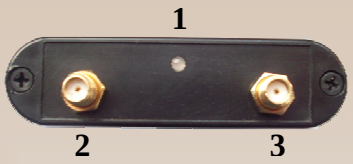

FRONT PANEL

1 – mode type diode: green - idle mode, blinking green - measurement, red - error

2 – generator output (female SMA)

3 – detector input (female SMA)

BACK PANEL

4 – mini USB connector

TECHNICAL SPECIFICATIONS

Hardware:

Power supply:	*5V (USB), ~400 mA*
Accuracy of measurement:	
ε	*1% for Q>1000*
tanδ	$\Delta\tan\delta=\pm 2\cdot 10^{-5}$ or $\pm 0.03\cdot\tan\delta$
Range of measured Q-factor:	*200 ÷ 100000*
Frequency range:	
type 1:	*4.4 GHz ÷ 5.2 GHz*
type 2:	*1.4 GHz ÷ 2.6 GHz*
type 3:	*0.7 GHz ÷ 1.3 GHz*
Frequency resolution:	*1 kHz*
Frequency stability:	*2.5 ppm*
Output power:	*12 dBm ± 3 dBm*
Range of input power:	*-55 dBm ÷ -5 dBm*
Measurement time:	*< 10 sec.*
Size:	*19 mm x 72 mm x 108 mm*
Weight:	*250 g*

Software:

Dedicated control application:	*Windows operating systems*
Export results:	*CSV file format, BMP picture*
Import results:	*CSV file format*

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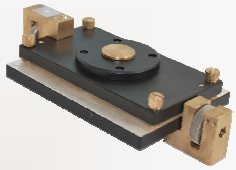
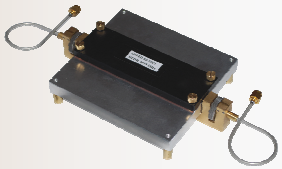
MICROWAVE Q–METER

PRECISE DIELECTRIC MEASUREMENT SETUP FOR EVERY MICROWAVE/MATERIAL LABORATORY

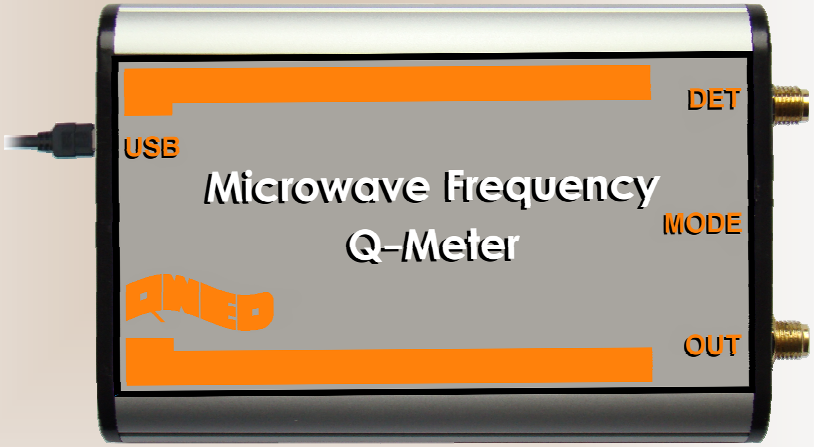
Split Post Dielectric Resonators (SPDR) are intended for the measurements of the complex permittivity of laminar dielectric materials including LTCC substrates, but also thin ferroelectric films deposited on low loss dielectric substrates. Additionally, SPDRs can be used for the measurements of the surface resistance and conductivity of various conducting materials such as commercial resistive layers, thin conductive polymer films or high resistivity semiconductors. Such measurements are only possible for large surface resistance samples with Rs > 5 kΩ/square.



Single Post Dielectric Resonators (SiPDR) are intended for the measurements of the surface impedance of metamaterials and resistive films as well as for the contact-less measurements of the conductivity of semiconductor wafers. Range of thin film materials that can be measured includes resistive layers, thin metal films and conductive polymer films with the surface resistance Rs < 20 kΩ/square. For semiconductor wafers the upper limit for resistivity measurements is about 1000 Ωcm. Semiconductors with higher resistivity values can be conveniently measured with split post dielectric resonators.



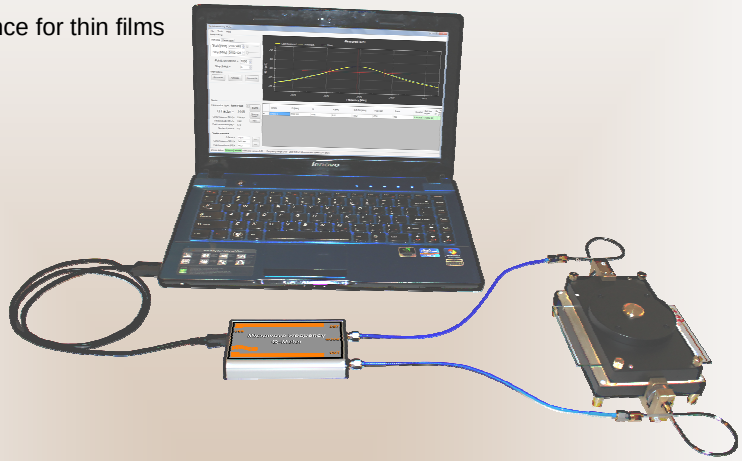
Microwave Frequency Q-Meter is an **inexpensive computer controlled microwave oscillator system** that enables quick and automatic measurements with a dedicated SPDR and SiPDR.



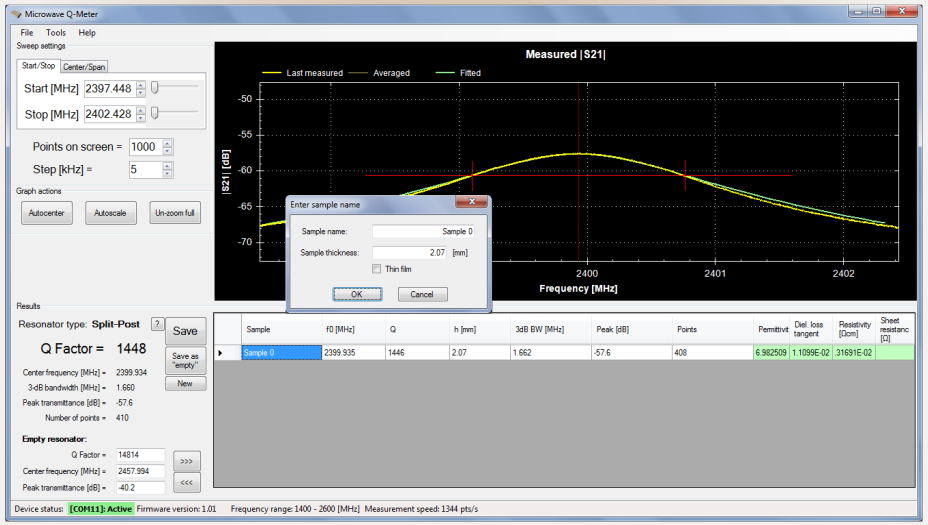
The hardware part of the Q-Meter consists of the PLL-stabilized microwave source with DDS generated reference controlled by fast 32-bit ARM microcontroller. A wideband logarithmic power detector is used to measure the transmitted power level through the resonator. A multipoint resonance curve fitting algorithm will enable the Q-factor to be accurately calculated. The only external information required is the thickness of the sample under test. Great hardware simplicity as well as the use of computer screen for presentation of the results leads to significant cost reduction to start exploration of electromagnetic properties of materials with SPDRs and SiPDRs.
Microwave Frequency Q-Meter can be connected to the computer via USB port. Dedicated application allows controlling measurement process and enables easy management of the measurements results.

With dedicated SPDRs and SiPDRs the following electromagnetic properties of materials can be measured:

- permittivity (SPDR only)
- dielectric loss tangent (SPDR only)
- resistivity
- sheet resistance for thin films



To determine permittivity, dielectric loss tangent and resistivity and sheet resistance, only two measurements should be performed. The first one, called reference measurements, is performed for empty resonator or resonator containing blank substrate for thin films measurement. The second one is performed for resonator containing test sample. In case of measurements of thin films deposited on a semi-insulating substrate samples must be placed in resonator with **thin film facing down - towards dielectric resonator**.



ALLOWS REPLACING EXPENSIVE MEASUREMENT EQUIPMENT WITH LOW COST VERY ACCURATE MEASUREMENT