Solution Brochure

Industry-proven low-loss dielectric material test solution 1GHz-10GHz

Keysight Technologies & EM Labs

Easy to use highly repeatable solution with Cavity Resonator perturbation method

The cavity resonator is a highly reliable solution that has been used for a wide range of companies and research institutions for more than a quarter of a century since our company introduced in Japan first time. With the extremely high Q factor of the resonator itself (over 10,000, typical), it is possible to accurately evaluate low loss materials with tan δ of 0.01 or less. Excellent hardware performance is realized through solid basic design and manufacturing process management including highly precise machining.

Furthermore, since the measurement procedure is simple, you can efficiently measure materials with high repeatability. Basically, you just need to insert a rod-shaped sample material into the sample insertion hole at the top of the resonator, and measure. There is no need to precisely position the sample, and thus the variation of measured values by operators is extremely small. The measurement software guides you through the measurement with step-by-step explanation, which assures that you can obtain the correct measurement result from the beginning.

- Ideal for evaluation of low loss dielectric materials with tan δ 0.01 or less
- Very simple procedure: just insert a rod sample and measure.
- Permittivity measurement software enables efficient and reliable measurements
- Robust hardware provides reproducible measurements over the years

KEYSIGHT TECHNOLOGIES

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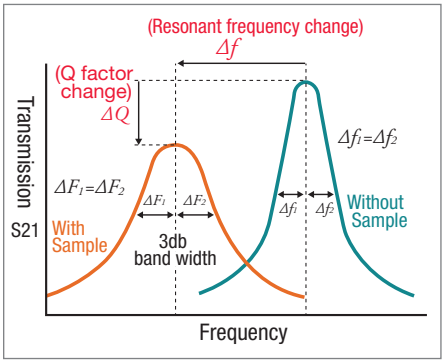
Technology Highlights

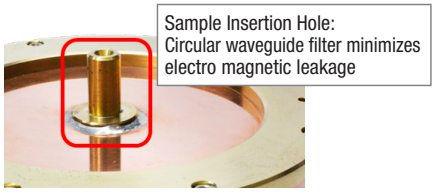
Resonator perturbation method provides accurate permittivity measurement

In the resonator perturbation method, complex relative permittivity is measured from the change in the resonance state when placing a dielectric sample in the maximum electric field area of the resonator. Permittivity is obtained from the frequency change, and dielectric loss is obtained from the Q factor change. Since the Q factor of the resonator itself is very high (10,000 or more, typical), even a slight change due to the insertion of a low loss sample causes a large Q factor change, which enables accurate measurements.



Unique sample insertion hole design enables easy and accurate measurements

Electric field disturbance by a sample insertion hole in the resonator is a big challenge in the perturbation method. By forming a circular waveguide with appropriate filter characteristics at the sample insertion hole, electromagnetic waves leaking from the resonator are minimized and accurate measurement is realized. Since there is no moving part such as a shield case to prevent leakage, high reproducibility can be obtained.



Solution configuration example with Keysight products

*Control PC is required in addition.

Keysight Streamline series USB network analyzer	P9373A (14 GHz)
Permittivity measurement software for cavity resonators	CP-MA
Cavity resonator starter kit	CP-ST
Cavity resonator 1 GHz	CP-001

Cavity resonator family

Cavity resonator 1 GHz	CP-001
Cavity resonator 2 GHz	CP-002
Cavity resonator 2.45 GHz	CP-245
Cavity resonator 3 GHz	CP-003
Cavity resonator 5 GHz	CP-005
Cavity resonator 5.8 GHz	CP-580
Cavity resonator 10 GHz	CP-010

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