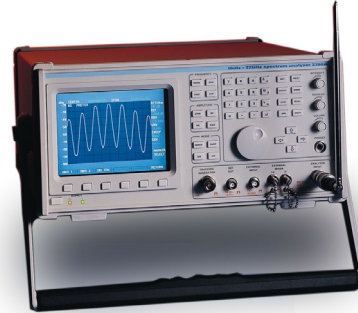


**A range of RF and Microwave Spectrum Analyzers that offer value and performance to both field and bench users**



- **Fully synthesized Spectrum Analyzers to 26.5 GHz**
- **3 Hz to 30 MHz resolution bandwidth filters**
- **Excellent intermodulation performance**
- **+30 to -135 dBm measurement range**
- **Measurements to 300 GHz with external mixers**
- **Optional built-in tracking generator**
- **Receiver mode with AM and FM demodulators**
- **Optional quasi-peak detector and EMC filters**

The 2390A series of spectrum analyzers from IFR combine exceptional performance with excellent value for money. There are three instruments in the range:-

2392A	9 kHz to 2.9 GHz
2390A	9 kHz to 22 GHz
2393A	9 kHz to 26.5 GHz

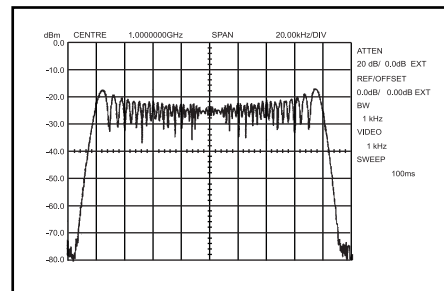
#### Frequency Accuracy

All three instruments are fully synthesized to give accurate frequency measurements. Even on wide spans the 2390A series gives precise frequency measurements and an integral frequency counter enables the measurement of individual signals to 1 Hz resolution.

Fundamental mixing to 12 GHz enables the microwave versions to reach their maximum frequency in only two harmonic sweeps. This gives excellent sensitivity and accuracy right up to 26.5 GHz.

#### Narrow Resolution

The 2390A series all have resolution bandwidths down to 3 Hz. Narrow resolution bandwidths provide the ability to resolve closely spaced signals or sidebands.

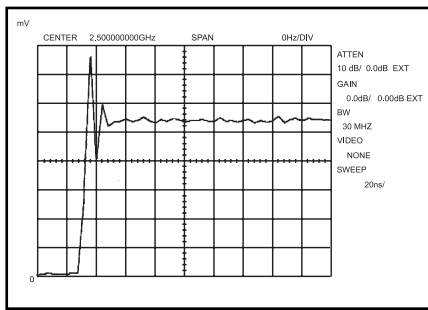


*FM Spectrum*

The 3 Hz filter is also used for close in signal analysis, for example it can be used to identify 50 or 60 Hz power line sidebands on oscillators. The average displayed noise level when using a 3 Hz filter is less than -135 dBm at 2.9 GHz and below -125 dBm at 26.5 GHz. This makes 2390A series suitable for locating and identifying low level spurious and harmonic signals.

#### Wideband Filters for Spread Spectrum and Pulsed Signals

When analyzing signals with wide spectrum bandwidths such as digitally modulated carriers or pulsed radar, the resolution bandwidth of the spectrum analyzer can limit the measurement. The 2390A series have 10 MHz and 30 MHz bandwidth filters. These give the best available characterization of wideband signals and have an impulse bandwidth >5 MHz. In zero span mode a minimum sweep time of 200 ns/div makes displaying radar pulses precise and straightforward.



200 ns sweep clearly shows ringing on demodulated radar pulse

### AM and FM Receiver Modes

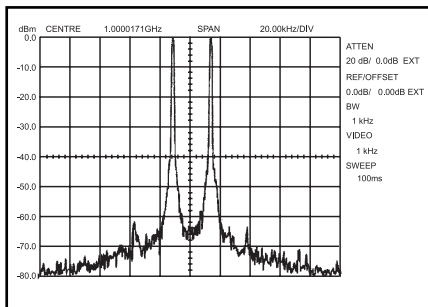
The 2390A series features built-in receivers for both AM and FM signals. Modulation detection can be set to narrowband or wideband mode.

For an FM transmission a modulation scale of 1 kHz to 5 MHz per division allows direct measurement of the modulation component of carrier signals up to  $\pm 20$  MHz deviation. Frequency synthesizer settling time can be measured using the DC coupled output from the FM detector.

A high quality audio output through either a built-in speaker or headphone connector allows audible detection of noise or distortion. It can also be used to identify the source of interfering transmissions.

### Harmonic and Spurious Measurements

When monitoring the frequency spectrum or installing and maintaining radio systems it is important to check the spurious and harmonic signals. The 2390A series has fundamental mixing to 12 GHz and sweeps to 26.5 GHz in only two harmonic steps. This means that good sensitivity is maintained across the whole frequency band revealing interfering signals that may otherwise have been lost in noise.



Third order intermodulation measurement of a 1 GHz amplifier

Internally generated intermodulation distorting products are minimized by the high performance input mixer. This gives more than 80 dBc intermodulation free dynamic range. As a result the user can be confident that all displayed signals are true signals even when measuring at busy transmitter sites.

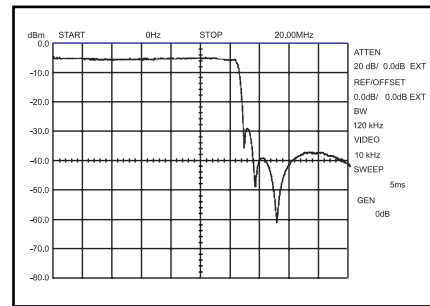
### Network Measurements

An optional built-in tracking generator is available covering from

100 kHz to 2.9 GHz. It is ideal for frequency response measurements on filters, amplifiers and couplers. A normalization function sets a 0 dB reference level which can be used for absolute measurements of insertion loss or gain.

If used with a bridge the return loss of devices such as antennas or loads can also be measured.

The output level of the tracking generator is adjustable from -70 dBm to 0 dBm. It can be used as a low level input for amplifiers, or in CW mode as a synthesized local oscillator.

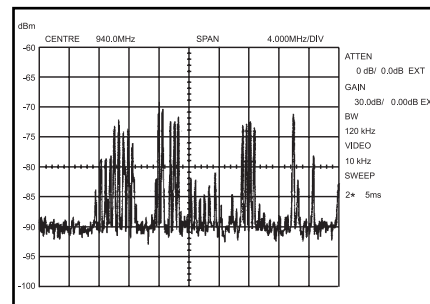


Filters can be characterized using the optional tracking generator

### Field Measurements

For measurements at remote sites in the field the 2390A series is portable and rugged. Mobile and cellular radio base stations demand 24 hour reliability. The 2392A is ideal for field measurements of spurious, harmonics and intermodulation products. Integral frequency counter and receiver modes mean that interfering signals can be identified quickly and easily.

For microwave radio links the 2390A or 2393A offer frequency coverage to 22 GHz and 26.5 GHz respectively. A wide 30 MHz resolution bandwidth filter, and limit mask, facilitate testing of modulated point-to-point or trunk radio links.



Monitoring signals at a cellular radio base station

### EMC Measurements

2390A series can be used for pre-compliance testing of electronic products to meet stringent EMC specifications. Before sending a product to an expensive test house a pre-compliance test will indicate if the product is likely to pass.

Option 08 provides quasi-peak detection and five extra resolution bandwidth filters. These comply with the CISPR recommendations for measurements of RF emissions.

### In-built FFT and Oscilloscope

When analyzing communications systems it is often necessary to test the audio and IF frequencies, as well as the RF signal. With its built-in 20 kHz FFT analyzer and 5 MHz oscilloscope, audio analysis and fault finding is possible. The FFT analyzer enables harmonic distortion measurements on audio signals and the scope provides a general fault finding and diagnostic tool.

### Clear Operation

The 2390A series has a large 7 in TFT color display for clear viewing of signals and instrument settings. All key elements such as sweep speed, resolution bandwidth, input attenuation and IF gain are automatically set, depending on the user's span and reference level. Two markers can be used to measure signals as well as provide standard operations such as peak find, marker to center and delta marker. This speeds up and simplifies measurements.

99 traces and 99 instrument settings can be stored into the non-volatile memory of the 2390A series. In this way tests can be stored in the instrument and results saved to memory for printout at a later time. The 2390A series spectrum analyzer is also equipped with both RS-232 and IEEE-488 (GPIB) interfaces.

### Applications Software

Accessory AC 1047 provides an additional 10 measurement applications to the 2390A series. The applications are:-

- Adjacent Channel Power
- Occupied Bandwidth
- Voltage Standing Wave Ratio
- Cable Fault
- Pulse Identification
- Noise Marker
- Carrier/Noise 1 Hz Normalized
- Carrier/Noise 1.23 MHz
- Normalized
- AMPS Cellular Channel Mode
- Increment

All applications are supplied on a single 3.5 in disk. They are downloaded into non volatile memory in the 2390A series spectrum analyzer.

### EasySpan Software

The EasySpan software is a Windows based program for PCs. It facilitates viewing 2390A series traces on the PC display without the need for spreadsheets. Traces and set-ups may be recorded to disk for future reference. An interactive window allows macros to be written allowing automatic trace acquisition. The instrument may be connected to a modem allowing traces to be viewed and recorded from a remote location, for remote site monitoring.

### Active Probe

The AC2388 Active Probe covers from 50 kHz to 1.25 GHz. It enables accurate measurements of devices from HF to UHF without loading the circuit. A built-in continuously variable attenuator minimizes probe distortion during measurement.

## Specification

### Frequency

#### FREQUENCY RANGE

2392A	9 kHz to 2.9 GHz
2390A	9 kHz to 22 GHz
2393A	9 kHz to 26.5 GHz

Internal Mixing (version dependent)

Band 0	0 Hz to 2.9 GHz
Band 1	2.6 GHz to 12.0 GHz
Band 2	11.5 GHz to 26.5 GHz

#### EXTERNAL MIXING (ALL INSTRUMENTS)

3 GHz to 300 GHz

#### FREQUENCY READOUT ACCURACY

$\pm(3\% \text{ of Span Width} + \text{Frequency Standard Accuracy} + 50\% \text{ of RBW})$

#### FREQUENCY SPAN RANGE

2392A	10 Hz/div to 290 MHz/div
2390A	10 Hz/div to 2.2 GHz/div
2393A	10 Hz/div to 2.65 GHz/div

All versions have continuously variable span and zero span (0 Hz)

#### Accuracy

$\pm 5\%$  of indicated span

#### FREQUENCY COUNTER

##### Resolution

1 Hz, 10 Hz, 100 Hz, 1 kHz

##### Accuracy

$\pm(\text{Frequency Standard Accuracy} + \text{Counter Resolution})$

##### Sensitivity

(at 120 MHz with 0 dB attenuation)  
<-85 dBm with 3 kHz RBW  
<-65 dBm with 5 MHz RBW

#### FREQUENCY STANDARD

##### Temperature Stability (0 - 50°C)

$\pm 0.2 \text{ ppm}$   
 $\pm 0.02 \text{ ppm}$  (Option 09)

##### Ageing

First year  
 $\pm 2 \text{ ppm/year}$   
 $\pm 1 \text{ ppm/year}$  (Option 09)

Thereafter  
 $\pm 1 \text{ ppm/year}$   
 $\pm 0.5 \text{ ppm/year}$  (Option 09)

#### RESIDUAL FM

(peak to peak in 20 ms, spans <1 MHz/div,  
100 Hz video filter)

<10 Hz, below 6 GHz  
<20 Hz, 6 GHz to 12 GHz  
<40 Hz, 12 GHz to 26.5 GHz

## NOISE SIDEBANDS

(Span <100 kHz/div)

	10 kHz offset	30 kHz offset
0.1 to 1.0 GHz	-97 dBc/Hz	-101 dBc/Hz
1.0 to 2.8 GHz	-92 dBc/Hz	-95 dBc/Hz
2.8 to 6.0 GHz	-93 dBc/Hz	-100 dBc/Hz
6.0 to 12.0 GHz	-88 dBc/Hz	-95 dBc/Hz
12.0 to 26.5 GHz	-81 dBc/Hz	-88 dBc/Hz

## SYSTEM RELATED SIDEBANDS

(at 300 Hz RBW)

<-65 dBc below 12 GHz  
<-60 dBc 12 GHz to 26.5 GHz

## Sweep

### TIME

#### Span >200 Hz/div

1 ms to 10 s/div in 1-2-5 sequence

#### Zero Span

200 ns/div to 10s/div in 1-2-5 sequence  
(Resolution reduced <2  $\mu$ s/div)

## ACCURACY

$\pm 1\%$  >1  $\mu$ s/div

## TRIGGER SOURCE

Internal (Video), External (front panel), External (rear panel) or line (AC input)

## TRIGGER MODE

Free Run, Auto Normal or Single

## TRIGGER COUPLING

AC, DC, High-Pass Filter, Low-Pass Filter, TV line, TV field

## TRIGGER BANDWIDTH

>5 MHz @ -3 dB (at EXTERNAL INPUT connector)

## TRIGGER LEVEL RANGE

### Video

Adjustable over 8 divisions, positive or negative polarity

### Front Panel BNC

User settable threshold: -2.5 V, -1.0 V, -0.5 V, 0 V, +0.5 V, +1.0 V, +2.5 V; nominal

### Rear Panel BNC

+2.5 V nominal

## TRIGGER SENSITIVITY

**Internal** 1 division

**Front Panel BNC** 200 mV peak

**Rear Panel BNC** +2 V (TTL)

## TRIGGER DELAY (using Zero Span)

0 to  $\pm 300$  divisions in time/div to a maximum of  $\pm 200$  second

## Amplitude

### MAXIMUM INPUT LEVEL

0 V DC,  
+20 dBm,  
+30 dBm CW >0 dB input attenuation  
+50 dBm peak; 10  $\mu$ s, <1% duty cycle, >0 dB input attenuation

### DISPLAYED AVERAGE NOISE LEVEL

(in 10 Hz Video Resolution Bandwidth)

	3 Hz RBW	300 Hz RBW
9 kHz to 100 kHz	<-115 dBm	<-95 dBm
100 kHz to 2.9 GHz	<-135 dBm	<-115 dBm
2.9 kHz to 12.0 GHz	<-130 dBm	<-110 dBm
12.0 GHz to 26.5 GHz	<-125 dBm	<-105 dBm

### GAIN COMPRESSION

<1.0 dB with -5 dBm (0 dB attenuation)

### AMPLITUDE UNITS

Logarithmic display dBm, dB $\mu$ W, dBmV, dBmV

Linear display mW,  $\mu$ W, mV,  $\mu$ V

### DISPLAY LINEARITY

#### Log

5 or 10 dB/div  $\pm 0.15$  dB/dB,  $\leq 1.5$  dB over 8 divisions

1 or 2 dB/div  $\pm 0.5$  dB over 8 divisions

#### Linear

#### <10 MHz RBW

$\pm 2\%$  of Reference Level over 8 divisions

#### 10 MHz and 30 MHz RBW

$\pm 10\%$  of Reference Level over 8 divisions  
(<10 dB IF Gain)

### FREQUENCY RESPONSE

(with 10 dB attenuation, relative to REF OUT)

$\pm 1.5$  dB, 9 kHz to 2.9 GHz

$\pm 2.0$  dB, 2.9 GHz to 12 GHz

$\pm 3.0$  dB, 12 GHz to 18 GHz

$\pm 4.0$  dB, 18 GHz to 26.5 GHz

### RESOLUTION BANDWIDTH

#### Range

3 Hz, 10 Hz, 30 Hz, 100 Hz (Digital Resolution);  
300 Hz, 3 kHz, 30 kHz, 300 kHz and 5 MHz (at 3 dB);  
10 MHz and 30 MHz (at 3 dB) (Linear display and FM modes)

#### Option 08

Additional 1 kHz and 1 MHz (at 3 dB);  
200 Hz, 9 kHz and 120 kHz (at 6 dB)

### Accuracy

$\pm 20\%$ , 300 Hz to 30 kHz;

$\pm 30\%$ , 300 kHz to 30 MHz;

$\pm 10\%$ , 200 Hz, 9 kHz and 120 kHz

## Selectivity

60 dB/3 dB ratio  
<5:1, 3 kHz, 30 kHz, 300 kHz, 1 MHz, 5 MHz;  
<12:1, 1 kHz;  
60 dB/6 dB ratio <5:1, 9 kHz and 120 kHz;  
50 dB/3 dB ratio <10:1, 300 Hz;  
50 dB/6 dB ratio <10:1, 200 Hz

## Switching Error

(referenced to 30 kHz RBW)  
±0.5 dB, 1 kHz to 5 MHz;  
±1.0 dB, <1 kHz;  
±2.0 dB, 10 MHz, 30 MHz;

## VIDEO BANDWIDTH

### Range

10 Hz to 1 MHz in decade steps plus NONE  
(no Video Filter activated)

## INPUT ATTENUATOR

### Range

0 to 60 dB in 10 dB steps

## Accuracy

Greater of ±0.5 dB or ±2%, 9 kHz to 2.9 GHz  
Greater of ±1.0 dB or ±4%, 2.9 GHz to 18 GHz  
Greater of ±1.5 dB or ±7%, 18 GHz to 26.5 GHz

## REFERENCE LEVEL

### Range

#### <10 MHz RBW

-95 to +30 dBm in 0.1 dB steps

#### 10 MHz, 30 MHz, RBW

-50 to +30 dBm in 0.2 steps

## Accuracy

With 10 dB attenuation and RBW <10 MHz  
±0.25 dB, -20 to -40 dBm  
±0.5 dB, -40 to -85 dBm  
RBW 10 MHz, 30 MHz  
±2.0 dB

## Offset

0 to ±99.9 dB in 0.1 dB steps

## SPURIOUS RESPONSES

### Harmonic Distortion

<-70 dBc, 9 kHz to 2.9 GHz  
(-30 dBm input and 10 dB attenuation)  
<-100 dBc, 2.9 GHz and 26.5 GHz  
(-10 dBm input and 10 dB attenuation)

### Third Order Intermodulation Distortion

<-80 dBc (-30 dBm input and 10 dB attenuation)  
<-75 dBc (9 - 12 GHz only)

## Residual Response

(input terminated with 50 Ω)  
<-90 dBm, 9 to 100 kHz;  
<-100 dBm, 100 kHz to 26.5 GHz

## Other Input Related Spurious

(-30 dBm input and -10 dB attenuation)  
<-70 dBc below 18 GHz  
<-60 dBc 18 GHz to 26.5 GHz

## DISPLAY BANDWIDTH

### Linear mode at <5 μs/div Sweep Time

>5 MHz (-3 dB), 30 MHz RBW;  
>2.5 MHz (-3 dB), 5 MHz RBW;

### Log mode at <20 μs/div Sweep Time

>1 MHz (-3 dB), 5 MHz RBW;

## Receiver

### FREQUENCY RANGE

2392A	9 kHz to 2.9 GHz
2390A	9 kHz to 22 GHz
2393A	9 kHz to 26.5 GHz

### SENSITIVITY

5 μV at 100 MHz (30 kHz RBW, 3 kHz Video Bandwidth, 5 kHz FM deviation at 1 kHz rate, 10 dB SINAD with 10 dB IF Gain)

### SELECTIVITY

Available analyzer RBW between 200 Hz and 300 MHz

### DEMODULATION

#### AM Scales

10%, 20 %, 50 % / div

#### FM Scales

(in 1-2-5 sequence)  
1 kHz to 100 kHz, <10 MHz RBW;  
200 kHz to 5 MHz, 10 MHz, 30 MHz RBW

## Memory

### TRACE STORAGE CAPACITY

99 traces (including user defined traces and test limits)

### RECALL TO DISPLAY AT ONE TIME

4 traces

### SET-UP STORAGE CAPACITY

99 set-ups

### MACRO PROGRAM CAPACITY

64 kbytes

## Oscilloscope

### INPUT

Type - BNC (f)

Impedance - 1 MΩ and 27 pF nominal

Coupling - AC, DC, GND

### Voltage Range

5 mV/div to 5 V/div (±3% of Full Scale) in 1-2-5 sequence

### Frequency Range

DC to >5 MHz (-3 dB) at <5 μs/div Sweep Time

## FFT Analyzer

**INPUT** - (as per oscilloscope)

### AMPLITUDE

#### Attenuation

0 to 60 dB in 20 dB steps

#### Reference Level Range

2.23 mV to 22.3 V Full Scale (-40 to +40 dBm/50  $\Omega$  reference voltage)

#### Response

+0/-3 dB (0 Hz to 20 kHz)

#### DYNAMIC RANGE - 80 dB

#### Average Noise Level - <1 $\mu$ V

#### Spurious - <7 $\mu$ V

### FREQUENCY

#### Range - 0 to 20 kHz

#### Span - 10 to 200 Hz/div continuously variable

#### Bandwidth - 3, 10, 30 or 100 Hz

### TRIGGER FUNCTION

Selectable external trigger (time-gate) capabilities

### PULSE WIDTH

>100 ns

## External Mixer

### EXTERNAL MIXER IF INPUT

**Type** - SMA (f)

#### Frequency

410.7 MHz at -30 dBm  $\pm$ 3 dB for top of screen display

#### Compression

1 dB at >-5 dBm

### EXTERNAL MIXER LO OUTPUT

SMA, 50  $\Omega$  nominal (must be terminated when not in use)

#### Frequency - 3 to 12 GHz

#### Amplitude - >+8 dBm

## Input/Output

### ANALYZER INPUT

2392, Precision Type N (f)

2390A, Precision Type N (f)

2393, Field replaceable Planar Crown™ with 3.5 mm (f) and Type N (f) both supplied

### INPUT VSWR

(>0 dB input attenuation)

<1.3:1	<2.9 GHz - (2390A, 2393A)
<1.45:1	<2.9 GHz - (2392A)
<1.5:1	2.9 GHz to 8 GHz
<2.0:1	8 GHz to 18 GHz
<2.5:1	18 GHz to 26.5 GHz

### EXTERNAL REAR TRIGGER INPUT

10 k $\Omega$  nominal

### EXT REF INPUT

**Type** - BNC (f), 1 k $\Omega$  nominal 10 MHz at 1 to 10 Vpk-pk

### PHONES OUTPUT

1/8 in (3.2 mm) phone jack

### REF OUT (CALIBRATOR)

**Type** - BNC (f), 50  $\Omega$  nominal

**Frequency** - 100 MHz

**Accuracy** - Same as Frequency Standard

**Amplitude** - -30 dBm

**Accuracy** -  $\pm$ 0.5 dB

### 10.7 MHz IF OUTPUT

**Type** BNC (f), 50  $\Omega$  nominal

### 410.7 MHz IF OUTPUT

**Type** BNC (f), 50  $\Omega$  nominal

### EXT DISPLAY OUTPUT

15 pin VGA format for external color display

### VIDEO OUTPUT

100 mV/div  $\pm$ 10% into 1 M $\Omega$

### FUNCTION CONNECTOR

External Rear Trigger, pin 8

Upper Limit Relay Drive, pin 13

Lower Limit Relay Drive, pin 5

Sweep, pin 14

Sweep Hold, pin 6

Auxiliary Video, pin 7

10 k $\Omega$  nominal

50 V, 200 mA max

50 V, 200 mA max

0 to +5 V ramp  $\pm$ 0.5 V

TTL Level

100 mV/div  $\pm$ 10% into 1 M $\Omega$

### IEEE-488 GPIB

#### Conforms to

IEEE-Standard 488-1987

#### Implemented Subsets

SH1, AH1, T1, TE0, L2, LE0, SR1, RL2, PPO, DC1, DT1 and CO

#### Compatibility

IEEE-488.2 Command Set.

High Speed waveform transfer supported.

### RS-232

#### Type

Half-duplex RS-232 (operates as slave to controller [DTE])

#### Baud Rate

110, 150, 300, 600, 1200, 2400, 4800, 9600, 19200 or 38400

#### Handshake Modes

XON/XOFF (Software), CTS/RTS (Hardware)

#### Parity Check

Odd, Even or None



## General Characteristics

### DIMENSIONS (ALL VERSIONS)

40.64 cm (16 in) wide (including handle);  
19.05 cm (7.5 in) high; 55.88 cm (22 in) deep

### WEIGHT (WITHOUT OPTIONS)

2392 15.5 kg (34.1 lbs)  
2390A 16.6 kg (36.6 lbs)  
2393 16.7 kg (36.8 lbs)

### POWER REQUIREMENTS

#### AC Line

90 to 132 VAC, 50 to 60 Hz / 400 Hz, <170 W  
198 to 264 VAC, 50 to 60 Hz / 400 Hz, <170 W

### ENVIRONMENT

**Operating Temperature** - 0 to 50°C

**Storage Temperature** - -40 to 71°C

**Temperature Change** - 1°C/minute for specified accuracy

#### Altitude

Operational 3,048 m (10,000 ft)  
Nonoperational 12,192 m (40,000 ft)

### ELECTRO-MAGNETIC COMPATIBILITY

Conforms with the protection requirements of EEC Council Directive 89/336/EEC.

Complies with the limits specified in the following standards:

EN55011-1991 (Emissions)	CISPR11
EN50082-1:1992 (Immunity)	IEC801-2 1991
	IEC801-3:1984
	IEC801-4:1988
EN60555-2: 1987	IEC555-2

### SAFETY

Complies with IEC 1010-1.BSEN 61010-1 for class 1 portable equipment and is for use in a pollution degree 2 environment. The instrument is designed to operate from an installation category 2 supply.

NOTE: The 2390A series requires 15 minutes of warm-up time to meet specifications. Specifications only apply with TIME CALIBRATION set to ENABLE in the Analyzer Configuration Screen Option Menu or immediately after manually activating a TIME CALIBRATION.

### Options

#### TRACKING GENERATOR (Option 02)

##### Frequency Range

100 kHz to 2.9 GHz

##### Flatness (at -10 dBm)

±2.0 dB, 100 kHz to 1 MHz  
±1.5 dB, 1 MHz to 2.9 GHz

##### Output Level

0 to -70 dBm in 1 dB steps

##### Attenuator Accuracy

±1 dB or 0.05 dB/dB

##### Nonharmonic Spurious

<-30 dBc

### Harmonics

<-20 dBc

### Leakage (Dynamic range)

-120 dBm

### QUASI-PEAK DETECTOR (Option 08)

Selected Bandwidth	Freq Range	Charge Time*	Discharge Time*	Display Time*
200 Hz	10 to 150 kHz	45	500	160
9 kHz	0.15 to 30 MHz	1	160	160
120 kHz	0.03 to 1 GHz	1	550	100

\* Time is given in ms ±20%

### HIGH STABILITY TIMEBASE (Option 09)

#### Temperature Stability

±0.02 ppm/°C

#### Ageing

First year ±1 ppm/year  
Thereafter ±0.5 ppm/year

## Versions and Accessories

For 220 VAC operation substitute -220 for -110

For a certificate of calibration add -C

2392A-110	9 kHz to 2.9 GHz Spectrum Analyzer, 110 VAC
2392A-110-C	9 kHz to 2.9 GHz Spectrum Analyzer, 110 VAC with certificate of calibration
2392AT-110	9 kHz to 2.9 GHz Spectrum Analyzer, Tracking generator, 110 VAC
2392AP-110	2392A Premium (Tracking generator; 200 Hz, 1, 9 and 120 kHz Filters; Quasi-peak Detector) 110 VAC
2390A-110	9 kHz to 22 GHz Spectrum Analyzer, 110 VAC operation
2390AT-110	9 kHz to 22 GHz Spectrum Analyzer, Tracking generator, 110 VAC
2390AP-110	2390A Premium (Tracking generator; 200 Hz, 1, 9, 120 kHz Filters; Quasi-peak Detector, 0.02 ppm high stability time base), 110 VAC operation
2393A-110	9 kHz to 26.5 GHz Spectrum Analyzer, 110 VAC operation
2393AT-110	9 kHz to 26.5 GHz Spectrum Analyzer, Tracking generator, 110 VAC
2393AP-110	2393A Premium (Tracking generator; 200 Hz, 1, 9, 120 kHz filters; Quasi-peak Detector, 0.02 ppm high stability time base) 110 VAC

### Accessories

AC0100M	Near Field Probe Set
AC0410	Maintenance Manual
AC1009M	EasySpan (Waveform Transfer Software)
AC 1047	Applications library
AC1600M	TMAC Programming Manual
AC2388	1 GHz Active Probe supplied with accessory power supply

AC4105	Return Loss Bridge (5 MHz to 1.3 GHz)
AC4103T	Return Loss Bridge (5 MHz to 2 GHz)
AC4250	75 $\Omega$ BNC to 50 $\Omega$ type N adapter
AC4700	Rack Mount Adapter
AC5007	Soft Padded Carrying Case
AC5009	Type SMA PLANAR CROWN Adapter (2393A only)
AC5010	Type N PLANAR CROWN Adapter (2393A only)
AC7800	75 $\Omega$ type F to 50 $\Omega$ type N adapter
AC8700	UHF Antenna
59000/327	MI Plot Measurement Presentation Software

**MILLIMETER WAVEGUIDE, SINGLE DIODE HARMONIC MIXERS**

Model Number	Frequency Range	Waveguide Designation	Flange Type
M42HW	18-26.5 GHz	WR42, WG20, R220	UG-597/U
M28HW	26.5-40 GHz	WR28, WG22, R320	UG-599/U
M22HW	33-50 GHz	WR22, WG23, R400	UG-383/U
M19HW	40-60 GHz	WR19, WG24, R500	UG-383/U
M15HW	50-75 GHz	WR15, WG25, R620	UG-385/U
M12HW	60-90 GHz	WR12, WG26, R740	UG-387/U
M10HW	75-110 GHz	WR10, WG27, R900	UG-387/U

For other frequencies and sizes please consult factory for details

A Diplexer (DPL.313A) is required for use with the mixers listed above. It is supplied with two SMA (m) barrel adapters for IF and LO interconnection to the spectrum analyzer connectors and a 1 meter long, high quality interconnecting cable for connection between mixer and diplexer.

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