ANNUAL REPORT

of COOMET TC 1.3 "Electricity and Magnetism" for 2022

1. **GENERAL CHARACTERISTICS OF COOPERATION, including information about the implementation of the COOMET Strategy and COOMET Development Program**

The members of COOMET TC 1.3 include representatives of 18 COOMET member-countries: Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Georgia, Germany, Kazakhstan, Kyrgyzstan, Cuba, Lithuania, Moldova, Russia, Slovakia, Tajikistan, Turkey, Ukraine and Uzbekistan.

Note – In October 2022 a notification was received from the Ministry of Economy of Ukraine of the suspension of participation in CSBs; in December 2022 a notification was received from the Ministry of the Economy and Innovation of the Republic of Lithuania about the termination of participation of Lithuanian institutes in COOMET.

The main task of the TC 1.3 is the realization of COOMET member countries' cooperation in the field "Electricity and Magnetism", including the following areas of activities:

- arrangement of key and supplementary comparisons of national standards of COOMET member countries to support calibration and measurement capabilities (CMCs) which are currently submitted or will shortly be submitted by COOMET member countries;
- preparation and regional review of CMCs of COOMET member countries;
- cooperation with the corresponding technical committees of other regional metrology organizations, participation in the interregional review of CMCs of other RMOs.

At the recent TC 1.3 meeting it was decided to separate the fields "High voltage and large current" and "Alternating voltage, current, electric power and impedance" and appoint appropriate coordinators. Official requests were sent to the NMIs of TC 1.3 member countries with a request to provide candidates for coordinators of the following filds "High Voltage", "Large Current", "Alternating Voltage", " Alternating Current Power", "Electric Power" and "Impedance".

TC 1.3 members participated in a webinar on "Evaluation of inconsistent results of national standards comparisons", speaker - A.G. Chunovkina, FGUP "VNIIM named after D.I. Mendeleyev" (11 November 2022).

The lists of COOMET TC 1.3 technical experts on CMC review and technical experts on peer review of NMI/DI QMS were updated.

TC 1.3 members participated in a number of activities provided for in the COOMET Development Program for 2020-2022 and in the Roadmap for the implementation of the COOMET Strategy for 2020-2025, namely:

- **9. (Ind-a.1.9)** Carrying out of an analysis of the timeframe for conducting COOMET comparisons and taking corrective actions for its reduction:
  - work was performed to officially complete the comparisons under project 267/RU-a/02 in the KCDB (COOMET.EM.RF-S1);
  - work continued to finalize the publication of reports under projects 604/RU-a/13 (COOMET.EM-S18), 411/RU-a/07 (COOMET.EM-S6), 449/RU-a/08 (COOMET.EM-S7), 490/RU-a/10 (COOMET.EM-S10), 707/RU-a/16 (COOMET.EM-S21) in the KCDB;
- **19. (Ind-a.4.1)** Preparation and implementation of a Roadmap for TC 1.2 – TC 1.11 for the implementation of decisions related to the redefinition of the SI base units: activities in planned actions within the scope of responsibility of TC 1.3
- **78.** Drawing up and implementation of a Plan for the preparation of COOMET Recommendations, having requirements for calibration of various groups of measuring instruments (Guide on calibration)**:** see TC 1.3 meeting resolutions in section 2.

2. MEETING OF THE TECHNICAL COMMITTEE

The 16th TC meeting was held online on 8 to 11 November 2022. Representatives from 11 COOMET member countries took part in the meeting (Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Turkey, Uzbekistan).

The following issues were discussed at the TC 1.3 meeting:

- resolutions of the 32nd and 33rd COOMET Committee meetings and Presidential Council meetings;
- information about the 21st and 22nd meetings of the Joint Committee for Measurement Standards (JCMS);
- implementation of the CIPM MRA within COOMET;
- discussion of the progress of realization of COOMET program P6/2021 "COOMET Roadmap for Implementing Decisions Related to the Redefinition of Basic Units of the International System of SI Units for 2021-2025" and the organization of comparisons of standards on the Josephson and Hall effects;
- discussion of the COOMET Plan for the preparation of model calibration procedures for various groups of measuring instruments;
- discussion of COOMET activities in the field of training;
- activities of the CCEM BIPM;
- TC activities within the framework of international cooperation;
- TC activities since the previous meeting;
- analysis of the decisions of the 15th TC meeting;
- -progress in the implementation of ongoing projects performed within the TC;
- approval of the Regulation on the TC;
- information about changes in the composition of the TC, about the office of field coordinators;
- implementation of the CIPM MRA as part of TC activities;
- comparisons lasting over 5 years;
- consideration of the issues of interregional reviews of CMCs;
- need to update the lists of experts in sub-fields, training of new technical experts;
- current state of metrological activities in the field of EM in COOMET member countries.

Some decisions of the TC meeting 1.3:

1) To note the lack of a sufficient number of proposals from the TC for the formation of a COOMET Plan for the development of model calibration procedures in the area of activity of the TC.

2) To note the appropriateness of taking the course "CIPM MRA" on the e-learning BIPM platform for NMI specialists of TC member countries (comparison pilots, CMC writers, technical experts, keepers of national standards, etc.). To note the appropriateness of participation of representatives of TC 1.3 in the seminar on training in the general principles of work with KCDB 2.0. (for candidates to technical experts on CMC review).

3) To consider it appropriate to conduct pilot comparisons of standards of the same accuracy level, including bilateral comparisons (Azerbaijan, Kyrgyzstan). To consider the possibility for TC members from the countries that classify themselves as CEEMS to participate in interlaboratory comparisons in order to test (to establish the suitability of application) the measurement (calibration) procedure, to draw up an uncertainty budget, to make a preliminary assessment of the expanded uncertainty (accuracy, best measurement capabilities) of measurement results performed using the standards of CEEMS NMIs.

4) To invite the coordinators of projects (proposed and agreed) and representatives of other NMIs to participate actively in TC meetings. If it is not possible to take part in a TC meeting, to provide a short report on the progress of comparisons in writing to TC members from the countries no later than 1 week before the meeting.

5) To take note of the information about the interregional review of CMCs carried out by experts in TC subfields and the difficulties of its conduct. To take note of the need for updating the lists of technical experts on CMC review and on peer review of QMS of NMIs/DIs by measurement subfields, training of new technical experts.

3. PROGRESS WITH COOMET PROJECTS IN THE FIELD "ELECTRICITY AND MAGNETISM"

The total number of COOMET projects (comparisons) performed within TC 1.3 in 2022: 11, including

Proposed - 4;

Agreed - 7.

Table 1 - PROPOSED PROJECTS

Project number (Code in the KCDB)	Project title, Pilot NMI, Coordinator
862/RU/22	Pilot comparisons of reference instruments measuring AC high voltage of power frequency, FGUP "VNIIMS", V. Kiselev
859/TR/22	Supplementary comparison of high current transformer measuring systems, TUBITAK UME, B. Mahallesi
855/RU/22	Pilot comparisons in the field of high DC current measurements, UNIIM - Branch of VNIIM, A. Akhmeev
799/UA/20 COOMET.EM-S27	Supplementary comparisons of electric field strength measurements, NSC "Institute of Metrology", E. Vasilyeva

Table 2 - AGREED PROJECTS

Project number (Code in the KCDB)	Project title, Pilot NMI, Coordinator	Status in the KCDB
770/RU-a/18 COOMET.EM-S26	Supplementary comparisons of NMI measurement standards in the field of measurements of magnetic flux density of a permanent magnetic field and magnetic flux using sensing coils, UNIIM - branch of VNIIM, T. Maslova	Waiting for approval
681/RU-a/16 COOMET.EM-S22	Supplementary comparison of the measurement of current transformers (CTs), UNIIM - Branch of VNIIM, A. Akhmeev	Waiting for approval
798/BY-a/19	Pilot comparisons of the volumes of digital information transmitted via the Internet and telephony channels, BelGIM, Y. Shershun	-
802/UZ-a/20	Pilot comparisons in the field of measuring DC and AC voltage and current, electrical resistance, UzNIM, D. Arifkhanov	-
813/RU-a/20 COOMET.EM-S25	Supplementary comparison of measuring current transformers (CTs), UNIIM - Branch of VNIIM, A. Akhmeev	Measurements in progress
821/RU-a/20	Pilot comparisons of DC high voltage reference measuring systems in the voltage range of ± (1…100) kV, FGUP VNIIMS, V. Kiselev	Measurements in progress
624/GE-a/13 COOMET.EM-S19	Comparison of electrical resistance standards at 100 Ω and 100 kΩ, GEOSTM, M. Gelovani	Report in progress, draft A

In 2022 project 783/UZ-a/19 "Pilot comparisons on the amplitude modulation coefficient of high frequency oscillations" was excluded from the COOMET Work Program.

4. PARTICIPATION IN THE IMPLEMENTATION OF THE MUTUAL RECOGNITION ARRANGEMENT OF NATIONAL MEASUREMENT STANDARDS

4.1 PROGRESS WITH EM CMCS OF COOMET NMIS/DIS

Currently there are no CMCs of COOMET NMIs under review.

4.2 COOMET'S PARTICIPATION IN THE INTERREGIONAL REVIEW OF CMC:

In 2022 review of 11 EURAMET CMCs in the subfields of high voltage and large current was completed.

3 AFRIMET CMCs in the subfield of DC resistance are under review.

5. COOPERACTION WITH INTERNATIONAL AND REGIONAL ORGANIZATIONS IN THE FIELD OF "ELECTRICITY AND MAGNETISM"

The TC 1.3 Chair M. Yarmolovich (BelGIM, Belarus) took part in the CCEM webinar "The CCEM strategy 2020-2030 and the future of electromagnetic metrology", which was held online on 15 September 2022.

6. TIME AND VENUE OF THE NEXT TC MEETING

The next TC meeting is scheduled for the first ten days of October 2023. The decision on the format will be made no later than 3 months before the date of the meeting.

TC 1.3 Chair
Marina Yarmolovich