# PrimeNano ScanWave™ 1.5

## sMIM Key Points

- Measure permittivity and conductivity
- Measure insulators, conductors, semiconductors, and dielectric materials
- Measure linear and non-linear materials simultaneously
- Sub-surface sensitivity
- Linear response with permittivity
- Linear response with doping concentration
- Compatible with any SPM imaging mode (contact, non-contact, intermittent)
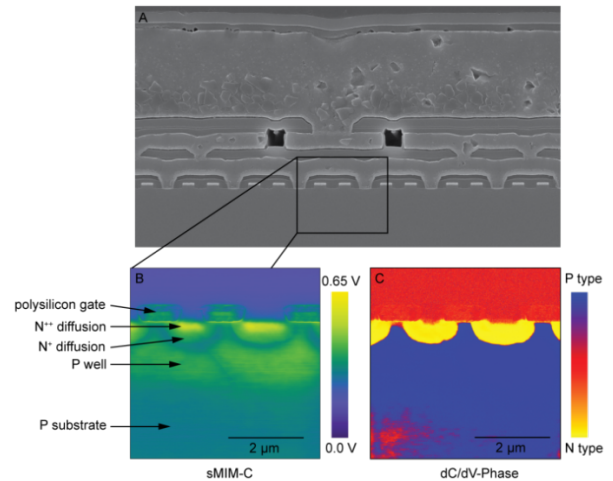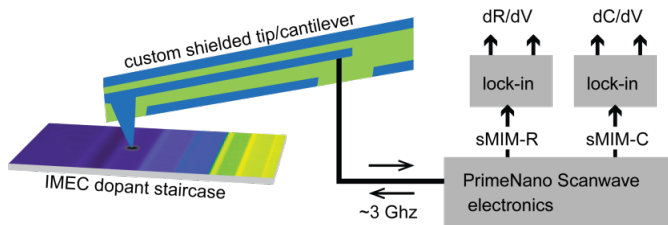


## sMIM Specifications

| Specification: | PrimeNano |
|---|---|
| Mode Description | sMIM |
| Measurements | sMIM (C,R), sMIM-AC (dC/dZ,dR/dZ); dC/dV Amp & Phase; dR/dV Amp & Phase |
| Scanning Method | Contact, Non-contact, 2 pass mode, & Aproach curves |
| Frequency | 3GHz |
| Min Detectable Capacitance* | 0.5aF |
| Dopant Sensitivity Range** | $10^{14}$ atoms/cm$^3$ - $10^{21}$ atoms/cm$^3$ |
| Probe tip Radius | 35nm +/- 5nm |
| Spatial Resolution (electrical)*** | <20nm |
| Noise Floor | 0.5aF |
| Scan Speed**** | 20Hz |
| Power | -15 dBm to -45dBm |
| Probes | Solid metal, hardened, shielded |
| Probe Bias | +/-25V from DC to 150kHz |
| Output | 2 channels; +/- 10V analog; up to 300kHzbandwidth |
| AFM compatibility | Asylum Research Cypher & MFP-3D; Park NX & XE Series; Bruker Dimension, ICON, & Edge, CSInstruments Nano-Observer<br>Other models upon request |

**Note:** Specifications above are only for the ScanWave product. AFM specifications are dependent on the specific model used with the PrimeNano electronics.

\* Value represents the smallest measured capcitance value on a known sample
\*\* Conductive dynamic range measured using IMEC staircase sample with certified values. Instrument sensitivity may be greater.
\*\*\* Sample and opreation mode depended. Verified electrical lateral resolution measured on a doped sample with defined n-p doped transitions or a graphene sample with domain boundaries or a graphene sample with superlattices.
\*\*\*\* Scan speed is limited by the AFM instrument used. Value shown here was measured using A Cypher AFM from Asylum Research

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