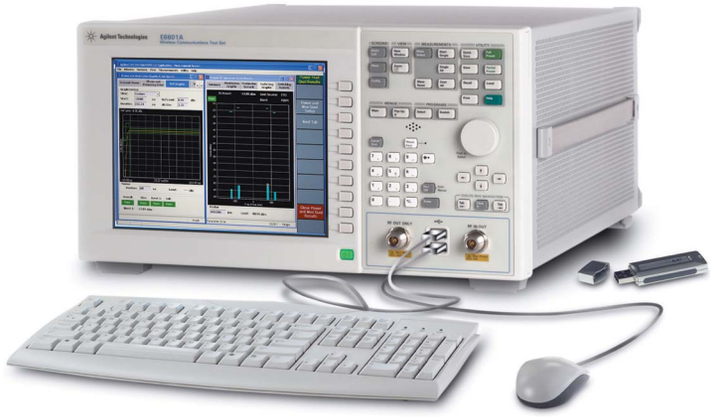
Agilent E6890A
General Purpose Application

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 E6890A General Purpose Application is a software application program for the Agilent E6601A. It provides general measurement capability in the E6601A manufacturing test. The E6890A General Purpose Application is required to run technology-specific calibration applications.

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
- QPSK EVM 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

Agilent Technologies

Technical Specifications

These specifications apply to an E6601A mainframe and the E6890A General Purpose Application firmware revision A.04 or higher. 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 unless otherwise noted. 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.

CW RF Generator

Frequency

Frequency range	380 to 2700 MHz
Accuracy	Same as timebase accuracy

CW output level

Output level ranges

RF IN/OUT	–130 to –13 dBm *typical over-range to –10 dBm*
RF OUT ONLY	–120 to –3 dBm *typical over-range to 0 dBm*

Absolute level accuracy
(≤ ±10 °C and ≤ 24 hours from last self alignment)

–108 to –13 dBm at RF IN/OUT	< ±1.0 dB, *typically < ±0.5 dBm*
–108 to –5 dBm at RF OUT ONLY	< ±1.0 dB, *typically < ±0.5 dBm*
Setting resolution	0.01 dB

Maximum applied reverse power

RF IN/OUT	< +37 dBm (5 W) peak
RF OUT ONLY	< +24 dBm (0.25 W) peak

Amplitude modulation

Modulation frequency range	100 Hz to 100 kHz
AM depth range	0 to 99.9%
AM accuracy	< ± 1.0% (20 kHz modulation frequency, 60% AM depth and –25 dBm output level)
Total harmonic distortion	< 0.5% (20 kHz modulation frequency, 60% AM depth and –25 dBm output level)

Frequency modulation

Modulation frequency range	10 Hz to 100 kHz
FM deviation range	0 to 100 kHz
FM deviation accuracy	< 3.5%
Total harmonic distortion	< 0.5%

Residual FM (0.3 - 3 kHz bandwith)

RF frequencies	< 1 GHz to 5 Hz rms
RF frequencies	2 to 2.2 GHz to 7 Hz rms
RF frequencies	> 2.2 GHz to 9 Hz rms

VSWR

RF IN/OUT

380 to 1000 MHz	< 1.15:1
1000 to 2000 MHz	< 1.2:1
2000 to 2200 MHz	< 1.3:1
2200 to 2700 MHz	< 1.35:1

RF OUT ONLY

380 to 1000 MHz	< 1.3:1 1000 to 2700 MHz< 1.5:1

Spectral purity

Harmonics
RF IN/OUT

–130 to –15 dBm, 400 to 2200 MHz	< –30 dBc

RF OUT ONLY

–120 to –5 dBm, 400 to 2200 MHz	< –30 dBc

Non-harmonic spurious
(< ±10 °C from last self alignment, 400 to 2200 MHz)

RF IN/OUT and RF OUT ONLY	< –40 dBc, *typically < –45 dBc*

RF Analyzer

Frequency ranges

Cellular bands	411 to 486 MHz 776 to 960 MHz 1574 to 1577 MHz 1710 to 1980 MHz
General purpose	400 to 2000 MHz

Input level ranges

Average power	–65 to +33 dBm, *typical over-range to +35 dBm*
Peak power	–65 to +37 dBm (5 W)

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

VSWR

RF IN/OUT

400 to 1000 MHz	< 1.15:1
1000 to 2000 MHz	< 1.2:1
2000 to 2200 MHz	< 1.3:1
2200 to 2600 MHz	< 1.35:1

Filters

1 kHz
30 kHz
100 kHz
300 kHz
640 kHz
1.23 MHz
1.6 MHz
3.84 MHz
5.0 MHz
GSM Tx power
W-CDMA mean power

Trigger setup

Arm	Single, continuous
Delay (varies by filter and measurement)	–180 to 180 ms
Sources (varies by measurement)	External, fall, immediate, rise

Measurement setup

Averaging (multi-measurement count–not applicable to all measurements)	Off, 1 to 999
Timeout	Off, 0.1 to 999.9 s

RF Channel Suite

Includes channel power, frequency error, power versus time, and IQ capture measurements.

Input level range

Average power	–65 to +35 dBm

Measurement interval and filter ranges

1 kHz filter	1 to 5000 ms
30 kHz filter	0.4 to 4000 ms
100 kHz filter	0.1 to 4000 ms
300 kHz filter	0.01 to 1700 ms
640 kHz filter	0.01 to 810 ms
1.23 MHz filter	0.01 to 420 ms
1.6 MHz filter	0.01 to 320 ms
3.84 MHz filter	0.01 to 135 ms
5.0 MHz filter	0.01 to 100 ms
GSM Tx power filter	0.01 to 199 ms
W-CDMA mean power filter	0.1 to 3200 ms

Channel power measurement

Measurement accuracy[1]

Within cellular frequency bands

–59 to +35 dBm	< ±0.6 dB, *typically < ±0.3 dB*
–65 to < –59 dBm	< ±0.7 dB, *typically < ±0.4 dB*

Within cellular frequency bands with < 48 hours warm-up before self alignment initiated

–59 to +35 dBm	< ±0.7 dB, *typically < ±0.3 dB*
–65 to < –59 dBm	< ±0.8 dB, *typically < ±0.4 dB*

400 to 2000 MHz

–59 to +35 dBm	*Typically < ±0.4 dB*
–65 to < –59 dBm	*Typically < ±0.6 dB*

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

Frequency error measurement

Measurement accuracy
CW signals from 400 to 2000 MHz

–60 to +35 dBm with 1, 30, 100, 300, 640 kHz GSM Tx power filters	< ±(50 Hz + timebase accuracy)
–40 to +35 dBm with 1.23, 3.84, 5.0 MHz W-CDMA mean power filters	< ±(50 Hz + timebase accuracy)

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

RF Channel Suite – continued

Power versus time measurement

This measurement is a graphical view of output power in the time domain. It is also useful as a zero-span spectrum analyzer.

Dynamic range (–15 dBm input signal)

With 1, 30, 100, 300, 640 kHz GSM Tx power filters	*Typically > 64 d*B
With 1.23, 3.84, 5.0 MHz W-CDMA mean power filters	Typically > 54 dB

IQ capture measurement

This measurement returns the IQ samples collected during the most recent RF channel suite measurements in either rectangular or polar format. The collected samples are provided as real/imaginary number pairs in rectangular format, or as magnitude/phase pairs in polar format.

Measurement results

IQ samples
Number of samples
Sample period

QPSK EVM measurement

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

Input level range

Average power	–25 to +28 dBm/3.48 MHz

UE ranges

EVM	≤ 25% rms
Frequency error	< ±10 kHz

Measurement accuracy (Includes residual results, measured for one slot (0.66666667 ms) measurement interval)

UE EVM 0% rms	< 2.5% rms
UE EVM 17.5% rms	< 0.7% rms
UE 25% rms	< 0.5% rms
Frequency error	< (±10 Hz + timebase accuracy)

Filter 5 MHz

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

Spectrum Monitor

Input level range

Average power	–65 to +35 dBm

Absolute level accuracy[1]

Within cellular frequency bands at expected frequency and level

–59 to +35 dBm	< ±0.6 dB, *typically < ±0.3 dB*
–65 to < –59 dBm	< ±0.7 dB, *typically < ±0.4 dB*

Within cellular frequency bands at expected frequency and level with < 48 hours warm-up before self alignment initiated

–59 to +35 dBm	< ±0.7 dB, *typically < ±0.3 dB*
–65 to < –59 dBm	< ±0.8 dB, *typically < ±0.4 dB*

380 to 2000 MHz at expected frequency and level

–59 to +35 dBm	*Typically < ±0.4 dB*
–65 to < –59 dBm	*Typically < ±0.6 dB*

Absolute level flatness *Typically < ±0.15 dB*

Spurious response *Typically < –65 dBc*

Signals ≥ –10 dBm excluding spurs that change with input attenuation but not with input level

Resolution bandwidth (RBW) 3 kHz to 5 MHz

Span RBW to 25 MHz

Amplitude scaling 0.1 to 20 dB/division

Markers

Number	0 to 5
Frequency	Absolute, relative
Amplitude	Absolute, relative

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

Internal OCXO Timebase

Output level range	*Typically 0 to +10 dBm*
Aging rate	< ±0.1 ppm/year
Temperature stability (referenced to +25 °C)	
–10 to +70 °C	< ±0.05 ppm
Accuracy	
After 30-minute warm-up	*±[time since last calibration x aging rate + temperature stability + accuracy of calibration]*
Initial adjustment	±0.05 ppm
Locking range	*Typically ±0.2 ppm*
Output frequency	10 MHz + locking range
Output impedance	*Typically 50 ohms*

Synchronization Inputs/Outputs

External reference input

Locking range	*Typically ±0.2 ppm*
Input frequency	1, 2, 5, or 10 MHz ± locking range
Input level range	*Typically 0 to +10 dBm*
Input impedance	*Typically 50 ohms*

Baseband triggers

Rear-panel input and/or output connections for format-dependent synchronization with external equipment.

Bi-directional	
DB9 connector	5 TTL triggers
Input	
BNC connector	1 TTL trigger input
Output	
BNC connector	1 TTL trigger output

General Specifications

Operating temperature range	+10 to +55 °C
Storage temperature range	–20 to +65 °C
Dimensions H x W x D	8.75 x 16.75 x 21 inches 222 x 426 x 533 mm
Weight	51 pounds 23.1 kg
AC power input	100 to 240 VAC, 50 to 60 Hz
AC power consumption	*Typically 260 W maximum*
Calibration interval	2 years
Self alignment conditions	
User alerted that automatic self re-alignment is required and can choose to align then or to ignore until later	> ±10 °C from last self alignment, or > 24 hours since last RF generator self alignment or > 30 days since last instrument self alignment
Self alignment times	
RF generator	*Typically < 1 minute*
Instrument and RF generator	*Typically < 5 minutes*
EMC	
Meets standards as listed	IEC 61326:2002 / EN 61326:1997 + A1:1998 + A2:2000 + A3:2003
Canada	ICES-001:2004
Australia and New Zealand	AS/NZS CISPR11:2002
Safety	
Meets standards as listed	IEC 61010-1:2001 / EN 61010-1:2001
Canada	CSA C22.2 No. 61010-1:2004
USA	UL 61010-1:2004
Radiated source leakage	
Within cellular frequency bands, at zero span with 10 Hz resolution bandwidth and one inch (2.54 cm) from instrument front panel and from front half of all sides of instrument surfaces	*Typically < 1 µV rms*
Remote programming	
GPIB	IEEE standard 488.2
LAN	1 RJ45 rear-panel connector
USB-B	1 rear-panel connector
External device connections	
USB-A	2 front-panel USB 1.1 4 rear-panel USB 2.0

Remove all doubt

Our repair and calibration services will get your equipment back to you, performing like new, when promised. You will get full value out of your Agilent equipment throughout its lifetime. Your equipment will be serviced by Agilent-trained technicians using the latest factory calibration procedures, automated repair diagnostics and genuine parts. You will always have the utmost confidence in your measurements.

Agilent offers a wide range of additional expert test and measurement services for your equipment, including initial start-up assistance onsite education and training, as well as design, system integration, and project management.

For more information on repair and calibration services, go to

www.agilent.com/find/removealldoubt

Agilent Email Updates

www.agilent.com/find/emailupdates
Get the latest information on the products and applications you select.

Agilent Direct

www.agilent.com/find/agilentdirect
Quickly choose and use your test equipment solutions with confidence.

Agilent Open

www.agilent.com/find/open
Agilent Open simplifies the process of connecting and programming test systems to help engineers design, validate and manufacture electronic products. Agilent offers open connectivity for a broad range of system-ready instruments, open industry software, PC-standard I/O and global support, which are combined to more easily integrate test system development.

www.agilent.com

For more information on Agilent Technologies' products, applications or services, please contact your local Agilent office. The complete list is available at:
www.agilent.com/find/contactus

Americas

Canada	877 894 4414
Latin America	305 269 7500
United States	800 829 4444

Asia Pacific

Australia	1 800 629 485
China	800 810 0189
Hong Kong	800 938 693
India	1 800 112 929
Japan	81 426 56 7832
Korea	080 769 0800
Malaysia	1 800 888 848
Singapore	1 800 375 8100
Taiwan	0800 047 866
Thailand	1 800 226 008

Europe & Middle East

Austria	0820 87 44 11
Belgium	32 (0) 2 404 93 40
Denmark	45 70 13 15 15
Finland	358 (0) 10 855 2100
France	0825 010 700* *0.125 € fixed network rates
Germany	01805 24 6333* *0.14€/minute
Ireland	1890 924 204
Israel	972 3 9288 504/544
Italy	39 02 92 60 8484
Netherlands	31 (0) 20 547 2111
Spain	34 (91) 631 3300
Sweden	0200-88 22 55
Switzerland (French)	41 (21) 8113811 (Opt 2)
Switzerland (German)	0800 80 53 53 (Opt 1)
United Kingdom	44 (0) 118 9276201

Other European Countries:
www.agilent.com/find/contactus

Revised: October 24, 2007

Printed in USA, December 6, 2007
5989-5291EN

Agilent Technologies