

PROTOCOL

16th meeting of TC 1.3 "Electricity and Magnetism"

November 8 - 11 2022, online

The meeting was attended by 22 representatives from 11 countries: TC members, project coordinators, leading specialists in the field of "Electricity and Magnetism" of NMI COOMET, as well as invitees:

Azerbaijan	Mr. Zeynalov Maarif, TC Member
Armenia	Ms. Armenoui Khachatryan, TC member
Belarus	Ms. Marina Anatolievna Yarmolovich, Chairperson of TC 1.3 Mr. Vadim Popko, Executive Secretary of TC 1.3
Bosnia and Herzegovina	Mr. Vladimir Milojevich, TC member
Georgia	Ms. Gelovani Manana Sergeevna, TC member
Kazakhstan	Ms. Nagima Abdullaevna Tuymekulova, TC member Mr. Nurlan Yertarginovich Seksembayev Ms. Raishan Zhaimanova
Kyrgyzstan	Ms. Elmira Shabdanbekova Abasbekova, TC member
Moldova	Ms. Elena Makarova, TC member Ms. Stella Strystar Mr. Gerlich Andrei Ms. Maria Chodakovskaia

Russia	Mr. Sergey Kolotygin, TC member, direction coordinator Mr. Alexander Sergeevich Katkov, direction coordinator Mr. Andrey Akhmeev Mr. Sergey Vladimirovich Serdyukov Ms. Tatiana Anatolievna Dubrovskaya
Turkey	Mr. Mehdi Arifović, TC Member
Uzbekistan	Mr. Arifkhanov Jalalkhan Tulaganovich, TC member Mr. Normurodov Bekzod Sherzod ugli
COOMET Secretariat	Ms. Nadezhda Dmitrievna Lyakhova

Taking into account the quorum requirements at the meeting of COOMET structural body according to COOMET D5/2021, the quorum at the meeting of TC 1.3 is provided.

The meeting was conducted in accordance with the agenda adopted by the participants:

- on decisions of the 32nd and 33rd meetings of COOMET Committee, President's Council;
- information on the 21st and 22nd meeting of the Joint Committee on Benchmarks (JCE);
- on the implementation of the CIPM MRA Agreement within COOMET;
- discussion of the progress of implementation of COOMET Programme P6/2021 "COOMET Roadmap for the implementation of decisions related to the redefinition of the basic units of the International System of Units SI for 2021-2025" and organization of comparisons of standards on the Josephson and Hall effect;

- discussion of COOMET Plan on development of standard calibration procedures for different groups of measuring instruments;
- discussion of COOMET activities in the field of training;
- on the activities of the IBEW CCEM;
- on the work of the TC within the framework of international cooperation;
- on the work of the TC for the period since the previous meeting;
- analyzing the decisions of the 15th TC meeting;
- on the progress of works on COOMET projects, carried out within TC;
- on the approval of the TC Regulations;
- information on changes in the composition of the TC, on the powers of the coordinators of the directions;
- on implementation of the CIPM MRA Agreement within the framework of TC activities;
- on comparisons lasting more than 5 years;
- consideration of issues of interregional expertise of the SMS;
- the need to update the lists of experts by subfields of measurements, training of new technical experts;
- on the current status of metrological activities in the field of EM in COOMET member-countries;
- of the date of the next TC meeting.

Within the framework of the TC meeting on November 11, 2022 a workshop on "Evaluation of inconsistent results of comparisons of national measurement standards" was held, speaker - A.G. Chunovkina, FGUP "VNIIM named after D.I. Mendeleev".

Having heard and discussed the reports and communications on the agenda, the meeting **adopted the following decisions:**

- 1) To take note:
 - information on decisions of COOMET Committee and JCE meetings;
 - information on the implementation of the CIPM MRA Agreement;
 - information on the activities of the IBEW CCEM;
 - Report of the TC Chair on the work carried out in 2021-2022;
 - information on the work of the TC for the period since the previous meeting.
 - information on approval of COOMET Document D5.15 "Statute of COOMET Technical Committee "Electricity and Magnetism" (TC 1.3)";
 - information on the work of the TC within the framework of international cooperation;

- 2) To take into consideration the information of the Ministry of Economy of Ukraine on the suspension of Ukraine's participation in COOMET structural bodies and on the intention to acquire full membership in EURAMET and on the transfer of the spheres of activities related to the CIPM MRA Agreement from COOMET to EURAMET.

Resolved:

- a) To express gratitude to V.N. Kikalo and O.N. Velichko, as well as other employees of SE "Ukrmetrteststandardt" and NSC "Institute of Metrology", Ukraine, for many years of active participation in the work of TC.

- b) To consider it appropriate to separate the areas "High voltages and high currents" and "AC voltage and power, electrical power and impedance" and to appoint appropriate coordinators.
 - c) The TC Chairperson and the TC Executive Secretary shall send formal requests to the NMIs of the TC member countries for nominations for coordinators of the High Voltage, High Current, AC Voltage, AC Force, AC Power, AC Electric Power and Impedance areas.
- 3) To take note of the implementation of activities within the framework of the program COOMET P6:2021 "COOMET Roadmap for the implementation of decisions related to the redefinition of the basic units of the International System of Units SI, for 2021-2025" in the TC responsibility area.

Resolved:

- (a) The TC Chair and the TC Executive Secretary to send formal requests to the NMIs of TC member countries for assistance in organizing the comparisons of the Josephson and Hall effect voltage standards planned under the Roadmap.
 - b) To request TC Chairman to send to JEC proposals to COOMET P6:2021 program in terms of clarification of the terms of implementation of comparisons on item 3a taking into account the information received from NMIs.
- 4) To take note of the information on preparation of the draft COOMET Plan for the development of standard calibration procedures for different groups of measuring instruments (hereinafter referred to as the Plan). To take into account that JCE and COOMET Project Coordinator during revision of COOMET Recommendation R/GM/31:2016 "Calibration methods for measuring instruments. General

requirements" (work term: 2023-2024, project opening - in 2023) plan to describe in detail the procedure of methods development, its structure and content of sections, as well as the process of its validation in the calibration laboratory.

Resolved:

- a) To note the absence of sufficient number of proposals from TCs for forming COOMET Plan for the development of standard calibration procedures in the field of TC activity.
 - b) Encourage representatives of interested CEEMS to develop calibration procedures in-house, based on the priority of their needs, using the recommendations of international organizations, e.g. European Accreditation Organization EA-4/02 M:2013 "Assessment of measurement uncertainty in calibrations".
- 5) To take note of the information on COOMET activities in the field of training:
- on formation of the Plan of COOMET training activities for 2023.
 - on placement of COOMET training courses on the electronic platform BIPM (<https://e-learning.bipm.org>).

Resolved:

- a) To note the expediency of taking the course "Arrangement on Mutual Recognition of CIPM MRA", posted on the electronic platform BIPM, for specialists of NMIs of TC member states (pilots of comparisons, CMC compilers, technical experts, custodians of national measurement standards, etc.).
 - b) To note expediency of participation of representatives of TC 1.3 in the workshop on training on general principles of work with KCDB 2.0. (for candidates to technical experts on SMS examination) - planned to be held in 2023.
 - c) TC members to submit to the TC Secretariat, by 09.12.2022, proposals on the subjects of COOMET seminars and training courses for TC members for 2023, as well as proposals on the possibility of providing source material (presentations, seminar materials, including video recordings) for the formation of COOMET training courses on the electronic platform BIPM in the direction of TC activity for further forwarding to the administrators of the COOMET web-site.
- 6) To take note of the proposals of NMIs of countries with developing metrological systems (CEEMS) in terms of comparisons and training activities.

Resolved:

- a) To consider it expedient to conduct pilot comparisons of measurement standards of the same level of accuracy, including bilateral ones (Azerbaijan, Kyrgyzstan). In case of making a decision on organization of comparisons and

agreement of pilots, to send to TC Secretariat and COOMET Secretariat the forms of proposed projects for their registration.

b) TC members from CEEMS countries should consider the possibility to participate in interlaboratory comparisons for the purpose of testing (establishing the suitability of application) of measurement (calibration) techniques, drawing up uncertainty budget, preliminary assessment of expanded uncertainty (accuracy, best measurement capabilities) of measurement results performed using CEMMS NMI standards.

7) To take note of the information on the progress of works on COOMET projects.

7.1) On proposed topics:

- **topic 862/RU/22** Pilot comparisons of reference measurement instruments of high voltage alternating current of industrial frequency, coordinator - FGUP "VNIIMS", V.V. Kiselev (reporter - T.A. Dubrovskaya). Kiselev (reporter - T.A. Dubrovskaya). To take note of the information on the progress of comparisons. Coordinator of comparisons to send to TC members the information on comparisons (draft technical protocol) to consider the possibility of participation in comparisons by 23.12.2022.

- **Topic 859/TR/22** Supplementary comparison of measuring systems of high current transformers, coordinated by TUBITAK UME, B. Mahallesi. To take note of the information on the progress of comparisons (preparation of draft technical protocol). TC members interested in participation should send the pilot a request for inclusion in the participants of comparisons till 23.12.2022. To take into account the readiness of UzNIM (participant of comparisons) to provide updated information on the progress of comparisons and terms of preparation of the draft technical protocol.

- **subject 855/RU/22** Pilot comparisons in the field of large direct current measurements, coordinator - UNIIM branch of FSUE "D.I. Mendeleev VNIIM", A.A. Akhmeev. To take note of the information on the progress of comparisons. TC member from Uzbekistan D.T. Arifkhanov to send updated information on participation in comparisons until 02.12.2022. In case of interest in participation TC members to send information to the pilot with a request for inclusion in the participants of comparisons by 23.12.2022.

- **project 799/UA/19** Additional comparisons of electric field strength, coordinator - NSC "Institute of Metrology", E.V. Vasilieva. Taking into account the complexity of comparisons, the TC Chairperson to discuss with the coordinator the expediency of excluding the project from the COOMET Program.

7.2) On Agreed Topics:

- **subject 770/RU-a/18 (COOMET.EM-S26)** Additional comparisons of NMI standards in the field of measurements of magnetic induction of permanent magnetic field and magnetic flux using field coils, coordinator - UNIIM - branch of FGUP "VNIIM named after D.I. Mendeleev", T.I. Maslova (rapporteur - S.V. Serdyukov). To take into account the information about the Report B being under approval of the CCEM (since May 2022) and preliminary approval sent by the CCEM expert by e-mail (23.09.2022). The Coordinator of comparisons after the official agreement and publication of Report B to complete the project in due order (to send to COOMET Secretariat the form of the final report).

- **subject 681/RU-a/16 (COOMET.EM-S22)** Additional comparison of measuring current transformers (CT), coordinator - UNIIM - branch of FGUP "VNIIM named after D.I. Mendeleev", A.A. Akhmeev. To take note of the information that Report B is under approval in CCEM (since June 2022). The Coordinator of comparisons after the official approval and publication of Report

B to complete the project in accordance with the established procedure (to send to COOMET Secretariat the form of the final report).

- **Project 798/BY-a/19** Pilot comparisons of volumes of transmitted digital information via Internet and telephony channels, coordinator - BelGIM, Y.V. Shershun. The Coordinator of comparisons to finalize the agreement of the technical protocol, to prepare and agree the Report A and Report B with the participants of comparisons and to send to the TC Secretariat and COOMET Secretariat the form of the final report by 30.12.2022;

- **subject 802/UZ-a/20** Pilot comparisons in the field of DC and AC voltage and force measurements, electrical resistance, coordinator - UzNIM, D.T. Arifkhanov. To take note of the information on the progress of comparisons. Coordinator of comparisons to update the list of participants.

- **project 783/UZ-a/19** Pilot comparisons on amplitude modulation coefficient of high-frequency oscillations, coordinator - UzNIM, B.Sh. Normurodov. Taking into account the complexity of comparisons, it is reasonable to exclude the project from the COOMET Program.

- **subject 813/RU-a/20 (COOMET.EM-S25)** Additional comparison of measuring current transformers (CT), coordinator - UNIIM - branch of FSUE "VNIIM named after D.I. Mendeleev", A.A. Akhmeev. To take note of the information on the progress of comparisons and information of TC member from Georgia M.S. Gelovani about the planned date of shipment of the transported standard not later than 06.12.2022. TC member from Uzbekistan D.T. Arifkhanov to send the protocol of measurements till 11.11.2022.

- **subject 821/RU-a/20** Pilot comparisons of reference measurement systems of DC voltage in the range $\pm (1...100)$ kV, coordinator - FSUE "VNIIMS", V. Kiselev (rapporteur - T.A. Dubrovskaya). To take into account

the information on the progress of comparisons and delay in providing the measurement protocol by the comparison participant NIM, China. The coordinator of comparisons after receipt of the measurement protocol NIM, China, to prepare and send for approval to the participants of comparisons Report A.

- **Subject 624/GE-a/13 (COOMET.EM-S19)** Comparison of 100 Ohm and 100 kOhm electrical resistance measures, coordinated by GEOSTM, M. Gelovani. To take note of the information on the progress of comparisons and to send Report A for agreement to the participants of comparisons. Further decision on the subject (revision of Report A using a different approach to the processing of results or preparation of Report B) to be made in the working order in agreement with the TC Chairman depending on the results of coordination.

7.3) On completed topics:

- **subject 604/RU-a/13 (COOMET.EM-S18)** Additional comparisons of reference measurement systems of electrical capacitance and dielectric loss angle at AC voltage of industrial frequency in the range (1...150) kV, coordinator - FGUP "VNIIMS", V. Kiselev (rapporteur - T-.A. Dubrovskaya). To take note of the information about the Abstract being under approval of the CCEM (since May 2022). Coordinator of comparisons to update the information on the status of the topic in KCDB, to continue the work on approval of the Summary Report (Abstract), if necessary. To inform TC members after official approval and publication of the Abstract in the journal Metrologia.

- **subject 411/RU-a/07 (COOMET.EM-S6)** Additional comparisons of high voltage AC standards, coordinator - FSUE "VNIIMS", V. Kiselev (rapporteur T-.A. Dubrovskaya). To take note of the information about the Abstract being under approval of the CCEM (since February 2022). Coordinator

to continue the work on harmonization of the Summary Report (Abstract) if necessary. To inform TC members after official approval and publication of the Abstract in the journal Metrologia.

- **subject 449/RU-a/08 (COOMET.EM-S70)** Additional comparisons of reference measurement instruments of high DC voltage, coordinator - FSUE "VNIIMS", V. Kiselev (rapporteur T.-A. Dubrovskaya). To -take note of the information about the Abstract being under approval of the CCEM (since February 2022). Coordinator to continue the work on harmonization of the Summary Report (Abstract) if necessary. To inform TC members after official approval and publication of the Abstract in the journal Metrologia.

- **subject 490/RU-a/10 (COOMET.EM-S10)** Additional comparisons of reference high-voltage AC measurement systems, coordinator - FGUP "VNIIMS", V. Kiselev (rapporteur T.-A. Dubrovskaya). To -take note of the information about the Abstract being under approval of the CCEM (since October 2022). Coordinator to continue the work on harmonization of the Summary Report (Abstract) if necessary. To inform TC members after official approval and publication of the Abstract in the journal Metrologia.

- **subject 707/RU-a/16 COOMET.EM-S21** Bilateral comparisons of reference systems for measurement of switching pulse voltage in the range from 1 to 100 kV, coordinator - FGUP "VNIIMS", V. Kiselev (rapporteur- T.A. Dubrovskaya). To take note of the information about the Abstract being under approval of the CCEM (since May 2022). Coordinator to continue the work on harmonization of the Summary Report (Abstract) if necessary. To inform TC members after official approval and publication of the Abstract in the journal Metrologia.

- **subject 710/RU-a/16 (COOMET.EM-S23)** Carrying out additional bilateral comparisons of impulse electric voltage standards, coordinator - FGUP "VNIIFTRI", O. Kaminsky. TC member from Russia S.A. Kolotygin and the coordinator of comparisons to prepare the Abstract and send it to the TC Secretariat for sending for approval to the CCEM by 23.12.2022.

- **subject 709/RU-a/16 (COOMET.EM-S24)** Conducting additional bilateral comparisons of harmonic coefficient standards, coordinator - FGUP "VNIIFTRI", O. Kaminsky. TC member from Russia S.A. Kolotygin and the coordinator of comparisons to prepare the Abstract and send it to the TC Secretariat for sending for approval to the CCEM by 23.12.2022.

7.4) Take into account the willingness of TC members to organize:

- pilot comparisons of reference measurement instruments of high AC voltage over 1 kV for transfer of units of coefficient and angle of scale transformation of AC voltage to digital low-power sensors, intended pilot - FSUE "VNIIMS", V. Kiselev;

- additional comparisons of units of scale conversion factor of alternating current force (measuring current transformers in the range from 10,000 to 50,000 A), intended pilot - UNIIM - branch of FSUE "VNIIM named after D.I. Mendeleev", A.A. Akhmejev;

- additional comparisons of frequency deviation units in the range from 1 kHz to 1 MHz and carrier frequencies of 5, 10 and 50 MHz, the presumed pilot is not defined (FSUE "VNIIFTRI", S. Kolotygin or BelGIM, T. Gerasimova).

- additional comparisons of electric static field strength units, the presumed pilot is not defined (UzNIM, D. Arifkhanov or FGUP "VNIIFTRI", S. Kolotygin).

Resolved:

- a) To continue the works within the projects of COOMET Comparison Program.
 - b) In case of making a decision on organization of comparisons proposed in p. 7.4) and agreement of pilots, to send to TC Secretariat and COOMET Secretariat the forms of proposed topics for their registration.
- 8) To invite subject coordinators (proposed and agreed) and representatives of other NMIs to actively participate in TC meetings. In case of impossibility to participate in the TC meeting, the coordinators of comparisons shall provide the TC member from the country with a brief report on the status of works on comparisons in writing not later than 1 week before the meeting.
- 9) To take note of the information on the interregional expertise of CMC strings conducted by the TC subfield experts and its difficulties. To take note of the necessity to update the lists of technical experts on CMC examination and assessment of NMI/NIM QMS by subfields of measurements, training of new technical experts.

Resolved:

- (a) Consider it appropriate to involve new technical experts in the interregional examination.
- b) TC members to send to the TC Secretariat candidates of specialists to be included in the list of technical experts on CMC examination and NMI/NI evaluation with indication of sub-area of measurements by 23.12.2022.
- b) TC members to send to the TC Secretariat candidates of specialists with brief description (including but not limited to the following information: education,

qualification, position, experience, etc.) for training as technical experts in the thematic area "Electricity and Magnetism" by 23.12.2022.

- 10) To take note of the information on the current status of metrological activities in the field of "Electricity and Magnetism" in COOMET countries.
- 11) To consider it expedient to hold the next TC meeting in the first decade of October 2023. Decide on the date, format and/or venue no later than 3 months prior to the date.

Chairman of TC 1.3

M.A. Yarmolovich

Executive Secretary of TC 1.3

V.V. Popko