

ATTENUATION METER 190 A



Frequency ranges

- 2 kHz to 1300 MHz (UHF Head)
- 1 to 18 GHz (SHF Head)

Input levels

- + 20 to - 130 dBm (UHF Head)
- 0 to - 110 dBm (SHF Head)

Most of the parameters such as frequency, modulation, distortion have become easy to measure with a reasonable accuracy. Meanwhile, attenuation measurements do still require the use of costly and hard-to-use means, which are still set to metrological laboratories only.

This is the reason why the Model 190 A has been designed by Adret, in order to test attenuators industrially, integrated or not in generators.

The entirely programmable conception of the instrument permits to build-up an entirely automatic measuring position, meeting all production requirements such as rapid measurements and ease of utilization.

It is important to state the Model 190 A is not a level calibrator, since it measures the difference between two le-

vels, one of them being taken as the reference. As it is always possible to change the reference level, any cell of an attenuator can be tested independantly from the other.

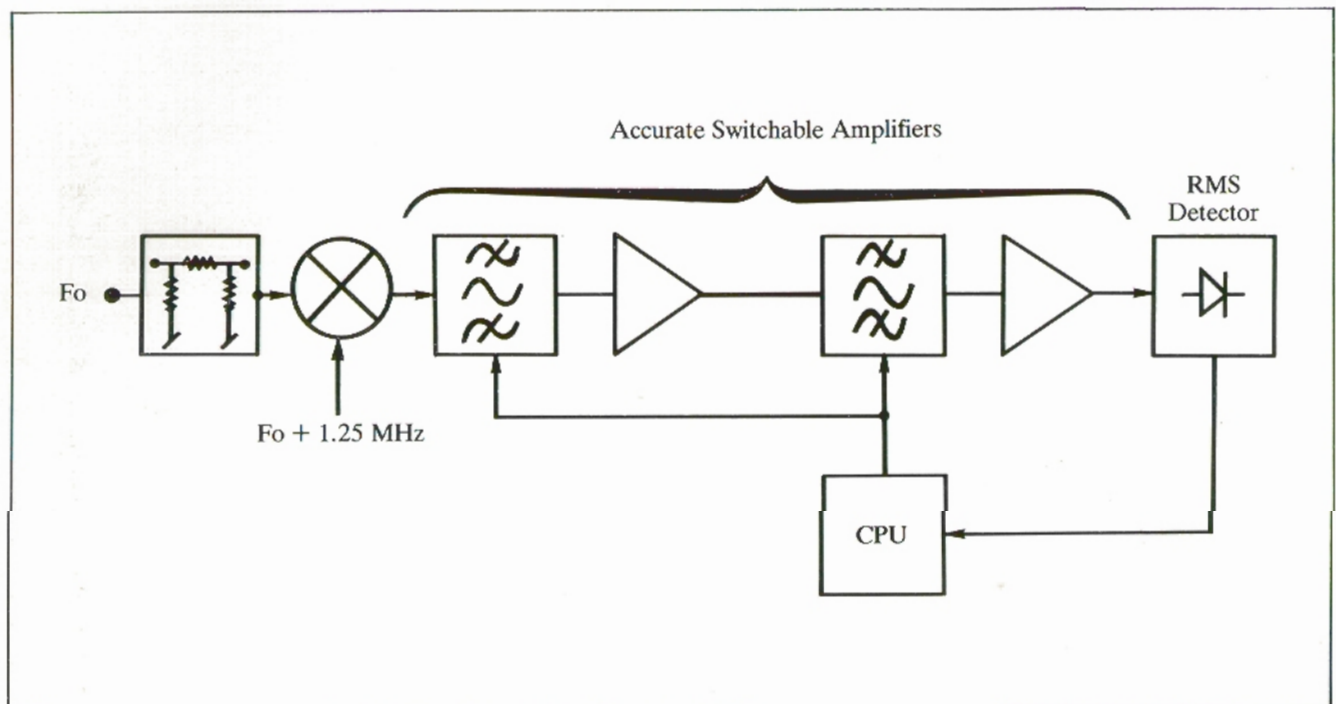
The local oscillator being not incorporated within the 190 A, the covered frequency range is the most extended possible, by the use of different external local oscillators, and the corresponding measuring probes.

Therefore two probes have been developed :

- a VHF probe covering the range 2 kHz - 1300 MHz,
- a SHF probe covering the range 1 to 18 GHz.

Other models will be further developed.

OPERATING PRINCIPLE



The frequency F_0 coming from the attenuator under test enters the attenuation-bridge and is then mixed with the local oscillator frequency $F_0 + 1.25$ MHz.

The 1.25 MHz offset is then transposed to 1 kHz, and goes through a range of switchable amplifiers.

The microprocessor works out the global gain of the amplifiers to be selected, according to the input level.

The RMS detector will work in a very small level range, ensuring therefore a very good accuracy.

PURPOSE OF THE 190 A

The Model 190 A can work according to two modes :

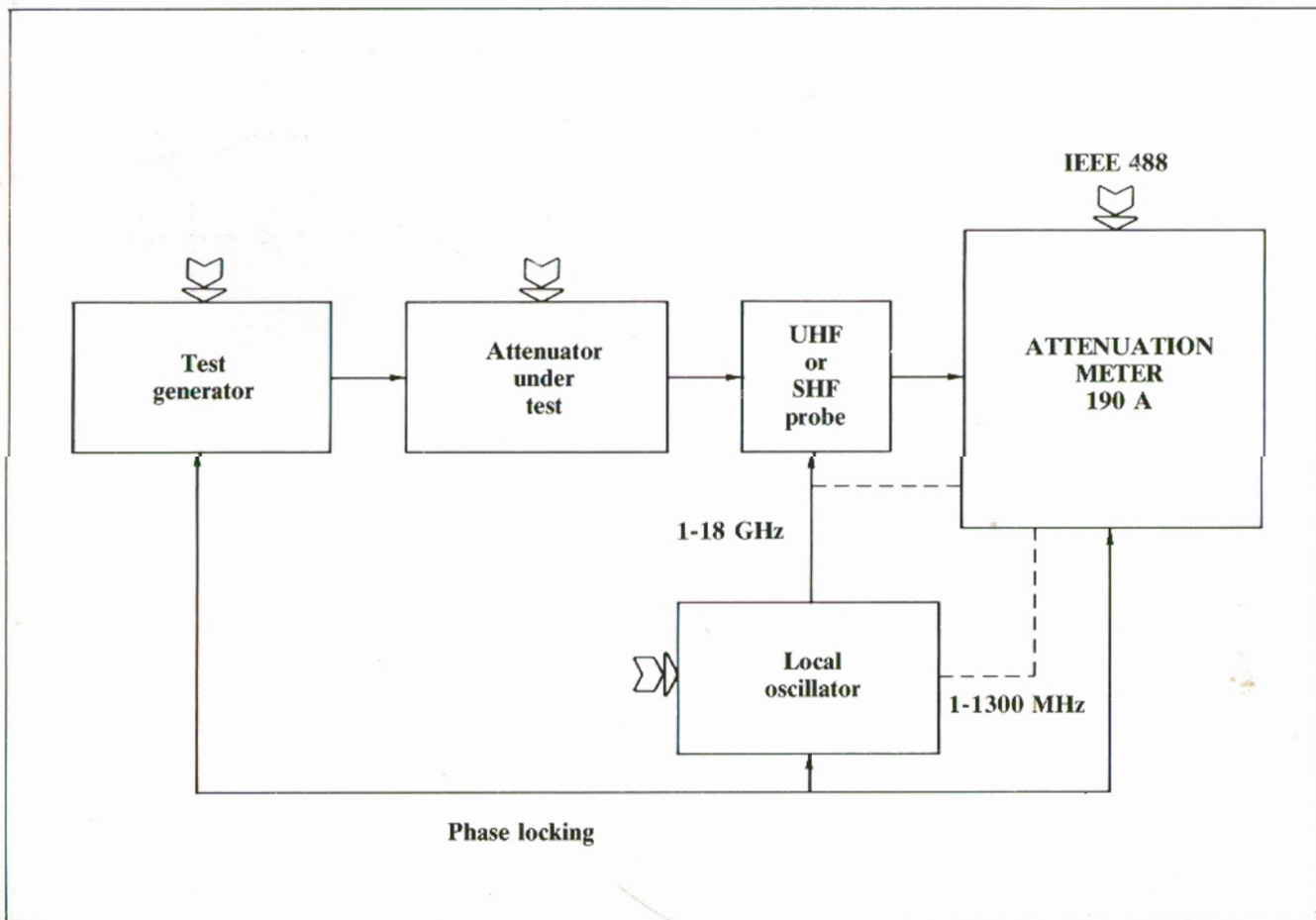
- Manual : the user defines the level ranges, the integration time and the filter bandwidth (30 Hz or 300 Hz in UHF range, 300 Hz in SHF range).
- Automatic : the 190 A automatically selects the above parameters.

The two modes can also be worked out through the BUS IEEE 488.

According to the below synopsis the attenuations measurements process is as follows :

- In case of a fixed-value attenuator, the output level of the test generator will be taken as the reference. After having connected the attenuator under test, the 190 A will measure the value of the attenuation either automatically, or according to the conditions defined by the user.
- In case of a variable attenuator, integrated or not in the test generator, the 190 A will measure the levels changes induced by this attenuator.

The analysis filter bandwidth is 30 Hz or 300 Hz up to 1.3 GHz, and 300 Hz up to 18 GHz. The instrument used as the test generator and as the local oscillator shall have a spectral purity (noise and spurious) and a stability compatible with these bandwidths.



SPECIFICATIONS 190 A

Features	UHF head	SHF head
Frequency ranges	2 kHz - 1300 MHz	1 - 18 GHz
Input levels	+ 20 to - 130 dBm/50 Ω	0 to - 110 dBm/50 Ω
Measurements dynamics	0 to 150 dB	0 to 110 dB
S.W.R.	≤ 1.12 ($> - 80$ dBm) ≤ 1.25 ($\leq - 80$ dBm)	≤ 1.4
LO input	1 - 1300 MHz	1 - 18 GHz
LO input level	+ 8 to + 10 dBm/50 Ω	0 dBm/50 Ω
Analysis filter	30 Hz or 300 Hz	300 Hz
Noise floor	- 120 dBm in 300 Hz - 130 dBm in 30 Hz	- 110 dBm in 300 Hz
Integration time	0.25 - 1 - 4 - 16 or 64 s	0.25 - 1 - 4 - 16 or 64 s
Relative accuracy as a function of the input level on the probe(*)	$0.02 \times A \text{ dB} + 0.1 \text{ dB}$ (+ 20 to + 15 dBm) $0.005 \times A \text{ dB} + 0.1 \text{ dB}$ (+ 15 to - 80 dBm) $0.005 \times A \text{ dB} + 0.5 \text{ dB}$ (- 80 to - 130 dBm)	$0.005 \times A \text{ dB} + 0.5 \text{ dB}$ (0 to - 110 dBm)

(*) $|A \text{ dB}|$ is the measured attenuation. The SWR of the system under test must be lower than 1.2 in UHF, and lower than 1.4 in SHF. The above performances are guaranteed for a temperature of $+ 23^\circ\text{C} \pm 3^\circ\text{C}$.

GENERAL

Resolution	0.01 dB
External locking	1 - 5 or 10 MHz (0.2 to 1 Vrms/50 Ω)
Reference output	10 MHz (0.6 Vrms/50 Ω)
Temperature range (guaranteed performances)	+ 15 to + 35 $^\circ$ C
Storage temperature	- 20 to + 70 $^\circ$ C
Power requirements	115 V or 230 V \pm 15 %
Power consumption	140 VA max.
Frequency	50 to 60 Hz
Dimensions	Rack 19", 3U
Weight	Net 16 kg Shipping 23 kg



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