

Agilent E6833A cdma2000/1xEV-D0 Calibration Application

For the E6601A Wireless Communications Test Set

Data Sheet



The next generation of mobile phone manufacturing test.

The Agilent E6601A is the new, one-box test set that expedites mobile phone calibration. 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 E6833A cdma2000/1xEV-DO Calibration Application is a non-signaling application optimized for cdma2000®/1xEV-DO mobile phone calibration. The E6833A also provides a choice of perpetual, transportable, or term licenses for maximizing asset

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

E6833A Features

Source modulation

CW, amplitude, frequency, IS-95, cdma2000, and 1xEV-D0

Power measurements

- Mean power
- · Root-raised cosine power

Power measurements

- · Channel power
- · Dynamic power
- · Fast device tune

Spectral measurements

- · Tx spurious emissions
- · Occupied bandwidth
- · Spectrum monitor

Modulation quality measurements

• IS-95, cdma2000 RC1 rho



Technical Specifications

These specifications apply to an E6601A mainframe and the E6833A cdma2000/1xEVDO Calibration Application firmware revision A.03 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 $\pm 10~^{\circ}\text{C}$ 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 a 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 | |
|-----------------------|---|
| US cellular band | 1-799, 991-1023, 1024-1323 (860.04-893.97 MHz) |
| US PCS band | 0-1199 (1930-1990 MHz) |
| Korean PCS band | 0-599 (1840-1870 MHz) |
| Japan CDMA band | 1-799, 801-1039, 1041-1199, 1201-1600 (832.0125-869.9875 MHz) |
| IMT-2000 band | 0-1199 (2110-2169.950 MHz) |
| NMT-450 band | 1-400, 472-871, 1039-1473, 1792-2016 (approx 420-494 MHz) |
| Secondary 800 band | 0-719, 720-919 (851-869, 935-940 MHz) |
| US PCS 1900 band | 0-1299 (1930-1995 MHz) |
| AWS band | 0-899 (2110-2155 MHz) |
| | |

Amplitude

| Output port control | User control of RF source routing to either the RF in/out port or the RF out only port |
|---------------------|--|
| Output level range | |
| RF in/out port | –115 dBm/1.23 MHz to –15 dBm/1.23 MHz |
| RF out only port | –115 dBm/1.23 MHz to –5 dBm/1.23 MHz |

Composite absolute output level accuracy

(< ±10 °C and < 24 hours from the last alignment,

-108 to -15 dBm/1.23 MHz)

RF in/out port $< \pm 1.0$ dB, typically ± 0.65 dB RF out only port $< \pm 1.0$ dB, typically ± 0.65 dB

Modulation

Residual EVM

| Waveforms | Spectrally correct IS-95, cdma2000 RC3, 1xEV-D0 waveforms |
|------------------------------------|---|
| Modulation quality Residual rho | Typically > 0.99 |

Typically < 3%

RF Analyzer

Frequency

Frequency range in ch annel numbers

US cellular band 1-799, 991-1023, 1024-1323 (815.04-848.97 MHz)

US PCS band 0-1199 (1850-1910 MHz)

Korean PCS band 0-599 (1750-1780 MHz)

Japan CDMA band 1-799, 801-1039, 1041-1199,

1201-1600

(887.0125-924.9875 MHz)

IMT-2000 band 0-1199 (1920-1979.950 MHz) NMT-450 band 1-400, 472-871, 1039-1473.

1792-2016 (approx 410-484 MHz)

Secondary 800 band 0-719, 720-919

(806-824, 896-901 MHz)

US PCS 1900 band 0-1299 (1850-1915 MHz)

AWS band 0-899 (1710-1755 MHz)

Amplitude

Input level range

Channel power -61 dBm/1.23 MHz to

+28 dBm/1.23 MHz

Peak input power —61 dBm/1.23 MHz to

+37 dBm/1.23 MHz

Self alignment validity $< \pm 10$ °C change and < 30 days

from last self alignment

Reverse Traffic Channel Suite

Triggering this measurement suite results in the capture of one block of samples from which is derived the channel power, occupied bandwidth, and Tx spurious emissions parameters.

Trigger setup

Sources External, immediate,

RF generator ARB

Channel power measurement

Measurement method Measures the total power in a

1.23 MHz bandwidth centered on the reverse channel center

frequency

Measurement interval 1.25 ms for cdma2000 or

1.67 ms for 1xEV-DO

Measurement range —61 dBm/1.23 MHz to

+28 dBm/1.23 MHz

Measurement accuracy

-61 to +28 dBm/1.23 MHz < $\pm 0.7 \text{ dB}$, typically < $\pm 0.2 \text{ dB}$

Measurement repeatability Typically $< \pm 0.05 dB$

Modulation quality measurement

Input frequency ranges Same as RF analyzer

Measurement chip rate 1.2288 Mcps

Measurement method IS-95 or cdma2000 RC1: single

code rho

Input level range Average power –25 to +37 dBm/

1.23 MHz

Modulation quality measurement range

(for signals with $< \pm 1$ kHz frequency error)

IS-95, RC1 0.40 to 1.00 rho

Measurement interval 1.042 ms (5 Walsh symbols)

Modulation quality measurement accuracy

IS-95, RC1 rho $< \pm 0.003 + \text{residual error for}$

0.8 < rho < 1.0

Modulation quality measurement residuals

rho > 0.999

Frequency error ±2 Hz plus timebase error

Measurement results rho, frequency error, phase error,

magnitude error, carrier

feedthrough

Occupied bandwidth

Measurement method

Measures the bandwidth that contains 99.0% of the total integrated power of the transmitted signal centered on the selected reverse channel +5 to +28 dBm/1.23 MHz

Input level range

±60 kHz for 99.0% total Measurement accuracy integrated power

Tx spurious emissions

Measurement method

Measures the active carrier power in a 1.23 MHz bandwidth, then measures the power in a 30 kHz bandwidth at two offsets above and below the active carrier and displays the ratio of the offset powers to the active carrier power in dBc

Input level range

+0 to +30 dBm/1.23 MHz

Measurement offsets

Frequencies < 1000 MHz Frequencies > 1000 MHz ±885 kHz, ±1.98 MHz ±1.25 MHz, ±1.98 MHz

Measurement bandwidth

Carrier Offsets 1.23 MHz flat channel filter

30 kHz synchronously tuned, five-pole filter with approximately

Gaussian shape

Measurement accuracy

±885 kHz, ±1.25 MHz ±1.98 MHz

 $< \pm 0.35$ dB, typically $< \pm 0.15$ dB $< \pm 0.6$ dB, typically $< \pm 0.25$ dB

Residual noise floor

±885 kHz, ±1.25 MHz ±1.98 MHz offsets

<-73 dBc/30 kHz BW < -75 dBc/30 kHz BW

Mobile pass/fail limits Auto mode

Frequencies < 1000 MHz

±885 kHz offsets -54 dBc/30 kHz for ±1.98 MHz offsets

-42 dBc/30 kHz for

Frequencies > 1000 MHz

-42 dBc/30 kHz for ±1.25 MHz offsets -50 dBc/30 kHz for ±1.98 MHz offsets

Manual mode

Settable from -10 to -65 dBc with 0.01 dB resolution

Dynamic Power Measurement

Measurement method

Captures a user-defined trace consisting of 5, 10, or 20 ms duration power steps with user-defined step size produced by a test mode in the device under test. Measures the total power in each step period in a 1.23 MHz bandwidth centered on the reverse channel center frequency

Input level range

Amplitude capture range

-61 to +28 dBm/1.23 MHz With 4 dB crest < ±2 dB of

expected power

Measurement accuracy¹ (within +2 to -45 dB of expected power) -61 to +28 dBm/1.23 MHz

 $< \pm 0.7$ dB, typically $< \pm 0.2$ dB

Measurement accuracy¹ (within 45 dB of expected power with < 48 hours warm-up before self alignment initiation)

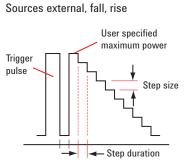
-59 to +28 dBm/1.23 MHz -65 to < -59 dBm/1.23 MHz

 $< \pm 0.7$ dB. typically $< \pm 0.3$ dB $< \pm 0.8$ dB, typically $< \pm 05$ dB

Measurement repeatability

Typically $< \pm 0.05 dB$ for returning to the same level and frequency with no temperature change and insignificant time change

Trigger setup



^{1.} Additional accuracy error when using RF OUT ONLY port is $< \pm 0.1$ dB.

Fast Device Tune Measurement

Measurement method

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 reverse link frequencies, and simultaneously tune its receiver to perform measurements (such as RSSI) of the test set's signal at various forward link

frequencies and power levels

Measurement range -65 dBm/1.23 MHz to

+28 dBm/1.23 MHz

Measurement interval 1.25 ms

Measurement filter 1.23 MHz brick wall

Step size range 5 to 20 ms

Trigger sources Immediate and RF rise

Output level setting (to be within 0.1 dB of the final power level)Amplitude switch< 1 ms, $typically < 250 \ \mu s$ Frequency switch< 1 ms, $typically < 500 \ \mu s$

within band

 $\textbf{Measurement accuracy}^{\textbf{1}}$ (within 45 dB of expected power with

< 48 hours warm-up before self alignment initiation)

-54 to +28 dBm/1.23 MHz $< \pm 0.75$ dB, typically $< \pm 0.3$ dB -61 to < -55 dBm/1.23 MHz $< \pm 0.85$ dB, typically $< \pm 0.3$ dB

RF source output level range

RF in/out port -115 dBm/1.23 MHz to

-15 dBm/1.23 MHz

RF out only port -115 dBm/1.23 MHz to

-5 dBm/1.23 MHz

Composite absolute output level accuracy ($< \pm 10$ °C and

< 24 hours from the last alignment, -108 to -15 dBm/1.23 MHz)

RF in/out port $< \pm 1.0 \text{ dB}$, $typically \pm 0.65 \text{ dB}$ RF out only port $< \pm 1.0 \text{ dB}$, $typically \pm 0.65 \text{ dB}$

RF output level settling < 1 ms to be within 0.1 dB of the

final value

^{1.} Additional accuracy error when using RF OUT ONLY port is $< \pm 0.1$ dB.

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