

NATIONAL METROLOGY INSTITUTE OF SOUTH AFRICA (NMISA)

Laboratory Progress Report in Electricity and Magnetism

Prepared for the 34th meeting of the CCEM, 6-7 March 2025

DCLF & RF laboratories

Resistance

NMISA, through its partners, is finalising the completion of a table-top Quantum Hall resistance standard and cryogenic current comparator. The product is at a metrology testing stage, and upon completion, it will enable NMISA to have a primary realisation of the Ohm at an uncertainty better than 2 in 10⁸.

Participation in comparisons:

- GULFMET.EM-K2 high resistance comparison as one of the linking laboratories to the CCEM-K2.2012 key comparison. The comparison is on resistance standards at 10 MΩ and 1 GΩ. The comparison commenced in 2022 and is currently ongoing.
- AFRIMETS.EM-S3 bilateral comparison between NMISA and KEBS (Kenya) on resistance standards at 1 Ω, 10 Ω, 100 Ω, 1 kΩ and 10 kΩ. A comparison report was published in KCDB and Metrologia in July 2023.

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AC/DC (Multifunction instrument)

Participation in comparisons:

- AFRIMETS.EM-S2 comparison on digital multimeter. NMISA coordinated and provided the reference values. The comparison was successfully completed and the report published in the KCDB and Metrologia in October 2024.
- CCEM K6a/K9 key comparisons of ac-dc voltage transfer standards, which commenced in 2019 and is currently in the Draft A stage.

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RF

Improved uncertainties for reflection coefficients in coaxial line for different connector sizes, and the process of having them published in the BIPM KCDB is planned.

Participation in comparisons:

- CCEM-RF-K5.d.CL, a collapsing star-type key comparison in coaxial scattering parameter measurements - 2.4 mm line system (9 kHz – 50 GHz).

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Digitalization

A feasibility study is underway to investigate the need and readiness of the South African industry for Digital Calibration Certificates (DCC) and to consequently determine the possibility for the implementation of the DCC system at NMISA.

With regards to Customer Management System (CMS), which is a module in our Enterprise Resource Planning (ERP) system, NMISA is in the process of implementing advanced electronic signatures on calibration certificates as mandated by the South African Electronic Communications and Transactions Act and required by the South African National Accreditation System.

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