Activity Report in Electricity and Magnetism

Prepared for the 33rd meeting of the CCEM, 7-9 March 2023

DCLF & RF laboratories

Resistance

NMISA commissioned a dual-source high resistance measurement system. This system allows NMISA to extend its calibration capabilities beyond 1 TΩ.

NMISA is in the process of having a Quantum Hall system with a cryogenic current comparator graphene-based system.

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 scheduled to be completed in 2024.
- AFRIMETS.EM-S3, which is a follow-up to AFRIMETS.EM-S1, as the pilot. The comparison is on resistance standards at 1 Ω, 10 Ω, 100 Ω, 1 kΩ, and 10 kΩ. The Draft B report is submitted to the WGLF Chair.

CMCs were improved, reviewed, and published in the KCDB.

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Voltage

NMISA commissioned a Cryocooled Programmable Josephson Voltage Standard for generating voltages up to 10 V. The basic configuration is the generation of voltages with ultimate precision and lowest noise level allowing voltages to be realised and measured in the order of 2 in 10^8.

CMCs were improved, reviewed, and published in the KCDB.

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Impedance

Through the CMC review process, CMCs for capacitance and inductance were improved and published in the KCDB.

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AC/DC (Multifunction instrument)

NMISA provided the comparison reference value for AFRIMETS.EM-S2 on digital multimeter (DC Voltage, DC current, DC resistance, AC voltage and AC current). The Draft A report is in progress.

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RF parameters

Through the CMC review process, CMCs for scattering parameters and calibration factor were extended to 50 GHz range in the KCDB.

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Digitalization

The laboratories have mainly automated the routine laboratory processes and systems as much as possible, for example, with respect to calibration procedures, data capturing and processing, customer management system as well as handling of maintenance tasks and audits.

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