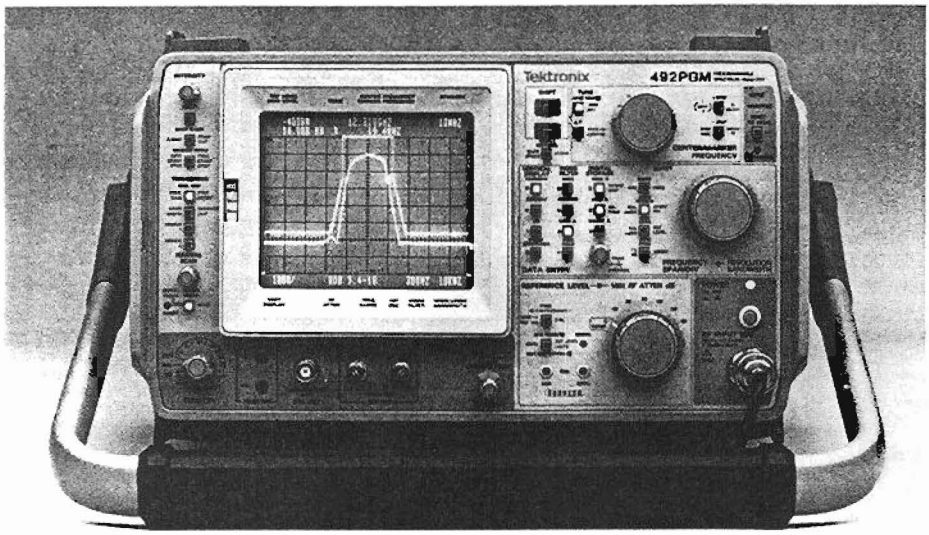

492PGM Spectrum Analyzer

490 Series
Spectrum Analyzers

100 Hz to 325 GHz Frequency Coverage

Continuous-Resolution Frequency Tuning Combines "Synthesized" Settability and Accuracy with Analog Feel

Up to 90 dB Viewable Dynamic Range

Built-in Frequency Counters Provide Frequency Determination to within 0.0000001% (1×10^{-9}/day ref.)

Sensitivities to −134 dBm

Built-in Intelligence for Signal Processing/Marker Functions

Push Button Occupied-Bandwidth and Noise-Normalization Functions

Macro Capability with Nonvolatile Memory to Simplify and Speed Up Commonly-Used Routines

Optional Switch-Selectable 50/75-ohm Impedances

Nonvolatile Memory for up to Nine Waveforms and Ten Front Panel Settings

GPIB Programmability with Tek Codes and Formats for Standardized Bus Operation

Optional MATE/CIIL Compatibility for Military Applications

Ergonomically-Designed Front Panel Controls

Direct Screen Data Plots without a Controller

Many Application-Specific Options

Ruggedized for Harsh Field Environments

Portable Laboratory Performance with Affordable Prices

Tektronix 490 Series Spectrum Analyzers offer a broad selection of features and benefits to meet wide-ranging needs for laboratory-level frequency domain spectrum analysis. All units provide full IEEE-488 (GPIB) programmability, which means you can change front panel settings, read data from the crt display, and send waveforms from internal digital source memory to other GPIB devices. Frequency range of the instruments is as follows:

10 kHz to 325 GHz: 494AP and 492BP
10 kHz to 21 GHz: 492PGM
100 Hz to 7.1 GHz: 497P
100 Hz to 1.8 GHz: 495P

Built to rugged MIL-T-28800C environmental specifications, these units can withstand transportation shock and vibration to a remote site. Or they can simply be moved from the engineering lab to the production floor with complete confidence in measurement accuracy.

A wide array of price/performance alternatives are available. If you need 10 Hz resolution for an exacting close-in spectral purity measurement, consider the 494AP. For more routine uses, such as a microwave transmitter occupied-bandwidth measurement, the 492PGM may be the most cost-effective solution.

A Wide Array of Intelligent Features

Downloadable programming (macro) capability lets you execute your frequently-used measurement routines from the Spectrum Analyzer's nonvolatile memory. In addition, these Spectrum Analyzers can store up to 10 complete front-panel measurement parameter setups in nonvolatile memory to save you measurement time. You can also save up to 9 waveform displays, a real benefit when data analysis must be delayed.

Tedious, time-consuming, and often incorrect carrier-to-noise ratio calculations are eliminated; the instrument handles it all with a single keystroke, with automatic noise normalization to 1 Hz and automatic conversion for reference units such as dBm, dBmV, dBV, dBμV, and dB/Hz.

An internal high-stability reference provides marker or center frequency accuracy approaching 10^{-9}/day in the 494AP. For added confidence in measurements, a built-in microwave signal counter in the 494AP with 144 dB dynamic range means you can determine the exact frequency of marked signals only 10 Hz apart — or count the exact delta-frequency between two marked signals — even with greatly differing amplitudes. You also have the flexibility of tying in with a system clock, using the external reference lock capacity.

A permanent record of crt displays can be obtained at the push of a button, without a controller, using the direct plot capability and a GPIB plotter such as the Tektronix HC100.

Menu-selected dynamic markers automatically update frequency and amplitude data with every sweep. Unprecedented signal processing power results when you use these markers in conjunction with the built-in intelligence. With *PULSE* Mode, you can mark the peak of a main lobe and peaks of side lobes at the push of a button. The *CW* Mode locates signals that exhibit CW characteristics and ignores all other signals. The *SPUR* Mode marks all signals that meet user-defined or automatic threshold criteria. User-definable threshold criteria are available for all signal processing modes.

These instruments also offer operator convenience for measuring the bandwidth of filters, amplifiers, and other networks. Just enter the desired bandwidth point and select *BANDWIDTH* Mode, and the markers automatically update to display the new value.

Dedicated direct keypad data entry of major measurement parameters enables fast, accurate instrument setup. Screen messages prompt you for proper keypad inputs — all "valid" keys to push are illuminated to steer you to the proper selections. The unique marker keypad allows Peak Find, Right and Left Next, Next Higher and Lower, Left and Right X dB, and Peak Find and Center operations to be executed directly from the front panel. This makes signal searches much easier.

Optional switch-selectable 50-ohm and 75-ohm impedances add versatility. For applications such as baseband and CATV, 75-ohm/dBmV greatly simplifies spectrum analysis.

The performance leader is the 494AP, which offers frequency coverage from 10 kHz to 21 GHz with its internal mixer, and to 325 GHz with external mixers such as Tek's WM490 Series, or the new WM780 Series (each WM780 Series mixer is individually calibrated). Signal sensitivity is an impressive −134 dBm. The 494AP is optimized for use in baseband through millimeter-wave measurements, where the ability to identify and process signal frequencies and amplitudes over wide dynamic ranges with high accuracy is critical.

The 492BP covers the same frequency range as the 494AP, and provides nearly the same set of outstanding features and state-of-the-art specifications. It is designed as a cost-effective and productive solution to engineering needs.

The 497P provides the same cost-effective performance as the 492BP, but over a frequency range of 100 Hz to 7.1 GHz.

The 492PGM's frequency range of 10 kHz to 21 GHz is ideal for cost-sensitive applications that still require most of the powerful features of the product family, but can get by with slightly-reduced performance specifications.

The 495P features the same functionality and high level of performance as the 494AP, but over a frequency range of 100 Hz to 1.8 GHz. It is optimized for standalone or automated operation in baseband through UHF measurements, where the ability to identify and process weak signals is critical.

Remote Operation and Complete Spectrum Analysis Packages

Full GPIB-programmability lets you automate your spectrum analysis system needs. Programming is simplified and measurement repeatability ensured. Under program control you can operate the instrument, change front panel settings, read data from the crt display, and send waveforms from internal memory to other GPIB devices. Tek's Standard Codes and Formats keeps commands clear, consistent, and universally understood.

You can increase programming flexibility and power with the optional MATE/CIIL language extension. It provides direct memory access (DMA) for high-speed data transmission, a requirement for MATE/CIIL compliance.

TekSPANS software lets you use the 490 Series Spectrum Analyzers as system components, controlling them with popular instrument controllers such as the Tektronix PEP-Series, Compaq models, and other PC compatibles. Coupling the computer to the Spectrum Analyzer via the IEEE 488 bus lets you take advantage of the PC's capability, as well as the power and versatility of the Spectrum Analyzer.

Available Tektronix automated spectrum analyzer packages provide ordering convenience. They are configured around a DOS-based PC, one of the 490 Series of programmable Spectrum Analyzers, and Tek's General RF Applications Software Package (GRASP). The GRASP software offers many different applications and utility routines, which are selected through easy menu-driven operation. Also, EMI software is available for FCC, VDE, CISPR, and MIL-STD testing.

490 Series Spectrum Analyzer characteristics are given in the following tables.

TYPICAL MEASUREMENTS

- Baseband Measurements
- Carrier Level Monitoring
- Carrier ON/OFF Ratios
- Carrier/Noise Measurements
- EMI/RFI Compliance
- EW Gathering and Analysis
- Frequency Counting
- Harmonic Distortion
- IF Amplifier Adjustments
- Modulation Adjustments
- Pulse Analysis
- Spectral Monitoring
- Typical Spur Searches

TYPICAL APPLICATIONS

- Manufacturing ATE
- Avionics
- Broadcasting
- CATV
- Cellular Radio
- Design and Engineering
- Nuclear Physics
- Radio Astronomy
- Satellite Communications
- Terrestrial Microwave
- Two-Way Radio

490 SERIES CHARACTERISTICS

FREQUENCY RELATED

	494AP	492BP	492PGM	497P	495P
Frequency Range with Internal Mixers	10 kHz to 21 GHz	10 kHz to 21 Ghz	10 kHz to 21 GHz	100 Hz to 7.1 GHz	100 Hz to 1.8 GHz
Frequency Range with External Mixers	10 kHz to 325 GHz	10 kHz to 325 GHz	N/A	N/A	N/A
Frequency Readout Accuracy (center or marker), ±[2% span + (CF × Ref) + (2N + 25) Hz]	±20 kHz @ 1 GHz with 100 kHz/div span	±21 kHz @ 1 GHz with 100 kHz/div span	±30 kHz @ 1 GHz with 100 kHz/div span	±21 kHz @ 1 GHz with 100 kHz/div span	±20 kHz @ 1 GHz with 100 kHz/div span
Frequency Counter Accuracy, ±[(CF × Ref) + (5 + N) Hz + 1 LSD]	±100 Hz @ 1 GHz	±1 kHz @ 1 GHz	N/A	±1 kHz @ 1 GHz	±100 Hz @ 1 GHz
Delta Count Accuracy, ±[(D-F × Ref) + (10 × 2N) + 1 LSD]	±13 Hz for 1 MHz D-F	±14 Hz for 1 MHz D-F	N/A	±14 Hz for 1 MHz D-F	±13 Hz for 1 MHz D-F
Frequency Reference Accuracy	≤1×10^{-7}/yr (aging)	≤1×10^{-6}/yr (aging)	≤1×10^{-5}/yr (aging)	≤1×10^{-6}/yr (aging)	≤1×10^{-7}/yr (aging)
Frequency Stability (residual FM)	≤5 Hz @ 1 GHz	≤12 Hz @ 1 GHz	≤12 Hz @ 1 GHz	≤ 12 Hz @ 1 GHz	≤ 5 Hz @ 1 GHz
Frequency Stability (drift)	<50 Hz/minute	<50 Hz/minute	<50 Hz/minute	<50 Hz/minute	<50 Hz/minute
Single Sideband Phase Noise (30 kHz offset and N=1)	−105 dBc/Hz @ 1 GHz	−105 dBc/Hz @ 1 GHz	−103 dBc/Hz @ 1 GHz	−105 dBc/Hz @ 1 GHz	−105 dBc/Hz @ 1 GHz
Frequency Span Range (per div)	0 Hz, 10 Hz-10 GHz	0 Hz, 100 Hz-10 GHz	0 Hz, 200 Hz-1 GHz	0 Hz, 100 Hz-500 MHz	0 Hz, 10 Hz-100 MHz
Frequency Span Accuracy	±5%	±5%	±5%	±5%	±5%
Delta Frequency Accuracy Marker Mode	1% of span	1% of span	1% of span	1% of span	1% of span
Resolution Bandwidth (6 dB) Range	10 Hz to 3 MHz	100 Hz to 3 MHz	1 kHz to 3 MHz	100 Hz to 3 MHz	10 Hz to 3 MHz
Resolution Bandwidth Selectivity (−60 dB/−6 dB)	≤7.5:1 except 15:1 @ 10 Hz	≤7.5:1	≤7.5:1	≤7.5:1	≤7.5:1 except 15:1 @ 10 Hz
Video Bandwidth Range	0.3 Hz to 30 kHz	0.3 Hz to 30 kHz	3 Hz to 30 kHz	0.3 Hz to 30 kHz	0.3 Hz to 30 kHz

490 SERIES CHARACTERISTICS (continued)

AMPLITUDE RELATED

	494AP	492BP	492PGM	497P	495P
Reference Level Range	−117 to +30 dBm	−117 to +30 dBm	−117 to +30 dBm	−117 to +30 dBm	−117 to +30 dBm
Maximum Safe Input Power, CW	1 Watt (+30 dBm)	1 Watt (+30 dBm)	1 Watt (+30 dBm)	1 Watt (+30 dBm)	1 Watt (+30 dBm)
Maximum Safe Input Power, Pulse 0.1% duty factor	75 W Pk (1 μS pulse, 0.1% duty factor)	75 W Pk (1 μS pulse, 0.1% duty factor)	75 W Pk (1 μS pulse, 0.1% duty factor)	75 W Pk (1 μS pulse, 0.1% duty factor)	75 W Pk (1 μS pulse)
CRT Display Range, Log	1 to 15 dB/div	1 to 15 dB/div	1 to 15 dB/div	1 to 15 dB/div	1 to 15 dB/div
CRT Display Range, Linear	39.6 nV/div to 2.8 V/div	39.6 nV/div to 2.8 V/div	39.6 nV/div to 2.8 V/div	39.6 nV/div to 2.8 V/div	39.6 nV/div to 2.8 V/div
Input Attenuator Range	0 to 60 dB in 10 dB steps	0 to 60 dB in 10 dB steps	0 to 60 dB in 10 dB steps	0 to 60 dB in 10 dB steps	0 to 60 dB in 10 dB steps
Viewable Dynamic Range	90 dB (12 dB/div)	90 dB (12 dB/div)	80 dB (10 dB/div)	90 dB (12 dB/div)	90 dB (12 dB/div)
Residual Response (no signal and zero RF attenuation)	−100 dBm (input terminated)	−100 dBm (input terminated)	−95 dBm (input terminated)	−100 dBm (input terminated	−100 dBm (input terminated)
Second Harmonic Distortion, RF Frequency Range	−60 dBc (mixer level −40 dBm)	−60 dBc (mixer level −40 dBm)	−60 dBc (mixer level −40 dBm)	−60 dBc (mixer level −40 dBm)	−60 dBc (mixer level −40 dBm)
Second Harmonic Distortion, Microwave Frequency Range	−100 dBc (mixer level −20 dBm)	−100 dBc (mixer level −20 dBm)	−100 dBc (mixer level −20 dBm)	−100 dBc (mixer level −20 dBm)	N/A
Third Order Intermodulation Distortion	−70 dBc (mixer level −27 dBm)	−70 dBc (mixer level −27 dBm)	−70 dBc (mixer level −27 dBm)	−70 dBc (mixer level −27 dBm)	−70 dBc (mixer level −27 dBm)
Calibrator Accuracy	±0.3 dB	±0.3 dB	±0.3 dB	±0.3 dB	±0.3 dB
Gain Compression (1 dB)	−13 dBm	−13 dBm	−13 dBm	−13 dBm	−13 dBm
Frequency Response (10 dB RF attenuation referred to cal signal)					
Band 1 (10 kHz to 1.8 MHz)	±2.5 dB	±2.5 dB	±3.0 dB	±2.5 dB	±1.5 dB (100 Hz to 1.8 GHz)
Band 2 (1.7 GHz to 5.5 GHz)	±3.5 dB	±3.5 dB	±4.0 dB	±3.5 dB	N/A
Band 3 (3.0 GHz to 7.1 GHz)	±3.5 dB	±3.5 dB	±4.0 dB	±3.5 dB	N/A
Band 4 (5.4 GHz to 18 GHz)	±4.5 dB	±4.5 dB	±5.0 dB	N/A	N/A
Band 5 (15 GHz to 21 GHz)	±6.5 dB	±6.5 dB	±7.0 dB	N/A	N/A
In-band Flatness (with 10 dB RF attenuation)					
Band 1 (10 kHz to 1.8 MHz)	±1.5 dB	±1.5 dB	±2.0 dB	±1.5 dB (100 Hz to 1.8 GHz)	±1.0 dB (100 Hz to 1.8 GHz)
Band 2 (1.7 GHz to 5.5 GHz)	±2.5 dB	±2.5 dB	±3.0 dB	±2.5 dB	N/A
Band 3 (3.0 GHz to 7.1 GHz)	±2.5 dB	±2.5 dB	±3.0 dB	±2.5 dB (5.4 GHz to 7.1 GHz)	N/A
Band 4 (5.4 GHz to 18 GHz)	±3.5 dB	±3.5 dB	±4.0 dB	N/A	N/A
Band 5 (15 GHz to 21 GHz)	±5.0 dB	±5.0 dB	±6.0 dB	N/A	N/A
Displayed Average Noise Level (input terminated, narrowest resolution bandwidth and video filter)					
Band 0 (100 Hz)	−100 dBm (typical)	−40 dBm (typical)	N/A	−40 dBm (typical)	−100 dBm (typical)
Band 0 (1 kHz to 10 kHz)	−110 dBm (typical)	−90 dBm (typical)	−40 dBm (typical)	−90 dBm	−110 dBm
Band 1 (10 kHz to 100 kHz)	−110 dBm	−100 dBm	−90 dBm	−100 dBm	−110 dBm
Band 1 (100 kHz to 1 MHz)	−120 dBm	−115 dBm	−105 dBm	−115 dBm	−120 dBm
Band 1 (1 MHz to 1.8 GHz)	−134 dBm	−120 dBm	−110 dBm	−120 dBm	−131 dBm
Band 2 (1.7 GHz to 5.5 GHz)	−125 dBm	−120 dBm	−108 dBm	−120 dBm	N/A
Band 3 (3.0 GHz to 7.1 GHz)	−125 dBm	−119 dBm	−108 dBm	−119 dBm	N/A
Band 4 (5.4 to 12 GHz/12 to 18 GHz)	−111 / −107 dBm	−105 / −100 dBm	−94 / −89 dBm	N/A	N/A
Band 5 (15 GHz to 21 GHz)	−105 dBm	−99 dBm	−88 dBm	N/A	N/A
IF Gain Uncertainty	±2 dB max over 107 dB range	±2 dB max over 107 dB range	±2 dB max over 107 dB range	±2 dB max over 107 dB range	±2 dB max over 107 dB range
Scale Fidelity, Log (80 dB range/90 dB range)	±2 dB max/ ±4 dB max	±2 dB max/ ±4 dB max	±2 dB max	±2 dB max/ ±4 dB max	±2 dB max/ ±4 dB max
Scale Fidelity, Linear	±5% of full scale	±5% of full scale	±5% of full scale	±5% of full scale	±5% of full scale
Input Attenuator Switching Accuracy (20 dB to 60 dB settings) 0 to 1.8 GHz	±0.5 dB/10 dB; ±1.0 dB max	±0.5 dB/10 dB; ±1.0 dB max	±0.5 dB/10 dB; ±1.0 dB max	±0.5 dB/10 dB; ±1.0 dB max	±0.5 dB/10 dB; ±1.0 dB max
1.8 to 18 GHz	±1.5 dB/10 dB; ±3.0 dB max	±1.5 dB/10 dB; ±3.0 dB max	±1.5 dB/10 dB; ±3.0 dB max	±1.5 dB/10 dB, ±3.0 dB max (1.8 to 7.1 GHz)	N/A
18 to 21 GHz	±3.0 dB/10 dB, ±6.0 dB max	±3.0 dB/10 dB; ±6.0 dB max	±3.0 dB/10 dB; ±6.0 dB max	N/A	N/A
Resolution Bandwidth Switching Uncertainty (reference BW X 3 MHz)	±0.4 dB	±0.4 dB	±0.4 dB	±0.4 dB	±0.4 dB

490 SERIES CHARACTERISTICS (continued)

TIME RELATED

FREQUENCY RELATED	494AP	492BP	492PGM	497P	495P
Sweep Time Range, Digitized Display	10 msec/div to 10 sec/div	10 msce/div to 10 sec/div	10 msec/div to 10 sec/div	10 msec/div to 10 sec/div	10 msec/div to 10 sec/div
Sweep Time Range, Real-Time Display	20 μsec/div to 10 sec/div	20 μsec/div to 10 sec/div	20 μsec/div to 10 sec/div	20 μsec/div to 10 sec/div	20 μsec/div to 10 sec/div
Sweep Time Accuracy	±5%	±5%	±5%	±5%	±5%
Marker Time Measurement Accuracy	±10%	±10%	±10%	±10%	±10%
Delta Marker Time Measurement Accuracy	±5%	±5%	±5%	±5%	±5%
Sweep Trigger	Free Run, Line, Video, Single, Ext	Free Run, Line, Video, Single, Ext	Free Run, Line, Video, Single, Ext	Free Run, Line, Video, Single, Ext	Free Run, Line, Video, Single, Ext

EXTERNAL INPUT

	494AP	492BP	492PGM	497P	495P
RF Input Impedance	50 ohms nominal	50 ohms nominal	50 ohms nominal	50 ohms nominal	50 ohms nominal
VSWR (10 dB input attenuation) < 2.5 GHz 2.5 GHz to 6.0 GHz 6.0 GHz to 18 GHz 18 GHz to 21 GHz	 1.3:1 max 1.7:1 max 2.3:1 max 3.5:1 max	 1.3:1 max 1.7:1 max 2.3:1 max 3.5:1 max	 1.3:1 max 1.7:1 max 2.3:1 max 3.5:1 max	 1.3:1 max 1.7:1 max N/A N/A	 1.3:1 max N/A N/A N/A
Local Oscillator Emission Level (10 dB input attenuation)	≤ −80 dBm	≤ −80 dBm	≤ −80 dBm	≤ −80 dBm	≤ −80 dBm
External Mixer Input	Approx 2 GHz IF	Approx 2 GHz IF	N/A	N/A	N/A
External Reference Input	1, 2, 5, or 10 MHz	1, 2, 5, or 10 MHz	N/A	1, 2, 5, or 10 MHz	1, 2, 5, or 10 MHz
Horizontal Input/Trigger Input	0 to +10 V/1 to 50 V	0 to +10 V/1 to 50 V	0 to +10 V/1 to 50 V	0 to +10 V/1 to 50 V	0 to +10 V/1 to 50 V
Video Input/Marker Input	0 to +4 V/0 to −10 V	0 to +4 V/0 to −10 V	0 to +4 V/0 to −10 V	0 to +4 V/0 to −10 V	0 to +4 V/0 to −10 V

EXTERNAL OUTPUT

	494AP	492BP	492PGM	497P	495P
Calibrator	100 MHz ±10 Hz, −20 dBm ±0.3 dB	100 MHz ±100 Hz, −20 dBm ±0.3 dB	100 MHz ±1 kHz, −20 dBm ±0.3 dB	100 MHz ±100 Hz, −20 dBm ±0.3 dB	100 MHz ±10 Hz, −20 dBm ±0.3 dB
1st Local Oscillator	2 to 6 GHz, +7.5 to +20 dBm	2 to 6 GHz, +7.5 to +20 dBm	2 to 6 GHz, +6 to +20 dBm	2 to 6 GHz, +6 to +20 dBm	2 to 4 GHz, +6 to +20 dBm
2nd Local Oscillator	−7 to −17 dBm	−7 to −17 dBm	−7 to −17 dBm	−7 to−17 dBm	−7 to −17 dBm
Video Output (CRT center reference)	0.5 V of signal per div of video	0.5 V of signal per div of video	0.5 V of signal per div of video	0.5 V of signal per div of video	0.5 V of signal per div of video
Sweep Output (CRT center reference)	0.5 V/div; ±2.5 V max	0.5 V/div; ±2.5 V max	0.5 V/div; ±2.5 V max	0.5 V/div; ±2.5 V max	0.5 V/div; ±2.5 V max
Pen Lift	+5 V nominal; TTL-compatible	+5 V nominal; TTL-compatible	+5 V nominal; TTL-compatible	+5 V nominal; TTL-compatible	+5 V nominal; TTL-compatible
2nd IF Output (Opt. 42)	110 MHz, 0 dBm; 3 dB BW is 4.5 MHz	110 MHz, 0 dBm; 3 dB BW is 4.5 MHz	110 MHz, 0 dBm; 3 dB BW is 4.5 MHz	110 MHz, 0 dBm; 3 dB BW is 4.5 MHz	110 MHz, 0 dBm; 3 dB BW is 4.5 MHz
3rd IF Output	10 MHz, −5 dBm	10 MHz, −5 dBm	10 MHz, −5 dBm	10 MHz, −5 dBm	10 MHz, −5 dBm
Probe Power	+5 V, −15 V, +15 V; 100 mA max each	+5 V, −15 V, +15 V; 100 mA max each	+5 V, −15 V, +15 V; 100 mA max each	+5 V, −15 V, +15 V; 100 mA max each	+5 V, −15 V, +15 V; 100 mA max each

GENERAL SPECIFICATIONS

	494AP	492BP	492PGM	497P	495P
Power Requirements Voltage Frequency Power	 90-132/180-250 Vac 48-440 Hz 210 W max @ 115 Vac, 60 Hz	 90-132/180-250 Vac 48-440 Hz 210 W max @ 115 Vac, 60 Hz	 90-132/180-250 Vac 48-440 Hz 210 W max @ 115 Vac, 60 Hz	 90-132/180-250 Vac 48-440 Hz 210 W max @ 115 Vac, 60 Hz	 90-132/180-250 Vac 48-440 Hz 210 W max @ 115 Vac, 60 Hz
Weight (carrying), Nominal	22.2 kg (48 lbs)	21.76 kg (47 lbs)	21.3 kg (46 lbs)	20.83 kg (45 lbs)	19.44 kg (42 lbs)
Dimensions (without handle, feet, or cover), mm/inches	175 × 327 × 499/ 6.9 × 12.87 × 19.65	175 × 327 × 499/ 6.9 × 12.87 × 19.65	175 × 327 × 499/ 6.9 × 12.87 × 19.65	175 × 327 × 499/ 6.9 × 12.87 × 19.65	175 × 327 × 499/ 6.9 × 12.87 × 19.65
Digital Storage	1000 pts horizontal, 250 pts vertical	1000 pts horizontal, 250 pts vertical	1000 pts horizontal, 250 pts vertical	1000 pts horizontal, 250 pts vertical	1000 pts horizontal, 250 pts vertical
Digitizing Rate	9 μS	9 μS	9 μS	9 μS	9 μS
Macro Programming	8K	8K	N/A	8K	8K
Nonvolatile Memory	9 waveforms, 10 control settings	9 waveforms, 10 control settings	9 waveforms, 10 control settings	9 waveforms, 10 control settings	9 waveforms, 10 control settings
HELP Mode	10 Yes	Yes	Yes	Yes	Yes

490 SERIES CHARACTERISTICS (continued)

ENVIRONMENTAL PER MIL-T-28800C, TYPE III, CLASS 3, STYLE C

FREQUENCY RELATED	494AP	492BP	492PGM	497P	495P
Electromagnetic Compatibility (consult data sheet for compliance details)	MIL-STD-461B	MIL-STD-461B	MIL-STD-461B	MIL-STD-461B	MIL-STD-461B
Calibration Interval	1 Year	1 Year	1 Year	1 Year	1 Year

IEEE 488 GPIB

	494AP	492BP	492PGM	497P	495P
Interface Functions	SH1, AH1, T5, L3, SR1, RL1, PP1, DC1, DT1, and C0	SH1, AH1, T5, L3, SR1, RL1, PP1, DC1, DT1, and C0	SH1, AH1, T5, L3, SR1, RL1, PP1, DC1, DT1, and C0	SH1, AH1, T5, L3, SR1, RL1, PP1, DC1, DT1, and C0	SH1, AH1, T5, L3, SR1, RL1 PP1, DC1, DT1, and C0
Direct Plotter Output	Supports Tek HC100, HP 7470A	Supports Tek HC100, HP 7470A	Supports Tek HC100, HP 7470A	Supports Tek HC100, HP 7470A	Supports Tek HC100, HP 7470A
Waveform Transfer Speed	165 msec/1000 pts	165 msec/1000 pts	165 msec/1000 pts	165 msec/1000 pts	165 msec/1000 pts

ORDERING INFORMATION

494AP Programmable Spectrum Analyzer

Includes: Operator's Manual; Programmer's Manual; 6-ft, 50-Ω coaxial cable, N-N (012-0114-00); 18-inch, 50-Ω coaxial cable, BNC-BNC (012-0076-00); N male to BNC female adapter (103-0045-00); rear connector shield (337-3274-00); power cord and spare fuses; CRT filter set consisting of amber and gray light filters plus mesh filter (all except 492PGM); gray crt light filter (492PGM).

492BP Programmable Spectrum Analyzer

Includes: same as 494AP

492PGM Programmable Spectrum Analyzer

Includes: same as 494AP, except gray CRT filter (no filter set)

497P Programmable Spectrum Analyzer

Includes: same as 494AP

495P Programmable Spectrum Analyzer

Includes: same as 494AP

OPTION ORDERING INFORMATION

Opt. 07 — 75-Ω dBmV input and calibration in addition to the normal 50-Ω dBm input and calibration. (Not combinable with Options 21 and 22; no external mixer capability.) Includes 42-inch, 75-Ω BNC-BNC coax cable (012-0074-00) and BNC male to "F" female adapter (013-0126-00)

Opt. 19 (494AP, 492BP) — High-performance 18 to 40 GHz WM780 Series Waveguide Mixer Set

Includes: WM780K (18-26.5 GHz) and WM780A (26.5-40 GHz) Waveguide Mixers, Diplexer Assembly (015-0385-00), and interconnecting cable (012-0649-00)

Opt. 20 (494AP, 492BP) — High Performance 18 to 60 GHz WM780 Series Waveguide Mixer Set

Includes: same as Option 19 plus WM780U (40-60 GHz) Waveguide Mixer

Opt. 21 (494AP, 492BP) — High-performance 18 to 40 GHz WM490 Series Waveguide Mixer Set

Includes: WM490K (18-26.5 GHz) and WM490A (26.5-40 GHz) Waveguide Mixers, Diplexer assembly (015-0385-00), and interconnecting cable (012-0649-00)

Opt. 22 (494AP, 492BP) — High-performance 18 to 60 GHz WM490 Series Waveguide Mixer Set

Includes: same as option 21 plus WM490U (40-60 GHz) Waveguide Mixer

Opt. 23 — GRASP software (S26RF00), PC2A interface, GPIB cable.

NOTE: The PC2A is a National Instruments GPIB Interface Card

NOTE: Options 24 through 29 and 32 through 34 are available only in the U.S. and Canada. For more information on any of these bundled software and computer packages, please contact your local Tek sales representative.

Opt. 24 — Compaq Portable II (with 80286 processor, built-in monitor, 640 kb RAM, 20 Mb hard drive, 360 kb diskette drive, serial/parallel interface, DOS 3.3), GRASP software, PC2A interface, and GPIB cable.

Opt. 25 — Compaq Deskpro 286E, Model 1 (with 80286 processor, VGA color monitor, 1 Mb RAM, 1.2 Mb and 360 kb diskette drives, serial/parallel interface, DOS 3.3), GRASP software, PC2A interface, and GPIB cable.

Opt. 26 — Compaq Deskpro 286E, Model 201 (with 80286 processor, VGA color monitor, 1 Mb RAM, 20 Mb hard drive, 1.2 Mb and 360 kb diskette drives, serial/parallel interface, DOS 3.3), GRASP software, PC2A interface, and GPIB cable.

Opt. 27 — Compaq SLT/286, Model 20 (with 80C286 processor, VGA backlit display, 640 kb RAM, 20 Mb hard drive, 1.44 Mb 3½" diskette drive, serieal/parallel interface, enhanced NiCad battery pack, desktop expansion base, DOS 3.3), GRASP software, PC2A interface, and GPIB cable.

Opt. 28 — Compaq Deskpro 386S, Model 20 (with 80386SX processor, VGA color monitor, 1 Mb RAM, 20 Mb hard drive, 1.2 Mb and 360 kb diskette drives, serial/parallel interface, DOS 3.3), GRASP software, PC2A interface, and GPIB cable.

Opt. 29 — Epson FX-850 printer with parallel interface cable

Opt. 32 — Tektronix PEP 301 system controller with additional 360K floppy disk drive

NOTE: The PEP 301 is an MS-DOS instrument/system controller based on the Intel 80386 with 80387 Coprocessor. It includes an EGA display, 40M hard disk, 1.2M floppy disk drive, and complete GPIB interface with cable.

Opt. 33 — Tektronix PEP 301 system controller with additional 360K floppy disk drive plus GRASP software

Opt. 34 — Tektronix PEP 301 system controller with additional 360K floppy disk drive plus EMI software

Opt. 39 — Non-lithium (Silver) batteries for battery-backed memory

Opt. 41 (all except 495P) — Digital Microwave Radio Measurement Enhancement package

Opt. 42 — Replaces MARKER/VIDEO input port on the rear panel with a 110 MHz IF output port that provides a 3 dB signal bandwidth ≥ 4.5 MHz

Opt. 45 (all except 492PGM) — MATE/CIIL language interface

Opt. B1 — Service manual(s)

Opt. B2 — Operator's manual, Programmer's manual, and Service manual(s) set

INTERNATIONAL POWER PLUG OPTIONS

Opt. A1 — Universal European 220 V/6 A, 50 Hz

Opt. A2 — UK 240 V/5 A, 50 Hz

Opt. A3 — Australian 240 V/6 A, 50 Hz

Opt. A4 — North American 240 V/12 A, 60 Hz

Opt. A5 — Switzerland 220 V/6 A, 50 Hz

OPTIONAL ACCESSORIES/ANCILLARIES (for all units unless otherwise noted)

1405 TV Sideband Analyzer Adapter (525/60 markers); TR503 Tracking Generator, 100 Hz to 1800 MHz; Microwave Comb Generator, TM500-Series compatible (067-0885-00, all except 495P); Tek HC100 Color Plotter; CRT Visor (016-0653-00); 75-Ω to 50-Ω minimum loss adapter (011-0112-00); DC blocking capacitor, N conn. (015-0509-00); 2-meter GPIB cable (012-0630-00); GPIB cable (012-0991-00); Programmer's Reference Guide (070-5567-00); Service Kit (006-3286-01).

WARRANTY

Tektronix 490 Series Spectrum Analyzers are warranted to be free from defects in material and workmanship for a period of one year from the date of shipment. Contact your local Tektronix sales representative for additional warranty information.

WARRANTY-PLUS SERVICE PLANS

Tektronix Warranty-Plus Service Plans for the 490 Series Spectrum Analyzers provide for both routine and remedial service, depending on the plan selected. They offer convenience plus an extra margin of protection for your newly-purchased Tektronix instruments by supplementing the warranties that accompany them. Warranty-Plus is an investment that provides up to five years of coverage, including options for calibration and remedial service. For more information on Warranty-Plus options, contact a Tektronix sales representative.

Opt. M1 — 2 years service and 2 calibrations

Opt. M2 — 4 years service

Opt. M3 — 4 years service and 4 calibrations

Opt. M4 — 2 years service and 5 calibrations

Opt. M5 — 4 years service and 7 calibrations

Opt. M7 — 2 calibrations

Opt. M8 — 4 calibrations

Opt. M9 — 2 years service