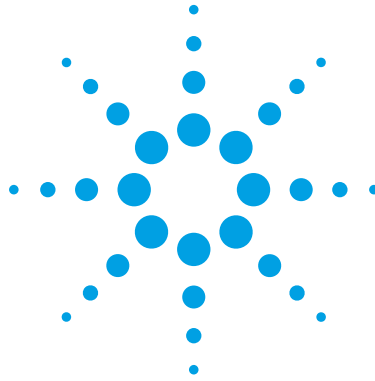


# Agilent E7495B Base Station Test Set

## Technical Overview



- Comprehensive base station test:**
- Wireless direct connect measurements
    - Over-air test measurements
    - Backhaul measurements
- Multiple wireless system testing:**
- cdmaOne, CDMA2000 1X, and CDMA2000 1xEV-DO
  - GSM, EDGE, TDMA, iDEN and analog systems
  - W-CDMA (UMTS), HSDPA



**Agilent Technologies**

## One Rugged Tool Performs all Critical Base Station Tests

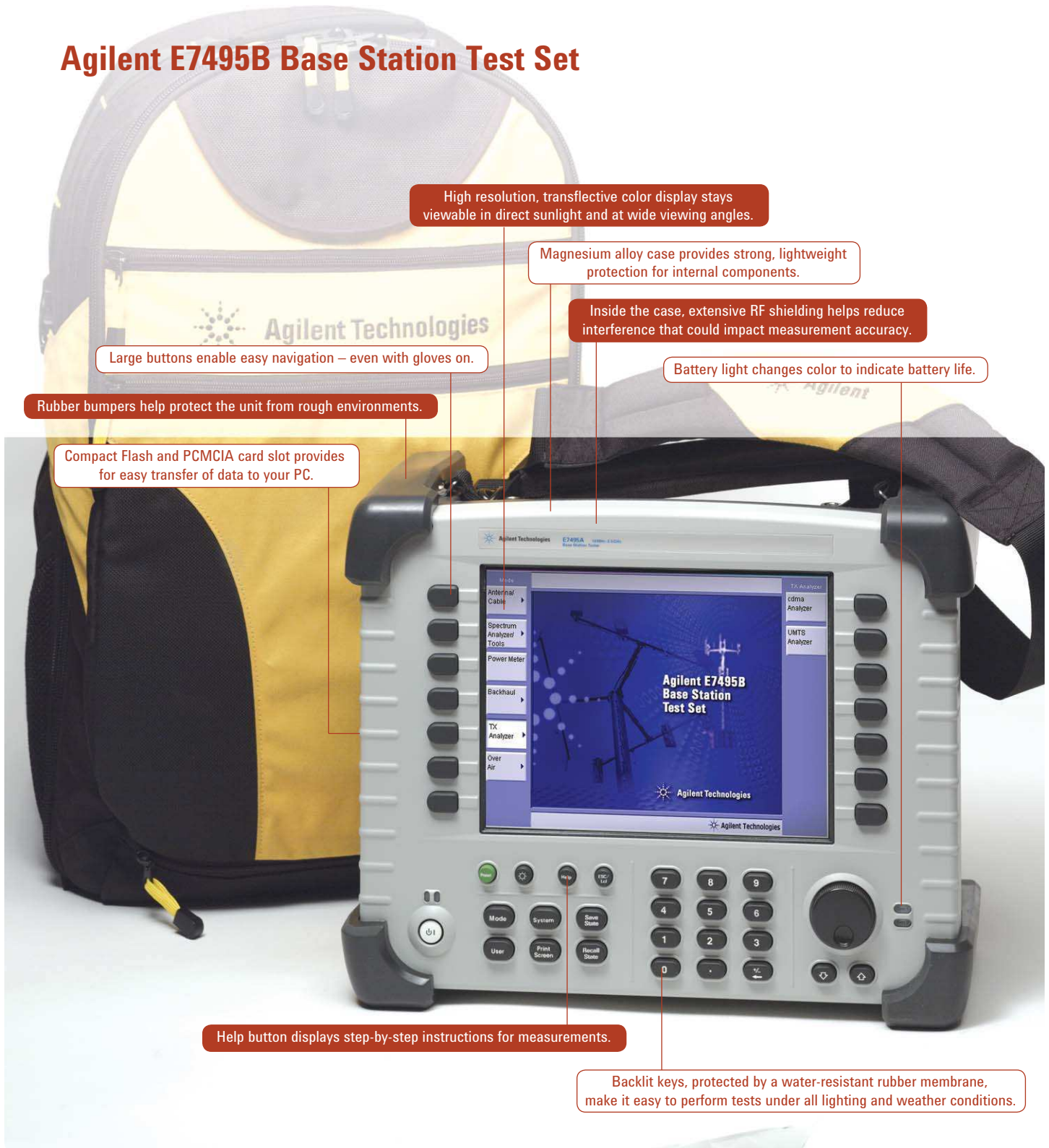


The Agilent base station test set is your single tool for everyday base station maintenance.

Technicians no longer need to carry armfuls of tools when they perform base station maintenance. All they need is one tool from Agilent Technologies. The Agilent E7495B base station test set:

- Performs all standard BTS and over-air measurements with the accuracy you need – more BTS wireless and wireline measurements than any other test set on the market.
- Minimizes the need for training because of its simple interface, simple procedures, and built-in measurement help.
- Increases each technician's productivity, decreasing time spent per cell site visit.
- Provides technicians with true spectrum analyzer performance for troubleshooting.
- Stands up to rough field use and all weather conditions.
- Costs much less than all the tools it replaces.

# Agilent E7495B Base Station Test Set



High resolution, transfective color display stays viewable in direct sunlight and at wide viewing angles.

Magnesium alloy case provides strong, lightweight protection for internal components.

Inside the case, extensive RF shielding helps reduce interference that could impact measurement accuracy.

Large buttons enable easy navigation – even with gloves on.

Battery light changes color to indicate battery life.

Rubber bumpers help protect the unit from rough environments.

Compact Flash and PCMCIA card slot provides for easy transfer of data to your PC.

Help button displays step-by-step instructions for measurements.

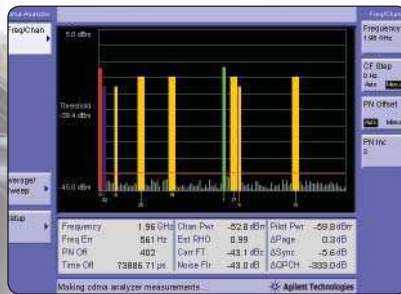
Backlit keys, protected by a water-resistant rubber membrane, make it easy to perform tests under all lighting and weather conditions.



# Comprehensive Base Station Test:

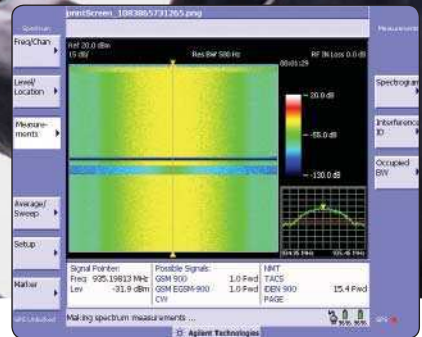
- ✓ Power meter
- ✓ CW, cdmaOne, CDMA2000 1X, CDMA2000 1xEV-DO, and iDEN reverse link signal generator
- ✓ W-CDMA (UMTS), HSDPA, cdmaOne, CDMA2000 1X, 1xEV-DO over-air test tool
- ✓ Antenna tester/cable fault analyzer
- ✓ Spectrum analyzer
- ✓ T1 or E1 tester
- ✓ TX RF tests for W-CDMA (UMTS), HSDPA, cdmaOne, CDMA2000 1X, CDMA2000 1xEV-DO, TDMA, GSM, EDGE, GPRS, AMPS, and iDEN
- ✓ TX RF modulation analyzer for W-CDMA, HSDPA, (UMTS), GSM, EDGE, cdmaOne, CDMA2000 1X, and CDMA2000 1xEV-DO
- ✓ Internal GPS receiver

Now technicians will never have to worry, "Did I bring all the tools I need?" or have to deal with learning different user interfaces found in the various instruments.

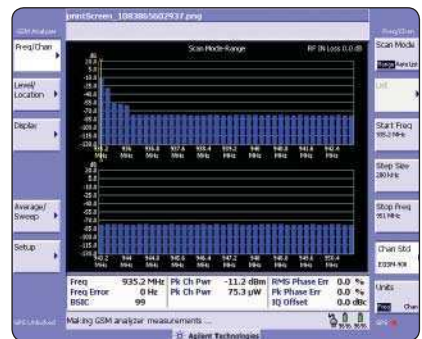


CDMA analyzer

With W-CDMA (UMTS)/CDMA over-air measurements, perform diagnostic tests without taking the base station off-the-air.

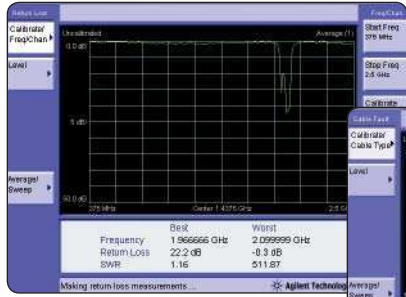


Interference analyzer



GSM analyzer

# Leverage Your Technicians' Time, Improve Your Quality of Service



Return loss



Cable loss



Power Meter

## Test/capability

## Technician benefit

## Subscriber benefit

<b>Power meter</b>	Replaces the need to carry a separate power meter, simplifying maintenance and shortening site visits. Additionally, using an appropriate power sensor enables technicians to make power measurements of microwave links.	Accurate power settings help networks operate at optimum capacity – reducing coverage holes and minimizing the effects of interference.
<b>CW, iDEN, cdmaOne, CDMA2000 1X, and CDMA2000 1xEV-DO reverse link signal generator</b>	Provides the technician with a source to conduct sensitivity measurements. Additionally, allows a technician to perform component level characterization utilizing simultaneous spectrum analysis and built-in RF and CDMA sources.	Reverse link testing helps to ensure network service quality.
<b>W-CDMA (UMTS), HSDPA cdmaOne, and CDMA2000 1X over-air test tool</b>	Provides fast measurements in less than five minutes. Enables time for proactive maintenance and makes pole top testing practical.	Problem areas can be identified without interrupting service.
<b>Antenna tester with vector network analysis capability</b> <ul style="list-style-type: none"> <li>cable tests</li> <li>swept insertion loss</li> <li>distance to fault</li> <li>swept insertion gain</li> </ul>	Lets your technicians evaluate one of the primary BTS (node B) trouble spots in a matter of minutes. Dual port insertion loss allows technicians to sweep various components like filters, duplexers, amps and more.	A healthy antenna and feed line network yields improved voice quality, better system reliability and reduced dropped calls.
<b>Spectrum analyzer</b>	Provides necessary functionality so your technicians don't need to carry a separate spectrum analyzer. Built-in masks and markers make it easy to use. Industry leading low noise figure receiver is capable of measuring down to -150 dBm, allowing technicians to identify and pull out low level, intermittent rogue interferers.	Quick interference detection leads to improved quality of service.
<b>T1 or E1</b>	Identifies and diagnoses T1 or E1 problems. Dual channel capability allows "loop-back" measurements.	Fewer wireline problems mean reduced service problems and down time.
<b>Channel scanner for CDMA, W-CDMA (UMTS), cdmaOne, CDMA2000 1X, CDMA2000 1xEV-DO, TDMA, GSM, EDGE, GPRS, AMPS, and iDEN</b>	Provides easy to interpret bar graph display illustrating channel power versus frequency of user defined channels.	The channel scanner quickly identifies improper power levels that can adversely affect network performance.
<b>Internal GPS receiver</b>	Provides position location, highly accurate frequency measurements and enables independent verification of base station GPS receiver timing.	For CDMA networks, the internal GPS receiver helps reduce dropped calls by identifying the "island cell" effect – improving the quality of service.
<b>Interference analyzer</b>	Allows engineers and technicians to find intermittent, interfering signals using a spectrogram display, signal strength meter and signal ID capability.	Eliminating interfering signals from the network improves quality of service.

See Specification section for details.



# Dramatically Increase Technician Productivity and Maintain High Quality of Service

The Agilent E7495B is the most functional one-box tool on the market, eliminating the need for your technicians to carry, manage and learn multiple test tools.

This helps reduce your asset costs, tracking costs, calibration and maintenance costs, and the training costs associated with learning the specifics of separate instruments.

The E7495B has a remarkably short learning curve because of its simple interface and accessible learning tools. So your engineers and technicians – even those with limited knowledge or experience – will be performing BTS measurements in less time. In turn, experienced engineers can devote more of their time resolving chronic coverage problems, planning new sites, and expanding into new services and technologies.

The simple procedures plus exceptionally usable hardware combine to produce shorter net time per cell site visit. Now each technician can handle more cell sites and have the time to conduct more proactive maintenance.

The field-rugged design means less downtime, more field time.

Engineered-in extensibility lets you do more today and tomorrow. Today, a variety of I/O ports permit data sharing with other tools and software. All feature upgrades will be done through hardware or firmware inside the case, preserving the single-case convenience and reliability.

Having the most frequently used BTS tools in one box dramatically increases your technicians' productivity.



## Agilent Puts the Emphasis on Usability



Technicians can comfortably carry the test set, a laptop, cables and connectors with the optional backpack or soft carry case.

The Agilent base station test set is so easy to use, it minimizes the need for training. Technicians will get up to speed fast – and get their work done quickly every day.

The intuitive hardkey/softkey interface, used for all measurements, means there's less of a learning curve.

The built-in measurement help leads technicians through each measurement task step-by-step. Other learning tools include a user's guide and an optional web-based tutorial.

Backlit hardkeys, protected by a water-resistant rubber membrane, make it easy to perform tests under all lighting and weather conditions. A transreflective color display stays viewable even in direct sunlight and at wide viewing angles. Result: faster, more accurate readings.

Technicians can hand-carry the unit with a soft carry case or use the ergonomically designed backpack to free up their hands. The backpack includes a comfort-contoured back panel, full padded hipbelt, plus extra pockets and tool loops for other hardware and supplies.

Snap-in battery packs provide up to three hours of performance. You can "hot swap" batteries in seconds.

Snap-in battery pack allows technicians to go to remote sites without the hassle of restrictive power cords.



## Rugged, Durable, Weather Resistant — Agilent-Reliable



The Agilent E7495B rugged design enables technicians to go anywhere, anytime regardless of the weather.

A single-box measurement solution makes sense only if it can stand up to rough field use and unexpected weather. So we designed the Agilent base station test set to be rugged, durable and weather resistant.

A magnesium alloy case with extensive internal RF shielding protects the components, reduces interference that could impact measurement accuracy, and makes the test set easy to handle and carry.

Gasketed ports, water-resistant rubber membrane, and dust-proof case design (no fan, no vents) add to the ongoing confidence you can have in the measurements. The soft carry case or backpack protects the unit on the way to and from the site.

We know that you'll want to add new capabilities as your network evolves. So we made sure that all functionality upgrades will be implemented through firmware or hardware inside the case. The Agilent test set grows in functionality without growing in size. The field-rugged design is never compromised by awkward external modules.



# Features and Benefits Summary

## Multiple tools

<b>Power meter</b>	The built-in power meter replaces the need to carry a separate power meter, simplifying overall maintenance routines and shortening site visits. Additionally, using an appropriate power sensor enables technicians to make power measurements of microwave links. Accurate power settings help technicians maximize network capacity while reducing coverage holes and minimizing the effects of interference.
<b>W-CDMA (UMTS), HSDPA, cdmaOne, CDMA2000 1X, and CDMA2000 1xEV-DO over-air test tool</b>	Provides fast, qualified measurements in less than five minutes. Enables time for proactive maintenance and makes pole top testing practical. Problem areas can be identified without interrupting service.
<b>CW, cdmaOne, CDMA2000 1X, CDMA2000 1xEV-DO, and iDEN reverse link signal generator</b>	Provides the technician with a source to conduct sensitivity measurements. Additionally, this option allows a technician to perform component level characterization utilizing simultaneous spectrum analysis and built-in RF and CDMA sources. Reverse link testing helps to ensure network Rx service quality.
<b>Antenna tester with vector network analysis capability</b> <ul style="list-style-type: none"> <li>• cable tests</li> <li>• distance to fault (DTF)</li> <li>• swept insertion loss</li> <li>• swept insertion gain</li> </ul>	Lets technicians evaluate one of the primary BTS trouble spots in a matter of minutes. Dual port insertion loss allows technicians to sweep various components like filters, duplexers, amps and more. DTF resolution includes 256, 512, or 1024 data points, enough resolution to locate and isolate faults within a few centimeters (inches) of one another or resolve short jumper cables at the end of a long antenna feed line. A healthy antenna and feed line network yields improved voice quality, better system reliability and reduced dropped calls.
<b>T1 or E1</b>	Identifies and diagnoses T1 or E1 problems. Dual channel capability allows “loop-back” measurements. Fewer wireline problems mean reduced service problems and down time.
<b>Spectrum analyzer</b>	Provides necessary functionality so technicians don’t need to carry a separate spectrum analyzer. Built-in spectrum emissions masks, occupied BW, Spectrogram, and markers make it easy-to-use. Industry-leading low noise figure receiver is capable of measuring down to -150 dBm, allowing technicians to identify and pull out low level, intermittent rogue interferers. Quick interference detection leads to improved quality of service.
<b>Channel scanner for CDMA, W-CDMA (UMTS), cdmaOne, CDMA2000 1X, CDMA2000 1xEV-DO, TDMA, GSM/EDGE GPRS, AMPS, and iDEN</b>	Provides easy to interpret bar graph display illustrating channel power versus frequency of user defined channels. The channel scanner quickly identifies improper power levels that can adversely affect network performance.
<b>TX RF modulation analysis for W-CDMA (UMTS), cdmaOne, CDMA2000 1X, CDMA2000 1xEV-DO, GSM, and EDGE</b>	TX modulation testing provides extensive transmitter analysis for various 2 to 3G formats like modulation quality (phase error, Rho, EVM), time offset, code domain power and display, channel power, etc. In addition, W-CDMA, and CDMA applications include Codogram analysis.
<b>Internal GPS receiver</b>	Provides position location, highly accurate frequency measurements and enables independent verification of base station GPS receiver timing. For CDMA networks, the internal GPS receivers help reduce dropped calls by identifying the “island cell” effect – improving the quality of service.
<b>Interference analysis</b> <ul style="list-style-type: none"> <li>• spectrogram display</li> <li>• level meter</li> <li>• modulation ID function</li> </ul>	Allows engineers and technicians to find intermittent, interfering signals using a spectrogram display, signal strength meter and signal ID capability. Eliminating interfering signals from the network improves quality of service.

*See Specification section for more details.*

## Features and Benefits Summary continued

### Ease-of-use

<b>Transflective color display</b>	Speeds up measurement readings because the display remains viewable in darkness, shade and direct sunlight.
<b>Single hardkey user interface</b>	Provides easy navigation to perform quick and accurate measurements – even with gloves on.
<b>Backlit keys</b>	Makes it easier to perform tests under all lighting and weather conditions.
<b>Built-in measurement help</b>	Provides step-by-step instructions for measurements.

### Rugged design

<b>Magnesium alloy case</b>	Provides a lightweight yet strong enclosure; enhances heat distribution and RF shielding.
<b>Water-resistant rubber membrane key pad and sealed display</b>	Enables technicians to go anywhere, anytime – regardless of the weather. Seals out water and dirt to help ensure measurement performance.
<b>Dust-free case design (no vents or fan)</b>	Keeps the unit free of moisture and dirt.
<b>Gasketed ports</b>	Protects components from moisture and harsh weather.
<b>Wide operating temperature range –10 to 50 °C/14 to 122 °F</b>	Performs well even in extreme cold and hot conditions.
<b>Extensive internal RF shielding</b>	Reduces RF interference that could impact measurement results.
<b>Rubber bumpers</b>	Protects the unit while in rugged field environments.

### Extensible

<b>Flexible architecture</b>	Easily upgradeable to meet future network needs without growing in size.
<b>Remote monitoring</b>	Allows technicians to remotely monitor problematic base stations from the comfort of their own desk.
<b>Upgradeable</b>	Upgradeable in the field. With license key enabled upgrades, to test set does not need to go back to the factory for upgraded functionality
<b>Linux operating system</b>	Provides a safe stable and efficient operation system.
<b>Compact Flash, PCMCIA card slot, and LAN connection</b>	Makes saving and transferring measurement results to your PC or network quick and easy. Enables data to be easily captured and transmitted to your network.
<b>Antenna test post processing tool</b>	Post processing software enables easy data collection and report generation
<b>File export</b>	Allows you to easily save data to Microsoft® Excel files and images to PNG files for use with a PC.

*See Specification section for more details.*



# E7495B Base Station Test Set Specifications

Specifications describe the instrument's warranted performance and are valid over the entire operating/environmental range unless otherwise noted.

Characteristics and specifications are shown as follows:

- **Bold type** indicates a warranted, hard specification
- **Normal type** indicates a nominal value. Nominal values are design center values and are not normally tested during the manufacturing process
- **Supplemental characteristics** are intended to provide additional information useful in applying the instrument by giving typical, but not warranted, performance parameters. These characteristics are shown in italics or labelled as "typical," or "usable to."

## General specifications

Unless otherwise noted the following specifications apply to all measurements/tools using **port 2**.

### Frequency accuracy:

- Using internal time base:  $\leq \pm 1$  ppm with > 15 minute warm-up
- Internal time base aging:  $\pm 1$  ppm aging/year
- With GPS lock for: > 15 minutes:  $\leq \pm 0.03$  ppm

### Input frequency range:

- 10 MHz to 2700 MHz
- Usable to 500 KHz (specifications and typical values do not apply below 375 MHz unless otherwise noted)

**Maximum input level:** +20 dBm (.1 W), +50 dBm w/supplied attenuator

**Maximum input power without damaging instrument:** 100 W (with external attenuator)  
1W (without attenuator)

### Frequency and time reference:

Can use internal timebase or external signal:

- GPS (external antenna supplied)
- Even second; pulse
- 1 MHz  $\geq 0$  dBm
- 2.048 MHz  $\geq 0$  dBm
- 4.95 MHz  $\geq 0$  dBm
- 10.0 MHz  $\geq 0$  dBm
- 13.0 MHz  $\geq 0$  dBm
- 15.0 MHz  $\geq 0$  dBm
- 19.6608 MHz  $\geq 0$  dBm

### Display:

- Scale: 1 to 20 dB/div. settable in 1 dB increments
- Number of points: 256
- Number of divisions: 10

### 40 dB attenuator:

- Frequency range: 10 to 3000 MHz
- Attenuation accuracy:  $\pm 0.5$  dB
- Max power: 50 dBm (100 W)

## Spectrum analyzer/tools

- Input frequency range:** 10 MHz to 2700 MHz (usable to 500 KHz)
- Reference level range:** -150 to +100 dBm
- Dynamic range:** +50 dBm to -150 dBm (with supplied 40 dB attenuator) (30 Hz RBW)
- Input attenuation:** 0 to 30 dB automatically selected, 10 dB controllable manually
- Amplitude accuracy:**  $\pm 1$  dB (100 to 2500 MHz at 25 °C)
- Adjacent channel power accuracy:**  $\pm 0.75$  dBc

- Resolution bandwidth:** 10 Hz to 1 MHz, settable to 1 Hz precision
- Span:** 1 KHz to 2.6995 GHz
- Trace update:**
  - Span: 2.49 GHz = 5.1 sec
  - 60 MHz = 400 mS
  - 1 MHz, 100 Hz RBW 1.2 sec
- Simultaneous dynamic range:** > 90 dB (CW signals at 300 KHz separation, span 500 KHz, 30 Hz RBW)
- SSB phase noise:**  $\leq -85$  dBc (30k Hz offset)
- Spurious responses:**
  - Range control set to auto, high sensitivity mode
  - Internally generated, 50  $\Omega$
  - load on input:  $< -115$  dBm
  - Crossing spurs:  $\leq -50$  dBc
- Displayed average noise level:** -150 dBm (30 Hz RBW, 375 MHz to 1.5 GHz)
- Port 2 VSWR:** < 2:1

## Antenna/cable analyzer<sup>1</sup>

- Frequency range:** 375 to 2500 MHz
- Frequency resolution:** < 500 Hz
- Immunity to interfering signals:** +20 dBm (with interference rejection turned on)
- Measurement speed:**
  - Full span: < 17 mS
  - 60 MHz span: < 7 mS
- Return loss (port1)**
  - With  $\geq 16$  averages: 375 to 2500 MHz
  - Range: > 40 dB
  - VSWR: < 1.02
  - Resolution: 0.1 dB
  - Display range: -5 to +150 dB
  - SWR range: 1 to 500

## Distance to fault (port1)

- Range (m): 1 m to 300 m
- Resolution:  $(1.5 \times 10^8) (Vf)/(f2-f1)$  Hz where Vf is relative propagation velocity of cable. (typically 1 % of measurement distance)
- VSWR: 1 to 500
- Number of Data Points: 256, 512, 1024

Example table illustrating the effects of data points and span versus measured distance and resolution (Vf of 93.1 %):

Data Points	Span	Measured distance	Resolution
256	140 MHz	127.68 m	50 cm (19.6 inch)
512	140 MHz	255.36 m	50 cm (19.6 inch)
512	280 MHz	127.68 m	25 cm (9.8 inch)
1024	560 MHz	127.68 m	12.5 cm (4.9 inch)

## Insertion loss (port 1 to port 2)

- Measurement uses supplied 10 dB pads
- Usable range: > 100 dB wide range mode
- Accuracy:  $\pm 1$  dB (over 0 to 60 dB,  $\geq 16$  averages)
- Average insertion loss (readout) accuracy:
  - Range: 0 to 40 dB
  - Frequency: 824 to 960 MHz, 1710 to 2170 MHz (mobile phone bands)
- Readout resolution:  $\pm 0.1$  dB

1. For antenna/cable measurements, a short self-calibration procedure must be run prior to making the measurement. For more information about the calibration procedures and when they are needed, see sections 2 and 3 in the users manual or use the online help.

## Options

### cdmaOne, CDMA2000 1X analyzer Option 200

#### Waveform quality (rho)

accuracy:  $\pm .005$  for  $0.9 < p < 1.0$   
(min power @ RF input  $> -85$  dBc)

Pilot time alignment (tau):  $\pm 500$  nSec

#### Code domain power

accuracy:  $\pm 1.5$  dB absolute,  $\pm 0.5$  dB relative ( $> -20$  dB)

Pilot power:  $\pm 1.5$  dB

### CDMA2000 1xEV-DO (Rev 0, Rev A) analyzer Option 205

#### Waveform quality (rho)

accuracy:  $\pm .008$  for  $0.9 < p < 1.0$   
(min power @ RF input  $> -70$  dBc)

Frequency error:  $\pm 20$  Hz (with freq/time ref set to external even sec or GPS)

Pilot time alignment (tau):  $\pm 500$  nSec

#### Code domain power

accuracy:  $\pm 1.5$  dB absolute,  $\pm 0.5$  dB relative ( $> -20$  dB)

Pilot + MAC power:  $\pm 1.5$  dB

### RF channel scanner Option 220

Measurement range:  $+20$  to  $-125$  dBm (up to  $+50$  dBm with external attenuator  $> 375$  MHz, 10 KHz RBW)

Frequency readout accuracy: Time base accuracy  $+3$  Hz  $+ 1/(\text{measurement time} \times \text{duty cycle})$

RF channel power:  $\pm 1$  dB (100 to 2500 MHz)

### GSM/EDGE TX analyzer Option 230/235

RF channel power accuracy:  $\pm 1$  dB (0 to  $-70$  dBm)

Phase error floor:  $< 2^\circ$  RMS

Phase error accuracy:  $< 1^\circ$  RMS,  $2^\circ \leq \text{phase error} \leq 15^\circ$

EVM floor:  $< 3.5\%$  RMS,

EVM accuracy:  $< 1.4\%$  RMS,  $4\% \leq \text{EVM} \leq 10\%$

Frequency error accuracy:  $\pm 40$  Hz with external reference

### W-CDMA/HSDPS TX analyzer Option 240/245

Error vector magnitude: Resolution 0.1

Conditions: Min power at RF input  $> -65$  dBm, 3GPP test model 4

#### Code domain power

accuracy:  $\pm 0.5$  dB for code channel power  $> -25$  dB relative to total power using test model 1 (with 16 DPCH, 32 DPCH, and 64 DPCH), test model 2, test model 3 (with 16 DPCH and 32 DCPH) and test model 5 (with 8 HS-PDSCH)

#### Scrambling code

determination: 1 second (in auto mode)

#### Code domain power

display update: 1.5 sec

### DC bias Option 300 (port 1 only)

Frequency range: 375 to 2500 MHz

DC voltage:  $+12.7$  VDC max

DC current: 800 mA max

Volt-amps: 9.84 VA max

### Signal generator (CW) Option 500 (port 1)

Frequency range: 375 to 2500 MHz

Output level:  $-23$  to  $-90$  dBm

Level accuracy:  $\pm 1$  dB ( $-25$  to  $-85$  dBm)

Phase error: at 30 KHz offset  $-90$  dBc/Hz

### cdmaOne, CDMA2000 1X, CDMA2000 1xEV-DO, iDEN (requires Option 205) reverse link signal generator

#### Option 510 (port 1)

Frequency range: 375 to 2500 MHz

Output level:  $-28$  to  $-95$  dBm E7495B; A=  $-50$  to  $-95$  dBm

Level accuracy:  $\pm 0.7$  dB (at 25 °C,  $-44$  dBm to  $-95$  dBm)

$\pm 1$  dB (at 25 °C,  $-28$  dBm to  $-43$  dBm)

### Minimum and Maximum Power levels for Generated Signals

This table provides the Minimum and Maximum signal power levels with updated data.

Signal	E7495A		E7495B	
	Max. power	Min. power	Max. power	Min. power
CDMA Forward Link Pilot Only No Filter	-47 dBm	-95 dBm	-28 dBm	-95 dBm
CDMA Forward Link Pilot Only Filtered	-47 dBm	-95 dBm	-28 dBm	-95 dBm
CDMA IS-95 Rev Link RC1 9.6 Kbps Zero Data Traffic	-47 dBm	-95 dBm	-28 dBm	-95 dBm
CDMA IS-95 Rev Link Zero Data Access	-47 dBm	-95 dBm	-28 dBm	-95 dBm
CDMA IS-95 Rev Link RC1 9.6 Kbps Random Data Traffic	-47 dBm	-95 dBm	-28 dBm	-95 dBm
CDMA IS-95 Rev Link RC2 14.4 Kbps Zero Data Traffic Channel	-47 dBm	-95 dBm	-28 dBm	-95 dBm
R-FCH RC3 Zero Data Fundamental	-47 dBm	-95 dBm	-28 dBm	-95 dBm
R-FCH RC3 Random Data Fundamental	-47 dBm	-95 dBm	-28 dBm	-95 dBm
1xEV-DO Reverse Link 9.6Kb 15PN Data (ARB) FW A.04.00 to A.06.00	-48.5 dBm	-96.5 dBm	-29.5 dBm	-96.5 dBm
1xEV-DO Reverse Link 9.6Kb 15PN Data (ARB) FW A.06.10 and higher	-49.3 dBm	-97.3 dBm	-30.3 dBm	-97.3 dBm
1xEV-DO Rev A Rev Link 9.6Kbps 15PN Data (ARB)	-50.5 dBm	-98.5 dBm	-31.5 dBm	-98.5 dBm
1xEV-DO Rev A Rev Link 460.8Kbps 15PN Data (ARB)	-51.7 dBm	-99.7 dBm	-32.7 dBm	-99.7 dBm
iDEN 1/6th Inbound (ARB)	-52.1 dBm	-100.1 dBm	-33.1 dBm	-100.1 dBm

1. Attenuator can be characterized to within 0.1dB in the mobile phone bands using the insertion loss measurement. This value can be stored for use with the power meter.



## Power meter Option 600

### Display

Range:	-100 dBm to +100 dBm (range is power sensor dependent)
Display limits:	± 100 dBm (user settable)
Resolution:	Settable 1.0, 0.1, 0.01, 0.001 in logarithmic mode, or 1, 2, 3, or 4 significant digits in linear mode

### Accuracy

#### Instrumentation:

Absolute:	± 0.02 dB (log) or ± 0.5 % (linear). Add the corresponding power sensor linearity percentage.
Relative:	± 0.04 dB (log) or ± 1.0 % (linear). Add the corresponding power sensor linearity percentage.

#### Zero set:

Zero set is the digital zero with a power sensor: ± 50 nW

#### Power reference:

Power output:	1.00 mW (0.0 dBm) traceable to the U.S. National Institute of Standards and Technology (NIST).
Accuracy:	± 1.2 % worst case (± 0.9 % rss) for one year.
SWR:	< 1.08

### External attenuator

Max power:	100 W
Attenuation:	40 dB ± 0.5 dB <sup>1</sup>

## Power meter Option 600 with Agilent N8482A-CFT power sensor (also supports Agilent 8481A/D and 8484A power sensors)

Frequency range:	100 KHz to 6 GHz
Dynamic Range:	-30 dBm to +20 dBm
Measurement noise:	< 114 nW
Zero drift:	< ± 7 nW

EEPROM feature is disabled to maintain backward compatibility with 8480 Series

## T1 analyzer Option 700

### Features:

Receive level:	(Line 1 and line 2) +6 dB DSC to -36 dB DSX or 100 mv p-to-p to 12 v p-to-p Receive frequency display receive frequency (5 ppm) (line 1 and line 2) "Loop-back" control send CSU or NIU loop codes CSU/NIU emulation respond to CSU or NIU loop codes
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### Electrical interface

Connectors, RX, TX:	Primary and secondary ports
Output:	Conforms to TR-TSY-000499, CCITT Rec.G.703 AT&T Pubs CB113, CB119, CB132, CB143 PUB62508 and PUB62411 pulse shape specifications when terminated in 100 Ω and 0 dB line build-out is selected
Line build-out:	0 dB, -7.5 dB, -15 dB
Input:	
Terminate:	DSX +6 dB to DSX -36 dB, 100 Ω
Monitor:	DSX -14 dB to DSX -40 dB, 100 Ω
Bridge:	DSX +6 dB to DSX -36 dB, > 1000 Ω
Clock:	1.544 MHz
Internal:	± 5 ppm
External:	± 300 ppm
Recovered:	± 300 ppm

### Transmitter and receiver

Framing:	Unframed, D3/D4 & ESF
Channel formats:	Full T1, 64x1

### Test patterns:

	QRSS, all 0s, 1:7, 2 in 8, 3 in 24, all 1s, T-1-Daly, 55 OCTET
Error injection	
Type:	BPV, frame, CRC, pattern (logic)
Error rate:	Single
Alarm inject	
Type:	LOS, LOF, yellow, AIS, idle (CDI)

## E1 analyzer Option 710

### Features

Error detect:	Code (BPV), FAS, MFAS, CRC-4, far end block (FEBE), pattern, frame slip
Error rate calculation:	Bit-error-rate, error free seconds, errored seconds
Alarm detect:	AIS, TS-16 AIS, FAST DISTANT, MFAS DISTANT
Clock and frame slips:	Clock slips, frame slips, peak wander, clock slip rate
Auto configuration:	Automatically detect line code, framing and test pattern
Receive level	
(line 1 and line 2):	+6 dB DSX to -36 dB DSX or 100 mv p-to-p to 12 v p-to-p
Receive frequency (line1):	Display receive frequency (± 5 ppm)
Channel access:	output audio to system
Delay measurement:	Measure delay in unit intervals for "looped-back" signal

### Electrical interface

Connectors, RX, TX:	Primary and secondary ports
Output:	Conforms to ITU-T Rec.G.703
Line code:	AMI, HDB3
Impedance:	Terminate: 75 Ω ± 5 % bridge: > 1000 Ω
Input:	Terminate: DSX +6 dB to DSX -36 dB
Bridge:	DSX +6 dB to DSX -36 dB
Clock:	2.048 MHz
Internal:	± 5 ppm
External:	± 300 ppm
Recovered:	± 300 ppm

### Transmitter and receiver

Framing:	Unframed, PCM-30, PCM-30 with CRC, PCM-31, PCM-31 with CRC
Channel formats:	Full E1, 64x1
Test patterns:	(True or Inverse, ITU Rec) 2 <sup>6</sup> -1 (Q6 & Q5), 2 <sup>9</sup> -1 (V.52), 2 <sup>11</sup> -1 (0.152), 2 <sup>15</sup> -1 (0.151) 2 <sup>20</sup> -1 (V.57), QRSS, 2 <sup>23</sup> -1 (0.151), all 0's, 1:7, 1:3, 1:1, all 1's
Error injection	
Type:	Code (BPV), FAS, MFAS, CRC-4, far end block (FEBE), pattern
Error rate:	Single Alarm generation AIS, TS-16 AIS, FAS DISTANT, MFAS DISTANT, loss of signal, loss of frame

# General

## Display

Transflective VGA color LCD

## Physical dimensions

Height: 11.6 in, 295 mm  
Width: 14.5 in, 368 mm  
Depth: 5.3 in, 135 mm  
Weight (without batteries): 20 lbs, 9.1 kg, fully hardware optioned

## Power

Power supply

Internal: *Lithium ion battery: 10.8 volts, 6.0 Ah*  
(1 NI2040AG shipped standard, will accept two batteries)  
External DC input: +9 V to +25 V DC 4 amps  
Battery life: *Approximately 1.5 per battery*  
(time varies dependent upon instrument mode)

## Interface ports

Two RS 232 (DB-9) (reserved for future use)  
Two USB 1.1 (reserved for future use)  
One LAN port: 10 base T  
Built-in speaker  
PCMCIA card slot  
Compact flash memory (type 1 & 2)  
Stereo headphone jack  
General purpose input/output: TTL level (reserved for future use)

## Inputs

Port 2 RF in: 50  $\Omega$ , type N  
External DC input: +9 V to +25 VDC 4 amps

## Frequency reference:

Input power:  $-10$  to  $+10$  dBm  
Connector: 50  $\Omega$  BNC

## Even second:

Connector: *High impedance BNC*  
Level: *TTL compatible*

## GPS antenna:

Connector: SMA  
Output: 5 V at 50 mA

## Outputs

Port 1 RF out/SWR:  
Connector: 50  $\Omega$ , type N  
Power reference: 50  $\Omega$  type N; SWR < 1.06

## Optional connectors

Option 600 power meter

Outputs: Type N 50  $\Omega$  power reference  
Inputs: Sensor input for 8480 series sensors

Option 700 T1 analyzer

Outputs: (2) Bantam outputs; TX primary and secondary  
Inputs: (2) Bantam inputs; RX primary and secondary

Option 710 E1 analyzer

Outputs: (2) 75  $\Omega$  BNC outputs; TX primary and secondary  
Inputs: (2) 75  $\Omega$  BNC inputs; RX primary and secondary

## Operating temperature

Specified temperature range:  $-10$  to  $50$  °C;  $14$  to  $122$  °F

## Storage temperature

$-40$  to  $70$  °C;  $-40$  to  $158$  °F

## Calibration

Cycle: one year

## Warranty

Duration: one year

## Ordering information – E7495B base station test set

Standard test set functionality includes spectrum analysis and antenna measurements

## Standard accessories include:

- PCMCIA 64 MB flash memory card
- AC/DC converter
- NI2040AG lithium ion battery
- GPS antenna
- 10 dB Coaxial attenuator (Q2)
- Coax 50  $\Omega$  terminated N-male
- Open/short M type N
- Adapter storage box
- Shoulder strap
- Documentation (CD ROM)A
- 2' M-N to M-N cables (Q2)
- 10' M-N to M-N cable
- N-female to N-female barrel (Q2)
- Adapters

## Ordering information – options

Note: Upgrade options for the E7495A/B use the designation E7495XU before the respective option number.

E7495B-200	cdmaOne and CDMA2000 1X TX analyzer
E7495B-205	CDMA2000 1xEV-DO analyzer (RX testing requires Option 510, adds OTA functionality if Option 210 is selected)
E7495B-210	cdmaOne, CDMA2000 1X over-the-air test (requires Option 200, recommend 810/811/812 or equivalent)
E7495B-220	Channel scanner
E7495B-230	GSM TX analyzer
E7495B-235	EDGE TX analyzer
E7495B-240	W-CDMA (UMTS) TX analyzer
E7495B-245	HSDPA TX analyzer
E7495B-250	W-CDMA (UMTS) over-the-air test (requires Option 240, recommend 813 or equivalent)
E7495B-270	Interference analyzer
E7495B-300	DC Bias
E7495B-330	Nortel CDMA base station software (requires Option 200, 510, 600)
E7495B-500	CW signal generator
E7495B-510	CW, cdmaOne, CDMA2000 1X, CDMA2000 1xEV-DO, iDEN (requires Option 205) reverse link signal generator
E7495B-600	Power meter (requires power sensor)
E7495B-700	T1 analyzer
E7495B-710	E1 analyzer
E7495B-801	Soft carry case
E7495B-802	Backpack
E7495B-803	40 dB 100 W attenuator
E7495B-805	Paper manual
E7495B-810	Cellular antenna and pre-selector filter for Option 210
E7495B-811	PCS antenna and pre-selector filter for Option 210
E7495B-812	Korean PCS antenna and pre-selector filter (required for Option 210)
E7495B-813	Antenna and pre-selector filter (required for Option 250)
E7495B-820	Battery pack, external battery charger, DC car adapter
E7495B-840	Transit case
E7495B-51B	Return to Agilent repair
E7495B-50C	Return to Agilent calibration
N8482A-CFT	Power sensor



## Additional Agilent Literature

### CD

Agilent Base Station Test Set  
*literature number 5988-7189EN*

### Photo Card

Agilent E7495A/B Base Station Test Set:  
Option 330 Nortel CDMA Base Station  
Test Software  
*literature number 5988-1783EN*

Agilent E7495B Base Station Test Set:  
E7495B Option 205-1xEV-DO Analyzer  
E7495XU Option 205-1xEV-DO Analyzer upgrade  
E7495B Firmware upgrade 4.0  
*literature number 5989-2846EN*

Agilent E7495B Base Station Test Set:  
E7495B Option 240-W-CDMA Analyzer  
E7495B Option 245-HSDPA Analyzer  
E7495B Option 250-W-CDMA/HSDPA OTA  
*literature number 5989-4060EN*

Agilent E7495A/B Base Station Test Set:  
E7495A/B Option 230-GSM Analyzer  
E7495A/B Option 235-EDGE Analyzer  
E7495A/B Option 270-Interference Analyzer  
*literature number 5989-4563EN*

## For More Information

For more information about Agilent's solutions for the communications industry, visit our Web site at [www.agilent.com](http://www.agilent.com)

For more information about the Agilent E7495B Base Station Test Set, go to: [www.agilent.com/find/E7495B](http://www.agilent.com/find/E7495B)



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