Wireless Communication Analyzers

▶ WCA230A • WCA280A

Trigger, Capture, Analyze

The WCA200A Series Wireless Communications Analyzers were developed for designers and manufacturers of wireless communications devices. The WCA200A Series can selectively trigger on frequency domain events that no other instrument can trigger on, they can capture a seamless record of time synchronized RF or base band signal into memory and they can analyze this data. This analysis includes correlating multiple domains, which allows developers to observe system interactions and behaviors, ensure proper operation and rapidly troubleshoot problems with a simple test set up.

Characterization – The Versatile WCA200A Series Lets You See More of What is There

The WCA230A and WCA280A provide design engineers with all the measurement capabilities needed to fully characterize devices in an accurate, efficient manner – ensuring a complete picture of the device's capability.

- **2G, 2.5G, 3G, 3.5G Modulation Analysis Software –** The WCA200A Series offers modulation analysis software that provides one-button measurement routines that quickly and accurately perform measurements that conform to the relevant industry standards – W-CDMA, HSDPA, GSM/EDGE, cdma2000 1x, 1xEV-DO and TD-SCDMA.
- **W-CDMA Compressed Mode –** The WCA200A Series, with its unique ability to analyze W-CDMA compressed mode, allows engineers to quickly and easily monitor their device during the complex handover process between W-CDMA and GSM.
- **Differential I/Q inputs –** By providing differential I/Q inputs, the WCA200A Series is the only product in this class that addresses the increasingly common need of 3G UE designers to directly measure their differential I/Q signals.
- **3D Graphical Display –** The WCA200A Series is the only one-box solution that offers engineers extremely useful graphical representations, such as spectrogram and codogram, which give a complete picture of what is happening with the signal under test.

▶ Features & Benefits

Multi-domain Analysis Enables Fast, Complete Signal Analysis in Frequency, Time, Code and Modulation Domains – Without Making Multiple Measurements

Extended Memory Enables 10 Seconds of 3 G and 3.5 G Signals to be Captured, Ensuring all the Necessary Information is Available to Make a Complete Analysis of the Signal

Frequency Mask Trigger – Available Only from Tektronix – Makes it Easy to Capture Fast, Transient or Intermittent Signals that Swept Spectrum Analyzers Would Miss

Fast and Accurate Measurements at the Touch of a Button

Spectrogram Provides a Revealing Picture of RF Signal Frequency and Amplitude Behavior over Time – Not Possible with a Swept Spectrum Analyzer

Codogram Provides a Simple, Graphical Means of Analyzing Code Power vs. Time

W-CDMA Compressed Mode Enables Analysis of Handovers Between W-CDMA and GSM

ACK/NACK and CQI Analysis for HSDPA Uplink (requires Opt. 27 and Opt. 23)

Differential I/Q Inputs Enable Straightforward Analysis of Differential Baseband I and Q Signals

Fast Measurement Speed and Exceptional Accuracy Improve Production Throughput Without Affecting Yield

Versatile General Demodulation Capabilities Ranging from BPSK to 256 QAM, as well as Selectable Filters Allow Analysis of Non-standard Signals

One Instrument, Practical and Useful Every Day, to Cover all of Your Spectrum and Vector Analysis Needs

▶ Applications

Characterization, Troubleshooting and Verification of Wireless Designs:

- W-CDMA
- HSDPA
- GSM/EDGE
- CDMA2000 1x
- CDMA2000 1xEV-DO
- TD-SCDMA

Tektronix
Enabling Innovation

Troubleshooting – Now it is Simple to See What Couldn't be Seen

Troubleshooting a design can be a challenging, time-consuming task for any engineer. The WCA200A Series is designed to let you focus on the task at hand, troubleshooting your design and not spend your time learning specialized test equipment or using external software for post processing. The WCA200A Series is designed to provide advanced modulation analysis and troubleshooting capability in an easy-to-use, one-box solution, which allows you to use these advanced troubleshooting tools without having to become an expert on the test equipment.

- **Frequency Mask Trigger –** The ability to trigger off any signal, either known or unknown, in the frequency domain ensures that signals which traditional spectrum analyzers and vector signal analyzers would miss can be captured and analyzed in all domains – providing you with a complete view of even the most random signals.
- **Long Acquisition Memory –** Extended memory enables 10 seconds of 3 G or 3.5 G signals to be captured, ensuring all the necessary information is available to make a complete analysis of the signal.
- **Concurrent Multi-domain Analysis –** The WCA200A Series lets you perform simultaneous measurements in the frequency, time, code and modulation domains, which enables simple, fast and complete analysis of all complex RF signals without the need for multiple and non-concurrent measurements. By removing the need for multiple measurements, you can be sure that your results correlate between domains, ensuring accurate comparisons.
- **Simultaneous Analysis of UE and BTS Interaction –** When two WCA200A Series instruments are synchronized, the unique frequency mask trigger coupled with the long memory capture enables the complete call up set interactions between UE and BTS be recorded so interoperability issues can be identified.
- **Analysis of Dynamically Changing interactions Between 3GPP Node-B and UE –** The WCA200A Series with HSDPA analysis software is the only spectrum analyzer that can trigger on any RF signal and seamlessly capture the full duration of the call set up into memory, enabling time-correlated multi-domain analysis views of the ACK/NACK signal and dynamic changes in the RF signal over time.
- **Ease of Use –** The user interface of the WCA200A Series was designed to ensure that its advanced troubleshooting capabilities are easy to use. As a result, you will spend less time pondering operation and more time troubleshooting the device under test.

Verification – Practical for Everyday Use, the WCA200A Series Lets You View Test Results Sooner

When verifying your product, two critical questions must be asked about your test equipment: How quickly can I get the results? How accurate are the results? The WCA200A Series answers these questions with a powerful combination of speed and accuracy. Even when your test challenges change day to day, the WCA200A Series enables you to solve your measurement challenges, quickly and accurately.

- **Fast Power Measurements –** Whether you are making power calibration measurements on a cell phone production line or testing the ACLR performance of a PA to a 2G, 2.5G, 3G, or 3.5G standard, the WCA200A Series offers not only exceptionally fast measurements, but outstanding accuracy as well, thereby improving production throughput without affecting yield.
- **Analysis of Complex and Dynamically Changing RF Signals or Interactions Between DSP Operations and RF Events –** The WCA200A Series with HSDPA analysis software is the only spectrum analyzer that can trigger on any RF signal and perform multi-domain analysis of the dynamic changes in ACK/NACK signals over time.
- **Reduced Test Setup and Cost –** The WCA200A Series removes the need for test systems to include several different analyzers. This one-box solution meets all your demodulation requirements, without sacrificing the traditional RF performance that you need to satisfy your RF test challenges.
- **Flexible Connectivity –** The WCA200A Series provides users with many different ways to access their measurement results. Ethernet, USB (2 ports), and GPIB ports are supplied as standard, along with a floppy disk drive.

► Characteristics

Electrical Specifications

Frequency Range – DC to 20 MHz (Baseband), 15 MHz to 3 GHz or 8 GHz.
Frequency Marker Readout Accuracy – ±(RExMF + 0.001xSpan + 2) Hz. RE: Reference Frequency Error MF: Marker Frequency [Hz].
Frequency Readout Accuracy at Specified Frequency –
±1.2 kHz (Marker).
±210 Hz (CFM) (RF/RF1, Frequency = 2 GHz, Span = 1 MHz).
CFM – Carrier Frequency Measurement.
Residual FM – 2 Hz_{p-p} (typical).

Spectrum Purity

Frequency = 1500 MHz, Carrier offset = 10 kHz – –100 dBc/Hz.

Amplitude

Reference Level Setting Range –
–50 dBm to +30 dBm (1 dB step, RF/RF1/RF2/RF3).
–30 dBm to +20 dBm (2 dB step, Baseband).
–10 dBm to +20 dBm (10 dB step, I/Q).
Frequency Response at 20 ºC to 30 ºC (RF ATT ≥ 10 dB) –
±0.5 dB (Baseband).
±1.2 dB (RF/RF1).
Absolute Amplitude Accuracy at Calibration Point (RF) –
±0.5 dB (at 50 MHz, –20 dBm Signal, 0 dB ATT, 20 ºC to 30 ºC) .
Level Linearity in Display Range – ±0.2 dB (0 to –40 dBfs).

Dynamic Range

1 dB Compression Input – +2 dBm (RF ATT = 0 dB, 2 GHz).
Third Order Inter-Modulation Distortion –
–74 dBc (Ref Level: +5 dBm, RF Att: 20 dB, Total Signal Power: –7 dBm, CF: 2 GHz).
Displayed Average Noise Level –
–150 dBm/Hz (at 2 GHz), –147 dBm/Hz (at 3 GHz), –141 dBm/Hz (at 7 GHz).

Acquisition

Acquisition Memory Size – 64 MB (Std), 256 MB (Opt. 02).
Vector Span – 15 MHz (RF), 20 MHz (Baseband), 20 MHz (I/Q, Opt. 03).
At 64 MB (Std), the product can capture 2.5 sec 3G signal at 5 MHz span.
At 256 MB, it extends to 4 times standard. (10 sec for 3G).

Digital Demodulation

Modulation Format –
BPSK, QPSK, π/4 Shift DQPSK, 8 PSK, 16 QAM, 32 QAM, 64 QAM, 256 QAM, GMSK, GFSK.
Maximum Symbol Rate – 12.8 Msps.
Standard Setup – PDC, PHS, NADC, TETRA, GSM, CDPD, Bluetooth.
Vector Diagram Display Format – Symbol Locus Display, Frequency Error Measurement, Origin Offset Measurement.
Constellation Diagram Display Format – Symbol Display, Frequency Error Measurement, Origin Offset Measurement.
Eye Diagram Display Format – I/Q/Trellis Display (1 to 16 Symbols).
Error Vector Diagram Display Format – EVM, Magnitude Error, Phase Error, Waveform Quality (ρ), Frequency Error Measurement, Origin Offset Measurement.
Symbol Table – Binary, Octal, Hexadecimal.

Digital Demodulation Accuracy

GMSK (1 MHz Span) – EVM ≤1.8%, Magnitude Error ≤1.2%, Phase Error ≤1.0º.
64 QAM, 5.3 Msps 1 GHz Carrier (15 MHz Span) – EVM ≤2.5% (typical).
QPSK, 3.84 Msps 2 GHz Carrier (15 MHz Span) – EVM ≤2.5% (typical).

Characteristics	Description
QPSK EVM CF = 2 GHz (typical value)	0.5 % (at 100 ksps) 0.5 % (at 1 Msps) 1.2 % (at 4 Msps) 2.7 % (at 10 Msps)

Resolution Bandwidth Filter

Filter Shape – Gaussian, Rectangle, Root Nyquist.
Range – 1 Hz to 10 MHz.

Trigger

Trigger Event Source – IF (Level Comparator), External (TTL), I/Q (Opt. 02, Power Comparator).
Pre/Post Trigger Setting – Trigger Position is settable within 0% to 100% of Total Data Length.
Frequency Mask Trigger Level Range (Opt. 02) – 0 dBfs to –70 dBfs (Except 15 MHz span), 0 dBfs to –60 dBfs (15 MHz span).
Time Mask Trigger Level Range (Opt. 02) – 0 dBfs to –40 dBfs.

Physical Characteristics

Dimensions	mm	in.
Width (without belts)	425	16.7
Height (without feet)	215	8.5
Length (without cover and feet)	425	16.7
Weight	**kg**	**lbs.**
Net	19 kg	41.9

Opt. 1A - External Pre-Amplifier

Environmental

Input Connector – SMA-J Type.
Output Connector – N-P Type.

Electrical Characteristics

Frequency Range – 100 MHz to 3 GHz.
Small Signal Gain – 19 dB to 24 dB at 2 GHz.
Gain Flatness –
±3.0 dB, 100 MHz to 3 GHz (without correction).
±1.0 dB, 100 MHz to 3 GHz (with correction) (typical).
Noise Figure – < 6.5 dB, 2 GHz (Typical).
Noise Floor – <–160 dBm/Hz, 2 GHz (typical).
Output Power – >+6 dBm at 1 dB Compression, 2 GHz (typical).
Harmonics – <–50 dBc at +4 dBm output power, 1 GHz (typical).
Third Order Intermodulation Distortion –
<–45 dBc at Total signal power= +4 dBm output power, CF=2 GHz (typical).

Signal Input

VSWR –
<2.2 at 100 MHz to 150 MHz (typical).
<1.8 at 150 MHz to 3 GHz (typical).
Maximum Input DC Voltage – ±20V.
Maximum Input Power – +13 dBm.

Signal Output

VSWR –
<2.2 at 100 MHz to 150 MHz (Typical).
<1.5 at 150 MHz to 2.5 GHz (Typical).
<2.2 at 2.5 GHz to 3 GHz (Typical).

Mechanical Specifications

Weight – 0.2 kg.
Dimensions (Without a Cap) – 108 mm (H) x 42 mm (D) x 32 mm (W).
Cooling, Required Clearances – Top: 2.5 cm, Left side: 2.5 cm, Right side: 2.5 cm, Rear: 2.5 cm.

Option 23 - W-CDMA Uplink Analysis

Perform key measurements for 3GPP TS34.121 Release 99 including PRACH analysis capability.

Option 24 - GSM/EDGE Analysis Software

Perform key measurements for ETSI TS 100 910 and 3GPP TS45.005.

► Burst Type: Normal

Characteristics	Description
Modulation accuracy measurement	
Carrier power range	–30 to +30 dBm
Phase error measurement accuracy for GMSK modulation (typical)	≤0.8º (RMS) ≤1.8º (Peak)
Phase error resolution	0.01º
EVM measurement accuracy for 8-PSK modulation (typical)	≤0.9% (RMS)
EVM resolution	0.01%
Time resolution	0.15625 µs at 5 MHz span
Burst count	1000 maximum
Mean power measurement	
RF input range	–50 dBm to +30 dBm
Absolute power measurement accuracy for GSM900 at 20 ºC to 30 ºC, excluding mismatch error (typical)	±0.5 dB (signal frequency: 880 MHz to 960 MHz, signal power: +10 dBm to –30 dBm, RF attenuator: 0 dB to 20 dB, after auto level is performed at 5 MHz span)
Absolute power measurement accuracy for DCS1800, PCS1900 at 20 ºC to 30 ºC, excluding mismatch error (typical)	±0.6 dB (signal frequency: 1710 MHz to 1990 MHz signal power: +10 dBm to –30 dBm, RF attenuator: 0 dB to 20 dB, after auto level is performed at 5 MHz span)
Resolution	0.01 dB
Burst count	1000 maximum
Power versus time measurement	
RF input range	–50 dBm to +30 dBm
Power ramp relative accuracy (typical)	±0.2 dB at 0 dBfs to –40 dBfs
Time resolution (typical)	0.15625 µs at 5 MHz span
Marker amplitude resolution	0.001 dB
Burst count	1000 maximum
Modulation spectrum measurement	
Carrier power range	–5 dBm to +30 dBm
Dynamic range for GMSK modulation (typical)	82 dB at 600 kHz offset (30 kHz RBW) 86 dB at 1.2 MHz offset (30 kHz RBW) 83 dB at 1.8 MHz offset (100 kHz RBW) 85 dB at 6 MHz offset (100 kHz RBW)
Dynamic range for 8-PSK modulation (typical)	82 dB at 600 kHz offset (30 kHz RBW) 85 dB at 1.2 MHz offset (30 kHz RBW) 83 dB at 1.8 MHz offset (100 kHz RBW) 83 dB at 6 MHz offset (100 kHz RBW)
Burst count	1000 maximum
Switching spectrum measurement	
Carrier power range	–5 dBm to +30 dBm
Dynamic range for GMSK modulation (typical)	75 dB at 400 kHz offset (30 kHz RBW) 80 dB at 600 kHz offset (30 kHz RBW) 84 dB at 1.2 MHz offset (30 kHz RBW) 88 dB at 1.8 MHz offset (30 kHz RBW)
Dynamic range for 8-PSK modulation (typical)	75 dB at 400 kHz offset (30 kHz RBW) 80 dB at 600 kHz offset (30 kHz RBW) 84 dB at 1.2 MHz offset (30 kHz RBW) 88 dB at 1.8 MHz offset (30 kHz RBW)
Burst count	1000 maximum

Option 25 — cdma2000 1x Signal Analysis Software

Perform key measurements for cdma2000 forward link (3GPP2 C.S0010) and reverse link (3GPP2 C.S0011).

► cdma2000 1x Forward Link

Characteristics	Description
Channel power	
Minimum power at RF input	–50 dBm
Absolute power measurement accuracy (at 20 ºC to 30 ºC, excluding mismatch error), typical	±0.6 dB at conditions below: Signal frequency: 824 to 960 MHz or 1750 to 2170 MHz Signal power: 0 dBm to –50 dBm After Auto Level is performed at 10 MHz span
Relative power measurement accuracy (at 20 ºC to 30 ºC, excluding mismatch error), typical	±0.2 dB at conditions below: Signal frequency: 824 to 960 MHz or 1750 to 2170 MHz Signal power: 0 dBm to –30 dBm After Auto Level is performed at 10 MHz span, 0 dBm input
Resolution	0.01 dB
ACPR	
Minimum carrier power at RF input	–40 dBm
Dynamic range	At –5 dBm signal input
765 kHz offset	76 dB (30 kHz BW)
1.995 MHz offset	81 dB (30 kHz BW)
3.125 MHz offset	81 dB (30 kHz BW)
4 MHz offset	82 dB (30 kHz BW)
CCDF	
Histogram resolution	0.01 dB
Intermodulation distortion	
Measurement filter	Rectangular, Root Nyquist, Nyquist, and Gaussian
Occupied bandwidth	
Minimum carrier power at RF input	–50 dBm
Measurement accuracy	0.2%
Spectrum emission mask	
Minimum carrier power at RF input	–5 dBm
Dynamic range 1.995 MHz offset	82 dB (30 kHz BW)
Code domain power	
Relative code domain power accuracy	±0.15 dB/±0.075 dB (typical)
QPSK EVM	
Minimum carrier power at RF input	–40 dBm
EVM floor, typical	2.0%
Modulation accuracy (composite)	
Minimum carrier power at RF input	–40 dBm
Composite EVM floor, typical	2.0%
Rho (ρ)	0.999
Frequency error accuracy	±10 Hz + center frequency accuracy
Timing accuracy (τ)	±250 ns

► cdma2000 1x Reverse Link

Characteristics	Description
Channel power	
Minimum power at RF input	–50 dBm
Absolute power measurement accuracy (at 20 ºC to 30 ºC, excluding mismatch error), typical	±0.6 dB at conditions below: Signal frequency: 824 to 960 MHz or 1750 to 2170 MHz Signal power: 0 dBm to –50 dBm After Auto Level is performed at 10 MHz span
Relative power measurement accuracy (at 20 ºC to 30 ºC, excluding mismatch error), typical	±0.2 dB at conditions below: Signal frequency: 824 to 960 MHz or 1750 to 2170 MHz Signal power: 0 dBm to –30 dBm After Auto Level is performed at 10 MHz span, 0 dBm input
Resolution	0.01 dB
ACPR	
Minimum carrier power at RF input	–40 dBm
Dynamic range	At –5 dBm signal input
900 kHz offset	76 dB (30 kHz BW)
1.995 MHz offset	81 dB (30 kHz BW)
3.125 MHz offset	81 dB (30 kHz BW)
4 MHz offset	82 dB (30 kHz BW)
CCDF	
Histogram resolution	0.01 dB
Intermodulation distortion	
Measurement filter	Rectangular, Root Nyquist, Nyquist, and Gaussian
Occupied bandwidth	
Minimum carrier power at RF input	–50 dBm
Measurement accuracy	0.2%
Spectrum emission mask	
Minimum carrier power at RF input	–5 dBm
Dynamic range 1.995 MHz offset	82 dB (30 kHz BW)
Code domain power	
Relative code domain power accuracy	±0.15 dB/±0.075 dB (typical)
QPSK EVM	
Minimum carrier power at RF input	–40 dBm
EVM floor, typical	2.0%
Modulation accuracy (composite)	
Minimum carrier power at RF input	–40 dBm
Composite EVM floor, typical	2.0%
Rho (ρ)	0.999
Frequency error accuracy	±10 Hz + center frequency accuracy

Option 26 — 1xEV-DO Signal Analysis Software

Perform key measurements for 1xEV-DO forward link (3GPP2 C.S0032) and reverse link (3GPP2 C.S0033).

► 1xEV-DO Forward Link

Characteristics	Description
Channel power	
Minimum power at RF input	–50 dBm
Absolute power measurement accuracy (at 20 ºC to 30 ºC, excluding mismatch error), typical	±0.6 dB at conditions below: Signal frequency: 824 to 960 MHz or 1750 to 2170 MHz Signal power: 0 dBm to –50 dBm After Auto Level is performed at 10 MHz span
Relative power measurement accuracy (at 20 ºC to 30 ºC, excluding mismatch error), typical	±0.2 dB at conditions below: Signal frequency: 824 to 960 MHz or 1750 to 2170 MHz Signal power: 0 dBm to –30 dBm after Auto Level is performed at 10 MHz span, 0 dBm input
Resolution	0.01 dB
CCDF	
Histogram resolution	0.01 dB
Intermodulation distortion	
Measurement filter	Rectangular, Root Nyquist, Nyquist, and Gaussian
Occupied bandwidth	
Minimum carrier power at RF input	–50 dBm
Measurement accuracy	0.2%
ACPR	
Minimum carrier power at RF input	–40 dBm
Dynamic range	At –5 dBm signal input
765 kHz offset	76 dB (30 kHz BW)
1.995 MHz offset	81 dB (30 kHz BW)
3.125 MHz offset	81 dB (30 kHz BW)
4 MHz offset	82 dB (30 kHz BW)
Spectrum emission mask	
Minimum carrier power at RF input	–5 dBm
Dynamic range1.995 MHz offset	82 dB (30 kHz BW)
Code domain power	
Relative code domain power accuracy	±0.15 dB/±0.075 dB (typical)
QPSK EVM	
Minimum carrier power at RF input	–40 dBm
EVM floor, typical	2.0%
Modulation accuracy (composite)	
Minimum carrier power at RF input	–40 dB
Composite EVM floor, typical	2.0%
Rho (ρ)	0.999
Frequency error accuracy	±10 Hz + center frequency accuracy
Timing accuracy (τ)	±250 ns

► 1xEV-DO Reverse Link

Characteristics	Description
Channel power	
Minimum power at RF input	–50 dBm
Absolute power measurement accuracy (at 20 ºC to 30 ºC, excluding mismatch error), typical	±0.6 dB at conditions below: Signal frequency: 824 to 960 MHz or 1750 to 2170 MHz Signal power: 0 dBm to –50 dBm after Auto Level is performed at 10 MHz span
Relative power measurement accuracy (at 20 ºC to 30 ºC, excluding mismatch error), typical	±0.2 dB at conditions below: Signal frequency: 824 to 960 MHz or 1750 to 2170 MHz Signal power: 0 dBm to –30 dBm after Auto Level is performed at 10 MHz span, 0 dBm input
Resolution	0.01 dB
CCDF	
Histogram resolution	0.01 dB
Intermodulation distortion	
Measurement filter	Rectangular, Root Nyquist, Nyquist and Gaussian
Occupied bandwidth	
Minimum carrier power at RF input	–50 dBm
Measurement accuracy	0.2%
ACPR	
Minimum carrier power at RF input	–40 dBm
Dynamic range	At –5 dBm signal input
765 kHz offset	74 dB (30 kHz BW)
1.995 MHz offset	83 dB (30 kHz BW)
3.125 MHz offset	83 dB (30 kHz BW)
4 MHz offset	84 dB (30 kHz BW)
Spectrum emission mask	
Minimum carrier power at RF input	–5 dBm
Dynamic range1.995 MHz offset	82 dB (30 kHz BW)
Code domain power	
Relative code domain power accuracy	±0.15 dB/±0.075 dB (typical)
QPSK EVM	
Minimum carrier power at RF input	–40 dBm
EVM floor, typical	2.0%
Modulation accuracy (composite)	
Minimum carrier power at RF input	–40 dB
Composite EVM floor, typical	2.0%
Rho (ρ)	0.999
Frequency error accuracy	±10 Hz + center frequency accuracy

Option 27 — 3GPP Release 5 Downlink (HSDPA) Analysis Software
Perform key measurements for 3GPP TS25.141 v5.7.0

▸ 3GPP-R5 Downlink

Characteristics	Description
Modulation format	
Modulation format	QPSK, 16 QAM auto detection
Channel power measurement	
Minimum power at RF input	–50 dBm
Absolute power measurement accuracy (Typical)	±0.6 dB at 20 ºC to 30 ºC, excluding mismatch error (Signal frequency: 1900 to 2200 MHz; Signal power: +10 dBm to –30 dBm; after Auto Level is performed at 10 MHz span)
Relative Power Measurement Accuracy (Typical)	±0.2 dB at 20 ºC to 30 ºC, excluding mismatch error (Signal frequency: 1900 to 2200 MHz; Signal power: 0 dBm to –30 dBm; after Auto Level is performed at 10 MHz span)
Resolution	0.01 dB
ACLR measurement	
Minimum carrier power at RF input	–40 dBm
Dynamic range	Test model 1, 16 ch, input power >–5 dBm 60 dB, typically 66 dB (5 MHz offset) 63 dB, typically 70 dB (10 MHz offset)
CCDF measurement	
Histogram Resolution	0.01 dB
OBW (Occupied Bandwidth) measurement	
Minimum carrier power at RF input	–50 dBm
Measurement accuracy	0.2% (5 MHz Span, 1000 times averaging)
Spectrum emission mask	
Dynamic range	82 dB (30 kHz BW, Input Power >–5 dBm, 5 MHz offset)
Code domain power	
Relative accuracy of code domain power accuracy	±0.15 dB, typically ±0.075 dB (Using Test Model 5, Total Power = 0 dBm, Code Level >–15 dB)
QPSK EVM (Pilot Channel Only)	
Minimum carrier power at RF input	–60 dBm (EVM <9 %)
EVM floor (Typical)	2.0% (Input Power >–40 dBm, 10 times averaged)
Modulation accuracy (Composite, Test Model 5)	
Minimum carrier power at RF input	–60 dBm (EVM <9 %)
Composite EVM floor (Typical)	2.5 % (Input Power >–40 dBm, 10 times averaged)
Frequency error accuracy	±10 Hz + (center frequency accuracy)
Modulation accuracy (Composite, Alternate Scrambling Code)	
Minimum carrier power at RF input	–60 dBm (EVM <9 %)
Composite EVM floor (Typical)	2.5 % (Input Power >–40 dBm, 10 times averaged)
Frequency error accuracy	±10 Hz + (center frequency accuracy)

▸ 3GPP-R5 Uplink

Characteristics	Description
ACK/NACK Analysis	
ACK/NACK Analysis Function	ACK/NACK/DTX detection, CQI decode
Code domain power	
Relative accuracy of code domain power accuracy	±0.15 dB, typically ±0.075 dB (Total Power = 0 dBm, Code Level >–15 dB)

Option 28 — 3GPP Release 4 Downlink and Uplink (TD-SCDMA)

Perform key measurements for TS25.102 (UL), 3GPP TS25.142 (DL)

Characteristics	Description
General	
Frequency range	1850 to 2050 MHz
Minimum power at RF input	–60 dBm
Channel power measurement	
Absolute power measurement accuracy (Typical, after Auto-level performed, excluding mismatch error, 5 MHz span)	±0.6 dB (Signal power +10 dBm to –30 dBm, 20 ºC to 30 ºC)
Relative power measurement accuracy (Typical, after Auto-level performed, excluding mismatch error, 5 MHz span)	±0.2 dB (Signal power +0 dBm to –30 dBm, 20 ºC to 30 ºC)
Resolution	0.01 dB
ACLR measurement	
Dynamic range	(8 active DPCH, Timeslots 4, 5, 6), input power >–20 dBm 60 dB, 1.6 MHz offset 61 dB, 3.2 MHz offset
CCDF measurement	
Histogram resolution	0.01 dB
Code domain analysis	
Relative code domain power accuracy	Input power >–40 dBm ±0.15 dB (±0.075 typical) at code power >–10 dBc ±0.30 dB (±0.15 typical) at code power >–25 dBc
Code domain residual error	<–40 dB (Input power >–40 dBm)
Modulation and frequency related	
Modulation format	QPSK
Residual EVM Floor	≤1.5%, input level >–40 dBm (1 DPCH in timeslots 4, 5, and 6)
Residual origin offset	≤-40 dB, input level >–40 dBm (1 DPCH in timeslots 4, 5, and 6)
Frequency error accuracy	±10 Hz + (center frequency accuracy)
Frequency lock range	±4 kHz from defined carrier frequency (input level >–40 dBm)
Other measurements	Occupied BW (OBW); Spectrum Emissions Mask (offset from carrier and inband, ungated)

WCA230A

Wireless Communication Analyzer (DC – 3 GHz).

WCA280A

Wireless Communication Analyzer (DC – 8 GHz).

Standard Accessories

User manual, Programmer manual, power cord, USB keyboard, USB mouse, BNC-N adapter, front cover (except Opt. 1R). Please specify power cord option when ordering.

Options

Opt. 1R – Rackmount kit.

Opt. 1A – External preamp, 20 dB gain, 100 MHz to 3 GHz.

Opt. 02 – 256 MB Data Memory with Frequency Mask Trigger.

Opt. 03 – Differential I/Q Inputs.

Opt. 23 – W-CDMA Uplink Analysis Software.

Opt. 24 – GSM/EDGE Analysis Software.

Opt. 25 – cdma2000 1x Analysis Software.

Opt. 26 – 1xEV-DO Analysis Software.

Opt. 27 – 3GPP Release 5 Downlink (HSDPA) Analysis Software.

Opt.28– TD-SCDMA Analysis Software.

Upgrade Options

WCA2UP Opt. 02 – 256 MB Data Memory with Frequency Mask Trigger upgrade.

WCA2UP Opt. 03 – Differential IQ Inputs upgrade.

WCA2UP Opt. 23 – W-CDMA Uplink Analysis upgrade (customer-installable).

WCA2UP Opt. 24 – GSM/EDGE Analysis upgrade (customer-installable).

WCA2UP Opt. 25 – cdma2000 1x Analysis upgrade (customer-installable).

WCA2UP Opt. 26 – 1xEV-DO Analysis upgrade (customer-installable).

WCA2UP Opt. 27 – 3GPP Release 5 Downlink (HSDPA) Analysis upgrade (customer-installable).

WCDMA2UPXP-28 – TD-SCDMA Analysis Software upgrade (customer-installable)

WCA2UP Opt. 1F – Installation for WCA2UPxx (no calibration required).

WCA2UP Opt. 1FC – Installation for WCA2Upxx (installation with calibration service).

Optional Accessories

Accessory Bag – Order 016-A330-00.

Power Plug Options

Opt. A0 – North America Power.

Opt. A1 – Universal EURO Power.

Opt. A2 – United Kingdom Power.

Opt. A3 – Australia Power.

Opt. A4 – 240 V, North America Power.

Opt. A5 – Switzerland Power.

Opt. A6 – Japan Power.

Opt. A10 – China Power.

Opt. A99 – No power cord.

Language Option

Option L0 – English User/Programmers manual.

Option L5 – Japanese User/Programmers manual.

Service Options

Opt. C3 – Calibration Service 3 Years.

Opt. C5 – Calibration Service 5 Years.

Opt. D1 – Calibration Data Report.

Opt. D3 – Calibration Data Report 3 Years (with Opt. C3).

Opt. D5 – Calibration Data Report 5 Years (with Opt. C5).

Opt. R3 – Repair Service 3 Years.

Opt. R5 – Repair Service 5 Years.

Wireless Communication Analyzers

► WCA230A • WCA280A

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Our most up-to-date product information is available at:
www.tektronix.com

Product(s) complies with IEEE Standard 4888.1-1987, RS-232-C, and with Tektronix Standard Codes and Formats.

10/04 HB/WOW 37W-16437-3

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