

Safety and Regulatory Information and Specifications

E7495A/B Base Station Test Set Specifications

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

The E7495A/B Base Station Test Set has been tested to the specifications of IEC 529 “Degrees of Protection Provided by Enclosures (IP Code).” Using this standard, the E7495A/B is rated IPX4.

Supplemental Characteristics are intended to provide additional information useful in applying the test set by giving typical, but non-warranted performance parameters.

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 not normally tested during manufacturing.

Supplemental characteristics are intended to provide additional information useful in applying the instrument by giving typical, but non-warranted, performance parameters. These characteristics are shown in *italics* or labeled as “typical,” or “usable to”.

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Table 21-1

E7495A/B Base Station Test Set General Specifications

Unless otherwise noted, the following specifications apply to all measurements/tools using Port 2.	
Frequency accuracy:	
Using internal time base:	<b>≤ ± 1 ppm</b>
Internal frequency aging	<b>± 1 ppm aging/year</b>
With GPS lock for > 15 minutes:	<b>≤ ± 0.03 ppm</b>
Input frequency range:	500 kHz to 2700 MHz (Refer to individual measurement tools below for applicable frequency ranges.)
Maximum input level:	+ 20 dBm (.1 W), + 50 dBm with supplied attenuator

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**Table 21-1 E7495A/B Base Station Test Set General Specifications**

Maximum input power without damaging instrument:	100 W (without external attenuator)
Frequency and time reference:	
Can use internal timebase or external signal:	
GPS (external antenna supplied)	
Even second; pulse	
1.000 MHz:	$\geq 0$ dBm (E7495B only)
2.048 MHz:	$\geq 0$ dBm (E7495B only)
4.950 MHz:	$\geq 0$ dBm (E7495B only)
10.000 MHz:	$\geq 0$ dBm
13.000 MHz:	$\geq 0$ dBm (E7495B only)
15.000 MHz:	$\geq 0$ dBm (E7495B only)
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 2500 MHz
Attenuation accuracy:	$\pm 0.5$ dB
Max power:	50 dBm (100 W)
<b>Spectrum Analyzer / Tools</b>	
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 external 40 dB attenuator) (30 Hz RBW)
Input attenuation:	0 to 30 dB automatically selected. 10 dB controllable manually.

**Table 21-1 E7495A/B Base Station Test Set General Specifications**

Amplitude accuracy:	$\pm 1$ dB (100 MHz – 2500 MHz at 25 °C)
Resolution bandwidth:	10 Hz to 1 MHz, settable to 1 Hz precision
Span:	1 kHz to 2.6995 GHz
Trace update:	
Span:	2.6995 GHz (autocouple) = 5.1 seconds 60 MHz (autocouple) = 400 ms 1 MHz (100 Hz RBW) = 1.2 seconds
Simultaneous dynamic range:	> 90 dB (CW signals at 300 kHz separation, span 500 kHz, 30 Hz RBW)
SSB phase noise:	$\leq -85$ dBc (30 kHz offset)
Spurious responses:	
Range control set to auto, high sensitivity mode internally generated.	
50 ohm 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 Tester

For each of the following measurements, a short self-calibration procedure must be run prior to making the measurement.

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/point
60 MHz span:	< 7 ms/point

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Return loss (Port 1): With $\geq 4$ averages and 375 MHz to 2200 MHz	
Range:	<i>E7495B &gt; 40 dB, E7495BA &gt; 30 dB</i>
VSWR:	<i>E7495B &lt; 1.02, E7495A &lt; 1.07</i>
Resolution:	0.1 dB
Display range:	–5 to +150 dB
SWR range:	1 to 500
Distance to Fault (Port 1):	
Range (m):	1 m to 300 m
Resolution:	$(1.5 \times 10^8) (V_f)/(f_2 - f_1)$ Hz where $V_f$ is relative propagating velocity of the cable. Typically 1% of measurement distance
VSWR:	1 to 500
Insertion loss (Port 1 to Port 2):	
Measurement uses supplied 10 dB pads.	
Usable range:	<i>&gt; 100 dB wide range mode</i>
Accuracy:	$\pm 1$ dB (over 0 to 60 dB, $\geq 16$ averages)
Readout resolution:	$\pm 0.1$ dB
Average insertion loss (readout) accuracy: $\pm 0.1$ dB for	$\pm 0.1$ dB; for Range – 0 to 40 dB, Frequency (mobile phone bands) – 824 to 960 MHz, 1710 to 2170 MHz

**Table 21-2 E7495A/B Base Station Test Set Option Specifications**

**cdmaOne / cdma2000 Tx Analyzer Option 200**

Waveform quality accuracy ( $\rho$ ):	$\pm 0.005$ for $0.9 < \rho < 1.0$ (min. power at RF input $> -85$ dBm)
Pilot time alignment ( $\tau$ ):	$\pm 500$ nSec
Code domain power accuracy:	$\pm 1.5$ dBm absolute, $\pm 0.5$ dB relative ( $> -20$ dB)
Pilot power:	$\pm 1.5$ dB

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<b>RF Channel Scanner Option 220</b> (includes adjacent channel power)	
Measurement range	+20 dBm to –125 dBm > 375 MHz, 10 kHz RBW (up to +50 dBm with external attenuator)
Frequency readout accuracy:	Timebase accuracy +3 Hz + 1 / (measurement time X duty cycle)
Frequency range:	10 MHz to 2700 MHz
RF channel power:	± 1 dB (100 to 2500 MHz)
Adjacent channel power accuracy:	± 0.75 dBc
<b>GSM Analyzer Option 230</b>	
Frequency range:	100 MHz to 2500 MHz (usable to 10 MHz)
RF channel power:	± 1 dB (0 to –70 dBm)
Phase error floor:	< 2.5 degrees RMS
Phase error accuracy:	< 1 degree RMS, 2 degrees ≤ Phase Error ≤ 15 degrees
Frequency error accuracy:	± 40 Hz with external reference
<b>NOTE</b>	Please see the product overview for the latest specifications. This can be found by visiting the Agilent website at <a href="http://www.agilent.com/find/E7495B">www.agilent.com/find/E7495B</a> , and clicking on the “E7495B Base Station Test Tool Product Overview” link.
<b>W-CDMA (UMTS) Option 240</b>	
Error Vector Magnitude (EVM): Conditions:	Resolution 0.1%; residual error <6% Min power at RF input > –65 dBm, 3GPP test model 4
Code Domain Power Accuracy:	±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 and test model 3 (with 16 DPCH and 32 DPCH))
Scrambling Code Determination	1 second (in auto mode)

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**DC Bias Option 300 (Port 1) E7495B only**

DC Voltage:	<i>+12.7 VDC maximum</i>
DC Current:	<i>800 mA maximum</i>
Volt-Amps:	<i>9.84 VA maximum</i>

**Signal Generator (CW) Option 500 (Port 1)**

Frequency range:	<i>375 to 2500 MHz</i>
Output level:	<i>−23 to −95 dBm</i>
Level accuracy:	<i>± 1 dB between −25 to −85 dBm</i>
Phase error:	<i>At 30 KHz offset −90 dBc/Hz</i>

**cdmaOne / cdma2000 Reverse Link Signal Generator Option 510 (port 1)**

Frequency range:	<i>375 to 2500 MHz</i>
Output level (E7495A):	<i>−50 to −95 dBm</i>
Output level (E7495B):	<i>−28 to −95 dBm</i>
Level accuracy:	<i>± 1.5 dB (−50 dBm to −90 dBm)</i> <i>± 2 dB (&gt;−50 dBm)</i>

**Power Meter Option 600**

Display

Range:	<i>−100 dBm to +100 dBm</i>
Limits:	<i>± −100 dBm</i>
Resolution:	<i>Settable 1.0, 0.1, 0.01, 0.001 in logarithmic mode or 1, 2, 3, or 4 significant digits in learner mode.</i>

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Instrumentation Accuracy:	
Absolute:	$\pm 0.02$ dB (log) or $\pm 0.5\%$ (linear) Add the corresponding power sensor linearity percentage.
Relative:	$\pm 0.04$ dB (log) or $\pm 1.0\%$ (linear) Add the corresponding power sensor linearity percentage.
Zero set accuracy:	<b>Zero set is the digital zero with an 8482A sensor</b> $\pm 50$ nW
Power reference accuracy:	
Power output:	<b>1.00 mW (0.0 dBm)</b> traceable to the U.S. National Institute of Standards and Technology (NIST).
Accuracy:	$\pm 1.2\%$ worst case ( $\pm 0.9\%$ rss) for one year
VSWR:	$< 1.08$
External attenuator:	
Max power:	100 watts
Attenuation:	40 dB $\pm 0.5$ dB
<b>Power meter Option 600 with Agilent 8482A power sensor</b> <b>(also supports Agilent 8481A power sensor)</b>	
Frequency Range:	100 kHz to 4.2 GHz
VSWR	
100 kHz to 1 MHz:	$< 1.60$
0.3 MHz to 1 MHz:	$< 1.20$
1 MHz to 2 GHz:	$< 1.10$
2 GHz to 4.2 GHz:	$< 1.3$
Power linearity:	<b>+ 10 dBm to +20 dBm; <math>\pm 3\%</math></b>
Maximum power:	<b>300 mW average. 1 W peak, 30 W - <math>\mu</math>sec per pulse</b>
Measurement noise:	$< 93.5$ nW (0.85 + 110 nW)
Average filtering:	Fixed at 32 in normal mode
Zero drift:	$< \pm 10$ nW

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**Table 21-2 E7495A/B Base Station Test Set Option Specifications**

**T1 Analyzer Option 700**

Receive level (line 1 and line 2):	+6 dB DSC to –36 dB DSX or 100 mv peak-to-peak to 12 V peak-to-peak  Receive frequency (line 1 and line 2) display receive frequency (5 ppm) “Loopback” control send CSU or NIU loop codes CSU/NIU emulation respond to CSU or NIU loop codes
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 ohms and 0 dB line build-out is selected
Line build out	0 dB, –7.5, –15 dB
Input:	
Terminate:	DSX +6 dB to DSX –36 dB, 100 ohms
Monitor:	DSX –14 dB to DSX –40 dB, 100 ohms
Bridge	DSX + 6 dB to DSX –36 dB, > 1000 ohms
Clock:	1.544 MHz
Internal:	± 5 ppm
External:	± 300 ppm
Recovered:	± 300 ppm
Transmitter and receiver:	
Framing: Unframed:	D3 / D4 and ESF
Channel formats:	Full T1, 64 X 1
Test patterns:	QRSS, all Os, 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)



**Table 21-2 E7495A/B Base Station Test Set Option Specifications**

<b>E1 Analyzer Option 710</b>	
Error detect:	Code (BPV), FAS, MFAS, CRC-4, Far End Block (FEBE), Pattern, Fame 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 (line 1):	Display receive frequency ( $\pm 5$ ppm)
Channel access:	Output audio to system
Delay measurement:	Measure delay in unit intervals for “looped-back” signal
<b>Electrical Interface:</b>	
Connectors, Rx, Tx:	Primary and secondary ports
Output:	Conforms to ITU-T Rec.G.703
Line code:	AMI, HDB3
Impedance:	Terminate: 75 ohms $\pm 5\%$ Bridge: > 1000 ohms
Input:	Terminate: DSX +6 dB to DSX -36 dB
Bridge:	DSX +6 dB to DSX -36 dB
Clock:	2.048 MHz
Internal:	$\pm 5$ ppm
External:	$\pm 300$ ppm
Recovered:	$\pm 300$ ppm
<b>Transmitter and receiver</b>	
Framing:	Unframed, PCM-30, PCM-30 with CRC, PCM-31, PCM-31 with CRC
Channel Formats:	Full E1, 64x1

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**Table 21-2 E7495A/B Base Station Test Set Option Specifications**

Test Patterns:	(True or Inverse, ITU Rec) $2^6-1$ (Q6&Q5), $2^9-1$ (V.52), $2^{11}-1$ (0.152), $2^{15}-1$ (0.151) $2^{20}-1$ (V.57), QRSS, $2^{23}-1$ (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

**Table 21-3 E7495A/B Base Station Test Set General Specifications**

Display:	Transflective VGA and color LCD
Dimensions	
Height:	11.6", 295 mm
Width:	14.5", 368 mm
Depth:	5.3", 135 mm
Weight (without batteries):	20 lbs, 9.1 kg
Power supply:	
Internal:	<i>Lithium Ion battery: 10.8 volts, 6.0 Ah (1 NI2040AG shipped standard, will accept 2 batteries)</i>
External:	DC Input +9 V to +25 V dc (55 Watts)
Battery life:	<i>Approximately 1.5 hour per battery (time varies depending upon instrument mode)</i>

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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 CompactFlash memory (type 1 & 2) Stereo headphone jack General purpose input/output - TTL level (reserved for future use)
Inputs	
Port 2 RF in:	50 ohm type N
External DC input:	+9 V to + 25 V DC (55 Watts)
Frequency reference:	
Input power:	<i>-10 to + 10 dBm</i>
Connector:	<i>50 ohm BNC</i>
Even second:	
Connector:	<i>High impedance BNC</i>
Level:	<i>TTL compatible</i>
GPS antenna:	
Connector:	SMA
Output:	5 V at 50 mA
Outputs:	
Port 1 RF Out/SWR Connector:	<i>50 ohm type N</i>
Power reference:	<i>50 ohm type N; SWR &lt; 1.06</i>

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Optional Connectors:	
Option 600 power meter:	
Outputs:	50 ohm type N power reference
Inputs:	Sensor input for 8480 series sensors
Option 700 T1 analyzer:	
Out puts:	(2) Bantum outputs; Tx primary and secondary
Inputs:	(2) Bantum inputs; Rx primary and secondary
Option 710 E1 analyzer:	
Outputs:	(2) 75 ohm BNC outputs; Tx primary and secondary
Inputs:	(2) 75 ohm BNC inputs; Rx primary and secondary
Operating temperature specified range:	<i>−10 ° to 50 °C; 14 ° to 122 °F</i>
Storage temperature:	<i>−40 ° to 70 °C; −40 ° to 158 °F</i>
Calibration Cycle:	1 year
Warranty Duration:	1 year