 bps and goes up to 153,600 bps</li> <li>– RC4 is based on 9,600 bps and goes up to 307,200 bps</li> </ul> <p>Note:<br/>RC = Radio Configuration.<br/>RC1 to 5 are for SR1<br/>RC6 to 9 are defined for SR3 but not list in this table</p> | <ul style="list-style-type: none"> <li>– RC1 is based on 9,600 bps traffic</li> <li>– RC2 is based on 14,400 bps traffic</li> <li>– RC3 is based on 9,600 bps and goes up to 307,200 bps</li> <li>– RC4 is based on 14,400 bps and goes up to 230,400 bps</li> </ul> <p>Note:<br/>RC1 to 4 are for SR1<br/>RC5 to 6 are defined for SR3 but not list in this table</p> |
| Pilot channel | Yes                                          | No                                            | Yes                                                                                                                                                                                                                                                                                                                                                                                              | Yes                                                                                                                                                                                                                                                                                                                                                                    |

## cdma2000 Transmitter Tests

With the X-Series signal analyzers and the cdma2000 measurement application, you can perform RF transmitter measurements on base station and user equipment devices in time, frequency and modulation domains. Measure basic IS-95 or cdmaOne signals as well as cdma2000 signals with all radio configurations in SR1.

### Standard-based RF transmitter tests

The latest RF transmitter test requirements for cdma2000 are defined in 3GPP2 C.S0010-D(BTS) and 3GPP2 C.S0011-C (MS) of the 3GPP2 standard. Table 2 shows the 3GPP2 required BTS RF transmitter tests along with the corresponding measurements available in the X-Series and 89600 VSA software cdma2000 applications.

*Table 2. Required base station (BTS) RF transmitter measurements and the corresponding measurements in N/W9072A and 89600 VSA software*

| 3GPP2 C.S0010 Paragraph # | Transmitter test                               | N/W9072A cdma2000 X-Series measurement application                | 89601B Option B7T-cdma2000/1xEV-DV modulation analysis           |
|---------------------------|------------------------------------------------|-------------------------------------------------------------------|------------------------------------------------------------------|
| 4.1.2                     | Frequency tolerance                            | Frequency error <sup>1</sup>                                      | Freq error <sup>1</sup>                                          |
| 4.2.1.1                   | Pilot time tolerance                           | Time offset <sup>1</sup>                                          | T trigger <sup>1</sup>                                           |
| 4.2.1.2                   | Pilot channel to code channel time tolerance   | Timing <sup>2</sup>                                               | Timing <sup>2</sup>                                              |
| 4.2.1.3                   | Pilot channel to code channel phase tolerance  | Phase <sup>2</sup>                                                | Phase <sup>2</sup>                                               |
| 4.2.2                     | Waveform quality                               | EVM/Rho <sup>1</sup>                                              | EVM/Rho <sup>1</sup>                                             |
| 4.3.1                     | Total power                                    | Total power <sup>3</sup>                                          | Can be performed using band power marker                         |
| 4.3.2                     | Pilot power                                    | Pilot Ch <sup>3</sup>                                             | CDP composite                                                    |
| 4.3.3                     | Code domain power                              | Code domain power <sup>4</sup>                                    | Power <sup>2</sup>                                               |
| 4.3.4                     | Femto cell transmission authorization          | Channel power                                                     | Can be performed using band power marker                         |
| 4.4.1                     | Conducted spurious emissions                   | ACP and spectrum emission mask                                    | ACP can be performed using marker function; SEM is not available |
| 4.4.2                     | Radiated spurious emissions                    | Spurious emissions                                                | Not available <sup>5</sup>                                       |
| 4.4.3                     | Inter-base station transmitter intermodulation | Channel power, ACP, SEM, spur emissions or spectrum analyzer mode | Not available <sup>5</sup>                                       |
| 4.4.4                     | Occupied bandwidth                             | Occupied BW                                                       | Can be performed using marker function                           |

1. For N/W9072A application, these values are found in "IQ Measured Polar Graph" view under Mod Accuracy (Composite Rho) measurement. For 89601B-B7T, these values are found under "Composite Error Summary" trace.
2. For N/W9072A application, these values are found in "Power Timing & Phase" view under Mod Accuracy (Composite Rho) measurement. For 89601B-B7T, these values are found under "Code Domain Offsets" trace.
3. For N/W9072A application, these values are found in "Power Graph & Metrics" view under Code Domain measurement. For 89601B-B7T, these values are found under "Composite Slot Summary" trace.
4. For N/W9072A application, these values are found in "Code Domain (Quad View)" view under Code Domain measurement. For 89601B-B7T, these values are found under "Composite Slot Summary" trace.
5. If 89601B-B7T is used with a Keysight spectrum or signal analyzer, these measurements are available as part of the spectrum analyzer mode under PowerSuite measurements.

## Measurement details

All of the RF transmitter measurements as defined by the 3GPP2 standard, as well as a wide range of additional measurements and analysis tools, are available with a press of a button (Table 3). These measurements are fully-remote controllable via the IEC/IEEE bus, GPIB or LAN, using SCPI commands.

Analog baseband measurements are available on the PXA or MXA signal analyzer with BBIQ hardware. Supported baseband measurements include all of the modulation quality plus I/Q waveform measurements.

Table 3. List of one-button measurements provided by N/W9072A measurement application

| Technology                       | IS-95/cdmaOne |        | cdma2000      |        |
|----------------------------------|---------------|--------|---------------|--------|
| X-Series measurement application | N9072A        | W9072A | N9072A        | W9072A |
| X-Series signal analyzer         | PXA, MXA, EXA | CXA    | PXA, MXA, EXA | CXA    |
| Channel power                    | •             | •      | •             | •      |
| ACP                              | •             | •      | •             | •      |
| Spectrum emission mask           | •             | •      | •             | •      |
| Spurious emissions               | •             | •      | •             | •      |
| Occupied bandwidth               | •             | •      | •             | •      |
| Code domain                      | •             | •      | •             | •      |
| Modulation Accuracy              |               |        |               |        |
| Rho                              | •             | •      | •             | •      |
| EVM                              | •             | •      | •             | •      |
| Peak CDE                         | •             | •      | •             | •      |
| Magnitude Error                  | •             | •      | •             | •      |
| Phase Error                      | •             | •      | •             | •      |
| Frequency Error                  | •             | •      | •             | •      |
| I/Q Origin Offset                | •             | •      | •             | •      |
| Active Channels                  | •             | •      | •             | •      |
| Pilot Offset                     | •             | •      | •             | •      |
| Power Stat CCDF                  | •             | •      | •             | •      |
| QPSK EVM                         | •             | •      | •             | •      |
| Monitor spectrum                 | •             | •      | •             | •      |
| I/Q waveform                     | •             | •      | •             | •      |

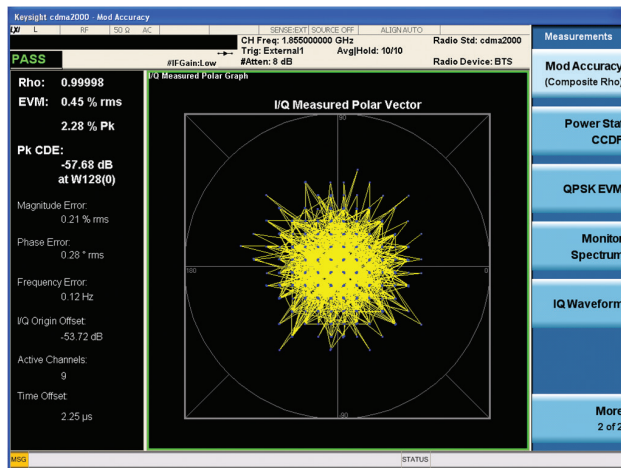


Figure 1. Modulation accuracy with cdma2000 forward 9 channels signal

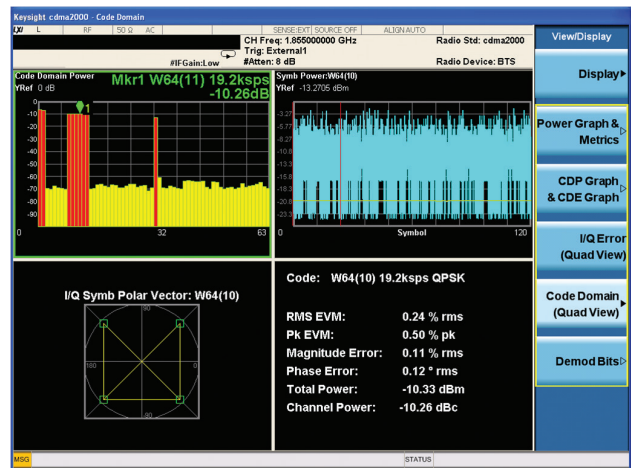


Figure 2. Code Domain Power quad view



Figure 3. Power, Timing, Phase and CDE by each Walsh code

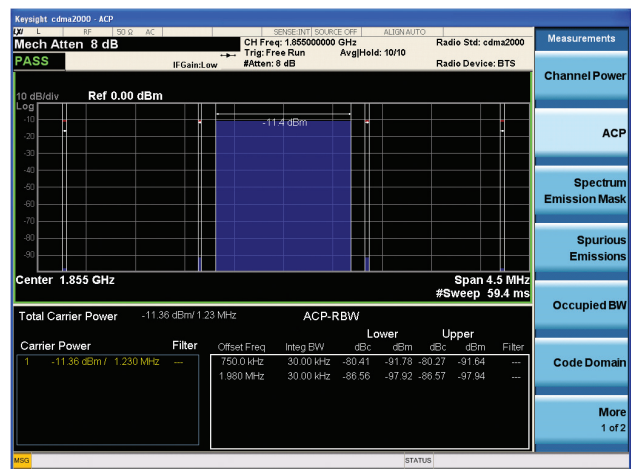


Figure 4. cdma2000 ACP measurement

## Key Specifications

### Definitions

- Specifications describe the performance of parameters covered by the product warranty.
- 95th percentile values indicate the breadth of the population ( $\approx 2\sigma$ ) of performance tolerances expected to be met in 95% of cases with a 95% confidence. These values are not covered by the product warranty.
- Typical values are designated with the abbreviation “typ.” These are performance beyond specification that 80% of the units exhibit with a 95% confidence. These values are not covered by the product warranty.
- Nominal values are designated with the abbreviation “nom.” These values indicate expected performance, or describe product performance that is useful in the application of the product, but is not covered by the product warranty.
- PXA specifications apply to analyzers with frequency options of 526 and lower. For analyzers with higher frequency options, specifications are not warranted but performance will nominally be close to that shown in this section.

Note: Data subject to change

### You Can Upgrade!

Options can be added after your initial purchase.



All of our X-Series application options are license-key upgradeable.

## Supported devices and radio bands

| Device type      | BTS, MS                                                          |
|------------------|------------------------------------------------------------------|
| Standard version | Mobile station: 3GPP2 C.S0011-C<br>Base station: 3GPP2 C.S0010-D |

## Performance Specifications

| Description                                                                    | PXA                                                                  | MXA                                         | EXA                                         | CXA                                         |
|--------------------------------------------------------------------------------|----------------------------------------------------------------------|---------------------------------------------|---------------------------------------------|---------------------------------------------|
| <b>Channel power</b>                                                           |                                                                      |                                             |                                             |                                             |
| Minimum power at RF input                                                      | -50 dBm (nom)                                                        |                                             |                                             |                                             |
| Absolute power accuracy                                                        | ± 0.61 dB<br>± 0.19 dB<br>(95th percentile)                          | ± 0.82 dB<br>± 0.23 dB<br>(95th percentile) | ± 0.94 dB<br>± 0.27 dB<br>(95th percentile) | ± 1.33 dB<br>± 0.61 dB<br>(95th percentile) |
| Measurement floor                                                              | -90.8 dBm (nom)                                                      | -88.8 dBm (nom)                             | -84.0 dBm (nom)                             | -83.8 dBm (nom)                             |
| <b>Adjacent channel power</b>                                                  |                                                                      |                                             |                                             |                                             |
| Minimum power at RF input                                                      | -36 dBm (nom)                                                        |                                             |                                             |                                             |
| Dynamic range<br>(reference to average power of carrier in 1.23 MHz bandwidth) |                                                                      |                                             |                                             |                                             |
| Offset frequency/integrated bandwidth                                          |                                                                      |                                             |                                             |                                             |
| 750 kHz/30 kHz                                                                 | -85.9 dBc<br>-89.5 dBc (typ)                                         | -78.6 dBc<br>-85.1 dBc (typ)                | -73.6 dBc<br>-81.0 dBc (typ)                | -67.4 dBc<br>-72.7 dBc (typ)                |
| 1980 kHz/30 kHz                                                                | -87.6 dBc<br>-90.6 dBc (typ)                                         | -83.1 dBc<br>-87.9 dBc (typ)                | -78.3 dBc<br>-83.9 dBc (typ)                | -75.6 dBc<br>-79.6 dBc (typ)                |
| ACPR relative accuracy                                                         |                                                                      |                                             |                                             |                                             |
| Offsets < 750 kHz                                                              | ± 0.04 dB                                                            | ± 0.09 dB                                   | ± 0.09 dB                                   | ± 0.09 dB                                   |
| Offsets > 1.98 MHz                                                             | ± 0.04 dB                                                            | ± 0.10 dB                                   | ± 0.10 dB                                   | ± 0.10 dB                                   |
| <b>Spectrum emission mask</b>                                                  |                                                                      |                                             |                                             |                                             |
| Dynamic range (relative)                                                       |                                                                      |                                             |                                             |                                             |
| 750 kHz (30 kHz RBW)                                                           | 85.9 dBc<br>89.5 dBc (typ)                                           | 78.6 dBc<br>85.1 dBc (typ)                  | 73.6 dBc<br>81.0 dBc (typ)                  | 67.4 dBc<br>72.7 dBc (typ)                  |
| Sensitivity, absolute                                                          |                                                                      |                                             |                                             |                                             |
| 750 kHz (30 kHz RBW)                                                           | -103.7 dBc<br>-106.7 dBc (typ)                                       | -99.7 dBc<br>-104.7 dBc (typ)               | -94.7 dBc<br>-100.7 dBc (typ)               | -93.7 dBc<br>-99.7 dBc (typ)                |
| Accuracy, relative                                                             |                                                                      |                                             |                                             |                                             |
| 750 kHz (30 kHz RBW)                                                           | ± 0.04 dB                                                            | ± 0.09 dB                                   | ± 0.09 dB                                   | ± 0.09 dB                                   |
| <b>Spurious emission</b>                                                       |                                                                      |                                             |                                             |                                             |
| Dynamic range, relative<br>(RBW=1 MHz)                                         | 88.8 dB<br>92.1 dB (typ)                                             | 81.3 dB<br>82.8 dB (typ)                    | 76.9 dB<br>77.4 dB (typ)                    | 71.7 dB<br>76.6 dB (typ)                    |
| Sensitivity, absolute<br>(RBW=1 MHz)                                           | -88.5 dBm<br>-91.5 dBm (typ)                                         | -84.5 dBm<br>-89.5 dBm (typ)                | -82.5 dBm<br>-86.5 dBm (typ)                | -78.4 dBm<br>-84.4 dBm (typ)                |
| Accuracy (attenuation = 10 dB)                                                 |                                                                      |                                             |                                             |                                             |
| 20 Hz to 3.6 GHz<br>(100 kHz to 3.0 GHz for CXA)                               | ± 0.19 dB<br>(95th percentile)                                       | ± 0.29 dB<br>(95th percentile)              | ± 0.38 dB<br>(95th percentile)              | ± 0.81 dB<br>(95th percentile)              |
| 3.5 GHz to 8.4 GHz<br>(3.0 GHz to 7.5 GHz for CXA)                             | ± 1.08 dB<br>(95th percentile)                                       | ± 1.17 dB<br>(95th percentile)              | ± 1.22 dB<br>(95th percentile)              | ± 1.80 dB<br>(95th percentile)              |
| 8.3 GHz to 13.6 GHz                                                            | ± 1.48 dB<br>(95th percentile)                                       | ± 1.54 dB<br>(95th percentile)              | ± 1.59 dB<br>(95th percentile)              | NA                                          |
| <b>Occupied bandwidth</b>                                                      |                                                                      |                                             |                                             |                                             |
| Minimum power at RF input                                                      | -30 dBm (nom)                                                        |                                             |                                             |                                             |
| Frequency accuracy                                                             | ± 2 kHz (nom) ( RBW = 30 kHz, Number of points = 1001, Span = 2 MHz) |                                             |                                             |                                             |

## Performance Specifications (continued)

| Description                                                                                                | PXA                              | MXA                              | EXA                              | CXA                              |
|------------------------------------------------------------------------------------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| Code domain ( $-25 \text{ dBm} \leq \text{ML} \leq -15 \text{ dBm}$ , 20 to 30 °C)                         |                                  |                                  |                                  |                                  |
| Code domain power                                                                                          |                                  |                                  |                                  |                                  |
| Relative accuracy                                                                                          |                                  |                                  |                                  |                                  |
| Code domain power range                                                                                    |                                  |                                  |                                  |                                  |
| 0 to $-10 \text{ dBc}$                                                                                     |                                  | $\pm 0.015 \text{ dB}$           |                                  |                                  |
| $-10$ to $-30 \text{ dBc}$                                                                                 |                                  | $\pm 0.06 \text{ dB}$            |                                  |                                  |
| $-30$ to $-40 \text{ dBc}$                                                                                 |                                  | $\pm 0.07 \text{ dB}$            |                                  |                                  |
| Symbol power vs. time                                                                                      |                                  |                                  |                                  |                                  |
| Relative accuracy                                                                                          |                                  |                                  |                                  |                                  |
| Code domain power range                                                                                    |                                  |                                  |                                  |                                  |
| 0 to $-10 \text{ dBc}$                                                                                     |                                  | $\pm 0.015 \text{ dB}$           |                                  |                                  |
| $-10$ to $-30 \text{ dBc}$                                                                                 |                                  | $\pm 0.06 \text{ dB}$            |                                  |                                  |
| $-30$ to $-40 \text{ dBc}$                                                                                 |                                  | $\pm 0.07 \text{ dB}$            |                                  |                                  |
| Symbol error vector magnitude                                                                              |                                  |                                  |                                  |                                  |
| Accuracy                                                                                                   |                                  |                                  |                                  |                                  |
| 0 to $-25 \text{ dBc}$                                                                                     |                                  | $\pm 1.0\%$ (nom)                |                                  |                                  |
| Modulation accuracy (Composite EVM) ( $-25 \text{ dBm} \leq \text{ML} \leq -15 \text{ dBm}$ , 20 to 30 °C) |                                  |                                  |                                  |                                  |
| Accuracy                                                                                                   |                                  |                                  |                                  |                                  |
| Composite EVM<br>(for $12.5\% < \text{EVM} < 22.5\%$ )                                                     | $\pm 0.5\%$                      | $\pm 0.5\%$                      | $\pm 0.5\%$                      | $\pm 0.5\%$                      |
| Composite Rho<br>(at Rho 0.99751 (EVM 5%))                                                                 | $\pm 0.0010$                     | $\pm 0.0010$                     | $\pm 0.0010$                     | $\pm 0.0010$                     |
| Pilot time offset                                                                                          | $\pm 300 \text{ ns}$             | $\pm 300 \text{ ns}$             | $\pm 300 \text{ ns}$             | $\pm 300 \text{ ns}$             |
| Code domain timing                                                                                         | $\pm 1.25 \text{ ns}$            | $\pm 1.25 \text{ ns}$            | $\pm 1.25 \text{ ns}$            | $\pm 1.25 \text{ ns}$            |
| Code domain phase                                                                                          | $\pm 10 \text{ mrad}$            | $\pm 10 \text{ mrad}$            | $\pm 10 \text{ mrad}$            | $\pm 10 \text{ mrad}$            |
| Peak code domain error                                                                                     | $\pm 1.0 \text{ dB}$ (nom)       | $\pm 1.0 \text{ dB}$ (nom)       | $\pm 1.0 \text{ dB}$ (nom)       | $\pm 1.0 \text{ dB}$ (nom)       |
| Frequency error                                                                                            | $\pm 10 \text{ Hz} + \text{tfa}$ | $\pm 10 \text{ Hz} + \text{tfa}$ | $\pm 10 \text{ Hz} + \text{tfa}$ | $\pm 10 \text{ Hz} + \text{tfa}$ |
| Power statistics CCDF                                                                                      |                                  |                                  |                                  |                                  |
| Histogram resolution                                                                                       |                                  | $0.01 \text{ dB}$                |                                  |                                  |
| QPSK EVM ( $-25 \text{ dBm} \leq \text{ML} \leq -15 \text{ dBm}$ , 20 to 30 °C)                            |                                  |                                  |                                  |                                  |
| EVM range                                                                                                  | 0 to 25%                         | 0 to 25%                         | 0 to 25%                         | 0 to 25%                         |
| EVM accuracy                                                                                               | $\pm 1.0\%$                      | $\pm 1.0\%$                      | $\pm 1.0\%$                      | $\pm 1.0\%$                      |
| Frequency error accuracy                                                                                   | $\pm 5 \text{ Hz} + \text{tfa}$  | $\pm 5 \text{ Hz} + \text{tfa}$  | $\pm 5 \text{ Hz} + \text{tfa}$  | $\pm 5 \text{ Hz} + \text{tfa}$  |

For a complete list of specifications refer to the appropriate specifications guide.

**PXA:** [www.keysight.com/find/pxa\\_specifications](http://www.keysight.com/find/pxa_specifications)

**MXA:** [www.keysight.com/find/mxa\\_specifications](http://www.keysight.com/find/mxa_specifications)

**EXA:** [www.keysight.com/find/exa\\_specifications](http://www.keysight.com/find/exa_specifications)

**CXA:** [www.keysight.com/find/cxa\\_specifications](http://www.keysight.com/find/cxa_specifications)

## Ordering Information

### Software licensing and configuration

Choose from two license types:

- Fixed, perpetual license:  
This allows you to run the application in the X-Series analyzer in which it is initially installed.
- Transportable, perpetual license:  
This allows you to run the application in the X-Series analyzer in which it is initially installed, plus it may be transferred from one X-Series analyzer to another.

### Try Before You Buy!

Free 30-day trials of X-Series measurement applications provide unrestricted use of each application's features and functionality on your X-Series analyzer. Redeem a trial license online today:  
[www.keysight.com/find/X-Series\\_trial](http://www.keysight.com/find/X-Series_trial)

The table below contains information on our fixed, perpetual licenses. For more information, please visit the product web pages.

### N9072A & W9072A cdma2000 X-Series measurement application

| Description | Model-Option  | Model-Option | Additional information |
|-------------|---------------|--------------|------------------------|
|             | PXA, MXA, EXA | CXA          |                        |
| cdma2000    | N9072A-2FP    | W9072A-2FP   |                        |

## Hardware configuration

### N9030A PXA signal analyzer

| Description                                             | Model-Option                                        | Additional information                   |
|---------------------------------------------------------|-----------------------------------------------------|------------------------------------------|
| 3.6, 8.4, 13.6, 26.5, 43, 44, or 50 GHz frequency range | N9030A-503, -508, -513, -526, -543, -544, or -550   | One required                             |
| Analog baseband IQ (BBIQ) inputs                        | N9030A-BBA                                          | Required for analog baseband measurement |
| Precision frequency reference                           | N9030A-PFR                                          | Recommended                              |
| Electronic attenuator, 3.6 GHz                          | N9030A-EA3                                          | Recommended                              |
| Preamplifier, 3.6, 8.4, 13.6, 26.5, 43, 44 or 50 GHz    | N9030A-P03, -P08, -P13 or -P26, -P43, -P44, or -P50 | One recommended                          |

### N9020A MXA signal analyzer

| Description                                 | Model-Option                   | Additional information                   |
|---------------------------------------------|--------------------------------|------------------------------------------|
| 3.6, 8.4, 13.6, or 26.5 GHz frequency range | N9020A-503, -508, -513 or -526 | One required                             |
| Analog baseband IQ (BBIQ) inputs            | N9020A-BBA                     | Required for analog baseband measurement |
| Precision frequency reference               | N9020A-PFR                     | Recommended                              |
| Electronic attenuator, 3.6 GHz              | N9020A-EA3                     | Recommended                              |
| Preamplifier, 3.6, 8.4, 13.6 or 26.5 GHz    | N9020A-P03, -P08, -P13 or -P26 | One recommended                          |

### N9010A EXA signal analyzer

| Description                                         | Model-Option                                | Additional information |
|-----------------------------------------------------|---------------------------------------------|------------------------|
| 3.6, 7.0, 13.6, 26.5, 32, or 44 GHz frequency range | N9010A-503, -507, -513, -526, -532, or -544 | One required           |
| Precision frequency reference                       | N9010A-PFR                                  | Recommended            |
| Fine step attenuator                                | N9010A-FSA                                  | Recommended            |
| Electronic attenuator, 3.6 GHz                      | N9010A-EA3                                  | Recommended            |
| Preamplifier, 3.6, 7, 13.6, or 26.5 GHz             | N9010A-P03, -P07, -P13, or -P26             | One Recommended        |

### N9000A CXA signal analyzer

| Description                                 | Model-Option                    | Additional information |
|---------------------------------------------|---------------------------------|------------------------|
| 3.0, 7.5, 13.6, or 26.5 GHz frequency range | N9000A-503, -507, -513, or -526 | One required           |
| Precision frequency reference               | N9000A-PFR                      | Recommended            |
| Fine step attenuator                        | N9000A-FSA                      | Recommended            |
| Preamplifier, 3.0, 7.5, 13.6, or 26.5 GHz   | N9000A-P03, -P07, -P13, or -P26 | One recommended        |

## Related Literature

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*N9072A & W9072A Self-Guided Demonstration, literature number 5990-8011EN*

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*Understanding CDMA Measurements for Base Stations and Their Components,  
Application Note 1311, Literature Number 5968-0953E*

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*Testing and Troubleshooting Digital RF Communications Transmitter Designs,  
Application Note 1313, Literature Number 5968-3578E*

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User's and Programmer's Reference Guide is available in the library section of the N9083A and W9083A product pages.

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## Web

### **Product page:**

[www.keysight.com/find/N9072A](http://www.keysight.com/find/N9072A) and [www.keysight.com/find/W9072A](http://www.keysight.com/find/W9072A)

### **X-Series measurement applications:**

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### **X-Series signal analyzers:**

[www.keysight.com/find/X-Series](http://www.keysight.com/find/X-Series)

### **Application pages:**

[www.keysight.com/find/cellular](http://www.keysight.com/find/cellular)

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