GŁÓWNY URZĄD MIAR
CENTRAL OFFICE OF MEASURES

8th EURAMET – TC Electricity and Magnetism Meeting 2014
16th – 17th October
Slovenian Institute of Quality and Metrology, Lljubljana, Slovenia

News from GUM, Electricity Department

DC Resistance

Software for calibration high resistance meter, teraohmmeters model 6500 and 6530 manufactured by Guildline was implemented. This work sets out a revised and improved solution for conducting measurements as compared to the currently used software. The application was created from scratch in a different environment, i.e. National Instruments LabView, it communicates with the device via GPIB interface, conducts the measurements in a strictly defined setup, and works out the values and uncertainty of measurement.

Cooperation with Technical University of Wrocław is continued in the field of resistance transfer from the QHR to standards of high resistances. Now new project is preparing.

Impedance

Cooperation with Technical University of Zielona Góra is continued. The results of the project "Measuring system for the calibration of standard resistors with small resistance values in the frequency range of acoustic" are implemented.

The PCI extension for instrumentation (PC-based platform for test measurement and control) were purchased.

AC/DC transfer

The AC Measurement Standard Fluke 5790A was purchased and implemented to reduce uncertainty of calibrations for clients.

High voltage, high current

The software in LabView to remote control and data acquisition from bridges for instrument transformers calibration was made.
Test of measuring stand based on algorithmic method for calibration energy meters and burdens of instrument transformers was performed.

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Energy

The test stand for testing the durability and reliability of domestic electricity meters was build. These tests consist in an examination of the stability characteristics of energy meter under conditions of elevated temperature and maximum current for a period of 1000 hours.

It also built the test stand for testing resistance conducted disturbances in the frequency range of 2 kHz to 150 kHz domestic electricity meters. Is made of the signal amplifier is achieved the current from 2 A 5A in this frequency range. These tests are carried out according to the document CLC / TR 50579.

EMRP/EMPIR

EMRP project participation:

- The project SIB53 „Automated Impedance Metrology extending the Quantum Toolbox for Electricity"
- Completion of EMRP EMINDA project at the end of June 2014
- EMRP SOLCELL project started on the 1st of July 2014, with GUM as one of participating institutions. The aim of the project is research on functional electronic materials used for solar cells manufacturing. GUM will provide contactless microwave measurements methods for materials characterisation

GUM has declared participation in EMPIR project:

- JRP r01 ACQ-PRO "Towards the propagation of ac quantum voltage standards" our application reference
- JRP i12 DynaFun "High Frequency and Dynamic Measurements of Functional Materials"
- JRP i15 MetroGRAPH "Metrology for Graphene Characterisation"

Calibration

- Calibration of resistance standards (3x 1 Ω, 100 Ω, 10 kΩ) in BIPM
- Calibration of capacitance standards (3 x 10 pF, 1 pF, 100 pF) in BIPM
- Calibration of inductance standards (100 µH, 1 mH, 2x 10 mH, 100 mH, 1 H, 10 H) in PTB.
- There were some of calibrations of reference standards in PTB (Germany):
  - 792A AC/DC Transfer Standard in range (2÷600) mV
  - Coaxioinal Thermal Voltage Converters Model 11 in range (0,6 ÷ 1000) V,
  - A40B Precision Current Shunt in range (0,1 ÷1) mA

International comparisons

The Microwaves, Electromagnetic Field and Electromagnetic Compatibility Laboratory participated in the CCEM.RF-K5c.CL comparison, coordinated by NMIJ (Japan). The comparison involves measurements of scattering coefficients of devices with 3.5 mm port standard, within 100 MHz – 33 GHz frequency range. The comparison is still in progress.

National comparisons

- Comparison of Inductance Standards at 1 mH and 1 H at 1 kHz - 6 participants (M41-EM.L-III)
- Comparison of Capacitance Standards at 10 pF and 1 µF at 1 kHz -6 participants (M41-EM.C-III)
- Comparison of Resistance Standards at 10 Ω and 10 kΩ at 1 kHz -6 participants (M41-EM.R.3-I)
- Comparison of Resistance Standards at 10 Ω and 1 kΩ - 9 participants (M41-EM.R.1-III)
- Comparison of Resistance Standards at 1 MΩ and 1 TΩ - 9 participants (M41-EM.R.2-II)
- Comparison of Voltage Standards at 1,018 V and 10 V -9 participants (M41-EM.V-III)
- Comparisons AC and DC quantities of low frequency (travelling standard - digital multimeter) and AC energy (electricity meter) were completed.

Peer review

The Microwaves, Electromagnetic Field and Electromagnetic Compatibility Laboratory underwent a peer review in November 2013 with a positive outcome.

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