

will'tek

Willtek 4301 Mobile Service Tester



High accuracy in a powerful test instrument that is easy to use

Handoff capability from AMPS/NAMPS and vice versa

Other models available for CDMA2000 (1xRTT) and TDMA

Data management results can be printed, stored or managed on a PC

Free software updates available on the Internet

Simulates real network conditions for complete testing

The Willtek 4301 Mobile Service Tester is specially designed to meet the needs of service depots and repair sites that have to repair and align AMPS/NAMPS mobile phones. Customers can choose the appropriate model from the Willtek 4300 Series according to their format requirements, AMPS/NAMPS/CDMA2000/TDMA. The Willtek 4300 Series includes:

- 4301 Mobile Service Tester AMPS plus NAMPS
- 4302 Mobile Service Tester AMPS plus CDMA2000
- 4303 Mobile Service Tester AMPS, CDMA2000 plus PCS (1900 MHz)
- 4304 Mobile Service Tester AMPS plus TDMA and IS-136 basic software
- 4305 Mobile Service Tester AMPS plus TDMA, PCS (1900 MHz) and IS-136 basic software

Easy to operate

Each tester in the Willtek 4300 Series shares the same three main characteristics: accuracy, ease of handling and affordability. The 4304 Mobile Service Tester allows testing of AMPS, NAMPS mobile phones. Handoffs between both formats (AMPS and NAMPS) are standard.

Three powerful test modes

The 4301 offers QuickTest, AutoTest and Manual modes to enable easy repair and alignment of mobile phones.

The QuickTest mode provides a reliable Go/NoGo decision at the press of a button, while the equally easy-to-use AutoTest mode provides more intensive testing. In the Manual mode users can set all important conditions and parameters that occur in a real network, and measure and align mobile phones accordingly. All results are displayed on the screen when Manual mode is used.

To achieve even greater accuracy, an external reference oscillator can be connected. Measurement results can be printed via the parallel printer port and the powerful set of SCPI commands allows the Mobile Service Tester to be remotely controlled via GPIB or via RS-232-C interface.

As a member of the next generation of cellular test systems, the Mobile Service Tester is functional and fully compatible with the Willtek 3600 models. With firmware updates available on the Internet that can be easily downloaded and installed into the test system, the Willtek Mobile Service Tester is a valuable asset now and for the future.

AMPS/NAMPS measurements

- Analog BER
- SINAD
- Mobile TX power (MAC)
- Frequency error
- SAT, ST deviation
- SAT, ST frequency measurement
- ST duration
- DSAT, DST (NAMPS)
- Audio deviation
- Wideband deviation
- Residual deviation
- Receiver distortion
- Receiver sensitivity

AMPS Summary		Messages
Mobile Transmitter		Audio Setup
Power	29.2 dBm	RF Tests
Freq Error	0.12 kHz	SAT
SAT Deviation	1975 Hz	ST
SAT Frequency	5970 Hz	Wide Band Deviation
Audio Deviation	555 Hz	Audio Deviation
Mobile Receiver		Release
Rx Sinad	0.1 dB	
DC Power	0.0 W 0.00 V 0.00 A	
Pwr Level	2 Base Pwr -70.0	
Channel	330	
ST	0 ms	

Summary screen shows all critical TX and RX measurements.

AMPS RF Tests		Messages
Tx Power 29.1 dBm		Audio Setup
Tx Freq Error 0.12 kHz		Tx/Rx Audio
Tx Freq 834.900122 MHz		SAT
Rx Sinad 0.1 dB		ST
SAT: Detected		Wide Band Deviation
Pwr Level 2 Base Pwr -70.0		Audio Deviation
Channel 330		Summary
ST 0 ms		

RF test screen provides easy visual of critical parameters relative to test limits.

Signaling

Mobile registration
 MS call (mobile-originated)
 BS call (page mobile)
 MS release
 BS release
 Handoff
 Alert with info
 Flash with info
 Authentication
 SSD update
 MS hookflash with info
 Message waiting
 Message channel

Additional features

Mobile DTMF key check
 QuickTest
 AutoTest
 Manual operation mode

Specifications

Basic RF data

Input/output impedance	50 Ω
VSWR	< 1.30 (900 MHz)
RF input/output	TNC-type, female
Internal reference frequency	10 MHz
Temperature stability	0.2×10^{-6} (0°C to 50°C)
Aging	10^{-6} per year
External reference input	BNC-type, female
External reference frequency	10 MHz
Cal Out	TNC-type, female

System functions

AMPS/NAMPS

RF Generator (AMPS/NAMPS)

Frequency	
Range	869.040 MHz to 893.970 MHz 1930 MHz to 1990 MHz
Resolution	0.01 MHz (NAMPS)
Accuracy	same as reference frequency

Output level

Range	-23 dBm to -125 dBm
Resolution	0.1 dB
Accuracy	± 0.75 dB + 0.003 dB/dB (from -30 dBm to -120 dBm at 25°C) ± 2.0 dB + 0.003 dB/dB (from -30 dBm to -120 dBm at 10°C to 40°C)

Modulation

Type	Frequency modulation
Frequency range	50 Hz to 12 kHz
Deviation range	0 Hz to 12 kHz
Deviation accuracy	$\pm 5\%$ (from 300 Hz to 12 kHz + FM residuals)

RF Analyzer (AMPS/NAMPS)

Frequency

Range	824 MHz to 849 MHz
Resolution	0.01 MHz (NAMPS) 0.03 MHz (AMPS/TDMA)
Accuracy	± 10 Hz (plus accuracy of the reference frequency)

Level

Range	-20 dBm to +40 dBm
Resolution	0.1 dB
Accuracy	± 0.65 dB + 0.003 dB/dB (from +40 dBm to -20 dBm at 25°C) ± 1.2 dB (at 10°C to 40°C)

Frequency counter (RF) – (AMPS)

Range	± 30 kHz from channel frequency
Resolution	0.01 kHz
Accuracy	± 10 Hz (plus accuracy of the reference frequency)
Sensitivity	-20 dBm typical

Demodulation measurement

Type	Frequency modulation
Frequency range	50 Hz to 12 kHz
Deviation range	0 Hz to 21.585 kHz
Deviation accuracy	$\pm 5\%$ (from 300 Hz to 12 kHz rates + FM residual)
Residual FM and noise	< 50 Hz rms (0.3 to 3 kHz)

DEMODO output

Level	$1 V_{rms} = 8$ kHz deviation
Frequency	10 Hz to 50 kHz
Impedance (load)	> 600 Ω

SINAD

Range	45 dB (at 1 kHz, at $1 V_{rms}$ In to Audio In)
Accuracy	± 1 dB (for inputs 0.1 to $1.0 V_{rms}$)
Distortion	0.6% (at 1 kHz, at $1 V_{rms}$ In to Audio In)

Basic AF data

Audio In	BNC-type, female
Audio Out	BNC-type, female
DEMODO Out	BNC-type, female

AF Generator (AMPS/NAMPS)

Frequency

Range	1 Hz to 100 kHz
Resolution	1 Hz
Accuracy	same as reference frequency

Output level

Range	0 to 8.00 V _{rms}
Resolution	0.008 V _{rms}
Distortion (sine wave)	< 0.50% (for 20 Hz to 50 kHz, V _{out} < 7.50 V _{rms})

AF Analyzer (AMPS/NAMPS)

External audio input

Level range	0 to 5.115 V _{rms}
Frequency range	50 Hz to 50 kHz
Impedance	200 kΩ

Frequency counter (SAT, ST)

Range	±20 kHz
Resolution	0.001 kHz
Accuracy	±0.001 kHz + accuracy of the reference frequency

DC measurements

Input level	0 to 15 VDC
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Output level measurements

Voltage level	0 to 15 VDC
Resolution	0.1 V
Accuracy	±0.1 V + 1 Digit
Current	0 to 5 A
Resolution	0.1 A
Accuracy	±0.1 A + 1 Digit

General data

External interfaces computer/control

Serial interface	RS-232-C
Printer interface	Centronics (parallel), Epson/IBM compatible
GPIO	IEEE STD 488 port
Disk drive	1.44 MB, 3.5-in, PC compatible

Power requirements

Mains voltage range	85 to 264 VAC (max 5 A)
Mains voltage frequency	47 to 440 Hz

Environmental specifications

Storage temperature	-20°C to +70°C
Operating temperature	+10°C to +40°C
Storage humidity	10% to 90% (noncondensing)
Operating humidity	10% to 75% (noncondensing)

Physical specifications

Size (h x w x d)	8 x 17.5 x 20.5 in (203 x 445 x 521 mm)
Weight	43 lb (19.5 kg)

Ordering information

Willtek 4301 Mobile Service Tester AMPS (includes NAMPS)	M 104 301
Willtek 4302 Mobile Service Tester AMPS/CDMA2000	M 104 302
Willtek 4303 Mobile Service Tester AMPS/CDMA2000/PCS	M 104 303
Willtek 4304 Mobile Service Tester AMPS/TDMA including IS-136 basic software	M 104 304
Willtek 4305 Mobile Service Tester AMPS/TDMA/PCS including IS-136 basics software	M 104 305

Options

OSC1	M 248 962
Oven-controlled oscillator (0.05 ppm)	
Screen capture software	M 892 193

Upgrades

4301 to 4302	I-CDMA-OPT
AMPS only to AMPS/CDMA	
4302 to 4303	I-FEX-OPT
AMPS/CDMA to AMPS/CDMA/PCS	
4301 to 4304	I-TDMA-OPT
AMPS only to AMPS/TDMA	
4304 to 4305	I-FEX-OPT
AMPS/TDMA to AMPS/TDMA/PCS	

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Willtek Communications GmbH
85737 Ismaning
Germany
Tel: +49 (0) 89 996 41 - 0
Fax: +49 (0) 89 996 41 - 440
info@willtek.com

Willtek Communications Inc.
Indianapolis
USA
Tel: +1 317 595 2021
Tel: +1 866 willtek
Fax: +1 317 595 2023
willtek.us@willtek.com

Willtek Communications Ltd.
Chessington
United Kingdom
Tel: +44 (0) 20 8408 5720
Fax: +44 (0) 20 8397 6286
willtek.uk@willtek.com

