DAK

DAK – Dielectric Assessment Kit Product Line

What are DAK, DAKS, and DAK-TL?

SPEAG's **D**ielectric **A**ssessment **K**it (DAK) product line offers high-precision dielectric parameter measurements (permittivity, conductivity, loss tangent) over the very broad frequency range from 4 MHz to 67 GHz for various applications in the electronic, chemical, food, and medical industries. The probe is connected to a vector network analyser (VNA) for measurement of the complex reflection coefficient (S11) at the probe end. The measured S11 is then converted into the complex permittivity of the material under test using the DAK software. The DAK product line consists of (i) DAK-TL2, the first ever system able to measure thin-layer materials and small volumes of liquids, (ii) DAK single probes, and (iii) the DAK System.

DAK-TL2	DAK-TL2 is the latest version of our Dielectric Assessment Kit for Thin Layers (DAK-TL)*. It has been developed based on a breakthrough in computational electromagnetics by the IT'IS Foundation for dielectric characterization of samples with limited size or volume. The novel algorithm combined with the upgraded hardware in DAK-TL2 expands the measurement capabilities and overcomes the limitations of the previous version, making the system more flexible and more accurate. The DAK-TL family is the first commercially available systems able to measure with high precision the dielectric properties of thin material layers (thickness range 100 µm – 10 mm) and small quantities of liquids (10 – 50 mL) over a broad frequency range. The system is fully automated and software controlled. Currently, three DAK-TL2 system configurations are offered: ▪ **DAK12-TL2**: 4 – 600 MHz ▪ **DAK-3.5-TL2**: 200 MHz – 20 GHz ▪ **DAK-1.2E-TL2**: 5 – 67 GHz The frequency range of the system can be easily extended by adding one or two probe beams. *DAK-TL is discontinued on August 2020 and succeeded by DAK-TL2

DAK	DAK consists of three single probes to cover that very broad frequency range from 4 MHz to 67 GHz without compromise on uncertainty. The probes are mounted on a mounting arm and connected via a high-quality cable to any VNA. The main features are: ▪ Minimized unwanted reflections due to maximum precision manufacture ▪ Optimized probe materials and shapes to ensure excellent contact with the material under test ▪ Easy cleaning process to avoid cross-contamination between probe and material ▪ Advanced algorithms that extend the frequency range of DAK probes down to 4 MHz (DAK-12) and up to 67 GHz (DAK-1.2E) with minimal uncertainty ▪ Novel shorting block for excellent system calibration, which is key for highly accurate and precise measurements The following three DAK single probe solutions are available: ▪ **DAK-12**: 4 MHz – 3 GHz ▪ **DAK-3.5**: 200 MHz – 20 GHz ▪ **DAK-1.2E**: 5 – 67 GHz
DAKS	The DAK System is based on the same probe technology as the single probe DAK versions but with the vector reflectometer integrated to eliminate phase distortions due to cable movements. Currently, two versions of DAKS are offered: **DAKS-12**: 4 MHz – 3 GHz, with integrated vector reflectometer model R60 from Copper Mountain Technologies **DAKS-3.5**: 200 MHz – 14 GHz with integrated vector reflectometer model R140 from Copper Mountain Technologies
DAK-R	DAK-R is an advanced resonator probe system to accurately characterize low-loss samples (d <5 mm) available for various frequency bands Release date: 2023Q4
DAK-LF	DAK-LF is a low-frequency probe based on the 4-point impedance measurement to extend our dielectric measurement capabilities into the kiloherz range. Release date: 2023Q4