

Report of NRC activities 2021-2023

DC Voltage

We have developed a voltage scaling method to scale from 10 V to 1000 V and also from 10 V to 0.1 V that can be used to calibrate digital voltmeters and voltage dividers. Results were reported at CPEM 2022.

We have upgraded our DC voltage stations and software to allow calibration of new types of Zeners that have 1 V and 0.1 V channels.

AC-DC Difference

NRC participated in CCEM-K6a, K9, and K6c, all in the AC-DC difference area, in early 2021 and submitted the results to the pilot lab in June 2021.

AC Voltage

We continue to develop our capabilities for the accurate measurement of AC voltages based on Josephson standards and synchronous sampling. This is important because of upcoming BIPM comparisons for which NRC helped revise the protocol. Recent developments include:

- Home-made AC sources with improved temperature stabilisation;
- Demonstrated capability to calibrate an AC source in terms of the programmable Josephson voltage standard, using either direct sampling or differential sampling in the frequency range 20 Hz to 1 kHz. These results were reported at CPEM 2022.

Impedance

A digital bridge using our home-made AC sources and a 3458 has been validated and a few internal client artefacts have been calibrated. This bridge is intended to be used mainly to support odd value capacitors, inductances, and phase angles of AC resistors.

Resistance

We are working on the closing measurements for the comparison entitled "Subsequent bilateral key comparison of CCEM-K2.2012.1: Comparison of Resistance Standards at 10 Mohm and 1 Gohm" between NRC, NIST, and KRISS.

Microwaves and Radiofrequencies

We are preparing to participate in a comparison at 50 GHz.

AC Power

Planning to participate in the CCEM international key comparison K-13 in AC power harmonics.

Expected to participate in a bilateral comparison with power lab at CENAM, Mexico.

High Voltage and Current

Participating in EURAMET.EM-S36 comparison in calibration of high voltage partial discharge measurement system.