will'tek

Test and Measurement solutions for the wireless industry 2004

boosting wireless efficiency

History & Outlook

Willtek is a young company, but our products have been around for many years, marketed under a variety of brand names. Some of these products are so successful and renowned that they have become adopted as standard terms by the industry. Statements like "we are testing our phones on a Wavetek", or "we have always used STABILOCK" are commonplace. These brands are part of Willtek's proud heritage.

Willtek Communications traces its roots back to 1957, when a small group of engineers founded a business in southern Munich. The following year, the company was acquired by Schlumberger, and continued to develop ground-breaking products for 36 years. During this time, the company grew to become the market leader, introducing a host of innovative test instruments to the wireless industry. Thousands of STABILOCK® units, boasting a wide range of applications and technologies, have been sold all over the world. STABILOCK®, distributed under the Schlumberger name and later the Wavetek brand, is synonymous with high quality and exceptional reliability.

Schlumberger sold the enterprise to Wavetek in 1994, who merged it with its Indianapolis business unit, creating Wavetek Wireless Division.

Many successful products were introduced to the market during this period: the 3600D, widely used in mobile service centers in the US, and the 4100, the world's smallest GSM tester, to name just two. All our products share the same key characteristics: value for money, ease of use, upgradeability and reliability.

In 1998, Wavetek merged with Wandel & Goltermann in Germany to form WWG. Two years later, US-based Dynatech acquired WWG and united it with its subsidiary TTC, creating Acterna.

The Wireless Instruments division, which was a part of Acterna's wireless network segment, purchased Chase Communications (UK), a leader in air interface testing of wireless networks, in 2001. Many Chase Communications products, such as its GPR receiver, are industry standards, widely used for the deployment of GSM wireless networks. With the addition of Chase Communications, the company became a leading supplier of testing solutions for a variety of applications, including wireless device analysis, and air interface and base station checks.

In 2002, the business became Willtek, following a management buy-out completed in spring 2003, when Investcorp acquired a majority shareholding. This provided the financial stability Willtek needed to confidently plan for long-term growth.

Whether as an independent company or part of a larger organization, the business has maintained its focus on serving its customers. Willtek's recipe for success has stood the test of time:

- ongoing investment in research and development, building on many years' experience working with RF measurements and wireless protocols
- a team of experts committed to delivering complete test solutions tailored to its customers' business needs.

By consistently offering cutting-edge products and value-added services, Willtek Communications is a partner that customers can rely on to enhance their business performance and competitiveness.

Powerful instruments for world-class wireless solutions

From RF performance assessment to handset production testing, the world of wireless networks presents a tremendously complex challenge for operators and manufacturers. With different wireless standards and protocols, companies should only be prepared to invest resources in those test products that support the widest range of technologies and configuration options.

In this guide, we feature a comprehensive range of solutions that help operators, manufacturers and service establishments build on the core feature sets of our products without breaking their budgets or causing unnecessary delay or disruption.

This guide includes the most up-to-date technical specifications for each of our wireless products and solutions. For easier navigation, all the products have been categorised into an appropriate technology family.

At the time of publication all specifications listed in this guide represented an accurate portrayal of the Willtek portfolio. However, some specifications in this catalogue are listed in summary form. For more comprehensive specifications please contact our regional office or your local representative.

All products and specifications are subject to change or withdrawal without notice. We also reserve the right to amend specifications at any time without incurring any obligation to incorporate new features in instruments or parts previously sold.

Further information on product and applications, including press releases, shows we are attending, references and details of local representatives can be found on our web site at:

www.willtek.com

The Wireless Portfolio

9101 Handheld Spectrum Analyzer 10

The 9101 Handheld Spectrum Analyzer provides RF engineers and technicians with an accurate, low-cost, fully featured spectrum analyzer.

4100 Mobile Fault Finder Series 13

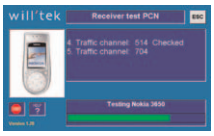
The Willtek 4100 GSM tester family provides a reliable analysis of the status of mobiles returned by customers in just a few seconds.

4200S Mobile Service Tester Series 14

Despite its low costs the 4200S is a GSM mobile phone service tester family designed for mid-level service.

4190 Utility Software 15

The Utility Software is intended for service centres who want to customise their test sequences to their own needs and requirements.



4192 Phone Checker Software 16

The Willtek Phone Checker Software is a PC-based software which controls products of the 4100 and 4200 series via a RS-232 interface.

4200R Mobile Service Tester 17

The 4200R is dedicated to GSM-R terminal testing, not only supporting the GSM-R frequency range, but also specific functionalities such as group calls.

4300 Mobile Service Tester Series 18

Designed for service and repair depots, the 4300 repairs and aligns AMPS, TDMA, CDMA mobile phones.

4350 Mobile Fault Finder Series 20

The 4350 Willtek Mobile Fault Finder provides a precise and affordable performance test set for AMPS, TDMA and CDMA.

4400 Mobile Phone Tester Series 22

The extremely accurate and fast 4400 tests GSM/GPRS, CDMA2000 and WCDMA mobile phones within high-volume manufacturing and service environments.

6800 Production Test System 24

Designed for high-speed testing and modularity, the 6800 provides simple tailoring to specific customer needs. With the database connection all results can be stored and analysed.

4920 RF Shield Box 25

This enclosure blocks interference and allows testing of GSM, AMPS, TDMA and CDMA mobile phones in a clean RF environment.

4910 Universal Antenna Coupler 25

With this device, users can verify different types and brands of phones with one tool.

8100 General Purpose Receiver 27

Its wide RF range and demodulation capability make this receiver a universal tool for in-field RF measurements.

8010 Hindsite™ RF Propagation Test Software 27

Hindsite™ is a data acquisition and presentation solution for RF propagation. It is designed for high-speed data capture and storage, supporting the analysis of fading and multipath situations. It can also indicate interference areas and detect coverage holes.

8300 Griffin Fast Measurement Receiver 28

Griffin is a high-speed measurement receiver for RF propagation measurements. Its measurement and channel change speed is so high that it can measure fading effects or occupancy on several channels simultaneously.

8050 HindsitePlus 29

HindsitePlus is a cost-effective drive test solution for wireless network analysis, monitoring and comparison. It includes a powerful MMI for real-time display of measurement data. It is ideal for troubleshooting over air problems with its fast, effective and precise RF measurement.

8501 GSM Air Interface Test Module 30

Test Mobile handset for GSM 900/1800 networks.

1205 RF Probe 20 dB 31

A universal contact probe for 0.1 to 4000 MHz. A special passive design avoids distortion and reduces the load. It is a small and handy tool for daily use.

Accessories 32

Technologies mapping

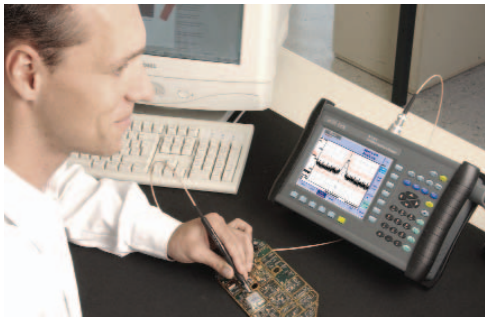
	GSM	GSM-R	GPRS/ HSCSD	EDGE	TDMA/ AMPS	CDMA	CDMA2000	1x-EVDO	W-CDMA/ UMTS	WLAN
9101 Handheld Spectrum Analyzer Series	x	x	x	x	x	x	x	x	x	x
4100 Mobile Fault Finder Series	x	x								
4200 Mobile Service Tester Series	x	x	x/–							
4300 Mobile Service Tester Series					x	x	x			
4350 Mobile Fault Finder Series					x	x	x			
4403 Mobile Phone Tester Series	x	x	x	x[1]		x	x		x[1]	
4405 Mobile Phone Tester Series	x	x	x	x[1]		x	x		x[1]	
6800 Production Test System	x		x			x	x			
4920 RF Shield Box	x	x	x	x		x	x	x	x	
4910 Universal Antenna Coupler	x	x	x	x		x	x	x	x	
8010 Hindsite RF Propagation Software	x	x	x	x		x	x	x	x	
8100 General Purpose Receiver Series	x	x	x	x		x	x	x	x	
8300 Griffin Fast Measurement Receiver Series	x	x	x	x		x	x	x	x	
8050 HindsitePlus	x		x							
8501 GSM Air Interface Test Module	x									
1205 RF Probe	x	x	x	x	x	x	x	x	x	x

[1] Available 2004

Applications mapping

	R&D Quality Design	Manufacturing	Service POS	Network Maintenance	Network Deployment
9101 Handheld Spectrum Analyzer Series	x	x	x	x	
4100 Mobile Fault Finder Series			x		
4200 Mobile Service Tester Series			x		
4300 Mobile Service Tester Series	x		x		
4350 Mobile Fault Finder Series			x		
4403 Mobile Phone Tester Series	x	x	(x)		
4405 Mobile Phone Tester Series	x	x	(x)		
6800 Production Test System		x			
4920 RF Shield Box	x	x	x		
4910 Universal Antenna Coupler	x		x		
8010 Hindsite RF Propagation Software					x
8100 General Purpose Receiver Series					x
8300 Griffin Fast Measurement Receiver Series					x
8501 GSM Air Interface Test Module	x			x	
8050 HindsitePlus				x	
1205 RF Probe	x	x	x		

Analysing spectrum



Excellent for a variety of applications including mobile communication workshops, R&D, Wireless LAN, wireless local loop, TV, handset repair and maintenance, wireless applications and much more.

Willtek 9101 Handheld Spectrum Analyzer

Highlights

- The specifications of a bench lab instrument equipped in a handheld.
- Excellent performance at a competitive price.
- Software updates are available on the Internet.
- Frequency range up to 4 GHz covers new requirements in wireless systems.
- Large colour display with VGA resolution provides excellent viewing.
- Small footprint of only 0.5 square foot fits anywhere on a busy workbench.
- AC or battery powered with up to 2 hours life provides portability between benches or to remote sites.
- Remote control via RS-232 and Ethernet reduces automatic test costs.
- Off-line evaluation of trace data with 91xx Data Exchange Software.

Applications

The range of applications comprises general purpose usage in R&D labs, repair and alignment of mobile phones in service shops as well as the installation and maintenance of base stations.

Specifications

Specifications valid after 30 minutes warm-up time at ambient temperature, specified environmental conditions and frequency measurement range, within a period of one year after calibration.

Frequency

Frequency range

Measurement range	100 kHz to 4 GHz
Resolution	1 kHz
Frequency accuracy (Sweep time ≤ 1s)	2 x 10^{-6}

Reference frequency

Temperature stability	< 2 x 10^{-6}
Aging	< 2 x 10^{-6}/year

Frequency span

Setting range	0 Hz, 100 kHz to 4000 MHz
Frequency accuracy	2 x 10^{-6}

Sweep time

Span ≥ 100 kHz	1 ms to 20 s
Span = 0 Hz	1 ms to 100 s

Resolution bandwidth (RBW)

RBW selection	manual or automatic
RBW (–3 dB) range	10 kHz to 1 MHz
Steps	1, 3, 10

Video bandwidth (VBW)

VBW selection	manual or automatic
VBW (–3 dB) range	100 Hz to 300 kHz
Steps	1, 3, 10

SSB noise

f = 2 GHz, Df = 100 kHz	< –80 dBc/Hz

Amplitude

Maximum safe DC Voltage at RF in	±50 V
Maximum safe input power	27 dBm
Display units	dBm, dBµV, dBmV, dBV

Measurement range

averaged noise floor to 27 dBm

Displayed average noise level (DANL)

(RBW = 10 kHz, Attenuator = 0 dB)

1 MHz to 3600 MHz	< –105 dBm
> 3600 MHz	< –100 dBm

Input attenuator

User-defined by direct entry or step keys. 0 dB only selectable by direct entry to protect the first mixer.

Setting range	(0) 10 to 50 dB
Attenuator steps	10 dB

Dynamic range

Range	> 65 dB
Max. measurable input level (attenuation = 50 dB)	20 dBm
Min. measurable input level	–105 dBm

Level accuracy

(Input Attenuator = 10 dB, ambient temperature from +20°C to +26°C)

10 to 3600 MHz	±1 dB

VSWR RF input

(input attenuation = 10 dB)

1 to 3600 MHz	< 1.8

Reference level

Reference level setting by keyboard entry or step keys

Setting range	–100 dBm to 27 dBm
Resolution	0.1 dB

Spurious response

Image rejection (f = 1 GHz)	> 80 dB
Spurious level (attenuation = 0 dB)	< –70 dBm
LO breakthrough (attenuation = 10 dB)	< –80 dBm
Intermodulation-free range (input level –26 dBm, f_1 = 990 MHz, f_2 = 992 MHz)	> 75 dB

Functions

Detector & Sweep

Detector types	pos./neg. peak, max., min., sample
Sweep processing	actual, average, max. hold, min. hold

Trace

Max. displayed traces	2
Trace points	2 x 500[1]
Trace functions	A, B
A-Curve	colour selectable (default is black)
B-Curve	colour selectable (default is blue)

Marker

Max. markers	4
Delta markers	3
Marker functions	max. peak, next peak
Transfer functions	M → centre frequency M → ref. level M → f step

Limit check

Max. no. of limit templates	16
Limit functions	upper, lower, upper and lower
Max. no. of limit segments	30

Power measurement

Max. no. of channel systems	32
Measurement functions	Channel Power, ACPR, OBW
Default systems	GSM, WCDMA, WLAN, Bluetooth

Demodulation

Min. input level	–50 dBm
AM/FM	on marker/permanent

Keyboard

Key type	silicon click
Parameters shortcut keys	Freq, Span, Level
Quick setting keys	Preset, Rcl

[1] Two independent traces are available (min. hold, max. hold at the same time)

Connectors

RF in

Connector	type N (female)
Impedance	50 Ω

Ext. Trigger

Connector	BNC (female)
Input level	LVTTL/LVCMOS 0 to 3V

DC in

Connector	2.5 mm dia. barrel jack socket
Max. current	3 A

Serial interface

For software updates and remote control

Connector	DB-9 (male)
Speed	57.6 kbps
Required cable	null modem cable

LAN (TCP/IP)

For software updates and remote control

Connector	RJ-45
Speed	10 Mbps

General

Display (TFT)	Size 6.5"
Resolution	640 x 480
Colours	256
Brightness	300 cd
Measurement result points	2 x 500[1]

Power supply

DC voltage, external	11 V to 15 V/max. 28 W
Internal battery	Li-Ion
Operating time, battery fully charged	
Standard battery (M 205 011)	max. 1.1 h
High-capacity battery (M 205 012)	max. 2.2 h

Memory

Type	Flash Disk
Capacity (set-ups and traces)	100

Dimensions (W x H x D)	355 x 190 x 85 [mm]

Weight

With standard battery	2.5 kg (5 lbs)
Power supply only	0.32 kg (0.7 lbs)

Environmental conditions (unless otherwise specified)	MIL-PRF28800F class 2
Operating temperature	0 to +45°C
Storage temperature	–10 to +50°C
Rel. humidity (non-condensing)	80%

Accessories

1205 RF Probe 20 dB

Frequency range	100 kHz to 4 GHz
RF attenuation (nominal at 50 Ω)	20 dB
RF loading effects	500 Ω ±10%
Capacity	< 1 pF at 1 MHz
Max. DC voltage	50 V
Cable length	1 meter
Connector	BNC (male)

Ordering details

9101 Handheld Spectrum Analyzer incl. 91xx Data Exchange Software, standard battery and AC power supply (100 to 240 V/50 to 60 Hz)	M 100 401

Accessories

1205 RF Probe 20 dB including adapter N (male), BNC (female)	M 248 640
Adapter N (male) to TNC (female)	M 886 098
Adapter N (male) to BNC (female)	M 886 097
Standard battery for 9101	M 205 011
High-capacity battery for 9101	M 205 012
Soft carrying bag for 9101	M 241 013
Null modem cable	M 860 388
12 V car adapter	M 860 389
Antenna 900 MHz (TNC)	M 860 261
Antenna 1800/1900 MHz (TNC)	M 860 262
Antenna 2400 MHz (TNC)	M 860 146
Safety lock	M 867 037
9190 Demo Signal Generator	M 248 633

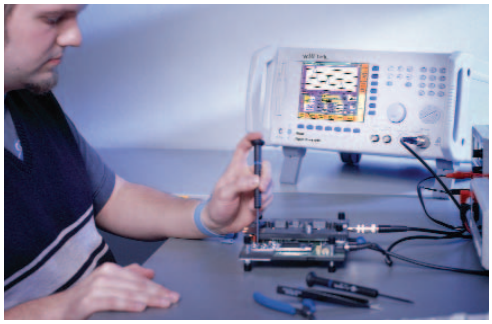
Related products

4201S Mobile Service Tester	M 101 301
4403 Mobile Phone Tester	M 101 105

Tracking Generator	Option planned for Q3/04

Testing wireless devices – increasing productivity & yield

The most comprehensive line of mobile phone testers available in the market.



Retail customer Go/NoGo check units – for faster and easier service

Despite tremendous engineering, mobile phones do not always perform as customers expect. They return them to the outlet where they bought the unit and ask for help. Determining if the problem is the phone, a set-up or configuration issue or due to a network or coverage difficulty can be costly when margins are continually squeezed.

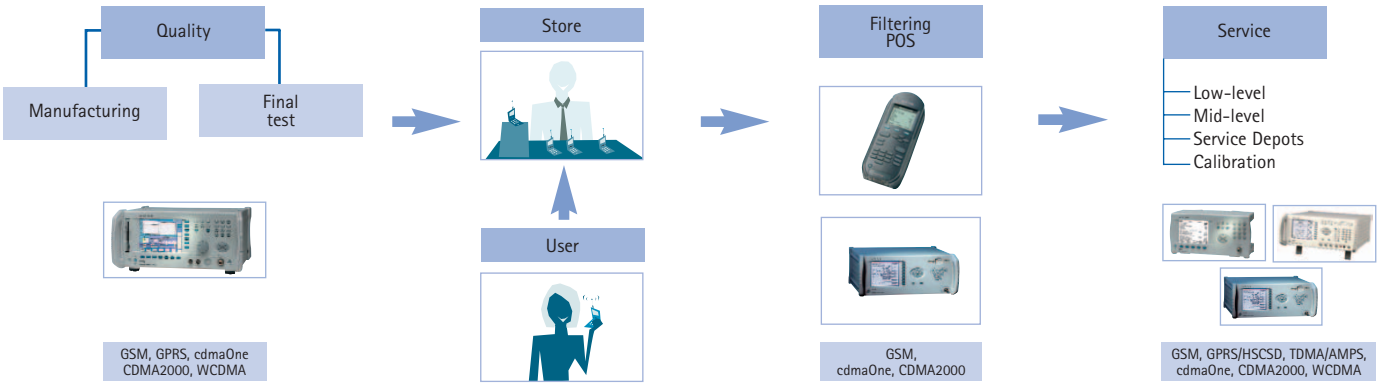
Service and repair workshops – improving turnaround

Running a busy service shop is a high pressure job. Phones arrive constantly, customers complain about delays, spare parts do not arrive on time, not to mention the administrative and financial efforts involved. Technically you need service equipment that is flexible for all types of phones, manufacturer approved and easy to operate for new staff.

Manufacturing

Fast testing with turnkey measurement systems linked to assembly lines are crucial for modern mobile phone manufacturing. Willtek has engineered their products to meet the demands of module and final testing with flexibility, accuracy and intelligent testing to reduce test times.

The mobile chain



Willtek 4100 Mobile Fault Finder Series

Highlights

- Smallest GSM Tester.
- Typically 2 keypresses to start testing.
- Dual-/triple-band capability.
- Easy to use: multiple language user interface in English, German, French and Italian.
- Different models (4107 and 4107S) to suit special user groups.
- Software updates available on the Internet.

Applications

The 4100 Series is the ideal test set for Point-of-Sale (POS) applications. Together with the 4192 Phone Checker Software it enables unskilled personnel to distinguish good phones from defective phones. The 4910 Universal Antenna Coupler allows versatile connection to different phones having various RF connectors or none at all.

Specifications

Basic RF data

Input/output impedance	50 Ω
VSWR	< 1.3
RF input / output	TNC-type, female

RF Signal Generator

Frequency range

GSM 900, E-GSM 900, GSM-R	
935 to 960 MHz	(Channel 1 to 124)
925 to 935 MHz	(Channel 975 to 1023, 0)
921 to 925 MHz	(Channel 955 to 974)
GSM 1800	
1805 to 1880 MHz	(Channel 512 to 885)[a]
GSM 1900	
1930 to 1990 MHz	(Channel 512 to 810)[b]
Frequency error	< 1 ppm
Output power level range	
(GSM 900/E-GSM)	–45 to –110 dBm
(GSM 1800/1900, dual band)	–50 to –110 dBm
Output power level accuracy	< 1.5 dB
	< 1.0 dB (S-version)

TX Measurement RF power measurement (burst)

Frequency range

GSM 900, E-GSM 900, GSM-R	
890 to 915 MHz	(Channel 1 to 124)
880 to 890 MHz	(Channel 975 to 1023, 0)
876 to 880 MHz	(Channel 955 to 974)
GSM 1800	
1710 to 1785 MHz	(Channel 512 to 885)[a]
GSM 1900	
1850 to 1910 MHz	(Channel 512 to 810)[b]

Frequency error

Measurement range	±5 kHz off carrier
Measurement accuracy	
GSM 900	< 25 Hz
GSM 1800/1900	< 50 Hz

Power level measurement

Input power level range	–10 to +45 dBm
Input power level accuracy	< 1.5 dB
	(–10 to +39 dBm)

Power/time template

Dynamic range	> 40 dB

Phase error

Measurement range	1.5° to 20° rms
Measurement accuracy	
GSM 900	< 1.5° rms
GSM 1800/1900	< 2.0° rms

Signalling capabilities

Location update
Mobile-originated/terminated call
Intracell handover
Cross-band handover
Call clearing by MS/Tester
Closed/open loop procedure

General data

Serial interface	D-Sub 25, female
	4800, 9600, 19200, 38400 Baud
Printer interface	D-Sub 25, female
Mains voltage range	100 to 250 VAC
Mains voltage frequency	50 to 60 Hz
Power consumption	15 Watts
Size	250 x 110 x 95 mm
Weight	1.5 kg

Standard delivery Willtek 4100 Series

Operating Manual	M 290 012
Test SIM	M 860 188
Power supply	M 860 105
RF connecting cable	M 860 409

Ordering details

Willtek 4107	M 101 207
Willtek 4107S	M 101 217

Special accessories (extract)

Universal Antenna Coupler	M 248 330
RF Shield Box (TNC)	M 248 340
RF Shield Package (TNC)	
(Antenna Coupler + RF Shield)	M 248 399
RF cable (TNC-TNC)	M 382 190
Antenna 900 MHz	M 860 261
Antenna 1800/1900 MHz	M 860 262
Utility Software for 4100 and 4200	M 897 110
4100 Universal adapter cable for printer + PC	M 384 877
4100 RS-232 cable (2.5 m)	M 384 875
4100 Centronics cable (2.5 m)	M 384 876

To obtain an RF adapter for specific models of mobile phones, please contact a Willtek office or your local representative for a detailed ordering information sheet.

[a] GSM 1800 usable every even channel

[b] GSM 1900 usable every odd channel

Willtek 4200S Mobile Service Tester Series

Highlights

- GPRS available.
- GSM 850.
- High sensitivity (–40 dBm).
- Built-in AM Signal Generator.
- The user interface supports English, German, French, Italian, Portuguese and Chinese languages ensuring ease of use wherever it is deployed.
- Two different models (4201S and 4202S) are offered to meet the needs of different user groups.
- Remote control and built-in AUTOTEST.
- Software updates are available on the Internet.

Applications

The 4200S is the ideal instrument for Service Applications, both for alignment of mobile phones, as well as for final tests. There are many useful options available to make the 4200S a versatile instrument. For example networking via PC, printout via PC, AM Signal Generator, etc. GPRS is even available as an upgrade to older units.

Specifications

Basic RF data

Input/output impedance	50 Ω
VSWR	< 1.3
RF input/output	N-type, female
External ref. input	BNC-type, female
	5/10/13 MHz

RF generator

Frequency range

GSM 900, E-GSM	
935 to 960 MHz	(Channel 1 to 124)
925 to 935 MHz	(Channel 975 to 1023, 0)
GSM 1800	
1805 to 1880 MHz	(Channel 512 to 885)
GSM 1900	
1930 to 1990 MHz	(Channel 512 to 810)
GSM 850 (optional)	
869 to 894 MHz	(Channel 128 to 251)
Reference frequency accuracy	
(without external reference oscillator)	< 10^{-6}
Output level range	
GSM 900	–38 to –117 dBm
GSM 1800/1900	–44 to –117 dBm
Output level accuracy	
For levels –110 to +38 dBm	< 0.9 dB

RF analyzer

Frequency range

GSM 900, E-GSM	
890 to 915 MHz	(Channel 1 to 124)
880 to 890 MHz	(Channel 975 to 1023, 0)
GSM 1800	
1710 to 1785 MHz	(Channel 512 to 885)
GSM 1900	
1850 to 1910 MHz	(Channel 512 to 810)
GSM 850 (option)	
824 to 849 MHz	(Channel 128 to 251)

Frequency error measurement

Measurement range	±10 kHz off carrier
Usable range	±45 kHz
Measurement accuracy	
GSM 850/900	< 15 Hz
GSM 1800/1900	< 25 Hz

Power level measurement

Measurement range

Burst mode	–20 to +39 dBm
CW mode	–20 to +33 dBm
Async mode	–40 to +39 dBm
Measurement accuracy	< 0.9 dB

Dynamic range

Power/time template	> 40 dB
I/Q alignment mask	> 60 dB

Phase error measurement

Measurement range	1.5° to 20° rms
Measurement accuracy	
GSM 900	< 0.8° rms
GSM 1800/1900	< 1.4° rms
Timing advance accuracy	1/4 Bit

Signalling capabilities

Location Update
Mobile-originated/terminated call
Intracell handover
Cross-band handover
Call clearing by MS/Tester
Closed/open loop procedure
SMS mobile-terminated/originated (4202S)
Data call (9.6 kbps)
GPRS Attach/Detach (GPRS option)
Uplink/Downlink TBF (GPRS option)

General data

Serial interface	D-Sub 9, female
	4800, 9600, 19200, 38400 Baud
Printer interface	D-Sub 25, female
Mains voltage range	100 to 250 VAC
Mains voltage frequency	50 to 60 Hz
Power consumption	17 Watts
Size	310 x 170 x 165 mm
Weight	2.4 kg

Standard delivery Willtek 4200S

Operating manual	M 290 013
Test SIM	M 860 188
RF connecting cable	M 860 407
Power cable	M 860 606
Centronics cable	M 860 378
RS-232 cable	M 860 379

Ordering details

Willtek 4201S	M 101 301
Willtek 4202S	M 101 302
4201S AM Signal Generator package (incl. Option)	M 101 351
4202S AM Signal Generator package (incl. Option)	M 101 352

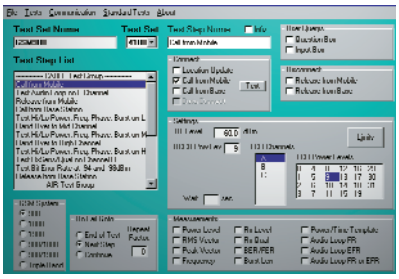
General options

Detuning Option	M 248 505
Result Upload Option	M 897 136
GSM 850 Option	M 248 418
4274 DC Option Upgrade	M 248 410
External Battery Kit (8 Ah)	M 205 014
Standard battery (4 Ah)	M 205 011
Standard battery (8 Ah)	M 205 012

4202S options

GPRS Go/NoGo Option	M 897 185
GPRS Measurement Option	M 897 186

Willtek 4190 Utility Software



Highlights

- Intuitive-to-use Software to create individual AUTOTESTs.
- Supports all features of 4100, 4200S and even 4202R series.
- Performs consistency check of test sequences before loading them onto the test set.

Applications

The Willtek 4190 Utility Software is intended for service centres who want to customise their test sequences to their own needs and requirements. It is a PC-based software which allows writing of AUTOTEST sequences for the 4100 and 4200S series of mobile phone testers. The software does not need any programming skills, since it requires the user only to click on the tests or signalling sequences that need to be performed.

The program distinguishes different product features supported by 4100 or 4200S; but also options, like GPRS Go/NoGo or GPRS measurement, which can be purchased for the 4202S.

Before downloading the AUTOTEST to the product the Utility Software performs a sanity check to ensure that the sequence follows certain rules, e.g. that a call is established before doing a test.

Specifications

Signalling

Location update
Call from mobile
Call from base station
Release from mobile
Release from base station
RF level of tester

RF power level of MS	(BCCH/TCH)
Channel change	(up to three channels per test)

Signalling delay for channel change

Systems supported

850, 900, 1800, 1900, 850/1900, 900/1800, 900/1900, 900/1800/1900

Implemented tests

Power level
Peak vector error
RMS vector error
Frequency error
Burst length
RX level
RX qual
Power/time template
BER/FER
(up to eight different levels, incl. tolerances)
Audio loop
(incl. notification text and PASS/FAIL entry, FR/EFR)
Entry of test limits for all tests

Additional features
Dialog box
(question/input)"On-Fail-Goto" function
Repeat factor

Connection
4100 requires serial adapter cable
(RS-232 cable) or universal adapter cable
4200S requires standard serial cable
(RS-232 cable)

System requirements

PC 486 and above, Windows 3.1x®, Windows 95®, Windows 98® or Windows 2000®, 4 MB RAM, 5MB hard disk space, mouse serial port, VGA or monochrome monitor with a minimum resolution of 800 x 600 pixels

Serial interface
COM 1 to COM 4, 4800, 9600, 19200, 38400 Baud

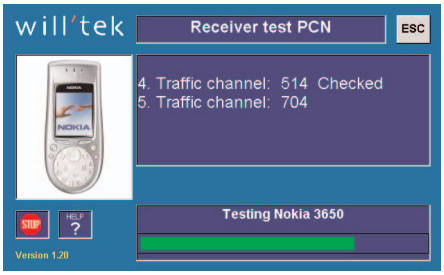
Ordering details

Willtek 4190 Utility Software	M 897 110
Willtek 4107 Mobile Service Tester	M 101 207
Willtek 4107S Mobile Service Tester	M 101 217
Willtek 4201S Mobile Service Tester	M 101 301
Willtek 4202S Mobile Service Tester	M 101 302
Willtek 4202R Mobile Service Tester	M 101 308

Special accessories (extract)

4100 Universal adapter cable for printers + PC	M 384 877
4100 RS-232 cable (2.5 m)	M 384 875
4200S RS-232 cable (2.5 m)	M 860 379

Willtek 4192 Phone Checker Software



Highlights

- Automatically detects different types of phones and does all the proper settings for testing.
- Provides a simple Pass/Fail verdict at the end of the sequence.
- Regular updates are provided on the Internet to keep pace with new phones introduced to the market.

Applications

The Willtek 4192 Phone Checker Software is a PC-based software which controls products of the 4100 and 4200S series via a RS-232 interface. The software is very intuitive and easy to use. The software recognises phones automatically, displays a picture of the phone and sets the attenuation values accordingly.

The typical application for the 4192 Phone Checker Software is the point-of-sale environment, where people with little knowledge of phone testing are enabled to perform a fully fledged test. This will help manufacturers as well as operators to reduce the rate of returned phones without errors found.

Ordering details

GSM 4192 Phone Checker Software	M 897 132
Willtek 4107L Phone Checker Package	M 190 203
Willtek 4107S Mobile Service Tester	M 101 217
Willtek 4201S Mobile Service Tester	M 101 301
Willtek 4202S Mobile Service Tester	M 101 302

Special accessories (extract)

4100 Universal adapter cable for printers + PC	M 384 877
4100 RS-232 cable (2.5 m)	M 384 875
4200S RS-232 cable (2.5 m)	M 860 379

Willtek 4202R Mobile Service Tester

Highlights

- GSM-R frequency range.
- Voice Group Call Service (VGCS).
- Emergency call based on VGCS.
- Group ID, Call priority.
- Mobility increased, with the option to the battery powered.

Applications

The 4202R is specifically tailored to railway applications. The 4202R can be used during installation of cab radios, as well as for repair and final test of GSM-R terminals. The 4202R can optionally be battery-powered so that it is truly mobile which simplifies the use on an engine.

These features enable railway organisations not only to test their GSM-R terminals, but also allow the verification of important peripherals, such as indicator lights or horns for incoming emergency calls.

Specifications

Specifications, which are different to the standard 4200S Series are highlighted.

RF generator

Frequency range

GSM 900, E-GSM, GSM-R	
935 to 960 MHz	(Channel 1 to 124)
925 to 935 MHz	(Channel 975 to 1023, 0)
921 to 925 MHz	(Channel 955 to 974)
GSM 1800	
1805 to 1880 MHz	(Channel 512 to 885)
GSM 1900	
1930 to 1990 MHz	(Channel 512 to 810)
GSM 850 (optional)	
869 to 894 MHz	(Channel 128 to 251)

RF analyzer

GSM 900, E-GSM, GSM-R	
890 to 915 MHz	(Channel 1 to 124)
880 to 890 MHz	(Channel 975 to 1023, 0)
876 to 880 MHz	(Channel 955 to 974)
GSM 1800	
1710 to 1785 MHz	(Channel 512 to 885)
GSM 1900	
1850 to 1910 MHz	(Channel 512 to 810)
GSM 850 (optional)	
824 to 849 MHz	(Channel 128 to 251)

Signalling capabilities

VGCS call from MS
VGCS call from BS
VGCS call clearing from BS
User-to-User signalling for proper clearing of emergency call (status message)
Call Priority (parameter)
Group ID (parameter)
Transmission of 1 kHz tone for VGCS call from BS for verification of functionality

Ordering details

Willtek 4202R	M 101 308

Standard delivery Willtek 4202R

Operating Manual	M 290 013
RF cable N-TNC	M 382 189
Power cable	M 860 606
SIM Card GSM-R	M 860 174
RS-232 cable	M 860 379

General options

Upgrade 4201S to 4202R	M 248 646
Upgrade 4202S to 4202R	M 248 647
GPRS Go/NoGo Option	M 897 185
GPRS Measurement Option	M 897 186
Result Upload Option	M 897 136
GSM 850 Option	M 248 418
4274 DC Option Upgrade	M 248 410
External Battery Kit (8 Ah)	M 205 014
Standard battery (4 Ah)	M 205 011
Standard battery (8 Ah)	M 205 012

Willtek 4300 Mobile Service Tester Series

Highlights

- Extensive graphical analysis.
- Choice of Manual, QuickTest or AUTOTEST Modes.
- An easy-to-use testing instrument that requires minimal training.

Applications

The 4300 is the ideal instrument for service applications, both for alignment of mobile phones, as well as for final tests. The easy-to-use interface provides a solution for the manual service bench, while the one-button AUTOTEST is ideal for the final test station.

The 4300 is an ideal and powerful test solution for testing AMPS, NAMPS, TDMA, CDMA IS-95, and CDMA2000 terminals. The 4300 provides excellent performance at a competitive price.

The unit is available in five models to meet the needs of different user groups:

4301 – AMPS/NAMPS

4302 – AMPS/NAMPS/CDMA2000 at US-800

4303 – AMPS/NAMPS/CDMA2000 at US-800/US PCS/Korean PCS

4304 – AMPS/NAMPS/TDMA at US-800

4305 – AMPS/NAMPS/TDMA at US-800/ US PCS/Korean PCS

Specifications

Basic RF data

Input/output impedance	50 Ω
VSWR	< 1.30 (900 MHz) < 1.80 (1900 MHz)
RF input/output	TNC-type, female
Internal reference frequency	10 MHz
Temperature stability	0.2 x 10^{-6}

AMPS/NAMPS (4301, 4302, 4303, 4304, 4305)

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

Measurements

Mobile TX power (MAC)
Frequency error
SAT, ST deviation
Audio deviation
Wideband deviation
SAT, ST frequency
ST duration
DSAT, DST deviation (NAMPS)
SINAD
Receiver sensitivity
Receiver distortion
Analog BER
DC Voltage and Current

RF generator

Frequency range	869 MHz to 894 MHz
Accuracy	same as reference frequency
Output level	
Range	–23 dBm to –125 dBm
Accuracy	±0.75 dB ±0.003 dB/dB
Modulation	
Frequency range	50 Hz to 12 kHz
Deviation range	0 Hz to 12 kHz
Deviation accuracy	±5%

RF analyzer

Frequency Range	824 MHz to 849 MHz
Accuracy	±10 Hz (plus accuracy of the reference frequency)

Level

Range	–20 dBm to +40 dBm
Accuracy	±0.65 dB ±0.003 dB/dB

Frequency counter (RF)

Range	±30 kHz from channel frequency
Accuracy	±10 Hz (plus accuracy of the reference frequency)
Sensitivity	–20 dBm typica

Demodulation measurement

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

Frequency counter (SAT, ST)

Range	±20 kHz
Accuracy	±0.001 kHz (plus accuracy of the reference frequency)

CDMA (4302, 4303) Signalling

Mobile registration

MS call (mobile-originated)
BS call (page mobile)
MS release
BS release
Handoffs – Intraband hard handoff
Interband hard handoff
Handoff to AMPS/NAMPS
Sector (softer) handoff
Alert with info
Flash with info
Authentication
SSD update
Message waiting

Radio Configuration Combinations

Forward RC1 & Reverse RC1
Forward RC2 & Reverse RC2
Forward RC3 & Reverse RC3
Forward RC4 & Reverse RC3
Forward RC5 & Reverse RC4

Service options – 1, 2, 3, 9,17,55,32,32768
Speech encoding – loopback, canned speech, silent, normal, audio tones, audio chirp

Transmitter measurements

Average power
Maximum power
Minimum power
Gated output power
Open loop power accuracy
Time response of open loop power control
Access probe power
Standby power
Closed loop power

Composite (multicode) waveform quality (rho)
Channel frequency error
Timing error
Code domain power (graphical and data)
Code domain time and phase offsets (data only)
Carrier feedthrough
RMS error vector magnitude
Peak error vector magnitude

RMS magnitude error
Peak magnitude
RMS phase error
Peak phase error
I/Q imbalance

Receiver measurements
Frame Error Rate (FER)
Receiver sensitivity
Receiver dynamic range
Demodulation with AWGN
Mobile reported FER

RF generator

Frequency

Cellular	869 to 894 MHz (4302, 4303)
US PCS	1930 to 1990 MHz (4303)
Korean PCS	1805 to 1870 MHz (4303)
Accuracy	same as reference frequency

Amplitude

Level	–23 dBm to –125 dBm
Accuracy	±0.75 dB ±0.003 dB/dB below –30 dBm at +25°C, from –30 to –120 dBm

AWGN

Code channels	
Sector A	– F–PICH,F–SYNC,F–QPCH,F–FCH, F–SCH,F–OCNS
Sector B	– F–PICH,F–FCH,F–OCNS

RF analyzer

Frequency

Cellular	824 to 849 MHz (4302, 4303)
US PCS	1850 to 1910 MHz (4303)
Korean PCS	1715 to 1780 MHz (4303)
Accuracy	±10 Hz relative to frequency reference

Power range

Max. input	+40 dBm
Measurement range	–60 dBm to +40 dBm
Accuracy	±0.65 dB +0.003 dB/dB at +25°C

Waveform quality rho

Range	0.90 to 1.0
Accuracy	±0.003
Timing measurement accuracy	±60 ns

TDMA (4304/4305)

Signalling
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
Short message system
Message waiting
Message channel

Transmitter Measurements

Peak magnitude error
RMS phase error
PEAK phase error
Origin offset
EVM normalised over 10 bursts
Mobile TX power (MAC)
Frequency error
Time alignment
Acquisition time
Forward R0 (requires VSELP)
Reverse R0 (requires VSELP)
Average MS power
Maximum MS power (Peak)
Fading simulation
Burst power/timing display
Constellation display
I/Q tuning spectrum display

Receiver measurements

Receiver sensitivity
Digital BER
BER reporting (MAHO BER)
RSSI binary/nominal (dB)
MAHO RSSI binary/nominal (dB)
2nd carrier RSSI

RF generator (TDMA)

Frequency

Range	869.040 MHz to 893.970 MHz (4304/05) 1930 MHz to 1990 MHz (4305)
Accuracy	same as reference frequency

Output level

Range	–23 dBm to –125 dBm
Accuracy	±0.75 dB +0.003 dB/dB (from –30 dBm to –120 dBm at +25°C)

RF analyzer (TDMA)

Frequency

Range	824 MHz to 849 MHz (4304/05) 1850 MHz to 1910 MHz (4305)
Accuracy	2 Hz (plus accuracy of the reference frequency)

Level

Range	–60 dBm to +40 dBm
Accuracy	±0.65 dB +0.003 dB/dB (from +40 dBm to –20 dBm at +25°C)

General data

Serial interface	RS-232
Printer interface Centronics (parallel), Epson/IBM compatible	
GPIB IEEE STD 488 port	
Disk drive	1.44 MB, 3.5 inch, PC compatible
Mains voltage range	85 to 264 VAC (max. 5 A)
Size	(h x w x d) 8 x 17.5 x 20.5 inch (203 x 445 x 521 mm)
Weight	43 lb (19.5 kg)

Standard delivery

430x, TNC to TNC Cable, Printer Cable, RS-232 Cable, TNC(M)-SMA(F) Adaptor, TNC(M)-N(F) Adaptor, Power Cord, Getting Started Guide, User Guide (CD)

Ordering details

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 basic software	M 104 305

Options

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

Upgrades

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

Willtek 4350 Mobile Fault Finder Series

Highlights

- Easy-to-use test operation and animated graphical user interface.
- Complete summary screens.
- Stores setting of up to 20 mobile phones and 10 independent networks.
- Custom tests and specification tables for testing flexibility.
- Performs the same complete in-depth mobile phone test as service technicians.
- Easy data management, results can be printed, stored or managed on a PC.
- Convenient, free firmware updates available on the Internet or via e-mail.

Applications

The 4350 Series is the ideal test set for POS applications. Together with the remote control software, it enables unskilled personnel to distinguish good phones from defective phones. The 4910 Universal Antenna Coupler allows versatile connection to different phones having various RF connectors or none at all.

Dependable filter test system for AMPS, NAMPS, CDMA IS-95, CDMA2000 and TDMA terminal testing at point of sales and service organisations.

The unit is available in five models to meet the needs of different user groups:

4351 – Mobile Fault Finder AMPS, NAMPS

4352 – Mobile Fault Finder AMPS, NAMPS, CDMA2000 (US-800)

4353 – Mobile Fault Finder AMPS, NAMPS, CDMA2000, PCS (US-800/US PCS/Korean PCS)

4354 – Mobile Fault Finder AMPS, NAMPS, TDMA (US-800)

4355 – Mobile Fault Finder AMPS, NAMPS, TDMA, PCS (US-800/US PCS/Korean PCS)

Specifications

Timer-based, power up, power down, zone, distance, ordered, implicit (origination), parameter change

Reverse link close loop power control modes

Active
Alternating
All up
All down

CDMA2000 call processing functions

Registration
Base station origination
Base station release
Mobile origination
Mobile release
Other: authentication, message waiting, caller ID
Intraband hard handoff
Interband hard handoff
Handoff to AMPS/NAMPS
Sector (softer) handoff
Speech encoding: loopback, canned speech, silent, normal
Audio tones, audio chirp

CDMA service options

Support for RC 1-5
SO1-9.6 kbps voice echo
SO2-9.6 kbps data loopback
SO3-9.6 kbps EVRC voice
SO9-14.4 kbps data loopback
SO17-14.4 kbps voice echo
SO55-RC 3, 4 and 5 data loopback
SO32-test data service option
SO32768-14.4 kbps voice echo

CDMA signal generator

Frequency

Cellular	864 to 894 MHz (MST4302,4303)
US PCS	1930 to 1990 MHz (MST4303)
Korean PCS	1805 to 1870 MHz (MST4303)
Resolution	10 kHz
Accuracy	same as OCXO time base

Amplitude

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

CDMA analyzer

Frequency

Cellular	824 to 849 MHz (MST4302,4303)
US PCS	1850 to 1910 MHz (MST4303)
Korean PCS	1715 to 1780 MHz(MST4303)
Resolution	10 kHz
Accuracy	±10 Hz relative to OCXO time base

Power range

Max. input	+40 dBm
Measurement range	–60 dBm to +40 dBm
Accuracy	±0.65 dB +0.003 dB/dB at +25°C ±1.2 dB +10°C to +40°C

Waveform quality rho

Range	0.90 to 1.0
Accuracy	0.003
Timing measurement accuracy	60 ns

External CDMA signals interface

Inputs 10 MHz reference, even second clock
Outputs even second clock chip x 16, chip x 8, chip x 4, chip, PN clock, 20 ms, 80 ms, 1.25 ms

Basic RF data

Input/output impedance	50 Ω
VSWR	< 1.30 (900 MHz) < 1.80 (1900 MHz)
RF input/output	TNC-type, female
Internal reference frequency	10 MHz
Temperature stability	0.2 x 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

AWGN

Range	+5 to –10 dB relative to CDMA channel power
Resolution	0.1 dB
Accuracy	±1 dB

CDMA modulation

Type	QPSK
Residual rho	> 0.97
Carrier feedthrough	< –30 dBc

CDMA channels

Sector A	
F-Pilot	Walsh code 0
F-Sync	Walsh code 32
F-Paging	Walsh code 1
F-QPCH	Walsh code 80
F-FCH	selectable Walsh codes 2-64
F-OCNS	fixed to upper three Walsh codes
Sector B (utilised in softer handoff)	
F-Pilot	Walsh code 0
F-FCH	selectable Walsh codes 2-63
F-OCNS	fixed to Walsh Code 64

Protocols supported

IS-95A
IS-98D
IS-2000 P_REV6
JSTD-008
TSB74

CDMA2000 transmitter measurements

Average power
Access probe power
Maximum power
Minimum power
Closed loop power
Gated output power
Composite (multicode) waveform quality (rho)
Code domain power (graphical and data)
Code domain time and phase offsets (data only)
Open loop power accuracy
Time response of open loop power control

CDMA2000 receiver measurements

Frame Error Rate (FER)
Receiver sensitivity
Receiver dynamic range
Demodulation with AWGN
Mobile reported FER
Mobile reported pilot strength

CDMA base station emulation functions (protocol)

Base station parameters

NID, SID, MCC, MNC, F-QPCH state, F-PCH relative level and reverse link traffic pilot gain

Access parameters

Nominal power, initial power, power step, probe steps, response sequences, request sequences, preamble length, timeout

RF generator

Frequency

Range	869.040 MHz to 893.970 MHz 1930.050 MHz to 1989.990 MHz
Resolution	0.01 MHz (NAMPS) 0.03 MHz (AMPS/TDMA)
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 (AMPS)

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

Modulation (TDMA)

Type	$\pi/4$ DQPSK $\alpha = 0.35$
RMS vector error	6%

RF analyzer

Frequency (AMPS)

Range	824.040 MHz to 848.970 MHz
Resolution	0.01 MHz (NAMPS) 0.03 MHz (AMPS/TDMA)
Accuracy	10 Hz (plus accuracy of the reference frequency)

Frequency (TDMA)

Range	824.040 MHz to 848.970 MHz (within ±500 Hz from channel center) 1850.050 MHz to 1909.990 MHz (within ±500 Hz from channel center)
Resolution	1 Hz (within ±500 Hz from channel center)
Accuracy	2 Hz (plus accuracy of the reference frequency)

Level (AMPS)

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)

Level (TDMA)

Range	–60 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 (AMPS)

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

Demodulation measurement (TDMA)

Measurement samples	157 symbols (max.)
Burst timing range	+5, –20 symbols relative to standard offset burst timing
Accuracy	5 µs (1/8 symbol)
EVM accuracy	0.4% ±2% of reading
Residual EVM	< 2.8% (typical)
Residual phase error	< 1.6° (typical)
Residual magnitude error	< 1.0° (typical)
I/Q origin offset accuracy	0.5 dB for –40 dBc (typical)

SINAD (AMPS)

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)

Frequency counter (SAT, ST)

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

General specifications

External interfaces computer/control

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)	178 x 495 x 419 mm (7 x 19.5 x 16.5 in)
Weight	16.8 kg (37 lb)

Ordering details

Willtek 4351 Mobile Fault Finder AMPS (Cellular 800 MHz only)	M 104 351
Willtek 4352 Mobile Fault Finder-1x AMPS/CDMA/CDMA2000 1xRTT (Cellular 800 MHz only)	M 104 352
Willtek 4353 Mobile Fault Finder-1x AMPS/CDMA/CDMA2000 1xRTT/PCS (800, 1900 MHz)	M 104 353
Willtek 4354 Mobile Fault Finder AMPS/TDMA (Cellular 800 MHz only)	M 104 354
Willtek 4355 Mobile Fault Finder AMPS/TDMA/PCS (800, 1900 MHz)	M 104 355

Willtek 4400 Mobile Phone Tester Series

Highlights

- Multistandard platform (GSM, HSCSD, GPRS, CDMA2000, WCDMA).
- Adaptable to individual needs with options that include Audio, Codecs, MS Power Supply and MS Current Measurement.
- Network capabilities allow for downloading of Software Updates, file handling and even remote control via a network. Standard SCPI commands for remote control.
- Built-in RAPID! for stand-alone automated procedures, allowing the user to easily develop and run programs on the 440x.
- Multi-DSP platform supports parallel testing of TX, RX and Audio-Driver software available for Test-Stand and LabWindows CVI.

Applications

Production

The 4400 is the ideal instrument for the production environment. It is one of the most accurate and quickest instruments on the market, helping to improve the yield of the production output.

A Turbo option is available, doubling the measurement speed on certain spectrum and power measurements (GSM power staircase). The combination with the test environment from Saab makes it the fastest instrument on the market.

High Level Service

Today many Service Centres operate more like manufacturing facilities, which require very high accuracy and measurement speed, making the 4400 the ideal instrument. Many useful options are available to improve service technicians performance.
For examples: alignment screen, automatic testing using the Rapid! environment.

Specifications

Basic RF data

Two independent synthesizers for RX and TX measurements

Frequency range	430 to 500 MHz[1] 800 to 1000 MHz 1700 to 2300 MHz[2]
VSWR	1.15[3], 1.2

Frequency base – TCXO

Temperature characteristic	1 x 10^{-6} max.

Frequency base – OCXO Option

Temperature characteristic	5 x 10^{-8} max.
Aging characteristic	1 x 10^{-7} max./year (after 30 operating days)

System functions

GSM/GPRS Option

Supported GSM bands	
GSM 850	(channel 128 to 251)
R-GSM, E-GSM, P-GSM	(ch. 955 to 974, 975 to 1023, 0, 1 to 124)
GSM 1800	(channel 512 to 885)
GSM 1900	(channel 512 to 810)

RF generator

Level range	–120 dBm to –10 dBm
Level accuracy	0,7 dB[4] + typ. 0.3 dB

RF analyzer

Peak power level range	–10 dBm to +36 dBm
Usable down to	–30 dBm
Peak level uncertainty	0.37 dB[5] typ. 0.15 dB

Supported measurements

Phase- and frequency error measurement
Power measurements
Power/time template
Timing advance
Modulation spectrum
Adjacent Channel Power Meter (ACPM/ORFS) due to modulation and due to switching transients

[1] Only available with CDMA2000 Option
[2] limited to 2000 MHz with GSM
[3] if 3RX signal < –32dBm and TX Signal > 10 dBm available
[4] 4403: 0.9 dB, typ 0.4 dB
[5] 4403: 0.8 dB

GSM Call Processing

Supported procedures	location update mobile-originated call mobile-terminated call intracell handover cross-band intracell handover call clearing by MS call clearing by 4400 open loop, closed loop procedures early or late assignment SMS to mobile (idle mode) SMS to mobile (on TCH/FS) SMS from mobile (idle mode)
Special functions	call state diagram paging test reduced signalling MS information display

GPRS Call Processing (additional specifications for GSM/GPRS Option)

Time slot selection	automatic, according to multislot class
Supported procedures	GPRS attach/detach routing area update downlink TBF establishment uplink TBF establishment (using ETSI-defined GPRS test mode command) reduced signalling
Uplink data modes according to GSM 04.14	Modes (a)
Uplink power control method	closed loop

GPRS transmitter measurements (additional specifications for GPRS Option)

Supported number of time slots	transmitter measurements: 1 through 4

GSM receiver measurements

Supported measurements	Bit Error Rate (BER) Residual Bit Error Rate (RBER) Fast Bit Error Rate (FBER, C loop) Frame Erasure Rate (FER)

GPRS receiver measurements (additional specifications for GPRS Option)

Displayed results	minimum, maximum, average BLER/BER
Coding scheme	CS-1
Data	PRBS (PN-9, PN-15, PN-23)
BLER-BCS measurement	
BLER-USF measurement	

Loopback in the 4400

Speech loopback	full rate, enhanced full rate
Data loopback	9.6 kBps, transparent data 14.4 kBps, transparent data

CDMA2000 features

Supported CDMA2000 bands	
Band 0 – US Cellular	(channel 1 to 1023)
Band 1 – PCS Band	(channel 1 to 1199)
Band 2 – TACS Band	(ch. 1 to 1000, 1329 – 2047)
Band 3 – JTACS Band	(ch. 1 to 799, 801 to 1039, 1041 to 1199, 1201 to 1600)
Band 4 – Korean PCS	(channel 1 to 599)
Band 5 – NMT-450	(ch. 1 to 300, 1039 to 1473, 1792 to 2016)
Band 6 – IMT-2000	(channel 1 to 1199)
Band 8 – 1800 MHz	(channel 1 to 1499)
Band 9 – 900 MHz	(channel 1 to 699)
Radio configuration combinations	
	Forward RC1 & Reverse RC1
	Forward RC2 & Reverse RC2
	Forward RC3 & Reverse RC3
	Forward RC4 & Reverse RC3
	Forward RC5 & Reverse RC4

RF generator

Level range (AWGN Off)	–120 dBm to –15 dBm
Level range (AWGN On)	–120 dBm to –17 dBm
Level accuracy (AWGN Off)	±0.9 dB, typ. ±0.6 dB*
Code channels	
Sector A – F-PICH,F-SYNC,F-QPCH,F-FCH,F-SCH, F-OCNS	
Sector B – F-PICH,F-FCH,F-OCNS	
AWGN generator	

*4403 ±1.4 dB

RF analyzer

Power meter

Level range	–70 dBm to 36 dBm
Level accuracy	(–10 dBm to 36 dBm) ±0.5 dB*
	(–60 dBm to –10 dBm) ±0.6 dB
	(–70 dBm to –60 dBm) ±0.7 dB

*4403 < ±1.2 dB

Modulation analyzer for CDMA2000

Level range	–30 dBm to 36dBm

CDMA2000 transmitter measurements

Power measurements	
	minimum/maximum RF power
	open loop power (level and timing)
	gated output power
	access probe power
	closed loop power (min./max. only)
	standby power
Modulation quality measurements	
	rho
	frequency error
	rms vector error
	time offset
	amplitude imbalance
	code domain power (graphical and data)
	code channel time offset
	code channel phase
	adjacent channel power
	modulation spectrum analyzer

CDMA2000 call processing

	mobile-originated call
	mobile-terminated call
	intracell handover
	cross-band handover
	call clearing by MS
	call clearing by 4400
	special functions call state diagram

CDMA2000 receiver measurements

	receiver performance sensitivity, dynamic range (Frame Error Rate)
	demodulator performance
	demodulation of forward traffic with AWGN
	mobile reported FER, pilot strength

GPIB features

Standard	IEEE-488.2
	conforming to SCPI standards
	secondary addressing not required

RAPID! Application Programming Environment

RAPID! = Run Application Programs with Integrated Development environment.

RAPID!	a programming language (a modern structured BASIC dialect)
	a programming environment
Input/output control from RAPID! Programs	
	GPIB
	RS-232
	parallel port (printer)
	floppy and hard disk access
	screen (text-based)
	keyboard, incl. barcode reader support
Other programming features	
	direct access to SCPI command set, to control the 4403/4405 and collect measurement results for postprocessing
	information hiding (program files can be protected against reading by the user)
Functions of built-in programming environment	
	file manager
	editor (multiple files)
	runtime I/O screen
	debug screen, display of variables contents

General data

Control interfaces	IEEE 488.2 (GPIB)
	Centronics (for printing)
	keyboard (with national keyboard drivers)
	mouse
	RS-232 (access through RAPID!)
Main power supply	94 to 132 VAC
	187 to 264 VAC
H x W x L	180 x 360 x 330 mm
Weight	10.5 kg (without options)
Delivery includes	mains cable
	Getting started manual (M 293 013)
	User's guide CD ROM (M 297 011)
	Calibration Report

Ordering details

Willtek 4405 Mobile Phone Tester	M 101 104
Willtek 4403 Mobile Phone Tester	M 101 105

System Options

GSM System Option	M 897 161
GPRS Option	M 897 159
GSM/GPRS System Option	M 897 162
Multislot HSCSD Option	M 897 158
CDMA2000 System Option	M 248 663

General Options

OCXO	M 214 028
Audio Option	M 248 360
MS Power Supply Option	M 248 355
MS Current Option	M 248 356
Network Option	M 248 632
Carrying case	M 300 808
Universal Antenna Coupler (UAC)	M 248 330
RF Shield Box (N)	M 248 342
RF package (N) (UAC + RF Shield)	M 248 343
Rack mount set	M 378 260

GSM/GPRS-specific Options

Turbo Option	M 248 359
ACPM (ORFS) Option	M 897 163
AM Signal Generator Option	M 897 165
RAPID! service tests for 4400-GSM	M 897 160
Basic codec Option	M 248 364
Codec Extension Option	M 897 156
Test SIM card	M 860 188
4400-GSM user´s guide	M 290 011
4400-GPRS user´s guide	M 293 016

CDMA2000-specific Options

4400 CDMA2000 user's guide	M 292 010

Willtek's customer support teams develop application software and hardware around the listed products, providing customers with complete solutions.

The specifications refer to the Willtek 4405 Mobile Phone Tester. If you need details about the 4403 Mobile Phone Tester please get in contact with us.

Willtek 6800 Production Test System

Highlights

- Designed for high-speed testing like event-driven test, parallel RX/TX test, sample testing, statistical testing.
- Modular system with easy tailoring.
- Universal test system for wide test application field.
- Connection to database and production control system with result store and analysis.
- Detailed development and easy-to-use runtime environment.
- Rapid adaptation of new phone models.

Applications

Production needs to test mobile phones both quickly and efficiently. Lowered production test times, together with accurate measurements, can be achieved with our 6800 Production Test System. This can be easily integrated into new or existing production line systems. The result is an increase in speed, higher accuracy and extended flexibility as test systems mature for extra features and new models.

With our full technical support, the Willtek 6800 Production Test System enables customised test solutions to enhance design, quality, manufacturing and repair departments.

Ordering details

6801 Production Test Software Runtime	M 897 195
6802 Production Test Software Development	M 897 196
6803 Production Test Package	M 897 197
6810 Log Database and Analyser Software	M 897 198

Willtek 4920 RF Shield Box

Highlights

- High RF isolation of external interfering signals.
- Large interior area covers all mobile phone types and models.
- Quick and easy open and close; no additional lock needed for testing.
- Opening angle of nearly 90° allows comfortable and quick access to phone.
- Replaceable rear panel for additional connectors such as control signals (RS-232, USB) and power supply.
- Special absorbers inside reduce signal reflection and avoids standing waves.
- Lock available, to prevent box from opening during transport.
- RF Shield Audio Option eliminates human error during audio check and speeds throughput due to automated audio test.
- Reduces costs of factory return.

Applications

As a tool for mobile phone service, Willtek's 4920 RF Shield Box isolates the mobile phone under test from interfering signals emitted by base stations or the workbench adjacent. A high shielding ensures accurate results and leads to precise Pass/Fail decisions. The ergonomic design allows a quick replacement of mobile phones.

Specifications

Shielding factor	800 to 1000 MHz > 60 dB
	1700 to 2200 MHz > 70 dB
Reflected power of Pyramidial Absorber	
	–8 dB at 900 MHz
	–18 dB at 2000 MHz

Connectors

External	TNC
Internal	RF Click

Mechanical

External dimensions (L x W x H)	
	405 x 260 x 200 mm
Weight	3.8 kg

Ordering details

4920 RF Shield Box (TNC) incl. RF cable, 150 cm (TNC-TNC) fits 410x, 43x0	M 248 340
4920 RF Shield Box (N) incl. RF cable, 150 cm (N-TNC) fits 420x, 440x	M 248 342
4923 RF Shield Box Audio Option incl. audio cabling for the 4400	M 248 420

Willtek 4910 Universal Antenna Coupler

Highlights

- Universal Antenna Coupler for all mobile phone types.
- Fits all Willtek radio test sets.
- Fast filter testing of mobile phones (Go/NoGo).
- Functional check of mobile phones post repair.
- Caters for all GSM frequency bands (900/1800/1900) and other standards (e.g. CDMA, TDMA, etc.).
- Mobile phone clamp fits all standard phones.
- No wear out of connectors and adapters.
- Test includes mobile phone antenna.

Applications

Willtek's 4910 Universal Antenna Coupler is the ideal accessory for testing mobile phones for retailers, in service, at manufacturing or in R&D. It provides a coupling technique that is almost as precise as direct cable-based testing.

All standard phones fit on this coupler and eliminate multiple RF adapters. A quick and easy placing on the phone avoids the fiddling with tiny connectors on the mobile. Tests using the coupler also check the mobile phone antenna performance.

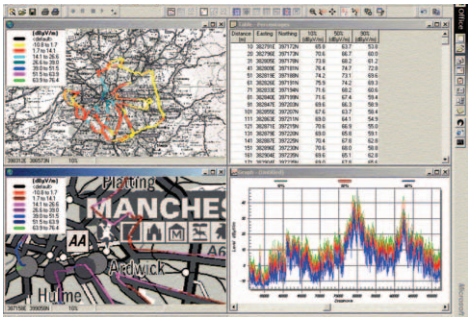
Specifications

Coupling factors typlically	
Cellular band	8 dB
PCN/PCS band	17 dB
Mechanical	
Dimension (w/o clamp)	290 x 180 x 21 mm
Weight	0.7 kg

Ordering details

4910 Universal Antenna Coupler	M 248 330

Testing the Air interface – deploying new technologies



Network planning and build-out always demand optimised performance under the highest schedules. Shortage of both appropriate technology and skilled technical staff provide challenges in highly competitive environments. The complexity of predicting RF propagation requires all the assistance available.

Willtek 8100 General Purpose Receiver

Highlights

- High dynamic range (over 110 dB).
- Wide frequency (100 kHz to 1GHz, 1.7 to 2.5 GHz).
- High portable operation.
- Long battery operation (entire working day).
- High reliability.
- Remote control via 8010 Hindsite.
- Transmitter site surveys.
- Interference tracing.
- Voice monitoring.
- 8181 GPR Down Converter supported by 8010 Hindsite™ software available optional.

Applications

The best solution for measuring field and signal strength on site is Willtek's 8100 General Purpose Receiver. The signal is audible, enabling the user to determine its type.

The robust design supports rough outdoor tasks. A special RF design guarantees precise measurement even in strong signal environments such as antenna farms.

Ordering details

8101 GPR General Purpose Receiver BW: 7.5, 15, 120 kHz	M 100 601
8102 GPR General Purpose Receiver BW: 7.5, 20, 120 kHz	M 100 602
8103 GPR General Purpose Receiver BW: 7.5, 15, 20, 120 kHz	M 100 603
8181 GPR Down Converter 1.7 to 2.5 GHz	M 248 618

Willtek 8010 Hindsite™ RF Propagation Test Software

Highlights

- Overlay of real topographical maps via geographical information system, built-in geographical information system (GIS).
- Preconfigured settings allow less skilled drivers to perform the measurements, dynamic equipment control.
- On-line display of actual measured results as graph and on the map, powerful view types.
- Powerful data analysis functionality.
- Straightforward, flexible report and export functions.
- Enables capacity of new technologies such as CDMA2000, GPRS, TETRA and UMTS to be tested using a benchmark standard.
- C/I features.
- Export utilities to planning tool formats.

Applications

Willtek's 8010 Hindsite™ is the powerful basic software tool for RF propagation measurements. It helps network operators plan and measure the capabilities of base transceiver stations in preparation for the deployment of technologies such as Tetra, GPRS and UMTS. It also supports coverage verification measurements to ensure communication in a given area.

Ordering details

8010 Hindsite™ RF Propagation Test Software MS-Windows 95, 98, NT, 2000, XP	M 897 825
8301 Griffin Fast Measurement Receiver US cellular, GSM 900	M 100 500
8302 Griffin Fast Measurement Receiver US PCS, GSM 1800	M 100 501
8103 GPR General Purpose Receiver 26 MHz to 1000 MHz	M 100 603

Willtek 8300 Griffin Fast Measurement Receiver

Highlights

- Rapid scanning and sampling at high rates (1,000 channels and 100,000 readings per second).
- Measures accurately across nine models and a wide dynamic range.
- Allows tests to be performed anywhere thanks to lightweight, portable and robust design.
- Verifies RF propagation/RF coverage, and detects interference.
- Covers both long and short distances to base stations thanks to wide dynamic range.
- Delivers high-speed scanning and sampling fulfills.
- Excellent degree of accuracy for alignment to RF prediction model.
- Nine measurement modes offer statistics for every scenario.
- 8300 Griffin UMTS Down Converter supported by 8010 Hindsite™ optional software available.

Applications

Willtek's 8300 Griffin Fast Measurement Receiver is the ideal choice for quick and accurate performance of a wide range of measurement functions in the RF channel.

Featuring the latest RF and logic technologies, the Griffin is the most effective measuring receiver available for planning and optimising cellular networks like TETRA, GSM-R or UMTS. Compliant measurements to the "Lee Criteria" for several channels can be performed while driving at 100 km/h.

Specifications

Griffin software

The Griffin series has no board interface, instead it is controlled using front panel software (FPS) running on a PC using Microsoft Windows 95, 98, 2000, XP or NT 4.0. This provides bar charts, graphs and data tables in addition to controlling and monitoring the devices.

Frequency

8301	800 to 1000 MHz
8302	1700 to 2000 MHz
Number of channels per second	1000
Tuning resolution	1 kHz
Tuning accuracy	2 kHz
Aging rate	1 kHz per year

Level measurement

Samples per second	100,000
Accuracy	1 dB
Maximum measurable input	0 dBm
Noise floor (200 kHz) typ.	–112 dBm
Instantaneous dynamic range	80 dB
Maximum input (no damage)	20 dBm
Maximum DC at input	50 V
Input 3rd order intercept	> 30 dBm
RF input impedance	50 Ω
Input VSWR	typ. 1.6:1

Measurement features

Measurement modes	min/mean/max, histogram level crossing rate
Sequence modes	fixed, cycling, scanning
No. of samples	1 to 65535 per measurement
No. of counters	5
Sampling interval	10 µs to 13.1 µs
Distance pulses	up to 500 per meter (on 35 m/s = 130 km/h = 80 mph)
Cycling memories	150
Noise filter	200 Hz to 12.5 kHz

Intermediate frequency

IF bandwidths	200 kHz or 15 kHz
IF frequency	10.7 MHz
IF outputs	I&Q
Output level	–98 to –18 dBm
Bandwidth	> 1 MHz

Rejection and blocking

Adjacent channel rejection	typ. 70 dB
In-band blocking	> 80 dB
Out-band blocking	> 100 dB
Image rejection	typ. 70 dB
Spurious signals (non harmonic)	< –90 dBm
IF rejection	> 70 dB

Connections

RF (input)	N-type
IF (output)	2 x SMA
Ext. frequency reference (in/out)	SMA
Distance transducer (input)	Lemo 1B
Auxiliary (in/out)	Lemo 1B
DC power (input)	Lemo 1B
RS-232	9-way D-type
Wheel encoder pulse input	TTL level
Auxiliary pulse	input TTL level
Raw battery voltage output	> +5.5 V
Detector output	25 mV per dB
Sampling pulse output	TTL level

Communications

RS-232 baud rate	2.4 k to 56.7 k
RS-232 control	X on/X off

General

DC Power	9.5 to 18 V, 2.5 A
Batteries	2 x 6 V, 4 AH, NIMH
Dimensions	240 x 170 x 92 mm
Weight	3.3 kg
Operating temperature	–10 to +40°C
Temperature (full accuracy)	+5 to +35°C
Operating humidity	0 to 90%, non-condensing

Ordering details

8301 Griffin Fast Measurement Receiver US cellular, GSM 900	M 100 501
8302 Griffin Fast Measurement Receiver US PCS, GSM 1800	M 100 502
8381 Griffin UMTS Down Converter for 8301, UMTS: 2000 to 2200 MHz	M 248 650
8382 Griffin Up Converter for 8301, 300 to 500 MHz	M 248 648
20 W CW Signal Generator battery-powered (ST24SV) UMTS Downlink	M 100 707

Willtek 8050 HindsitePlus

Highlights

- Rapid identification of critical issues.
- Straightforward assessment of RF capacity via an intuitive graphical interface.
- Real-time network maintenance.
- Fast, effective data capture.
- Function for analysing off-line fault diagnosis.
- Rapid troubleshooting via problem indicator and stored results.
- MOC calls to a public service number (for example, speaking clock).
- Measurement of air interface data (signal strength ±1 dB, RXqual, signalling messages etc.).
- Powerful MMI for real-time display of measurement data.
- Data analysis software for on-the-spot replay and analysis of measurement data.
- Complete BA and CA list.
- Flexible scanning.
- RXqual in idle mode.

Applications

Willtek 8050 HindsitePlus is a powerful software application for testing and optimising mobile phone networks. The solution runs on any Windows® 2000- or NT-based notebook, and provides cost-effective capture and analysis of drive test data. It is suitable for a variety of tasks related to enhancing network performance, or maximising network staff efficiency.

Ordering details

8050 HindsitePlus (incl. HindsitePlus Software, manual and dongle)	M 248 602
8501 GSM Air Interface Test Module	M 100 801
Accessory Kit MAX-502	M 248 600
Accessory Kit MAX-503 with GPS	M 248 601

Willtek 8501 GSM Air Interface Test Module

Highlights

- Utilises a tried-and-tested design used in more than 25 different GSM mobile types.
- Delivers precise measurements through individual calibrations.
- Uses industry-standard control commands.
- Integrates easily into system solutions.
- Allows users to define which channels are scanned.
- Provides quality information without call establishment.

Applications

This module provides functionality like a GSM test mobile phone. It allows analysis of the quality of the air interface to the serving and neighbouring base stations. 8501 provides protocol traces and can scan the whole GSM 900 and 1800 band or any portions. It provides special features like selecting the serving cell, forcing call handover or simulating a single-band phone. With full remote control features the 8501 can easily be integrated into existing systems.

Specifications

Basic RF data

Frequency range	890 MHz to 960 MHz 1710 MHz to 1880 MHz
Channel range	1 to 124, 512 to 885
Impedance	50 Ω
RF connector	SMA female
Communication systems	GSM 900/1800
TX level	5 to 33 dBm (GSM 900) 0 to 30 dBm (GSM 1800)
TX level accuracy	±1 dB ±2 dB at TX level 5 and 33 dBm (GSM 900) ±2 dB at TX level 0 and 30 dBm (GSM 1800)
RX sensitivity	< –110 dBm
RX level accuracy	±1 dB (–104 to –47 dBm)

Basic AF data

Loudspeaker output	60 Ω balanced
Microphone input	20 kΩ balanced

System functions

Band select	GSM 900, GSM 1800, dual band
Voice select	full rate (FR) or FR/EFR
Forcing	location update on given channel, handover by RX report manipulation
Serving cell report	RX Qual/RX Lev (idle and call mode)
Neighboring cells reported	≤ 6

Control interface

Control connector	36-pole, Mini D Ribbon female, contains data port, trace port, audio, power supply
Data port	RS-232, 19200 bps
Trace port	RS-232, 9600 bps
Power supply	5.5 VDC to 16 VDC

Environmental conditions

Specification temperature range	+5°C to +45°C
Operation temperature range	–10°C to +55°C
Relative humidity	< 90%
Shock	25 g
Dimensions	158 (162) x 60 x 20 mm
Weight	290 g

Ordering details

8501 GSM Air Interface Test Module	M 860 280
Accessory Kit for 8501 MAX-502	M 248 600
Accessory Kit with GPS for 8501 MAX-503 with built-in GPS receiver	M 248 601
8050 HindsitePlus data collection and analysis (Software for cellular wireless networks)	M 248 602

Accessories

Willtek 1205 RF Probe 20dB

Highlights

- Wide bandwidth from 100 kHz to 4 GHz.
- Low distortion through passive RF design.
- Light RF loading characteristics.
- Internal 50 VDC block.
- 20 dB coupling or 10:1 voltage ratio.
- Rugged design for daily use.

Applications

The Willtek's 1205 RF Probe 20 dB is a unique and lightweight probe for RF signal tracking. Its ergonomic design supports daily use on probing boards with RF signals. R&D, production, service or QA needs to probe RF signals on a board level.

1205 RF Probe 20 dB has been designed to allow operators of RF test equipment to use standard signal tracing techniques. The probe makes it possible to conveniently and accurately monitor or inject signals up to 4 GHz into RF circuits without significantly loading or detuning them. The probe comes with interchangeable ground clips, a tip extension and an N adapter, making the RF probe suitable for a wide range of applications.

Specifications

Frequency range

Specified	100 kHz to 3 GHz
Usable	100 kHz to 4 GHz
Frequency response	±3 dB
Voltage attenuation	10:1 (nominal) for 50 Ω sources
RF attenuation	20 dB (nominal) for 50 Ω circuitries
RF loading effects	500 Ω ±10% < 1 pF at 1 MHz
RF voltage range	7 V_{rms} (continuous) 35 V_{rms} (max. 1 sec.)
DC voltage block	50 V maximum
Cable length	1 meter
Connector	BNC (male)

Ordering details

1205 RF Probe 20 dB incl. adapter N (male), BNC (female)	M 248 640

Accessories

Legend

AS = 4100 part of standard delivery item
AO = 4100 optional extra
BS = 4200S part of standard delivery item
BO = 4200S optional extra
CS = 4300 part of standard delivery item
CO = 4300 optional extra
DS = 4400 part of standard delivery item
DO = 4400 optional extra
ES = TestPad BAT part of standard delivery
EO = TestPad BAT optional extra
FS = Griffin part of standard delivery item
FO = Griffin optional extra
GS = GPR part of standard delivery item
GO = GPR optional extra
HS = 8501 part of standard delivery item
IO = 9100 optional extra

RF-Adapters (AS, BS, CS, DS)

Adapter N (male) TNC (female)	M 886 098
Adapter N (male) BNC (female)	M 886 097
Adapter TNC (male) BNC (female)	Order No. on request

Mobile phone adapters (AO, BO, CO, DO)

Due to the large number of mobile phones, many different RF adapters are required to perform cable-based testing. These adapters connect the mobile phone's RF interface to the RF adapter cable attached to the tester. A separate list is available, which is regularly updated. This list can either be downloaded from our Website or obtained directly from your nearest sales office. These adapters are connected via RF Click cables.

IEEE bus cable, 2m (CO, DO)

Double-shielded metal casing, 24-contact	M 860 110

4100 Universal adapter cable for printer + PC (2.5 m) (AO)

Cable used to attach the 4100 to the serial port of a PC (RS-232) and to a printer (Centronics interface)	M 384 877

4100 Centronics cable (2.5 m) (AO)

To attach the 4100 to a printer with a Centronics interface	M 384 876

4100 RS-232 cable (2.5 m) (AO)

Cable used to attach the 4100 to a PC with an RS-232 port	M 384 875

RS-232 cable (2.5 m) (BS, CS, DO, FO)

Cable used to connect the tester to a PC with an RS-232 port	M 860 379
GPR to RS-232 (GS)	M 384 923

Centronics cable (2.5 m) (BO, CO, DO)

To connect the tester to a printer with a Centronics interface	M 860 378
Null Modem Cable (2 m) (FS)	M 860 500

Cables, Connectivity

Couplers (EO)

Dual-Band Coupler	M 860 042

Connector/cable set

N/BNC adapter, 2 x 1m cable BNC-BNC, 1 x 1m cable N-N, 1 x 1m cable BNC-banana (AS, BS, CS, DS)	M 300 690

RF cables

RF cable, 150 cm, N-TNC to connect 4200S/4400 to the RF Shield (BO, DO)	M 382 189
RF cable, 150 cm, TNC-TNC to connect 4100/4300 to the RF Shield (AO, CO)	M 382 190
RF lead to connect GFC to GPR (GS)	M 382 826
RF cable, 200 cm, N-N blue cap (ES)	M 382 811
RF cable, 200 cm, N-N yellow cap (ES)	M 382 810
Removable cable binder (incl. 4 pcs) (ES)	M 770 163

RF connecting cable (AS, BS, CO, DO)

A connecting cable between any Willtek RF adapter (extra accessory) and the tester.	
TNC-RF Click – 4100, 4300 (150 cm)	M 860 409
N-RF Click – 4200S, 4400 (150 cm)	M 860 407

Accessories

Power supply/Battery

Power supply unit (100 VAC to 250 VAC) with power cord and adapter cable (AS)	M 860 105
GPR Series Receiver batteries for units which are 200 mm high (GS)	M 205 009
GPR Series Receiver batteries for units which are 180 mm high (GS)	M 205 010
Assembled battery pack (FS)	M 205 008

Replacement battery/Battery charger

GPR battery charger (GS)	M 204 093
1500 battery charger (BO, IO)	M 204 097

DC/DC converter

Just plug into the car cigarette lighter adapter 12 V is CE-E1 certified and smaller than a cigarette packet (AO)	M 860 078
Cigarette lighter adapter/charger (EO)	CAC-31905
DC cable vehicle to GPR (GS)	M 384 921
DC lead to connect GFC to GPR (GS)	M 384 894
Cable assy vehicle power (FS)	M 384 905
Mains PSU assembly (FS)	
Input plug UK (FS)	M 860 219
Input plug EURO (FS)	M 860 220
Input plug US (FS)	M 860 221
Input plug AUSTRALIA (FS)	M 860 222

SIM cards

GSM-R Test SIM (full size/plug-in) (BO)

This SIM card supports GSM-R features like group calls. The plug-in SIM can be detached from the card and used separately.

Test SIMs operate with 3 V and 5 V mobile phones	M 860 174

Test SIM (full size/plug-in) (AS, BS, DO)

The plug-in SIM can be detached from the card and used separately.

Test SIMs operate with 3 V and 5 V mobile phones	M 860 188

Accessories

Antennas/Probes

Antenna 900 MHz (AO, BO, CO, DO)

Antenna with TNC connector, which can be fitted to the tester in the frequency range of 800/900 MHz.
The N-TNC adapter is needed for 4200S/4400.
No adapter needed for 4100, 4300, 4350 and TestPad BAT — M 860 261

Antenna 1800/1900 MHz (AO, BO, CO, DO)

Antenna with TNC connector, which can be fitted to the tester in the frequency range of 1800/1900 MHz.
The N-TNC adapter is needed for 4200S/4400.
No adapter needed for 4100, 4300, 4350 and TestPad BAT — M 860 262

Monitoring antenna (rt angle) (GS)	M 249 038
GPS antenna (HS)	M 860 263

Bags/Integration

Carrying case 4400 (DO)

Wheels and handle of this carrying case ease transportation of the 4400 from site to site. Ideal for carrying and storing the test set. The telescopic handle can be retracted when not in use.

Colour	White, with black wheels and handle.
Dimensions	700 x 400 x 360 mm (1040 x 400 x 360 mm, handle pulled out)
	M 300 808

Carrying case

This hard-wearing carrying case is suitable for carrying the 4100 tester and the complete range of accessories.

Colour	Black
Outer dimensions	480 x 360 x 180 mm
Lower section	Separate compartments for 4100, 3 SIM cards, cables, power supply, manuals, antennas
Upper section	Separate compartments for up to 10 cable adapters (AO)
	M 860 252
Carrying case large soft (EO)	CT2000-095
Carrying case multimodule soft (EO)	CCC-45158

Soft shoulder bag (AO)

This lightweight case is suitable for carrying the 4100 and the essential accessories that are needed to test mobile phones.

Colour	Black
Outer dimensions	390 x 300 x 170 mm
	M 860 251
Hanging strap (EO)	CAC-31891
Kickstand (EO)	CTTC2K-024

Rack Mount Set 4400 (DO)

With the 19-in rack mount set, the 4400 can easily be installed in a manufacturing environment. The height of 5 HU allows for adequate air circulation and the front side cables can be fed to the rear through appropriate holes. — M 378 260

Documentation

Recommended Literature (written by Willtek employees)

An Introduction to GSM by Siegmund M. Redl, Matthias K. Weber, Malcolm W. Oliphant	Order No. 1010-00-0476
GSM and Personal Communications Handbook by Siegmund M. Redl, Matthias K. Weber, Malcolm W. Oliphant	Order No. 1010-00-0477
Wireless Technician's Handbook by Andrew Miceli	Order No. 1010-00-0475
Handys im Service by Achim Grolman	ISBN No. 3-7723-5896-9

Get the latest information

Willtek newsletters ensure that you get the latest information for making better use of Willtek equipment and helps keep your technical skills up-to-date.

Identify the specific type of information you want to receive:

Service and support information

Such as firmware updates and software upgrades, manuals, calibration and services.

What's new

Such as new product announcements, technology information, tradeshows.

ServiceWaves

Willtek's customer newsletter

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