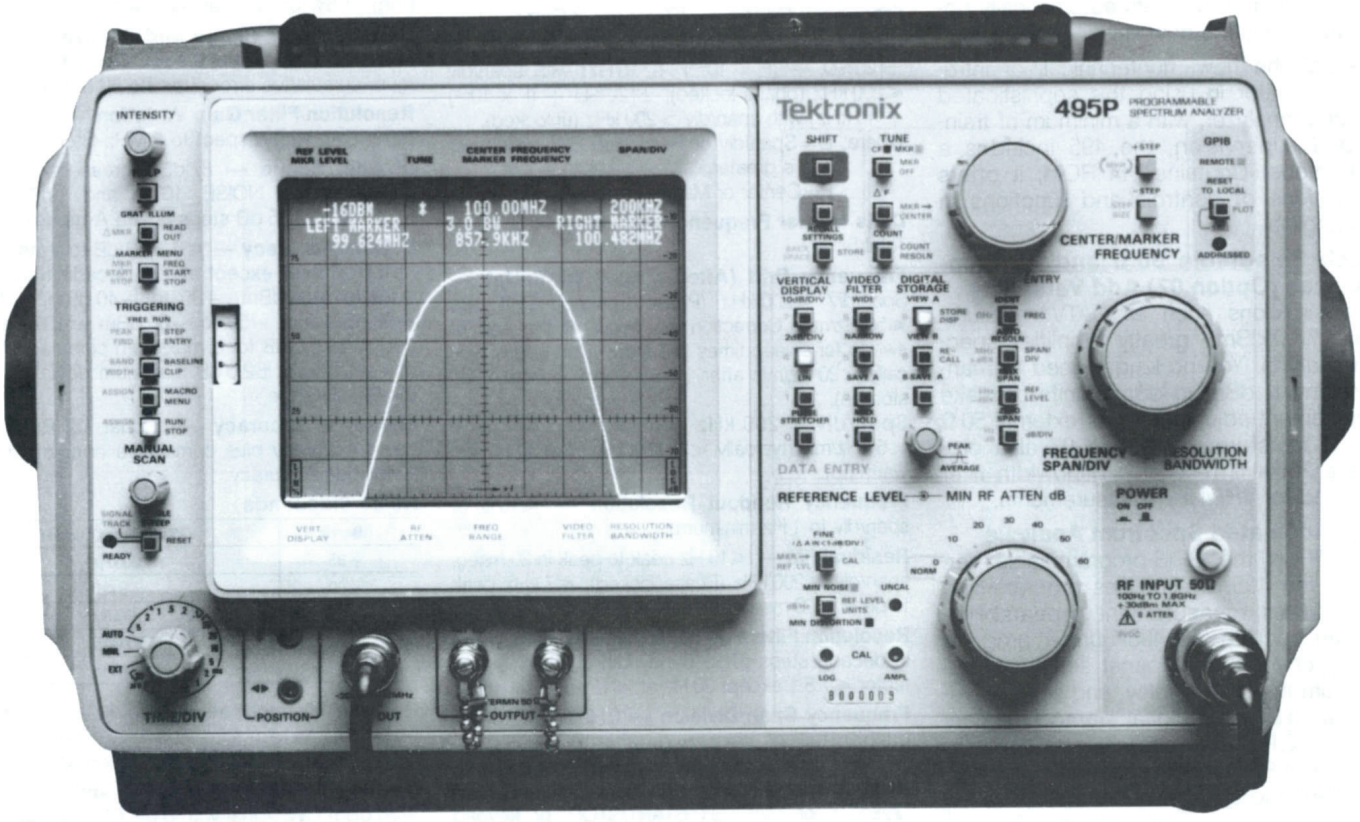
NEW

GPIB

NO COMPROMISE PERFORMANCE IN THE 495/495P PORTABLE SPECTRUM ANALYZERS



NEW 495/495P

Portable Spectrum Analyzers

GPIB IEEE-488

The 495P complies with IEEE Standard 488-1978, and with Tektronix *Standard Codes and Formats.*

Covers 100 Hz to 1.8 GHz With −130 dBm Sensitivity and ±1 dB Frequency Response

10^{-9} Marker and Center Frequency Accuracy, Built-In Signal Counter, External Reference Input With Option 05: 10^{-5} Frequency Accuracy With the Standard 495/495P

Front Panel Execution of Downloaded Programs With the 495P Option 05

Intelligent Markers With Signal Processing Functions

Pushbutton Occupied Bandwidth and Noise Normalization Functions

Switch Selectable 50 Ω and 75 Ω Impedances (Option 07) for IF, CATV and Local Area Network Applications

Nonvolatile Memory for Up to Nine Waveforms and Nine Front Panel Settings

Direct Keypad Entry of Control Parameters

HELP Mode Explains Front Panel Controls and Signal Processing Functions at the Touch of a Button

Optional MATE/CIIL Compatibility for Military System Integration

Lab Quality Performance Made Fully Portable and Easy to Use

The Tektronix 495 Spectrum Analyzer offers features essential for lab grade measurements in a lightweight, portable package. Offering frequency coverage from 100 Hz to 1.8 GHz, with an impressive −130 dBm sensitivity and advanced, intelligent markers with exclusive signal processing capabilities, the 495 is optimized for use in baseband through UHF measurements, where ability to identify and process weak signals is critical.

Option 05 Offers Macro Programming, 10^{-9} Frequency Accuracy, Signal Counting and System Clock Compatibility

Downloadable programming capability (495P only) lets you execute frequently used measurement routines from the spectrum analyzer's nonvolatile memory. An internal high stability reference provides 10^{-9} marker or center frequency accuracy for added confidence in measurements. A built-in signal counter with 140 dB dynamic range means you can determine the exact frequency of marked signals only 30 Hz apart, or count the exact delta frequency between two marked signals, even with greatly differing amplitudes.

With Option 05 you also have the flexibility of coupling to a system clock, using the instrument's external reference lock capacity.

Nonvolatile memory lets you store up to nine front panel settings and nine waveforms, simplifying setup and making field operation easier. A permanent record of CRT displays can be obtained at the push of a button, without a controller, using the direct plot capability.

Menu-Selected, Intelligent Markers and Signal Processing

New dynamic markers automatically update frequency and amplitude data with every sweep. In conjunction with the 495's powerful signal processing intelligence, you can use PULSE mode to mark the peak of a main lobe and peaks of side lobes at the push of a button. CW mode locates signals exhibiting CW characteristics and ignores all other signals. SPUR mode marks signals that meet user-definable or automatic threshold criteria. Threshold criteria are available for all signal processing modes.

The 495 also offers hands-off convenience for measuring the bandwidths of filters, amplifiers and other networks. Simply enter the desired bandwidth point, select Bandwidth mode, and markers automatically update to display the new value.

To assist the new, nontechnical, or infrequent operator in using this sophisticated spectrum analyzer, with a minimum of training and supervision, the 495 includes a HELP mode. Contained in ROM, it offers descriptions of controls and functions in plain English.

Switch Selectable 50 Ω and 75 Ω Impedances (Option 07) Add Versatility
For applications such as CATV measurements, 75 Ω/dBmV greatly simplifies spectrum analysis. You no longer need to manually convert dBm to dBmV units or make measurement adjustments for external 50 Ω to 75 Ω transformers. Option 07 also provides a 300 kHz resolution bandwidth filter optimized for VHF/UHF measurements.

Fully Automated Spectrum Analysis
The 495P is the GPIB-programmable version of the 495. It simplifies programming and ensures measurement repeatability. You can operate the 495P under program control, change front panel settings, read data from the CRT display, and send waveforms from internal digital storage memory to other GPIB devices. Tek's *Standard Codes and Formats* keep commands clear, consistent and universally understood.

You can increase programming flexibility and power with the 495P's MATE/CIIL language extension (Option 45). It provides direct memory access for high speed data transmission, a requirement for MATE/CIIL compliance.

To meet budget constraints or future applications, you can add full programmability to a standard 495 at any time. Your Tek Service Center is eager to assist when you are ready to convert.

There are many other time-saving and accuracy enhancing capabilities. See the summary of signal processing and marker functions on page 160 for a more complete idea of the 495 measurement benefits. Talk to your Tektronix Spectrum Analyzer Sales Engineer for complete details.

Tektronix Automated Spectrum Analyzer Packages
Convenient to order, these packages are configured around the IBM PC and Tek laboratory quality programmable 490P Series spectrum analyzers. Coupling the PC to the analyzer via the IEEE-488 bus enables the user to take advantage of the PC's capability, as well as the power and versatility of Tek's spectrum analyzers. A highly versatile General RF Applications Software Package (GRASP) offers many different applications and utility routines which are selected through easy, menu driven operation.

CHARACTERISTICS

The following characteristics apply after a 30 minute warm-up period unless otherwise noted.

FREQUENCY RELATED

Frequency Range — 100 Hz to 1.8 GHz.

Center and Marker Frequency Accuracy*1 — ±[20%D + (F x 10^{-5}) + 15 Hz] with span/div ≤200 kHz (phase locked); ±[20%D + (F x 10^{-5}) + 15 kHz] with span/div >200 kHz (unlocked).
Where: D=Span/div or Resolution BW, whichever is greater.
F=Center or Marker Frequency.

Delta Marker Frequency Accuracy — ±1% of Total Span.

Frequency Drift (After 1 Hour Warm-Up) — Span/div ≤200 kHz (Phase Locked): Drift rate ≤50 Hz/min. Correction will occur at the end of sweep for sweep times ≥5 s/div. (Drift rate is typically <20 Hz/min after 1 hour warm-up from 25°C storage).
Span/div >200 kHz (unlocked): Drift rate <5 kHz/min (typically <25 kHz/min after 30 minute warm-up).

Frequency Readout Resolution — ≤10% of span/div to 1 Hz minimum.

Residual FM — ≤10 Hz peak-to-peak in 20 msec, span/div ≤200 kHz (Phase locked); ≤7 kHz peak to peak in 20 msec, span/div >200 kHz (unlocked).

Resolution Filters — 30 Hz then 100 Hz to 1 MHz in decade steps (6 db bandwidth ±20%); Shape factor ≤7.5:1 except 30 Hz at ≤12:1 (60 dB/6 dB).

Frequency Span/Division — 0 Hz (ZERO SPAN pushbutton or keypad data entry); 20 Hz to 100 MHz (in a 1-2-5 sequence) via span/div knob; 20 Hz to 170 Hz (to two significant digits) via FREQUENCY or MARKER START/STOP, or keypad data entry; 180 MHz via power-up, RESET, or MAX SPAN pushbuttons; accuracy ±5%.

Frequency Response — ±1.0 dB (measured with 10 dB RF attenuation).

Zero Frequency Spur — −24 dBm maximum measured into 50 Ω and open circuit with 0 dB RF attenuation; −35 dBm typical.

AMPLITUDE RELATED

Vertical Display Modes — 10 dB/div, 2 dB/div and linear via pushbutton; any integer from 1 to 15 dB/div via Data Entry keypad.

Display Dynamic Range — 80 dB Log mode; 8 divisions Linear mode.

Reference Level Range — Log Mode : −117 to +40 dBm (+30 dBm maximum); −130 to +27 dBV (+17 dBV maximum); −70 to +87 dBmV (+77 dBmV maximum); −10 to +147 dBμV (+137 dBμV maximum).
Linear Mode: 39.6 nV/div to 2.8 V/div (1 W or 10 V peak maximum).

Reference Level Steps — 10 dB coarse, 1 dB fine in 10 dB log; 1 dB coarse, 0.25 dB fine in 2 dB log; 1-2-5 sequence coarse, 1 dB equivalent fine in linear; coarse step=Log/div (except 1 dB for 2 dB/div), fine is 1 dB for ≥5 dB or 0.25 dB for ≤4 dB/div, set via Data Entry keypad.

Reference Level Accuracy — Accuracy is dependent on a combination of RF Attenuator Accuracy, IF Gain Accuracy, Resolution Bandwidth, Display Mode, Calibrator Accuracy, Frequency Response and Temperature Change. (±0.15 dB/°C maximum.)

**1 Reference Oscillator Accuracy: ±1.5 kHz over the temperature extremes of −15°C to +55°C.*

Display Amplitude Accuracy — ±1.0 dB/10 dB to a maximum error of ±2.0 dB over 80 dB range (10 dB/div Log); ±0.4 dB/2.0 dB to a maximum error of ±1.0 dB over 16 dB range (2 dB/div Log); ±5% of full scale in Linear.

RF Attenuator Range and Accuracy — 0 to 60 dB in 10 dB steps; 0.5 dB/10 dB, 1.0 dB maximum cumulative error over the 60 dB range.

Resolution Filter Gain Variation — <±0.4 dB (after CAL with respect to 1 MHz filter).

IF Gain Range — 87 dB increase, 10 dB decrease in MIN NOISE, 10 dB and 1 dB steps; 57.75 dB in 0.25 dB steps (Delta A mode).

IF Gain Accuracy — ≤0.2 dB/dB to a maximum of 0.5 dB/9 dB except at the decade transitions −29 to −30 dBm, −39 to −40 dBm, −49 to −50 dBm and −59 to −60 dBm which add an additional 0.5 dB for a maximum cumulative error of 1 dB/10 dB; ±2.0 dB maximum deviation over the 97 dB range.

Marker/s Accuracy — Equal to Reference Level Accuracy plus cumulative error of Display Amplitude Accuracy.

Noise Sidebands

dBc/Hz	Offset From Carrier
−85	900 Hz
−90	3 kHz
−105	30 kHz
−115	300 kHz
−125	3 MHz

Residual Responses — ≤−100 dBm with input terminated and 0 dB RF attenuation (≤−95 dBm for Rackmount Option 31).

Harmonic Distortion — ≤−60 dBc for a −30 dBm CW signal with 0 dB RF Attenuation in MIN DISTORTION mode.

Third Order Intermodulation Distortion — ≤−70 dBc for any two on-screen CW signals within any frequency span in MIN DISTORTION mode.

Sensitivity (Equivalent Input Noise)

Sensitivity dBm	Resolution
−130	30 Hz
−125	100 Hz
−115	1000 Hz
−105	10 kHz
−95	100 kHz
−85	1 MHz

LO Emissions — ≤−70 dBm with 0 dB RF attenuation.

INPUT SIGNAL

RF Input — Type "N" female, 50 Ω nominal impedance.

VSWR — 1.3:1 maximum, 1.2:1 typical, with 10 dB or more RF attenuation; 2.0:1 maximum, 1.9:1 typical, with 0 dB attenuation.

Maximum Safe Input (0 dB RF Attenuation) — +30 dBm (1 W) continuous, 75 W peak, 1 μsec pulse width, 0.001 duty; 0 Vdc.

1 dB Gain Compression — −10 dBm with 0 dB RF attenuation in MIN NOISE; −20 dBm with 0 dB RF Attenuation in MIN DISTORTION; (No gain compression can be observed on screen).

OUTPUT SIGNALS

Calibrator (Cal Out) — −20 dBm ±0.3 dB at 100 MHz ± 10 PPM.

1st and 2nd LO — Provides access to the output of the respective local oscillators. 1st LO output range +6 dBm to +15 dBm; 2nd LO output range −10 dBm to +15 dBm; these ports must be terminated in 50 Ω at all times.

Vertical Output — Provides 0.5 V ±5% of signal/div of video above and below the CRT centerline; 1 kΩ source impedance.

Horizontal Output — Provides 0.5 V either side of the CRT centerline. Full range ±2.5 V ±10%.

Pen Lift — TTL compatible, +5 V nominal to lift pen.

10 MHz IF Output — Output level is −5 dBm for a full screen signal at −30 dBm reference level; 50 Ω nominal impedance.

110 MHz IF Output (Option 42) — Center frequency from 108.5 MHz to 111.5 MHz; 3 dB bandwidth >5 MHz; Bandpass ripple ≤0.5 dB; power out with −30 dBm reference level and a full screen signal ≤0 dBm; 1 dB compression at ≥0 dBm output, MIN DISTORTION; 50 Ω nominal impedance.

Probe Power — Provides operating voltages for active probes. Pin 1: +5 V at 100 mA maximum. Pin 2: Ground. Pin 3: −15 V at 100 mA maximum. Pin 4: +15 V at 100 mA maximum.

IEEE Standard 488-1978 Interface Function Subsets Implemented — 495P Version: In accordance with IEEE Std 488-1978 implemented as SH1, AH1, T5, L3, SR1, RL1, PP1, DC1, DT1, and CØ. 495 Non-P Version (Plotter Output): Implemented as SH1, AHØ, T3, LØ, SRØ, RLØ, PPØ, DCØ, DTØ, and CØ.

DISPLAY CHARACTERISTICS

CRT — 8 cm x 10 cm, GH (P31) phosphor.

CRT Readout — Displays: Reference level, center frequency, marker frequency and amplitude, frequency range, vertical display mode, frequency span/div, resolution bandwidth, RF attenuation, video filter, and text.

Video Filter Range — 0.3 Hz to 30 kHz (coupled to resolution filter by front panel pushbuttons).

Sweep — Triggered, auto, manual, single sweep, and external.

Sweep Time — 20 μs to 5 s/div (10 s/div in Auto) in a 1-2-5 sequence; accuracy ±5%.

Triggering — Internal, External, Line, and Free Run; Internal Trigger Level ≥2 div of signal; external level ≥1 V peak, 15 Hz to 1 MHz, 50 V maximum (dc + ac peak).

Digital Storage — 1000 points Horizontal, 250 points Vertical; A and B Views; Save A; Max Hold; B to Save A; digital averaging (Peak/Average); Pulse Stretcher.

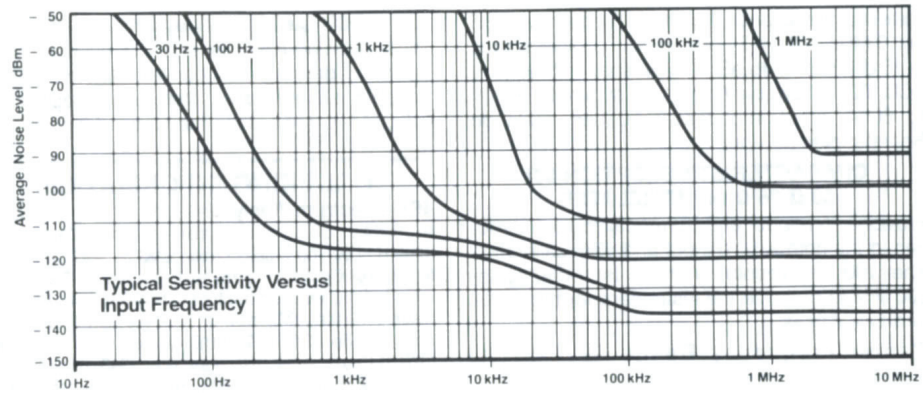
Nonvolatile Display Memory — Store and recall up to 9 full waveforms complete with CRT readouts.

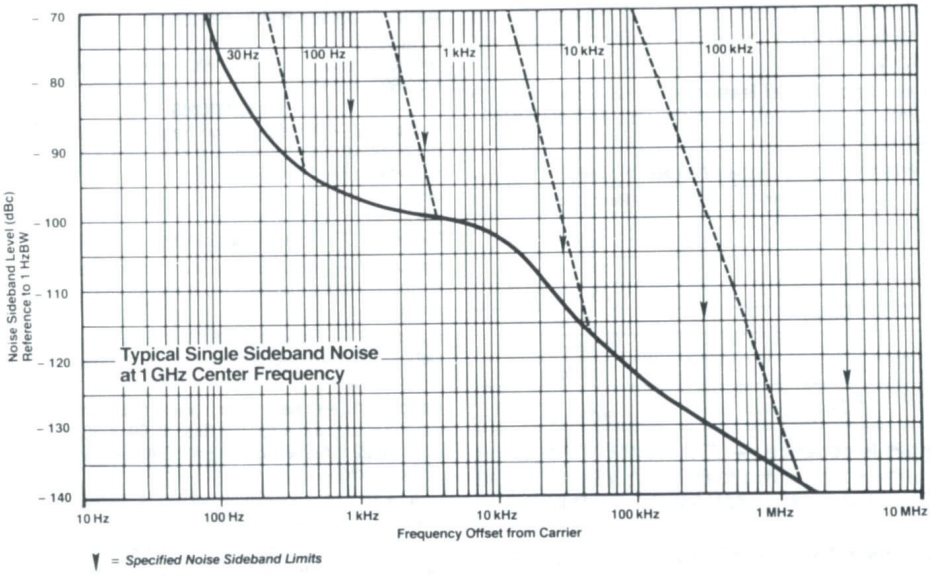
GENERAL CHARACTERISTICS

Input Voltage — 90 to 132 V ac or 180 to 250 V ac, 48 to 440 Hz.

Power — 210 W maximum with all options, at 115 V and 60 Hz.

Configuration — (Portable) 19.1 kg (42 lb) including cover and included accessories. Option 05 adds .4 kg (.9 lb). Option 07 adds .2 kg (.4 lb); 175 mm x 327 mm x 499 mm (6.9 in x 12.9 in x 29.6 in).





ENVIRONMENTAL

Meets MIL-T-28800C, Type III, Class 3, Style C specifications as follows:

Temperature — Operating: −15°C to +55°C. Nonoperating: −62°C to +85°C.

Altitude — Operating: 15,000 feet (tested to 25,000 feet). Nonoperating: 40,000 feet (50,000).

Vibration — Operating: 15 Hz to 55 Hz at 4 g maximum per MIL-STD-810D, Method 514, Procedure I (modified).

Humidity — Operating: 95% (+5%, −0%). Nonoperating: Five cycles (120 hours) in accordance with MIL-STD-810D Procedure 3 (modified).

Shock — Operating and Nonoperating: 30 g, one-half sine, 11 ms (tested to 50 g).

Transit Drop — Free fall, 12 inches, one per each of six faces and eight corners.

Electromagnetic Compatibility — Meets requirements of MIL-STD-461B Part 4 tested as follows:
Conducted Emissions: CE01, 1 kHz to 15 kHz only; CE03, 15 kHz to 50 kHz relaxed by 15 dB.
Conducted Susceptibility: CS01; CS02; CS06.
Radiated Emissions: RE01, Relaxed by 10 dB for fundamental to the 10th harmonic of power line (exceptioned, 30 kHz to 36 kHz); RE02.
Radiated Susceptibility: RS01; RS02, to 5A only; RS03, up to 1 GHz.

CHARACTERISTICS (OPTION 05)

Provides precision internal reference, signal counter, external reference input, and Macro (495P only) down-loadable programming capabilities.

Center and Marker Frequency Accuracy — ±[20%D + (F x Ref. Freq. Error) + 15 Hz] with span/div ≤200 kHz (Phase locked); ±[20%D + (F x Ref. Freq. Error) + 15 kHz] with span/div >200 kHz (unlocked).
Where: D=Span/div or Resolution BW, whichever is greater.
F=Center or Marker Frequency.

Reference Frequency Error (Internal) — ≤1 x 10^{-9} per day; ≤1 x 10^{-7} in the first six months, ≤1 x 10^{-7} year thereafter; Accuracy 30 minutes after power on within 5 x 10^{-8} of the frequency after 24 hours; Within 2 x 10^{-8} over the temperature range of −15°C to +55°C.

Signal Counter Accuracy — ±[(F x Ref. Freq. Error) + 12 Hz + 1 LSD]
Where: F=Center, Marker, or Delta Marker Frequency
LSD=Least Significant Digit

Counter Sensitivity — Signal level must be ≤20 dB above the average noise level and within 60 dB of the reference level.

Counter Readout Resolution — Selectable from 1 Hz to 100 MHz in decade steps.

TEK 100 Hz to 1.8 GHz PORTABLE SPECTRUM ANALYZERS

External Reference Input — Frequency: 1,2,5, or 10 MHz with ≤5 ppm stability. Power Range: −15 dBm to +15 dBm. Waveshape: Sinewave, ECL, TTL (Allowable Duty cycle symmetry is 40% to 60%). Input Impedance: 50 Ω ac, 500 Ω dc; Rear-panel BNC input.

CHARACTERISTICS (OPTION 07) 50 Ω/75 Ω INPUT RELATED

Provides 75 Ω input and dBmV calibration in addition to the normal 50 Ω input and dBm calibration. The 100 kHz resolution filter is replaced by 300 kHz to optimize the instrument for broadcast and CATV uses.

Center Frequency Range — 1 MHz to 1000 MHz.

Frequency Response — ±2.0 dB from 5 MHz to 1000 MHz; typical response for the 1 MHz to 5 MHz frequency range is <3 dB down from the 5 MHz response.

Reference Level Range — −68 dBmV to +79 dBmV (+89 dBmV is achievable in MIN NOISE mode).

Sensitivity (Equivalent Input Noise)

Sensitivity dBmV	Resolution
75 Ω Input 5 MHz to 1000 MHz −81	30 Hz
−76	100 Hz
−66	1000 Hz
−56	10 kHz
−41	300 kHz
−36	1 MHz
50 Ω RF Input −90 (dBm)	300 kHz

Input Impedance — 75 Ω; VSWR 1.35:1 (17 dB RL) maximum, 5 MHz to 800 MHz; VSWR 1.6:1 (13 dB RL) maximum, 800 MHz to 1000 MHz; BNC female.

Maximum Input Level — With 0 dB attenuation: +78 dBmV. With attenuation ≥20 dB: +78 dBmV, 100 V maximum (dc + ac peak).

Calibrator (Cal Out) — +20 dBmV ±0.5 dB; 75 Ω impedance nominal.

CHARACTERISTICS (OPTIONS 30 AND 31) RACKMOUNT

These options provide rackmount configurations with accessories drawer that mount in standard EIA 19 inch racks. Option 31 additionally provides rear-panel input/output connectors. These rackmounts affect the 495/495P electrical and environmental characteristics as follows:

Environmental — Meets MIL-T-28800C, Type III, Class 5, Style F.

Residual FM — May increase according to the rack frame environment; typically by a factor of two.

Electrical — (Option 31) Frequency Response: ±1.5 dB measured at the rear panel RF input. Residual Spurious Response: <−95 dBm.

Size — 8.75 x 16.89 x 25.00 inches (222 x 429 x 635 mm).

Weight — Adds 20 lbs. (9.1 kg) to the weight of the instrument.

PORTABLE TO RACK ADAPTOR

Those needing the utility of a rackmounted instrument and desiring easy convertibility to a rugged portable should order the rack adaptor P/N 016-0844-00 rather than the Option 30 or 31.

ORDERING INFORMATION

495 Spectrum Analyzer **$26,250**

Includes: 50 Ω coax cable, N to N Conn, 6 ft (012-0114-00); 50 Ω coax cable, BNC to BNC Conn, 18 in (012-0076-00); operator manual, Vol. 2 (070-5085-00); N male to BNC female adaptor (103-0045-00); 4A fast blow fuses (159-0017-00); power cord (161-0104-00); power cord clamp (343-0170-00); amber CRT light filter (378-0115-01); gray CRT light filter (343-0115-02); CRT mesh filter, (378-0887-01); Rear Connector Shield (337-3274-00).

495P Programmable Spectrum Analyzer **$29,950**

Includes: Same as 495 plus programmer's manual (070-5086-00).

OPTIONS

Option 05 — Adds precision frequency reference, signal counter, external reference lock, and macro programming.
(495) **+$2,500**
(495P) **+$3,000**
Includes: CRT mesh filter (378-0227-01).

Option 07 — Adds 75 Ω input and dBmV calibrator to the normal 50 Ω input and dBm calibrator. **+$750**

Option 30 — Rackmount; 8.75 x 16.89 x 25.0 inches (222 x 429 x 635 mm); fits EIA standard 19 inch rack. **+$790**

Option 31 — Rackmount with rear-panel input/output connectors; 8.75 x 16.89 x 25.0 inches (222 x 429 x 635 mm); fits EIA standard 19 inch rack. **+$840**

Option 39 — Replaces Lithium with Silver batteries for instrument memory. **+$50**

Option 42 — 110 MHz, >5 MHz bandwidth, IF Output suitable for broadband receiver measurements. **+$1,500**

Option 45 — MATE/CIIL language interface (495P only). **+$4,975**

Option 52*1 — North American 220 V configuration with standard power cord.

**1 To order, contact your local Tektronix Sales Office.*

INTERNATIONAL POWER PLUG OPTIONS

Option A1 — Universal Euro 220 V, 50 Hz.
Option A2 — UK 240 V, 50 Hz.
Option A3 — Australian 240 V, 50 Hz.
Option A4 — North American 240 V, 60 Hz.
Option A5 — Switzerland 220 V, 50 Hz.

WARRANTY-PLUS SERVICE PLANS

SEE PAGE 497

M1 — (495) 2 Calibrations. **+$1,735**
M1 — (495P) 2 Calibrations. **+$1,810**
M2 — (495) 2 Years Service. **+$2,875**
M2 — (495P) 2 Years Service. **+$3,015**
M3 — (495) 2 Years Service and 4 Calibrations. **+$3,470**
M3 — (495P) 2 Years Service and 4 Calibrations. **+$3,620**

SUMMARY OF SIGNAL PROCESSING AND MARKER FUNCTIONS

Assign Menu Functions — Marker functions that are assignable to nonvolatile front-panel pushbuttons ASSIGN 1 and ASSIGN 2 listed as follows:

RIGHT NEXT: Moves marker to the right next signal defined by "SIGNAL TYPE" in frequency.

LEFT NEXT: Moves marker to the left next signal defined by "SIGNAL TYPE" in frequency.

NEXT LOWER: Moves marker to the next lower signal defined by "SIGNAL TYPE" in amplitude.

NEXT HIGHER: Moves marker to the next higher signal defined by "SIGNAL TYPE" in amplitude.

MOVE RIGHT "X" dB: Moves marker to the right "X" dB (X can be + or −) in signal amplitude from its current position.

MOVE LEFT "X" dB: Moves marker to the left "X" dB (X can be + or −) in signal amplitude from its current position.

FIND PEAK AND CENTER: Marks the highest displayed signal and moves it to the center of the CRT screen.

Signal Type Menu — Sets the signal processor pattern recognition from a selection of three routines (chosen signal type remains in memory until overwritten by new selection, RESET, which defaults to CW, or power-down):

CW: Recognizes signals with CW characteristics and ignores all others (instrument selects this mode at power-up).

PULSE: Recognizes pulsed RF lobe patterns for line and dense spectrums and places marker at peaks for easy location of carrier spectral line.

SPUR: Recognizes ALL signals including impulses above the assigned Threshold.

Noise Normalization (dB/Hz) — Normalizes the noise measured at the marked position to 1 Hz; simplifies Phase Noise and Signal/Noise Ratio tests.

Signal Track — Locates, marks, and centers on the highest signal on screen above the Threshold. If track is lost, or if the signal drops below Threshold value, "SIGNAL TRACK IDLE" will be displayed on the CRT below the last "tracked" frequency and the instrument will "idle" there until track is regained.

Peak Find — Locates and marks the highest displayed signal on the CRT.

Bandwidth — Places markers the assigned number (from memory) of dB below, left and right of desired signal peak automatically after each sweep.

Marker to Reference Level — Changes reference level to the marker amplitude value.

Marker to Center — Changes center frequency to equal marker frequency.

Marker Start/Stop — Frequency start/stop sweep is matched to the current delta marker positions.

Step Size — Assigns either the center, marker, or delta marker frequency to the ±STEP frequency functions.

Macro Menu (495P Option 05 only) — Allows the selection from up to seven stored user-defined programs to be executed.

Run/Stop (495P Option 05 only) — Starts and stops execution of the selected Macro program.

Settings Store/Recall — Allows up to nine full front panel set-ups, plus a power-down last instrument state, to be stored and recalled from nonvolatile memory.

Zoom (495P only) — Moves the marked signal to center screen and decrements the span.