Operation.

This instrument measures the RFrms voltage on the internal 50 Ohms transmission line.
One BNC bus is connected to the RF source, the other to a 50 Ohms load.

SMD chip IC1 is an accurate and sensitive wide band 2.5 GHz **"rms detector"** SMD chip It has a conversion gain of 7.5 Vdc out, per 1 Vrms in. And capable of detecting as little as -30dBm or 7mVrms with only -1dB error. Between 0 and 100 MHz is has a constant input impedance of 225 Ohms // 1pF.

With s1 in position "0", the total impedance on the inpout of IC1 is : **22.3 Ohms.**
The input attenuation is then : (5,023 + 0,0223) kOhm / 0,0223 kOhm= **226,2x.**

With s1 in poisition "-20", the input attenuation is : (5,023 + 0,225) kOhm / 0,225 kOhm = **23,32x.** Resulting in 20dB higher sensitivity.

The total resistance of R5//R6 is 3.083 kOhms.
With s2 in position R5//R6 = "0", and full scale deflection of mete M, the output of IC1 is : (210 + 3083) Ohm x 0,001 A = 3,293 Vdc, rounded off to **3,3Vdc**.

With s2 in position R4 = "-20", and full scale deflection of mete M, the output of IC1 is : 0,001 A x (210 + 120) Ohm = **0,33Vdc**. Resulting in 20dB higher sensitivity.

The measurable power range is therefore +53dBm - (-4dBm) = 57dB (!!).

To prevent influence from low frequency signals, coupling capacitor C2 causes the sensitivity to roll off 6db / octave from abt. 160 kHz down.

Extending the frequency range down :

By soldering an extra SMD capacitor of 100 nF on top of (in parallel to) C2, the low frequency range can be extended down to abt. 16 kHz (-45 dB @ 50 Hz).

By soldering an extra SMD capacitor of 1uF on top of (in parallel to) C2, the low frequency range can be extended down to abt. 1.6 kHz (-25 dB @ 50 Hz).

By soldering an extra ceramic SMD capacitor of 10uF on top of (in parallel to) C2, the low frequency range can be extended down to abt. 160 Hz (-5 dB @ 50 Hz).