Agilent
E6835A TD-SCDMA Calibration Application

For the E6601A Wireless Communications Test Set

Data Sheet

The next generation of mobile phone manufacturing test.

The 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 E6835A TD-SCDMA Calibration Application is a non-signaling application optimized for TD-SCDMA user equipment calibration. The E6835A also provides a choice of perpetual, transportable, or term licenses for maximizing asset utilization and your cost per test.

Because it's Agilent, you can be confident—it operates using trusted, proven measurement methodology that ensures measurement integrity that is never compromised.

E6601A Features

- 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 time base
- 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

E6835A Features

Source modulation
- CW, AM, FM, DSB-SC source modulation
- TD-SCDMA source modulation

Power measurements
- Mean power
- Root-raised cosine (RRC) filtered mean power

Spectral measurements
- Adjacent channel leakage ratio (ACLR)
- Spectrum emission mask (SEM)
- Spectrum monitor

Modulation quality
- CW frequency error
- DPCH error vector magnitude (EVM)
- DPCH peak code domain error (PCDE)
- DPCH frequency error

Dynamic power measurement

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Technical Specifications

These specifications apply to an Agilent E6601A Wireless Communications Test Set mainframe and the E6835A TD-SCDMA Calibration Application firmware revision A.05 or higher. Only feature additions beyond the Agilent 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

Frequency range 380 to 2700 MHz

TD-SCDMA cellular bands 2010 to 2025 MHz

Output level

Output level ranges

RF IN/OUT port	–120 to –15 dBm/1.28 MHz
RF OUT ONLY port	–120 to –5 dBm/1.28 MHz

Composite signal absolute level accuracy

< ±10 °C and < 24 hours from last self alignment

RF IN/OUT port	
–108 to –28 dBm/1.28 MHz	< ±1 dB, *typically < ±0.45 dB*
–28 to –15 dBm/1.28 MHz	< ±1 dB, *typically < ±0.39 dB*
RF OUT ONLY port	
–108 to –28 dBm/1.28 MHz	< ±1 dB, *typically < ±0.45 dB*
–28 to –5 dBm/1.28 MHz	< ±1 dB, *typically < ±0.39 dB*

QPSK modulation

Residual EVM *Typically < 2.5% (rms)*

RF Analyzer

Frequency

Frequency range 380 to 2700 MHz

TD-SCDMA cellular bands 2010 to 2025 MHz

Input level ranges

Average power	–65 to +28 dBm/1.28 MHz
Peak power	–65 to +37 dBm/1.28 MHz (5 W)

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

DPCH Measurement Suite

Includes mean power, RRC filtered mean power, ACLR, EVM, frequency error, PCDE, and SEM measurements.

Trigger setup

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

Mean and RRC-filtered mean power measurements

Input level range

Average power –65 to +28 dBm/1.28 MHz

Measurement accuracy

–61 to +28 dBm/1.28 MHz < ±0.65 dB, *typically < ±0.3 dB*

With < 48 hours warm-up before self alignment initiated

–61 to +28 dBm/1.28 MHz < ±0.8 dB, *typically < ±0.3 dB*

Measurement repeatability *Typically < ±0.05 dB*

Filter

Mean power	Mean power-compliant filter
RRC-filtered mean power	1.28 MHz

Adjacent channel leakage ratio (ACLR) measurement

This measurement provides a ratio of the RRC filtered mean power centered on an adjacent channel to the RRC filtered mean power centered on the assigned channel frequency. The RRC filter has an RRC response with roll-off α = 0.22 and a bandwidth equal to the chip rate.

Input level range

Average power +5 to +28 dBm/1.28 MHz

Measurement accuracy

±1.6 MHz offsets at –33 dB	< ±0.8 dB, *typically < ±0.4 dB*
±3.2 MHz offsets at –43 dB	< ±0.8 dB, *typically < ±0.4 dB*

Residual noise floor

±1.6 MHz offsets	*Typically < –53 dBc*
±3.2 MHz offsets	*Typically < –63 dBc*

Filter 1.28 MHz (RRC)

Spectrum emission mask (SEM) measurement

This measurement provides the out of channel emission for the offset frequencies, which are between 0.8 and 4 MHz away from the UE carrier frequency. The out of channel emission is specified relative to the RRC filtered mean power of the UE carrier. The RRC filter has an RRC response with roll-off α = 0.22 and a bandwidth equal to the chip rate.

Input level range

Average power +5 to +28 dBm/1.28 MHz

Measurement accuracy ±(0.8 to 4.0) MHz < ±1.5 dB

Filter

In band	1.28 MHz (RRC)
0.8 to 2.4 MHz	30 kHz (Gaussian)
2.4 to 4.0 MHz	1 MHz (Gaussian)

Measurement results

Pass/fail, in-channel power (dBm/1.28 MHz), average power level relative to in-channel power for each offset range (dBc), the power level vectors relative to in-channel power for all points tested in each offset range, as well as the worst case results

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/1.28 MHz

UE ranges
EVM ≤ 20% rms
Frequency error < ±20 kHz
Timing error < ±25 chips

EVM measurement accuracy
(Includes residual EVM) < ±2.5% rms

Filter 1.28 MHz (RRC)

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

Frequency error measurement

This measurement measures the difference between the carrier frequency transmitted from the UE and the expected frequency. The UE uses the same frequency source for both RF frequency generation and the chip clock.

Input level range
Average power –25 to +28 dBm/1.28 MHz

UE ranges
EVM ≤ 20% rms
Frequency error < ±20 kHz
Timing error < ±25 chips

Measurement accuracy < (±10 Hz + timebase accuracy)

Filter 1.28 MHz (RRC)

Measurement results Frequency error

Peak code domain error (PCDE) measurement

This measurement is computed by projecting power of the error vector onto the code domain at a specific spreading factor. The code domain error for every code in the domain is defined as the ratio of the mean power of the projection onto that code, to the mean power of the composite reference waveform. This ratio is expressed in dB. The PCDE is defined as the maximum value for the code domain error for all codes.

Input level range
Average power –25 to +28 dBm/1.28 MHz

UE ranges
EVM ≤ 20% rms
Frequency error < ±20 kHz
Timing error < ±25 chips

Measurement accuracy < ±0.3 dB

Filter 1.28 MHz (RRC)

Measurement results Maximum value of CDE

Dynamic Power Measurement

This measurement provides a fast and flexible method for calibrating the power accuracy of a wireless device by providing multiple Tx power measurements at a single frequency. It tracks and reports the power result for each step. To take advantage of this measurement capability, the wireless device must have a test mode that outputs an appropriate power ramp at each frequency with the expected number of steps and dwell time at each step (step length).

Input level range
Average power –65 to +28 dBm/1.28 MHz

Amplitude capture range
With 7 dB crest factor < ±2 dB of expected power

Measurement accuracy[1]
+2 to –42 dB of expected power
–54 to +28 dBm/1.28 MHz < ±0.6 dB, *typically* < *±0.3 dB*
–61 to < –54 dBm/1.28 MHz < ±0.7 dB, *typically* < *±0.4 dB*
+2 to –42 dB of expected power
With < 48 hours warm-up before self alignment initiated
–54 to +28 dBm/1.28 MHz < ±0.7 dB, t*ypically* < *±0.3 dB*
–61 to < –54 dBm/1.28 MHz < ±0.8 dB, *typically* < *±0.4 dB*

Measurement repeatability *Typically* < *±0.05 dB*

Trigger setup
Sources External, fall, rise

Step Length and **Number of Steps** parameters are coupled to the setting of the **Filter**:

Filter	Step length (SL)	Number of steps
1 kHz	0.5 to 180 ms	1 to (1048000/(21973 x SL))
30 kHz	0.25 to 180 ms	1 to (1048000/(60e3 x SL))
100 kHz	0.1 to 20 ms	1 to (1048000/(250e3 x SL))
300 kHz	0.1 to 20 ms	1 to (1048000/(600e3 x SL))
640 kHz	0.1 to 20 ms	1 to (1048000/(1.28e6 x SL))
1.23 MHz	0.1 to 20 ms	1 to (1048000/(2.46e6 x SL))
1.28 MHz	0.1 to 20 ms	1 to (1048000/(2.56e6 x SL))
1.6 MHz	0.1 to 20 ms	1 to (1048000/(3.2e6 x SL))
3.84 MHz	0.1 to 20 ms	0.1 to (1048000/(7.68e6 x SL))
5.0 MHz	0.1 to 20 ms	0.1 to (1048000/(10e6 x SL))
8PSK estimated carrier power	0.575 to 20 ms	1 to 1047800/(1.0833e6 x SL)
GSM Tx power	0.1 to 20 ms	1 to (1048000/(320e3 x SL))
W-CDMA mean power)	0.1 to 20 ms	1 to (1048000/(5.25e6 x SL))

Measurement result
A graph displaying the discrete power at each power step along with numeric power results for each step

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

Remove all doubt

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