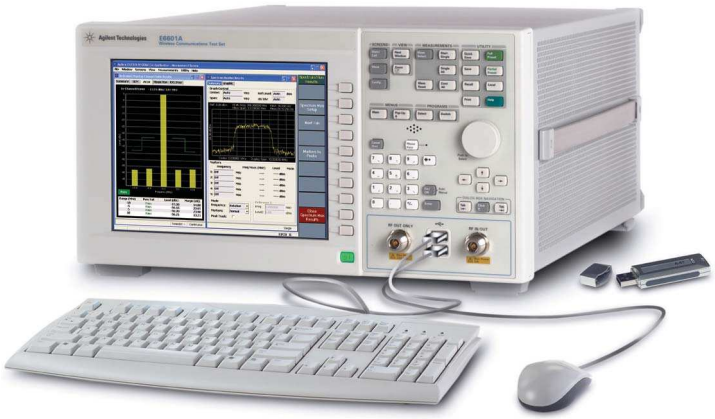
Agilent E6832A
W-CDMA Calibration Application

For the E6601A Wireless Communications Test Set

Data Sheet



The next generation of mobile phone manufacturing test.

E6601A is the newest test set from Agilent Technologies, designed especially for high-volume, test-mode manufacturing. Combining industry-leading measurement speed, selectable formats, flexible licensing, and an integrated open Windows® XP PC, the E6601A helps you achieve the lowest cost of test in mobile phone manufacturing.

The E6601A and its available technology-specific software applications deliver industry leading measurement speed and accuracy for your mobile phone test needs.

The Agilent E6832A W-CDMA Calibration Application is a non-signaling application optimized for W-CDMA and HSDPA mobile phone calibration. The E6832A also provides a choice of perpetual, transportable, or term licenses for maximizing asset utilization and your cost per test.

The test set and its applications use emerging advancements such as fast device tune features to deliver fast, high-quality calibration. Because it's Agilent, you can be confident—it operates using trusted, proven measurement methodology that ensures measurement integrity that is never compromised.

E6601A/E6890A Features and General Specifications

- CW, AM, FM, DSB-SC source modulation
- RF analyzer
- Spectrum monitor
- Transmitter power measurements
- Power versus time measurement
- Frequency error measurement
- Optional IQ capture waveform sampling
- Internal OCXO timebase
- Built-in open Windows XP PC
- Built-in help system
- Run test programs with internal or external PC
- GPIB, USB, and LAN connectivity and control

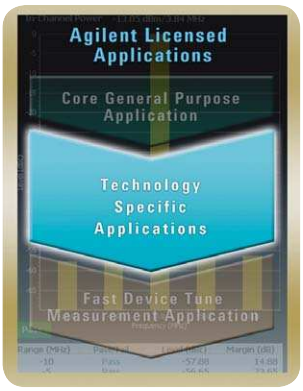
E6832A Features

Source modulation
- CW, amplitude, frequency, W-CDMA

Power measurements
- Mean power
- Root-raised cosine power

Spectral measurements
- Spectrum emission mask
- Adjacent channel leakage
- Spectrum monitor

Modulation quality
- CW frequency error
- DPCH EVM, OBW, frequency error



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Technical Specifications

These specifications apply to an E6601A mainframe and the E6832A W-CDMA Calibration Application firmware revision A.04 or higher. Only feature additions beyond the E6890A General Purpose Application are included in this document. Specifications describe the test set's warranted performance and are valid for the unit's operation within ±10 °C of the last self alignment. All specifications are valid after a 30-minute warm-up period of continuous operation with valid self alignment. If the instrument has been off for longer than 48 hours, a 48-hour warm-up period followed by self alignment is required.

Supplemental characteristics are intended to provide typical, but non-warranted, performance parameters that may be useful in applying the instrument. These characteristics are shown in italics and labeled as "typical." All units shipped from the factory meet these typical numbers at +25 °C ambient temperature without including measurement uncertainty.

RF Generator

Frequency

W-CDMA cellular bands

Band I IMT-2000	2112 to 2168 MHz
Band II U.S. PCS	1932 to 1988 MHz
Band III DCS/PCS	1807 to 1878 MHz
Band IV	2112 to 2153 MHz
Band V U.S. Cellular	871 to 892 MHz
Band VI UMTS800	877 to 883 MHz
Band VII UMTS2600	2620 to 2690 MHz
Band VIII UMTS900	927 to 958 MHz
Band IX UMTS1700	1844 to 1880 MHz
Band X UMTS Extended	2110 to 2170 MHz
Band XI UMTS1500	1475.9 to 1500.9 MHz

Output level

Signal level is measured using a root-raised cosine (RRC) filter with a roll-off a = 0.22 and a 3.84 MHz bandwidth.

Output level renges

RF IN/OUT port	–115 to –13 dBm/3.84 MHz
RF OUT ONLY port	–115 to –5 dBm/3.84 MHz

Composite signal absolute level accuracy
(< ±10 °C and < 24 hours from last self alignment,
–108 to –15 dBm / 3.84 MHz)

RF IN/OUT port	< ±1.0 dB, *typically* < *±0.65 dBm*
RF OUT ONLY port	< ±1.0 dB, *typically* < *±0.65 dBm*

QPSK modulation

Residual EVM	*Typically < 3%*

RF Analyzer

Frequency

W-CDMA cellular bands

Band I IMT-2000	1922 to 1978 MHz
Band II U.S. PCS	1852 to 1908 MHz
Band III DCS/PCS	1712 to 1783 MHz
Band IV	1712 to 1753 MHz
Band V U.S. Cellular	826 to 847 MHz
Band VI UMTS800	832 to 838 MHz
Band VII UMTS2600	2500 to 2570 MHz
Band VIII UMTS900	882 to 913 MHz
Band X UMTS Extended	1710 to 1770 MHz
Band XI UMTS1500	1427.9 to 1452.9 MHz
Band IX UMTS1700	1749 to 1785 MHz

Input level ranges

Average power	–65 to +28 dBm/3.84 MHz
Peak power	–65 to +37 dBm/3.84 MHz (5 W)

Self alignment validity ≤ ±10 °C change and ≤ 30 days from last self alignment

DPCH Measurement Suite

Includes mean and RRC-filtered mean power, spectrum emission mask, ACLR, composite EVM frequency error, PCDE, and occupied bandwidth measurements.

Trigger setup

Delay	–20 to +20 ms
Sources	External, fall, immediate, rise

Mean and RRC-filtered mean power measurements

Input level range

Average power	–61 to +28 dBm/3.84 MHz

Measurement accuracy[1]

–54 to +28 dBm/3.84 MHz	< ±0.6 dB, *typically* < *±0.3 dB*
–61 to < –54 dBm/3.84 MHz	< ±0.7 dB, *typically* < *±0.4 dB*

With < 48 hours warm-up before self alignment initiated

–54 to +28 dBm/3.84 MHz	< ±0.7 dB, typically < ±0.3 dB
–61 to < –54 dBm/3.84 MHz	< ±0.8 dB, *typically* < *±0.4 dB*

Measurement repeatability *Typically* < *±0.05 dB*

Filter

Mean power	Mean power-compliant filter
RRC-filtered mean power	3.84 MHz

Spectrum emission mask (SEM) measurement

This measurement provides a ratio of the transmitted power in a 3.84 MHz RRC bandwidth to offset frequencies, which are between 2.5 MHz and 12.5 MHz away from the UE carrier frequency.

Input level range

Average power	+5 to +28 dBm/3.84 MHz

Measurement accuracy

2.5 to 12.5 MHz	< ±1.5 dB, *typically* < *±0.5 dB*

Offset frequency measurement bandwidths

2.5 to 3.5 MHz offsets	30 kHz
3.5 to 12.5 MHz offsets	1 MHz

In-band measurement filter 3.84 MHz (RRC)

Adjacent channel leakage ratio (ACLR) measurement

This measurement provides a ratio of the filtered mean transmitted power to the filtered mean power in an adjacent channel. Both the transmitted and the adjacent channel powers are measured with a filter that has an RRC response with roll-off a = 0.22 and a bandwidth equal to the chip rate.

Input level range

Average power	+5 to +28 dBm/3.84 MHz

Measurement accuracy

±5 MHz offsets at –33 dB	< ±0.8 dB, *typically* < *±0.4 dB*
±10 MHz offsets at –43 dB	< ±0.8 dB, typically < ±0.4 dB

Residual noise floor

±5 MHz offsets	*Typically* < *–53 dBc*
±10 MHz offsets	*Typically* < *–63 dBc*

Filter 3.84 MHz (RRC)

Error vector magnitude (EVM) measurement

This measurement calculates composite EVM and several other results relating to UE modulation quality.

Input level range

Average power	–25 to +28 dBm/3.84 MHz

UE ranges

EVM	≤ 35% rms
Frequency error	< ±1 kHz
Timing error	< ±50 chips

EVM measurement accuracy (Includes residual EVM)

UE EVM 0% rms	< 2.5% rms
UE EVM 17.5% rms	< 0.7% rms
UE EVM 35% rms	< 0.5% rms

Filter 3.84 MHz (RRC)

Measurement results EVM, magnitude error, phase error, origin offset

1. Additional accuracy error when using RF OUT ONLY port is < ±0.1 dB.

Frequency error measurement

Input level range
Average power –25 to +28 dBm/3.84 MHz

UE ranges
EVM ≤ 35% rms
Frequency error < ±1 kHz
Timing error < ±50 chips

Filter 3.84 MHz (RRC)

Measurement accuracy < (±5 Hz + timebase accuracy)

Peak code domain error (PCDE) measurement

Input level range
Average power –25 to +28 dBm/3.84 MHz

UE ranges
EVM ≤ 35% rms
Frequency error < ±1 KHz
Timing error < ±50 chips

Filter 3.84 MHz (RRC)

Measurement accuracy < ±0.3 dB

Occupied bandwidth (OBW) measurement

This measurement calculates the bandwidth containing 99.0% of the total integrated power of the transmitted signal, centered on the channel frequency.

Input level range
Average power +5 to +28 dBm/3.84 MHz

Measurement accuracy < ±60 kHz at 99.0% total integrated power

Dynamic Power Measurement

Input level range
Average power –61 to +28 dBm/3.84 MHz

Amplitude capture range
With 4 dB crest factor < ±2 dB of expected power

Measurement accuracy[1]
+2 to –45 dB of expected power
–54 to +28 dBm/3.84 MHz < ±0.6 dB, *typically* < *±0.3 dB*
–61 to < –54 dBm/3.84 MHz < ±0.7 dB, *typically* < *±0.4 dB*

+2 to –45 dB of expected power with < 48 hours warm-up before self alignment initiated
–54 to +28 dBm/3.84 MHz < ±0.7 dB, *typically* < *±0.3 dB*
–61 to < –54 dBm/3.84 MHz < ±0.8 dB, *typically* < *±0.4 dB*

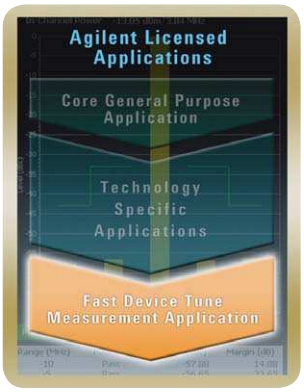
Measurement repeatability
Returning to same level and frequency, no temperature change and insignificant time change *Typically* < *±0.05 dB*

Trigger setup
Sources External, fall, rise

Filters
1 kHz
30 kHz
100 kHz
300 kHz
640 kHz
1.23 MHz
1.28 MHz
1.6 MHz
3.84 MHz
5.0 MHz
8PSK estimated carrier power
GSM Tx power
W-CDMA mean power

1. Additional accuracy error when using RF OUT ONLY port is < ±0.1 dB.

Fast Device Tune Measurement



Allows simultaneous calibration of a device's transmitter output power and receiver input level across level and frequency in a single sweep (per frequency band). The device must operate in a test mode, which forces it to transmit a predefined series of power steps at various uplink frequencies, and also forces it to simultaneously tune its receiver to perform measurements (such as RSSI) of the test set's signal at various downlink frequencies and power levels.

Input level range

Average Tx power	–61 to +28 dBm/3.84 MHz
Measurement interval	1 timeslot (667 µs)
Measurement filter	W-CDMA mean power

Power measurement accuracy[1]

0 to –45 dB of expected power and 20 to 55 °C

–54 to +28 dBm/3.84 MHz	< ±0.75 dB, *typically < ±0.4 dB*
–61 to < –54 dBm/3.84 MHz	< ±0.85 dB, *typically < ±0.5 dB*

0 to –45 dB of expected power and 20 to 55 °C with 48-hours warm-up before self alignment initiated

–54 to +28 dBm/3.84 MHz	< ±0.85 dB, *typically < ±0.4 dB*
–61 to < –54 dBm/3.84 MHz	< ±0.95 dB, *typically < ±0.5 dB*

Output level ranges (Rx level at)

RF IN/OUT port	–108 to –15 dBm/3.84 MHz
RF OUT ONLY port	–108 to –5 dBm/3.84 MHz

Composite signal absolute output level accuracy
(< ±10 °C and < 24 hours from last self alignment)

–108 to –15 dBm/ 3.84 MHz at RF IN/OUT port	< ±1.0 dB, *typically < ±0.65 dBm*
–108 to –5 dBm/ 3.84 MHz at RF OUT ONLY port	< ±1.0 dB, *typically < ±0.65 dBm*

Output level settling (Rx level within 0.1 dB)

Amplitude switch	< 1 ms, *typically < 250 µs*
Frequency switch within band	< 1 ms, *typically < 500 µs*
Step size range	5 to 20 ms

Trigger setup

Sources	Immediate, rise

1. Additional accuracy error when using RF OUT ONLY port is < ±0.1 dB.

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