

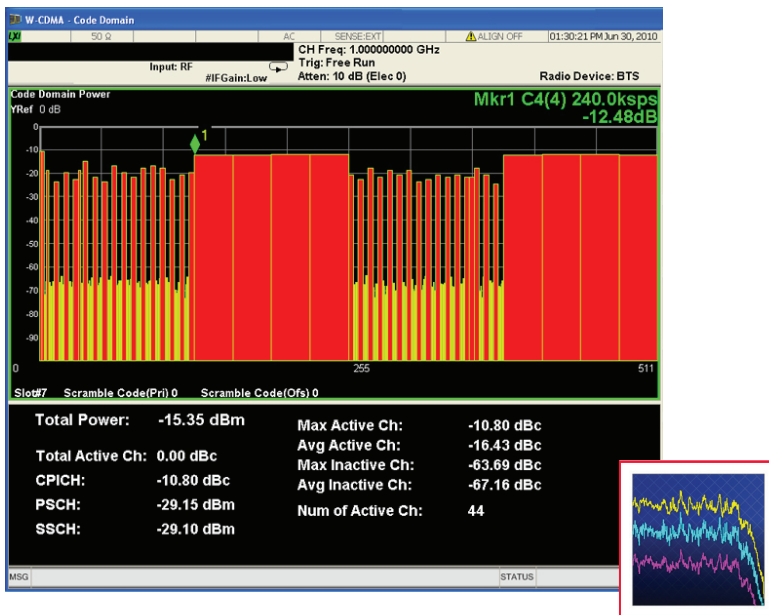
# Keysight Technologies

## W-CDMA/HSPA+

## X-Series Measurement App, Multi-Touch

### N9073C

### Technical Overview



- Perform W-CDMA, HSPA, and HSPA+ downlink and uplink transmitter test per 3GPP standard
- Perform one-touch tests with pass/fail limit per 3GPP standard
- Use multi-touch user interface or SCPI remote interface
- Leverage built-in, context-sensitive help
- Extend test assets with transportable licenses between X-Series signal analyzers with multi-touch UI

## W-CDMA/HSPA+ Measurement Application

The W-CDMA/HSPA+ measurement application transforms the X-Series signal analyzers into 3GPP standard-based transmitter testers. The application provides fast, one-touch RF conformance measurements to help you design, evaluate, and manufacture your W-CDMA/HSPA/HSPA+ base station and user equipment devices. The measurement application closely follows the 3GPP standard, allowing you to stay on the leading edge of your design and manufacturing challenges.

### X-Series measurement applications

X-Series measurement applications increase the capability and functionality of Keysight Technologies, Inc. signal analyzers to speed time to insight. They provide essential measurements for specific tasks in general-purpose, cellular communications, wireless connectivity and digital video applications, covering established standards and modulation types. Applications are supported across X-Series analyzers, with the only difference being the level of performance achieved by the hardware you select.

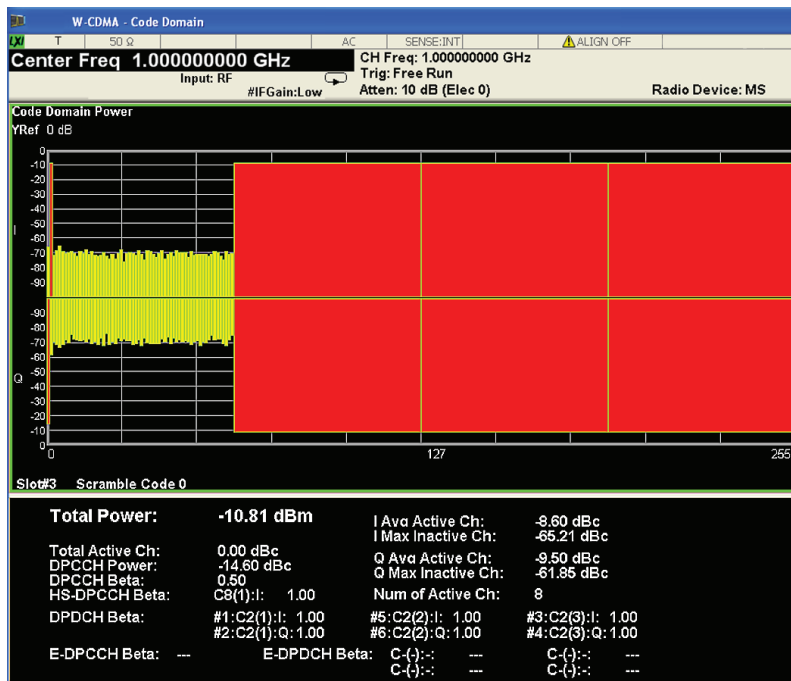


Figure 1. WCDMA code domain power measurement

## Download your next insight

Keysight software is downloadable expertise. From first simulation through first customer shipment, we deliver the tools your team needs to accelerate from data to information to actionable insight.

- Electronic design automation (EDA) software
- Application software
- Programming environments
- Productivity software



Learn more at

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

Start with a 30-day free trial.

[www.keysight.com/find/free\\_trials](http://www.keysight.com/find/free_trials)

## Top Features

With the W-CDMA measurement application, you can perform RF transmitter measurements on eNB and UE devices in time, frequency, and modulation domains. Measurement setups are simplified with automatic detection of downlink channels and signals. For eNB conformance testing, measurement is simplified by recalling E-TM presets according to 3GPP TS 25 standard.

- Expedite troubleshooting and design verification using a rich selection of traces: I/Q measured polar graph; code domain power; peak/avg metrics showing numeric result table with average and peak hold statistic results; capture time summary showing a summary table with measurement results of multiple slots; slot CDE/EVM showing EVM, peak CDE, and frequency error in three windows
- Add real-time spectrum analyzer (RTSA) capability to the PXA or MXA signal analyzers to pinpoint interference caused by multi-carrier W-CDMA signals or other events in the transmitter

## Downlink eNB measurements

- EVM, frequency error, CPICH power accuracy, 64QAM RCDE, SEM, ACLR and more
- Perform adjacent channel power measurement over wide dynamic range (up to -88 dBc) on single-carrier and multi-carrier ACLR measurements on base station systems, as well as components such as amplifiers that have to meet more stringent requirements

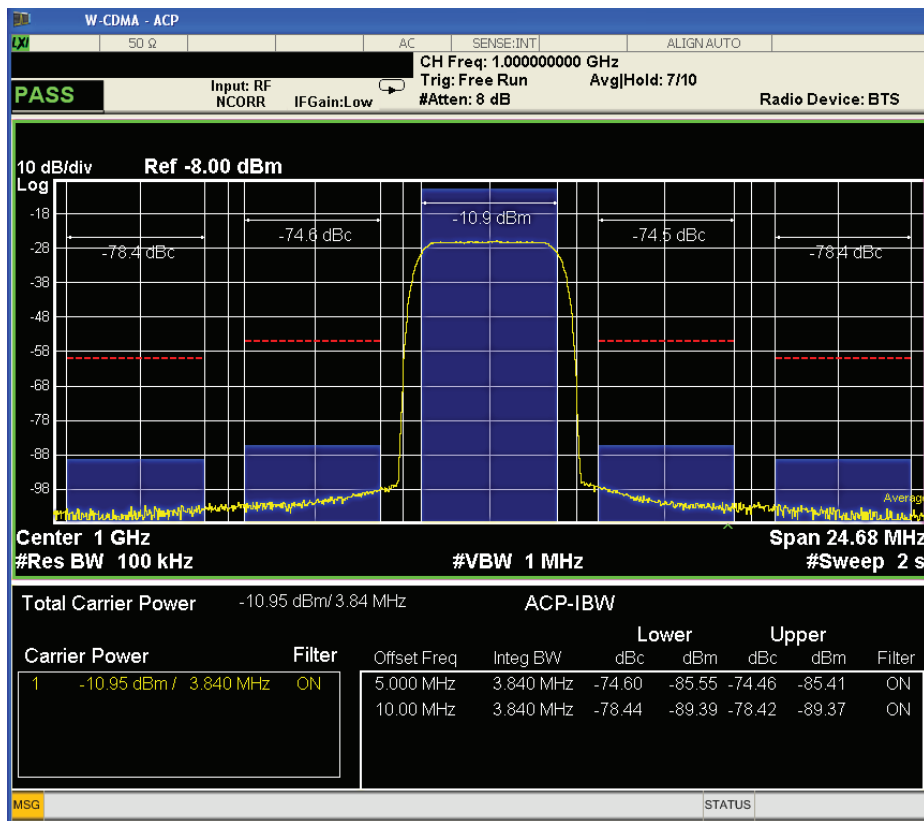


Figure 2. W-CDMA ACLR measurement

## Uplink UE measurements

- EVM, frequency error, PkCDE, RCDE, PRACH power, slot power, SEM, ACLR and more
- Characterize your UE device using the uplink power control measurement. The power control measurement includes: slot power, PRACH power and slot phase
- Evaluate 3GPP UE phase discontinuity EVM of uplink slots with slot power and phase measurements

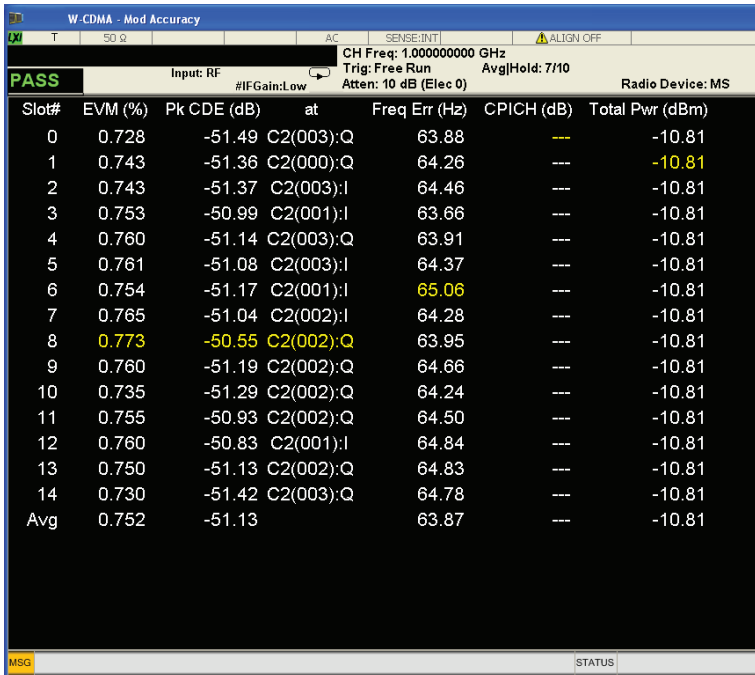


Figure 3. HSUPA capture time summary trace showing error metrics for 15 consecutive slots

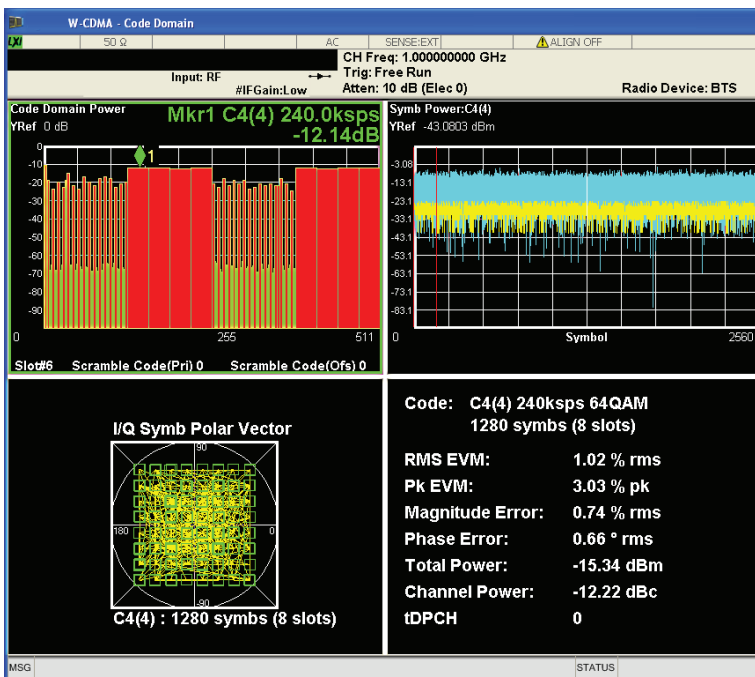


Figure 4. HSPA+ 64QAM code domain power quad view

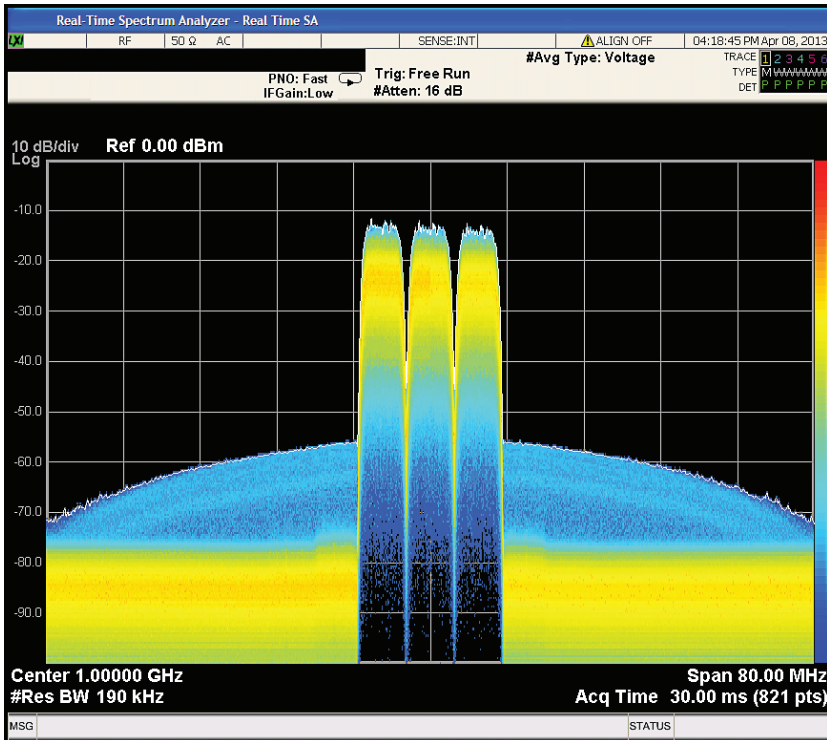


Figure 5. Real-time view of multi-carrier W-CDMA signal using RTSA option on the PXA or MXA signal analyzers

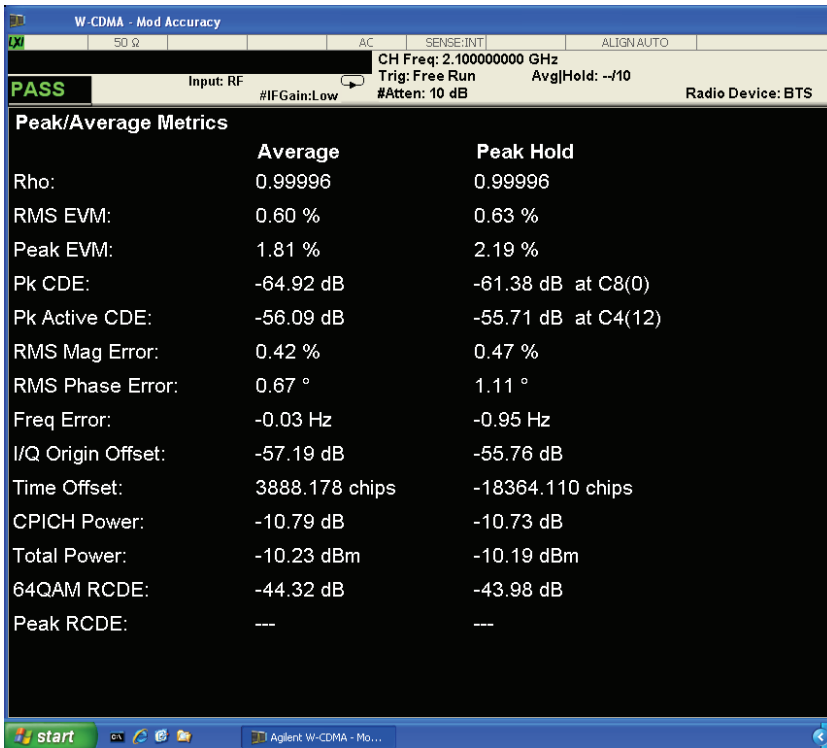


Figure 6. HSPA+ modulation analysis with 64QAM RCDE metrics

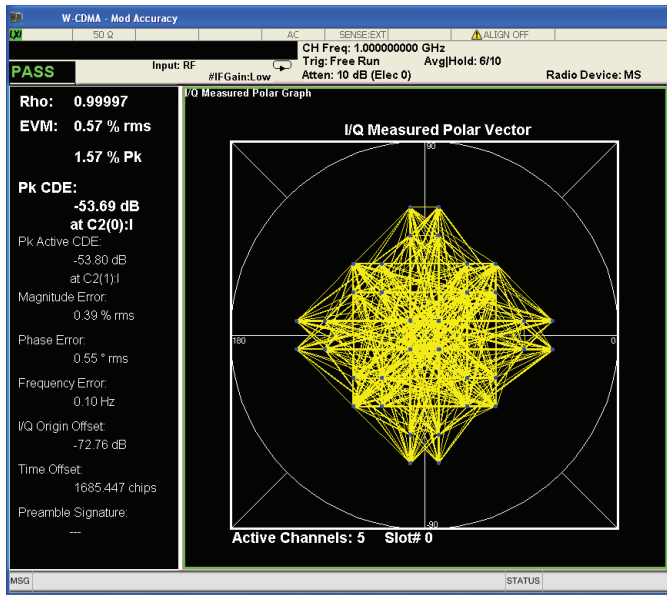


Figure 7. W-CDMA uplink EVM measurement

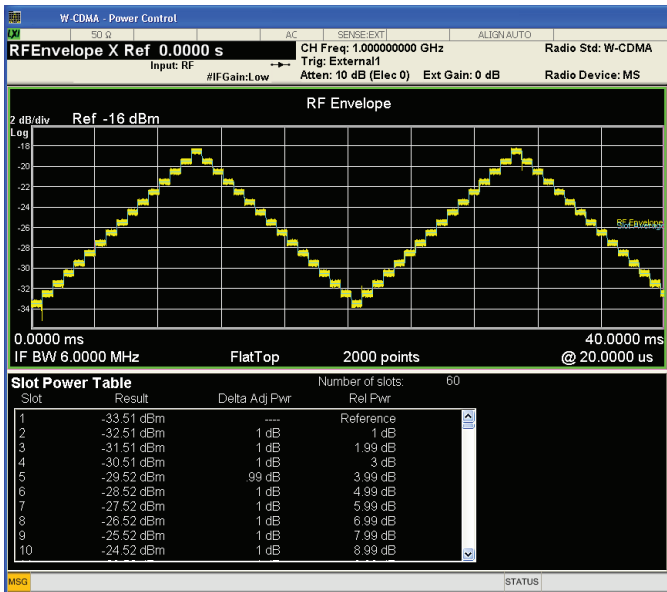


Figure 8. W-CDMA UL power control measurement

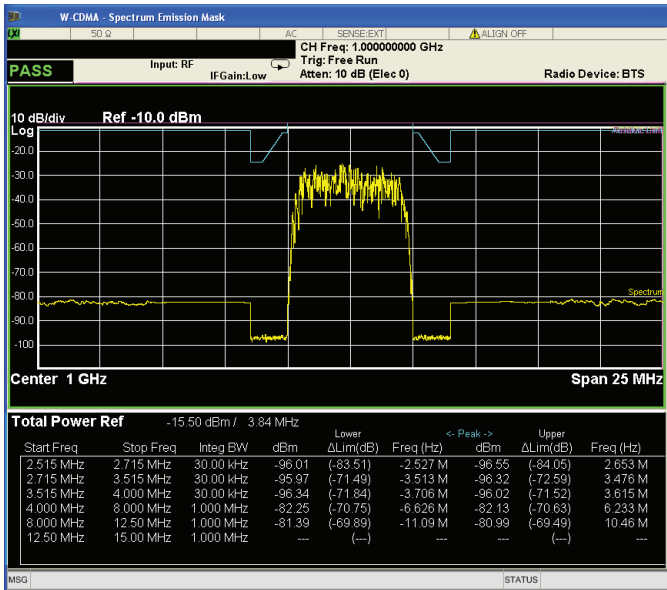


Figure 9. W-CDMA spectrum emissions mask measurement

## Measurement Summary

### One-touch standards-based measurements

#### Required base station (eNB) RF transmitter measurements

Table 1. Required base station (eNB) RF transmitter measurements and the corresponding measurements in the N9073C measurement application and 89600 VSA software

3GPP TS25.141 subclause	Transmitter test	N9073C X-Series application	89601B Option B7U
6.2.1	Base station maximum output power	Total power <sup>1</sup>	Total power <sup>1</sup>
6.2.2	CPICH power accuracy	CPICH power <sup>1</sup>	CPICH power <sup>1</sup>
6.3	Frequency error	Freq error <sup>1</sup>	Freq error <sup>1</sup>
6.4.1	Inner loop power control	Channel power <sup>2</sup>	IQ meas time <sup>3</sup>
6.4.2	Power control steps	Channel power <sup>2</sup>	IQ meas time <sup>3</sup>
6.4.3	Power control dynamic range	Channel power <sup>2</sup>	IQ meas time <sup>3</sup>
6.4.4	Total power dynamic range	Total power <sup>1</sup>	Total power <sup>1</sup>
6.4.5	IPDL time mask	Chip power vs. time <sup>4</sup>	Composite meas time <sup>4</sup>
6.5.1	Occupied bandwidth	Occupied BW	OBW <sup>5</sup>
6.5.2.1	Spectrum emission mask	Spectrum emission mask	Not available <sup>6</sup>
6.5.2.2	Adjacent channel leakage power ratio	ACP	ACP <sup>5</sup>
6.5.3	Spurious emissions	Spurious emissions	Not available <sup>6</sup>
6.6	Transmit intermodulation	ACP, SEM, spur emissions or spectrum analyzer mode	Not available <sup>6</sup>
6.7.1	Error vector magnitude	EVM <sup>1</sup>	EVM <sup>1</sup>
6.7.2	Peak code domain error	PkCDE <sup>1</sup>	PkCDE <sup>1</sup>
6.7.3	Time alignment error in Tx diversity and MMO transmission	Time offset <sup>7</sup> (under mod accuracy)	Time offset (under error summary or MIMO info trace). Note: 89601B-B7U supports 2x2 MIMO. <sup>7</sup>
6.7.4	Relative code domain error	64QAM RCDE (under mod accuracy)	RCDE for 64QAM (under composite error summary)

- For N9073C application, these values are found in "Capture Time Summary" view under Mod Accuracy measurement. For 89601B-B7U, these values are found under "Composite Slot Summary" trace.
- This "channel power" metric is reported under Symbol EVM error summary result under code domain power measurement quad view. "Symbol power" trace under code domain power quad view can also be used for this measurement however RMS slot power is not provided.
- Measurement parameters must be set up manually. IQ Meas Time with LogMag (dB) format with band marker over each slot length can be used. Measurement parameters must be set up manually. For N9073C application, "chip power vs. time" is one of the traces displayed in the "symbol power" display under code domain quad view. For 89601B-B7U, "composite Meas Time" trace with LogMag (dB) format provides chip power in dB (dBm value not available).
- Measurement parameters must be set up manually. If 89601B Option B7U is used with a Keysight spectrum or signal analyzer, these measurements are available as part of the spectrum analyzer mode under power suite measurements.
- If 89601B Option B7U is used with a Keysight spectrum or signal analyzer, these measurements are available as part of the spectrum analyzer mode under power suite measurements.
- Both the N9073C and 89601B Option B7U can perform the time offset measurement for Tx diversity. In addition, the 89601B Option B7U supports 2x2 MIMO analysis using dual channel hardware such as dual-MXA, dual-EXA, or Keysight oscilloscopes.

## Measurement Summary

### One-touch standards-based measurements

#### Required user equipment (UE) RF transmitter measurements

Table 2. Required user equipment (UE) RF transmitter measurements and the corresponding measurements in the N9073C measurement application and 89600 VSA software.

<b>3GPP TS34.121 subclause</b>	<b>Transmitter test</b>	<b>N9073C X-Series application</b>	<b>89601B Option B7U</b>
5.2	Maximum output power	Total power <sup>1</sup>	Total power <sup>1</sup>
5.2A, 5.2AA	Maximum output power with HS-DPCCH	Total power <sup>1</sup>	Total power <sup>1</sup>
5.2B	Maximum output power with HS-DPCCH and E-DCH	Total power <sup>1</sup>	Total power <sup>1</sup>
5.2C	UE Relative code domain power accuracy	Not available <sup>2</sup>	Not available <sup>2</sup>
5.2D	UE Relative code domain power accuracy for HS-DPCCH and E-DCH	Not available <sup>2</sup>	Not available <sup>2</sup>
5.2E	UE Relative code domain power accuracy for HS-DPCCH and E-DCH with 16QAM	Not available <sup>2</sup>	Not available <sup>2</sup>
5.3	Frequency error	Freq error <sup>1</sup>	Freq error <sup>1</sup>
5.4.1	Open loop power control in the uplink	Power control (Meas type = PRACH power)	Not available
5.4.2	Inner loop power control in the uplink	Power control (Meas type = slot power)	IQ Meas time <sup>3</sup>
5.4.3	Minimum output power	Channel power	Channel power using band power marker
5.4.4	Out-of-synchronization handling of output power	Manual configuration using symbol power vs. time or I/Q waveform (time domain) trace	Not available
5.5.1	Transmit off power	Power control (Meas type = slot power and I/Q waveform with RRC filtered)	Not available
5.5.2	Transmit on/off time mask	Power control (Meas type = PRACH power)	Manual configuration using "Time" trace with trigger and band power marker
5.6	Change of TFC	Power control (Meas type = slot power)	IQ meas time <sup>3</sup>
5.7	Power setting in uplink compressed mode	Power control (Meas type = slot power)	IQ meas time <sup>3</sup>
5.7A	HS-DPCCH power control	Power control (Meas type = slot phase) with meas interval = 0.5 slot	IQ meas time with "LogMag (dB)" with band marker over each half-slot length.
5.8	Occupied bandwidth	Occupied bandwidth	OBW <sup>4</sup>
5.9	Spectrum emission mask	Spectrum emission mask	Not available <sup>5</sup>
5.9A	Spectrum emission mask with HS-DPCCH	Spectrum emission mask	Not available <sup>5</sup>
5.9B	Spectrum emission mask with E-DCH	Spectrum emission mask	Not available <sup>5</sup>
5.10	Adjacent channel leakage power ratio	ACP	ACP <sup>4</sup>
5.10A	Adjacent channel leakage power ratio with HS-DPCCH	ACP	ACP <sup>4</sup>
5.10B	Adjacent channel leakage power ratio with E-DCH	ACP	ACP <sup>4</sup>
5.11	Spurious emissions	Spurious emissions	Not available <sup>5</sup>

- For the N9073C application, these values are found in "Capture Time Summary" table under Mod Accuracy measurement. For 89601B-B7U, these values are found under "Composite Slot Summary" trace.
- This measurement is not supported. One possible way is to make code domain power measurement and subtract the result from the expected code domain power value.
- Measurement parameters must be set up manually. IQ Meas Time trace with LogMag(dB) format and band power marker over each slot length.
- Measurement parameters must be set up manually. If 89601B Option B7U is used with a Keysight spectrum or signal analyzer, these measurements are available as part of the spectrum analyzer mode under PowerSuite measurements.
- If 89601B Option B7U is used with a Keysight spectrum or signal analyzer, these measurements are available as part of the spectrum analyzer mode under power suite measurements.



Table 2, continued. Required user equipment (UE) RF transmitter measurements and the corresponding measurements in the N9073C measurement application and 89600 VSA software.

<b>3GPP TS34.121 Paragraph #</b>	<b>Transmitter test</b>	<b>N9073C X-Series application</b>	<b>89601B Option B7U</b>
5.12	Transmit intermodulation	ACP	ACP <sup>4</sup>
5.13.1	Error vector magnitude	EVM <sup>1</sup>	EVM <sup>1</sup>
5.13.1A	Error vector magnitude with HS-DPCCH	Power control (meas type = slot phase) with meas interval = 0.5 slot	EVM (over half-slot length)
5.13.1AA	Error vector magnitude and phase discontinuity with HS-DPCCH	Power control (meas type = slot phase) with meas interval = 0.5 slot	Not available
5.13.1AAA	EVM and IQ origin offset for HS-DPCCH and E-DCH with 16QAM	Mod accuracy	Error summary trace
5.13.2	Peak code domain error	PkCDE <sup>1</sup>	PkCDE <sup>1</sup>
5.13.2A	Relative code domain error with HS-DPCCH	RCDE in mod accuracy	RCDE in code domain offsets
5.13.2B	Relative code domain error with HS-DPCCH and E-DCH	RCDE in mod accuracy	RCDE in code domain offsets
5.13.2C	Relative code domain error with HS-DPCCH and E-DCH with 16QAM	RCDE in mod accuracy	RCDE in code domain offsets
5.13.3	UE phase discontinuity	Power control (meas type = slot phase)	Not available
5.13.4	PRACH preamble quality	QPSK EVM	QPSK EVM (using Option AYA)

1. For N9073C application, these values are found in "Capture Time Summary" table under Mod Accuracy measurement. For 89601B-B7U, these values are found under "Composite Slot Summary" trace.

## Measurement details

All of the RF transmitter measurements as defined by the 3GPP standard, as well as a wide range of additional measurements and analysis tools, are accessible directly on the instrument's touch screen (Tables 3 and 5). These measurements are fully remote control-able via the IEC/IEEE bus or LAN, using SCPI commands. Analog baseband measurements are available on the PXA or MXA signal analyzer equipped with BBIQ hardware. Supported baseband measurements include all of the modulation quality plus I/Q waveform measurements.

## Measurement details for base station (eNB) transmitter test

Table 3. One-touch measurements for base station (eNB) test provided by the N9073C measurement application

<b>Technology</b>	<b>W-CDMA</b>	<b>HSDPA/HSUPA</b>	<b>HSPA+</b>
<b>Model-option</b>	<b>N9073C-1FP</b>	<b>N9073C-2FP</b>	<b>N9073C-2FP</b>
Rho	●	●	●
RMS EVM	●	●	●
Peak EVM	●	●	●
Pk CDE	●	●	●
Pk active CDE	●	●	●
RMS mag error	●	●	●
RMS phase error	●	●	●
Freq error	●	●	●
I/Q origin offset	●	●	●
Time offset	●	●	●
CPICH power	●	●	●
Total power	●	●	●
64QAM RCDE			●
QPSK EVM	●	●	●
Code domain power	●	●	●
Time alignment error for Tx diversity, and MIMO	●	●	●
Channel power	●	●	●
ACP	●	●	●
Spectrum emission mask (SEM)	●	●	●
Spurious emissions	●	●	●
Occupied bandwidth	●	●	●
CCDF	●	●	●
Monitor spectrum	●	●	●
I/Q waveform	●	●	●

## Measurement details for user equipment (UE) transmitter test

Table 4. One-touch measurements for user equipment provided by the N9073C measurement application

<b>Technology</b>	<b>W-CDMA</b>	<b>HSUPA</b>	<b>HSPA+</b>
<b>Model-option</b>	<b>N9073C-1FP</b>	<b>N9073C-2FP</b>	<b>N9073C-3FP</b>
Rho	●	●	●
RMS EVM	●	●	●
Peak EVM	●	●	●
Pk CDE	●	●	●
Pk active CDE	●	●	●
RMS mag error	●	●	●
RMS phase error	●	●	●
Freq error	●	●	●
I/Q origin offset	●	●	●
Time offset	●	●	●
Total power	●	●	●
Peak RCDE	●	●	●
QPSK EVM	●	●	●
Code domain power	●	●	●
Power control	●	●	●
PRACH power	●	●	●
Slot power	●	●	●
Slot phase	●	●	●
Channel power	●	●	●
ACP	●	●	●
Spectrum emission mask (SEM)	●	●	●
Spurious emissions	●	●	●
Occupied bandwidth	●	●	●
CCDF	●	●	●
Monitor spectrum	●	●	●
I/Q waveform	●	●	●

## 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.

Note: Data subject to change

### Supported standards

Table 5. Supported standards

3GPP standards sections		3GPP required test instrument tolerance (as of 2009-12)	Instrument tolerance interval <sup>1,2,3</sup>	Supplemental information
Sub-clause	Measurement name			
6.2.1	Maximum output power (channel power)	±0.7 dB (95%)	±0.19 dB (95%)	
6.2.2	CPICH power accuracy (code domain)	±0.8 dB (95%)	±0.2 dB (95%)	
6.3	Frequency error (modulation accuracy)	±12 Hz (95%)	±5 Hz (100%)	Excluding timebase error
6.4.2	Power control steps <sup>4</sup> (code domain)			
	1 dB step	±0.1 dB (95%)	±0.03 dB (100%)	
	Ten 1 dB steps	±0.1 dB (95%)	±0.03 dB (100%)	
6.4.3	Power dynamic range	±1.1 dB (95%)	±0.14 dB (100%)	
6.4.4	Total power dynamic range <sup>4</sup> (code domain)	±0.3 dB (95%)	±0.06 dB (100%)	
6.5.1	Occupied bandwidth	±100 kHz (95%)	±10 kHz (100%)	
6.5.2.1	Spectrum emission mask	±1.5 dB (95%)	±0.20 dB (95%)	Absolute peak <sup>5</sup>
6.5.2.2	ACLR			
	5 MHz offset	±0.8 dB (95%)	±0.22 dB (100%)	
	10 MHz offset	±0.8 dB (95%)	±0.18 dB (100%)	
6.5.3	Spurious emissions			Excluding timebase error
	f ≤ 2.2 GHz	±1.58 dB (95%)	±0.19 Hz (95%)	
	2.2 GHz < f ≤ 4 GHz	±2.0 dB (95%)	±1.13 Hz (95%)	
	4 GHz < f	±4.0 dB (95%)	±1.50 Hz (95%)	
6.7.1	EVM (Modulation accuracy)	±2.5% (95%)	±0.5% (100%)	EVM in the range of 12.5% to 22.5%
6.7.2	Peak Code Domain Error (Modulation accuracy)	±1.0 dB (95%)	±1.0 dB (100%)	
6.7.3	Time alignment error in Tx Diversity (Modulation accuracy)	±26 ns (95%) [= 0.1 Tc]	±1.25 ns (100%)	

## Key Specifications (continued)

Table 6. Key specifications

Description			UXA	PXA	MXA	EXA	CXA
<b>Channel power</b>							
Minimum power at RF input			-50 dBm (nom)	-50 dBm (nom)	-50 dBm (nom)	-50 dBm (nom)	-50 dBm (nom)
Absolute power accuracy (Atten = 10 dB)			±0.61 dB	±0.61 dB	±0.82 dB	±0.94 dB	±1.33 dB
Power accuracy (95% confidence)			±0.19 dB	±0.19 dB	±0.23 dB	±0.27 dB	±0.61 dB
Measurement floor			-84.8 dBm (nom)	-85.8 dBm (nom)	-83.8 dBm (nom)	-79.8 dBm (nom)	-76.8 dBm (nom)
<b>Adjacent channel power (ACPR, ACLR)</b>							
<b>Single carrier</b>							
Minimum power at RF input			-36 dBm (nom)				
ACPR accuracy (RRC weighted, 3.84 MHz noise BW)							
<b>Radio</b>	<b>Offset frequency</b>						
UE	5 MHz (ACPR -30 to -36 dBc)		±0.08 dB	±0.08 dB	±0.14 dB	±0.22 dB	±0.76 dB
UE	10 MHz (ACPR -40 to -46 dBc)		±0.09 dB	±0.12 dB	±0.21 dB	±0.34 dB	±0.73 dB
BTS	5 MHz (ACPR -42 to -48 dBc)		±0.22 dB	±0.20 dB	±0.49 dB	±1.07 dB	±1.72 dB
BTS	10 MHz (ACPR -48 to -53 dBc)		±0.18 dB	±0.21 dB	±0.44 dB	±1.00 dB	±1.96 dB
BTS	5 MHz (-48 dBc with non-coherent ACPR)		±0.10 dB	±0.10 dB	±0.21 dB	±0.44 dB	±0.87 dB
Dynamic range (RRC weighted, 3.84 MHz noise BW)							
<b>Noise correction</b>	<b>Offset</b>	<b>Method frequency</b>					
Off	5 MHz	Filtered IBW	-81.5 dB (typ) Opt ML -8 dBm (nom)	-80 dB (typ)	-73 dB (typ)	-68 dB (typ)	-63 dB (typ)
Off	5 MHz	Fast	-81 dB (typ) Opt ML -8 dBm (nom)	-80 dB (typ)	-72 dB (typ)	-67 dB (typ)	n/a
Off	10 MHz	Filtered IBW	-87 dB (typ) Opt ML -8 dBm (nom)	-87 dB (typ)	-79 dB (typ)	-74 dB (typ)	-67 dB (typ)
On	5 MHz	Filtered IBW	-82.5 dB (typ) Opt ML -8 dBm (nom)	-83.5 dB (typ); -88 dB (nom)	-78 dB (typ)	-73 dB (typ)	-73 dB (typ)
On	10 MHz	Filtered IBW	-88 dB (typ) Opt ML -4 dBm (nom)	-89.5 dB (typ)	-82 dB (typ)	-76 dB (typ)	-78 dB (typ)

Table 6, continued. Key specifications

Description	UXA	PXA	MXA	EXA	CXA
<b>RRC weighting accuracy, nominal</b>					
White noise in adjacent channel	0.00 dB	0.00 dB	0.00 dB	0.00 dB	0.00 dB
TOI-induced spectrum	0.001 dB	0.001 dB	0.001 dB	0.001 dB	0.001 dB
rms CW error	0.012 dB	0.012 dB	0.012 dB	0.012 dB	0.012 dB
<b>Multiple carriers (RRC weighted, 3.84 MHz noise BW)</b>					
ACPR dynamic range (two carriers), nominal					
5 MHz offset, noise correction (NC)	-83 dB, NC on	-83 dB, NC on	-70 dB, NC off	n/a	n/a
ACPR accuracy (two carriers), nominal					
5 MHz offset, noise correction on	±0.20 dB	±0.20 dB	±0.42 dB	n/a	n/a
ACPR dynamic range (four carriers), nominal					
5 MHz offset, noise correction off (NFE off on PXA)	-69 dB	-69 dB	-64 dB	n/a	n/a
5 MHz offset, noise correction on	-79 dB	-79 dB	-72 dB	n/a	n/a
ACPR accuracy (four carriers, 5 MHz offset)					
BTS, incoherent TOI, ACPR range -42 to -48 dB					
5 MHz offset, noise correction off	±0.18 dB	±0.18 dB	±0.42 dB	n/a	n/a
5 MHz offset, noise correction on	±0.09 dB	±0.09 dB	±0.17 dB	n/a	n/a
<b>Spectrum emission mask</b>					
Dynamic range, relative 2.515 MHz offset	86.8 (91.3 dB typ)	87.9 (92.6 dB typ)	81.9 (88.2 dB typ)	76.6 (83.8 dB typ)	73.4 (80.2 dB typ)
Sensitivity, absolute 2.515 MHz offset	-103.7 (-105.7 dBm typ)	-103.7 (-106.7 dBm typ)	-99.7 (-104.7 dBm typ)	-94.7 (-100.7 dBm typ)	-91.7 (-97.7 dBm typ)
Accuracy, 2.515 MHz offset					
Relative	±0.08 dB	±0.06 dB	±0.12 dB	±0.11 dB	±0.11 dB
Absolute (20 to 30 °C)	±0.62 dB (±0.20 dB 95%)	±0.62 dB (±0.20 dB 95%)	±0.88 dB (±0.27 dB 95%)	±1.15 dB (±0.31 dB 95%)	±1.53 dB (±0.65 dB 95%)
<b>Spurious emissions</b>					
Dynamic range, relative	88.8 (91.1 dB typ)	88.8 (92.1 dB typ)	81.3 (82.2 dB typ)	76.9 (77.4 dB typ)	70.7 (75.9 dB typ)
Sensitivity, absolute	-88.5 (-90.5 dBm typ)	-88.4 (-91.4 dBm typ)	-84.4 (-89.4 dBm typ)	-79.4 (-85.4 dBm typ)	-76.5 (-82.5 dBm typ)
Accuracy (95% confidence; attenuation = 10 dB)					
Frequency range					
20 Hz to 3.6 GHz	±0.19 dB	±0.19 dB	±0.29 dB	±0.38 dB (9 kHz to 3.6 GHz)	±0.81 dB (100 kHz to 3.0 GHz)
3.5 GHz to 8.4 GHz	±1.13 dB	±1.08 dB	±1.17 dB	±1.22 dB (3.5 GHz to 7.0 GHz)	±1.80 dB (3.0 GHz to 7.5 GHz)
8.3 GHz to 13.6 GHz	±1.5 dB	±1.48 dB	±1.54 dB	±1.59 dB (6.9 GHz to 13.6 GHz)	n/a
<b>Occupied bandwidth</b>					
Minimum power at RF input	-30 dBm (nom)				
Frequency accuracy	±10 kHz (RBW = 30 kHz; number of points = 1001 span = 10 MHz)				
<b>Power statistics CCDF</b>					
Histogram resolution	0.01 dB				

Table 6, continued. Key specifications

Code domain	UXA	PXA	MXA	EXA	CXA
BTS measurements, -25 dBm ≤ mixer level ≤ -15 dBm, 20 to 30 °C					
Code domain power					
Absolute accuracy (95% confidence) (-10 dBc CPICH, Atten = 10 dB)	±0.20 dB	±0.25 dB	±0.25 dB	±0.32 dB	±0.61 dB
Relative accuracy					
CDP range between 0 and -10 dBc			±0.015 dB		
CDP range between -10 and -30 dBc			±0.06 dB		
CDP range between -30 and -40 dBc			±0.07 dB		
Power control steps accuracy					
CDP range between 0 and -10 dBc			±0.03 dB		
CDP range between -10 and -30 dBc			±0.12 dB		
Power dynamic range accuracy					
CDP range 0 to -40 dBc			±0.14 dB		
Symbol power vs. time					
Relative accuracy					
CDP range between 0 and -10 dBc			±0.015 dB		
CDP range between -10 and -30 dBc			±0.06 dB		
CDP range between -30 and -40 dBc			±0.07 dB		
Symbol error vector magnitude					
Accuracy for range between 0 and -25 dBc			±1.0% (nom)		
<b>Modulation accuracy (composite EVM)</b>					
BTS measurements, -25 dBm ≤ mixer level ≤ -15 dBm, 20 to 30 °C					
Composite EVM range			0 to 25%		
Composite EVM floor	1.50%	1.50%	1.50%	1.60%	1.60%
Composite EVM floor (with Option BBA)	±1.5% (nom)	±1.5% (nom)	±1.5% (nom)	n/a	n/a
Composite EVM accuracy	±1.0%, (±0.5% in the EVM range of 12.5% to 22.5%, no 16QAM nor 64QAM codes)				±1.0%, (±0.5% in the EVM range of 12.5% to 22.5%, no 16QAM codes)
Peak code domain error accuracy			±1.0 dB		
I/Q origin offset, DUT maximum offset			-10 dBc (nom)		
I/Q origin offset, analyzer noise floor			-50 dBc (nom)		
Frequency error range			±3 kHz (nom)		
Frequency error accuracy			±5 Hz + (transmitter frequency x frequency reference accuracy)		
Time offset					
Absolute frame offset accuracy			±20 nsec		
Relative frame offset accuracy			±5.0 nsec (nom)		
Relative offset accuracy (for STTD diff mode)			±1.25 nsec		

Table 6, continued. Key specifications

Power control	UXA	PXA	MXA	EXA	CXA
Using 5 MHz resolution BW					
Absolute power measurement					
Accuracy 0 to -20 dBm			±0.7 dB (nom)		
Accuracy -20 to -60 dBm			±1.0 dB (nom)		
Relative power measurement accuracy					
Step range ±1.5 dB			±0.1 dB (nom)		
Step range ±3.0 dB			±0.15 dB (nom)		
Step range ±4.5 dB			±0.2 dB (nom)		
Step range ±26.0 dB			±0.3 dB (nom)		
<b>QPSK EVM</b>					
-25 dBm ≤ mixer level ≤ -15 dBm, 20 to 30 °C					
EVM					
Range			0 to 25% (nom)		
Floor		1.50%	1.50%	1.60%	1.60%
Accuracy			±1.0%		
I/Q origin offset					
DUT maximum offset			-10 dBc (nom)		
Analyzer noise floor			-50 dBc (nom)		
Frequency error					
Range			±30 kHz (nom)		
Accuracy		±5 Hz + (transmitter frequency x frequency reference accuracy)			

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

UXA: [www.keysight.com/find/uxa\\_specifications](http://www.keysight.com/find/uxa_specifications)

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 with multi-touch UI to another.

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

Table 7. Licenses

Description	Model - Option <sup>1</sup>		Additional information
	Fixed perpetual	Transportable perpetual	
W-CDMA	N9073C-1FP	N9073C-1TP	
HSPA/HSUPA	N9073C-2FP	N9073C-2TP	Requires -1FP or 1TP
HSPA+	N9073C-3FP	N9073C-3TP	Requires -1FP and -2FP or -1TP and -2TP
Single acquisition combined W-CDMA	N9073C-XFP	N9073C-XTP	MXA and EXA only, requires -1FP or -1TP

1. The N9073C W-CDMA application requires an X-Series signal analyzer with multi-touch user interface

### You Can Upgrade!

Options can be added after your initial purchase.

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



## Hardware Configuration

For optimizing measurements on W-CDMA signals with W-CDMA measurement application, Keysight recommends a minimum level of X-Series multi-touch instrument hardware functionality at each instrument performance point.

Supported instruments include:

- UXA N9040B
- PXA N9030B
- MXA N9020B
- EXA N9010B
- CXA N9000B

Table 8. Hardware configuration

Capability	Instrument option	Benefit
Analysis bandwidth	25 MHz minimum (-B25) or wider	Required: Up to full aggregated bandwidth of carrier such as 4 carrier CCDF (complementary cumulative-distribution function)
Precision frequency reference	-PRF	Recommended: For enhanced frequency accuracy and repeatability for lower measurement uncertainty
Electronic attenuator	-EA3	Recommended: Fast and reliable attenuation changes ideal for manufacturing without the wear associated with mechanical attenuators up to 3.6 GHz in 1 dB steps
Pre-amplifier	3.6 GHz (-P03) or higher	Recommended: For maximizing the measurement sensitivity
Fine resolution step attenuator	-FSA	Recommended: Useful for maximizing useable dynamic range to see signals
Analog baseband I/Q inputs	-BBA on PXA and MXA only	Optional: To extend measurements at baseband if required by device under test

## Related Literature

*W-CDMA/HSPA/HSPA+ Self-Guided Demonstration*,  
literature number 5990-5926EN

*W-CDMA/HSPA/HSPA+ Measurement Application Measurement Guide*, part  
number N9073-90017

*Designing and Testing 3GPP W-CDMA Base Transceiver Stations (Including  
Femtocells)*, *Application Note 1355*, literature number 5980-1239E

*Designing and Testing 3GPP W-CDMA User Equipment*, *Application Note 1356*,  
literature number 5980-1238E

*Concepts of High Speed Downlink Packet Access: Bringing Increased Through-  
put and Efficiency to W-CDMA*, *Application Note*,  
literature number 5989-2365EN

*User's and Programmer's Reference Guide* is available in the library section of  
the N9073C product page.

## Web

Product pages:

[www.keysight.com/find/n9073C](http://www.keysight.com/find/n9073C)

X-Series measurement applications:

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

X-Series signal analyzers:

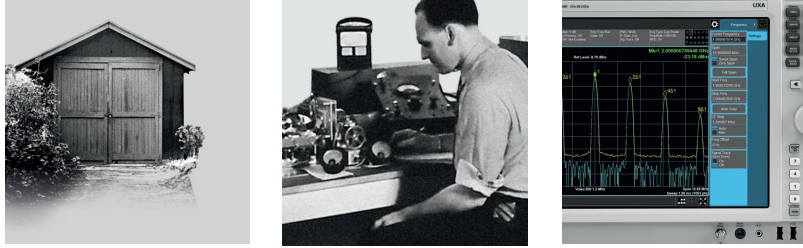
[www.keysight.com/find/X-Series](http://www.keysight.com/find/X-Series)

Application pages:

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

## From Hewlett-Packard through Agilent to Keysight

For more than 75 years, we've been helping you unlock measurement insights. Our unique combination of hardware, software and people can help you reach your next breakthrough. **Unlocking measurement insights since 1939.**



1939

THE FUTURE

### myKeysight

### myKeysight

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

A personalized view into the information most relevant to you.

### Three-Year Warranty



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

Keysight's committed to superior product quality and lower total cost of ownership. Keysight is the only test and measurement company with a three-year warranty standard on all instruments, worldwide. And, we provide a one-year warranty on many accessories, calibration devices, systems and custom products.

### Keysight Assurance Plans



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

Up to ten years of protection and no budgetary surprises to ensure your instruments are operating to specification, so you can rely on accurate measurements.

### Keysight Infoline

### Keysight Infoline

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

Keysight's insight to best in class information management. Free access to your Keysight equipment company reports and e-library.

### Keysight Channel Partners

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

Get the best of both worlds: Keysight's measurement expertise and product breadth, combined with channel partner convenience.

[www.keysight.com/find/n9073c](http://www.keysight.com/find/n9073c)

For more information on Keysight Technologies' products, applications or services, please contact your local Keysight office. The complete list is available at: [www.keysight.com/find/contactus](http://www.keysight.com/find/contactus)

### Americas

Canada	(877) 894 4414
Brazil	55 11 3351 7010
Mexico	001 800 254 2440
United States	(800) 829 4444

### Asia Pacific

Australia	1 800 629 485
China	800 810 0189
Hong Kong	800 938 693
India	1 800 11 2626
Japan	0120 (421) 345
Korea	080 769 0800
Malaysia	1 800 888 848
Singapore	1 800 375 8100
Taiwan	0800 047 866
Other AP Countries	(65) 6375 8100

### Europe & Middle East

Austria	0800 001122
Belgium	0800 58580
Finland	0800 523252
France	0805 980333
Germany	0800 6270999
Ireland	1800 832700
Israel	1 809 343051
Italy	800 599100
Luxembourg	+32 800 58580
Netherlands	0800 0233200
Russia	8800 5009286
Spain	800 000154
Sweden	0200 882255
Switzerland	0800 805353
	Opt. 1 (DE)
	Opt. 2 (FR)
	Opt. 3 (IT)
United Kingdom	0800 0260637

For other unlisted countries:

[www.keysight.com/find/contactus](http://www.keysight.com/find/contactus)  
(BP-01-01-16)



[www.keysight.com/go/quality](http://www.keysight.com/go/quality)

Keysight Technologies, Inc.  
DEKRA Certified ISO 9001:2008  
Quality Management System



Unlocking Measurement Insights

This information is subject to change without notice.

© Keysight Technologies, 2013 - 2016

Published in USA, January 27, 2016

5992-1310EN

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