

# Long-awaited mmWave Low-loss Dielectric Material Test Solution

## Easy to use and highly repeatable measurements up to 80 GHz

- Very high Q resonators enable low loss material test for 5G and other demanding mmWave applications.
- Easy operation for excellent repeatability and test efficiency regardless of operator skills.
- Complies with IPC test method TM-650 2.5.5.13.

### Product line-up with key characteristics

Keysight model number	Description	Res mode	Q factor	Connectors
N1501AKEAD-710	Split Cylinder Resonator 10 GHz	TE011*	> 20,000	2.92 mm (f)
N1501AKEAD-720	Split Cylinder Resonator 20 GHz			
N1501AKEAD-724	Split Cylinder Resonator 24 GHz		> 14,000	2.92 mm (f)
N1501AKEAD-728	Split Cylinder Resonator 28 GHz			
N1501AKEAD-735	Split Cylinder Resonator 35 GHz		> 10,000	2.92 mm (f)
N1501AKEAD-740	Split Cylinder Resonator 40 GHz			
N1501AKEAD-750	Split Cylinder Resonator 50 GHz		> 7,000	2.4 mm (f)
N1501AKEAD-760	Split Cylinder Resonator 60 GHz		> 6,000	1.85 mm (f)
N1501AKEAD-780	Split Cylinder Resonator 80 GHz			1 mm (f)

\* The electric field is parallel to the test sample.

### Other characteristics

Keysight model number	Operating temperature	Dimensions [mm]	Weight [kg]
N1501AKEAD-710	0 to 40°C	100 x 105 x 70	2.4
N1501AKEAD 720 - 780		62 x 80 x 40	0.9

## Configuration

N1500A materials measurement suite option 007 and USB license dongle are required. Two RF cables for network analyzer connection and a control PC are also required.

## Test software

Permittivity measurement software is available for efficient measurement. It controls the Keysight Technologies network analyzer and automatically acquires the necessary parameters, then outputs the complex relative permittivity.

The N1500A materials measurement suite option 007- resonant cavity method for split cylinder resonators - supports N1501AKEAD-7xx split cylinder resonators.

For the detail of the N1500A and other solutions, please refer to the following web pages:

Keysight material measurement solutions: <http://www.keysight.com/find/materials>

N1500A software download: <https://www.keysight.com/us/en/support/N1500A/materials-measurement-suite.html#drivers>

# Test sample requirements

A thin flat plate sample is required for split cylinder measurements.

## Size

Recommendation for accurate measurement and easy handling:

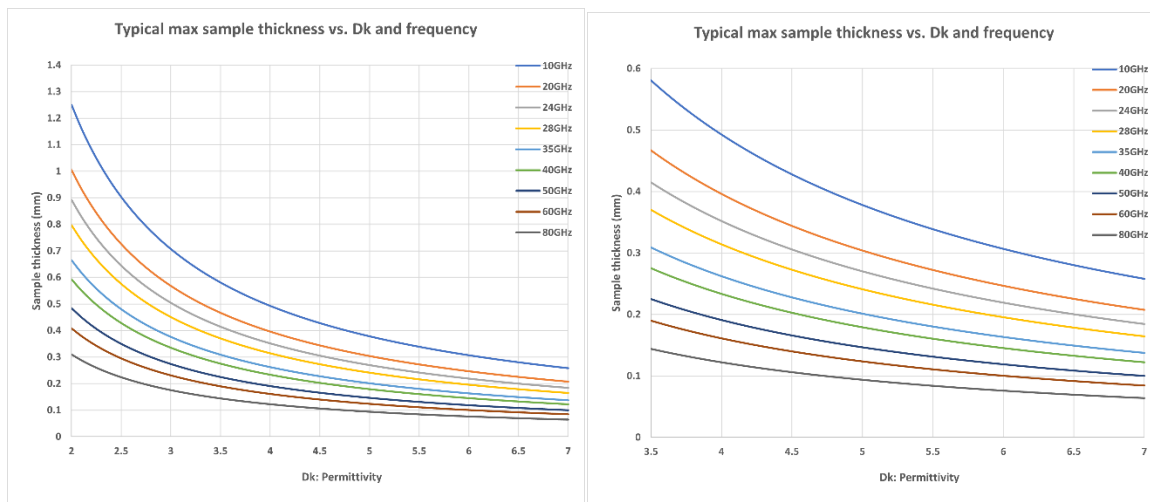
10 GHz: 62 mm x 75 mm, 20 GHz - 80 GHz: 34 x 45 mm

## Thickness

We recommend a thickness of about 100  $\mu\text{m}$ .

The typical maximum thickness is shown in the chart below.

In the case of relatively high loss materials,  $\tan \delta > 0.01$  for example, a sample may need to be significantly thinner than the limit in the chart.



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