FAST&BEST Co., Ltd

FPOR20110K

Open Resonator System

Datasheet

Overview

Millimeter wave materials are crucial for the development of mobile communications, and the dielectric characteristic test of these materials is essential for the development of high-frequency materials.

For measuring the dielectric properties of millimeter wave materials, a high-precision and low-vibration motion system is needed, along with an integrated algorithm that can accurately position the sample at the position with the strongest electric field signal for measurement.

An automatic integration of measurement is also necessary to achieve fast and simple measurement, which provides verification and testing solutions for the dielectric properties of new materials on millimeter waves.

The measurement system requires careful design and implementation, with attention to factors such as signal processing, accuracy, repeatability, and reproducibility. The system should also be capable of handling different types of materials, as well as various frequency ranges and measurement modes.

Overall, the development of a reliable and accurate dielectric characteristic measurement system for millimeter wave materials is crucial for advancing the field of high-frequency materials and enabling the continued evolution of mobile communication technology.

Technical Specifications

- Dielectric Properties Measurement (Dk and Df)
- Consultation about materials dielectric properties
- Measurement system construction
- Measurement standard substrates (TAF 3327)
- Line transmission loss verification

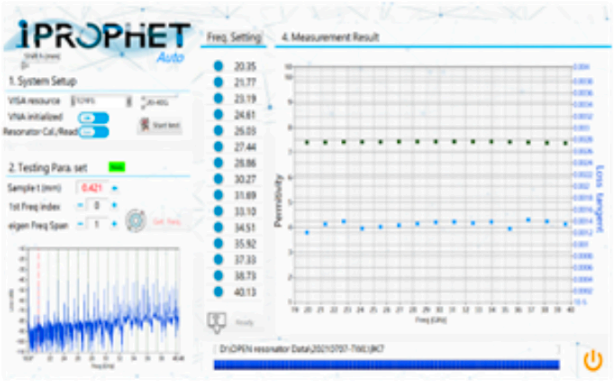
Frequency (GHz)	Method	Sample thickness (mm)	Sample size (mm)
10	SPDR	0.05~0.9	30*30~80*80
15	SPDR	0.05~0.5	20*50~35*50
20~110	Open Resonator	0.01~2	60*60~90*90

- **Measurement Technology Services And Solutions for Dielectric Properties of Materials in the Millimeter Wave Band Typically Involve Specialized Equipment and Expertise in the use of High-frequency Measurement Techniques.**

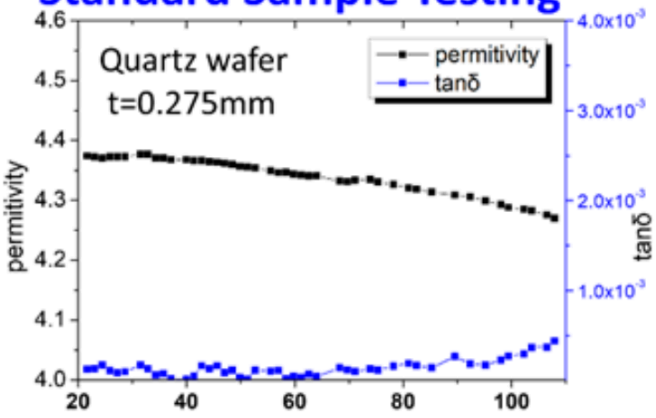
Product	Spec
FPOR2040	F : 20-40GHz, t:5um to 2mm
FPOR2060	F : 20-60GHz, t:5um to 1mm
FPOR20110	F : 20-110GHz, t:5um to 0.5mm
FPOR6080	F : 60-80GHz, t:5um to 1mm
Option	Thin Film; Automatic; High Q Design; Sample Holder

Sheet dielectric material sample such as polyamide (PI), polytetrafluoroethylene (PTFE), printed circuit boards(PCB) , Ceramic etc.

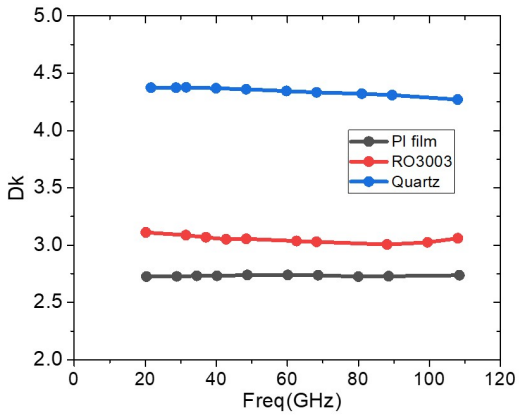
Automatic Measurement UI

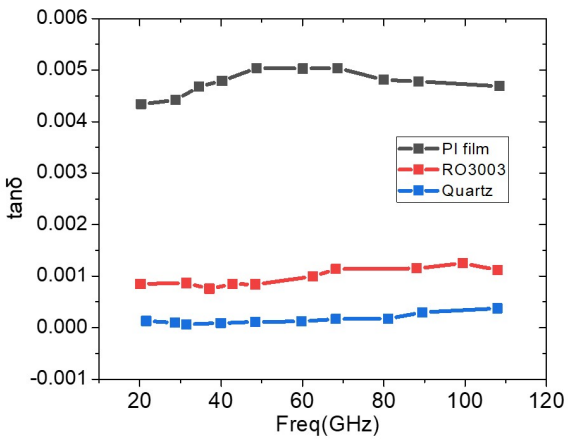


Standard Sample Testing



Different types of samples Testing





Uncertainty of System

teflon t=250um		Uc	K	Expandcd uncertainty U	Average	Expandcd rclative uncertainty(%)
28GHz	Dk	0.00519	2	0.01037	2.077	0.499
	Df	0.02024	2	4.047E05	6.183E-04	6.546
38GHz	Dk	0.00519	2	0.01037	2.070	0.501
	Df	0.01554	2	3.109E-05	5.009E-04	6.206
60GHz	Dk	0.00519	2	0.01038	2.053	0.505
	Df	0.01998	2	3.995E-05	5.500E-04	7.264
77GHz	Dk	0.00519	2	0.01039	2.033	0.511
	Df	0.01753	2	3.506E-05	5.340E-04	6.565

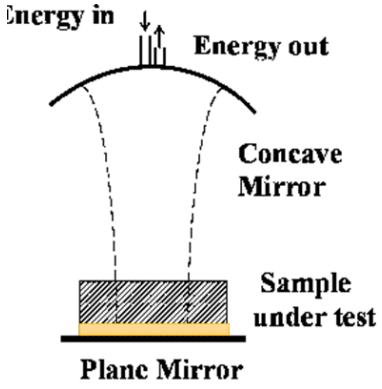
Quartz t=200um		Uc	K	Expandcd uncertainty U	Average	Expandcd rclative uncertainty(%)
28GHz	Dk	0.00519	2	0.01038	4.418	0.235
	Df	0.01288	2	2.456E-05	9.976E-05	24.621
38GHz	Dk	0.00519	2	0.01037	4.415	0.235
	Df	0.01256	2	2.512E-05	1.131E-04	22.202
60GHz	Dk	0.00520	2	0.01040	4.415	0.235
	Df	0.01295	2	2.590E-05	1.539E-04	16.833
77GHz	Dk	0.00521	2	0.01043	4.432	0.235
	Df	0.01196	2	2.392E-05	4075E-04	5.869

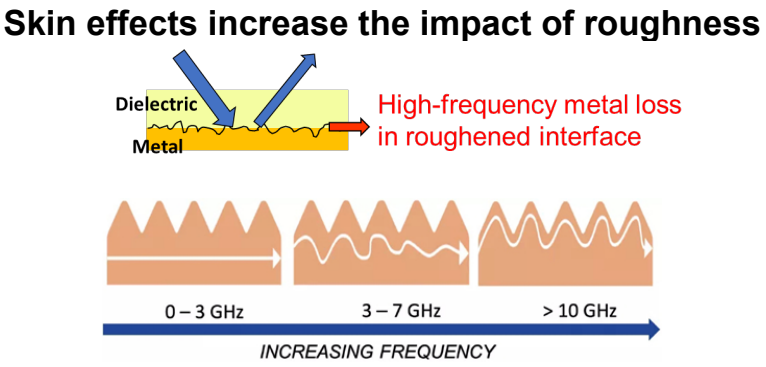
Industrial Application

Millimeter wave material measurement systems can provide valuable information for the development and characterization of new material in various industries. There systems user electromagnetic waves in the millimeter wavelength range to probe the physical properties of materials such as their dielectric constant, loss tangent, conductivity and thickness.

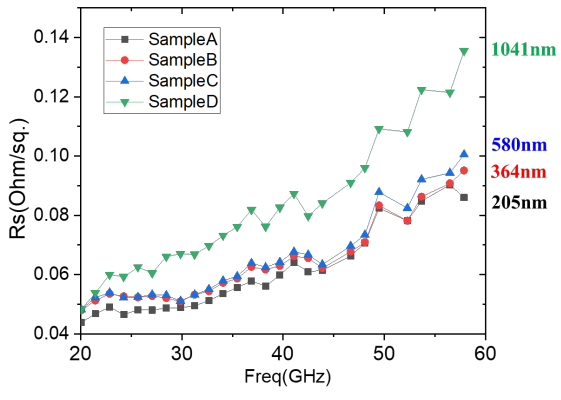
By measuring these properties the millimeter wave material measurement system can help manufactures optimize the performance and reliability of their products, such a printed circuit boards (PCBs), flexible boards, ceramic substrates and packaging materials.

The transmission loss included dielectric loss and conductor loss. Conducting loss dominated by the interface of substrate and metal. The hemispherical Fabry Perot Open Resonator (FPOR) with a reflective structure of signal is good tools for measurement dielectric properties and metal loss.

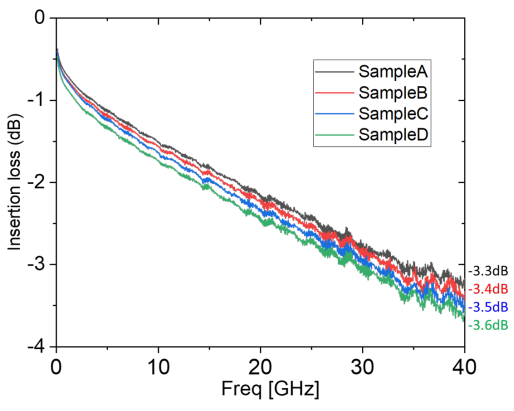




Interface Rs Measurement by Reflection FPOR



Transmission Insertion Loss From CPW



SPECIFICATION

Cavity Q improved	
Q	Up to 100000
Loss tangent (Df) Range	0.05 to 0.0001

Frequency Range Support	
FPOR2040	20 GHz to 40 GHz
FPOR2060	20 GHz to 67 GHz
FPOR20110	20 GHz to 110 GHz

Low Dk Material Measurement	
Dk Range	1 to 30
DUT Dimension	6cm x 6cm or larger

Frequency Section Design	
FPOR2040	t : 2mm to 5um
FPOR2060	t : 1mm to 5um
FPOR20110	t : 0.5mm to 5um

Motion Information	
Minimum incremental motion	25nm
Bi-directional Repeatability	120nm
Movement Range	32mm

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Ordering Information

Assembly Cable	
2.92mm Cable	DC to 40 GHz, Length: 16 cm
1.85mm Cable	DC to 67 GHz, Length: 16 cm
1.0mm Cable	DC to 110 GHz, Length: 16 cm
2.92mm Cable	DC to 40 GHz, Length: 120 cm
1.85mm Cable	DC to 67 GHz, Length: 120 cm
1.0mm Cable	DC to 110 GHz, Length: 120 cm
Source Cable	
PSC292	Probe Source Cable from DC to 40 GHz
PSC185	Probe Source Cable from DC to 67 GHz
PSC10	Probe Source Cable from DC to 110 GHz
DUT Holder	
DH2040	DUT Holder from 20 GHz to 40 GHz
DHC4067	DUT Holder Cover from 40 GHz to 67 GHz
DHC67110	DUT Holder Cover from 67 GHz to 110 GHz
RF Adapter	
BHA292	2.92mm Bulk Head Adapter
BHA185	1.85mm Bulk Head Adapter
BHA10	1.0 mm Bulk Head Adapter

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