



ANNUAL REPORT

TC 1.9 “Ionizing Radiation and Radioactivity” for 2022

1. GENERAL QUALIFICATION OF COOPERATION, including information on the COOMET Strategy and the COOMET Development Program implementation

COOMET TC 1.9 includes representatives of 15 countries: Azerbaijan, Armenia, Belarus, Bulgaria, Bosnia and Herzegovina, Georgia, Cuba, Lithuania, Moldova, Russia, Slovakia, Tajikistan, Uzbekistan and Ukraine.

Remark – Notification from the Ministry of Economy of Ukraine on suspension of participation in the RMO was received in October 2022. Notification from the Ministry of Economy of Republic of Lithuania on the termination of participation in the RMO was received in December 2022.

From February 1, 2023 NMIs of Georgia and Ukraine carry out their activities on implementation of the CIPM MRA in EURAMET, remaining COOMET members.

This year, a representative of Kazakhstan, Tilek Yepenov, began working as a member of TC 1.9.

The TC main mission is the organization of cooperation between the COOMET state metrological institutions in the ionizing radiation measurements area. Priority direction is key and supplementary comparisons organization and conduct for COOMET national metrological institutes measuring capabilities supporting.

TC members participated in the implementation of a number of activities provided for by the COOMET Development Program for 2020-2022 and the Roadmap for the implementation of the COOMET Strategy for 20220-20225, namely:

- 9. (Ind-a.1.9) Analysis of the timing of COOMET comparisons and implementation of corrective measures to reduce them: action was carried out to speed-up completion of the topics 641/BY-a/14 and 833/RU-a/21 (see section 3);
- 78. Creation and implementation of the Plan for the development of COOMET Recommendations containing requirements for the calibration of various groups of measuring instruments (Guidelines for calibration): process is underway on topic 600/RU-a/13 (see section 3).

2. TC 1.9 MEETING

The regular 18th meeting of TC 1.9 “Ionizing radiation and radioactivity” was held on-line on February 7, 2023 (TC meeting was not held in 2022).

There were representatives of 10 COOMET member countries (Azerbaijan, Armenia, Belarus, Bosnia and Herzegovina, Georgia, Kazakhstan, Moldova, Russia, Tajikistan, Uzbekistan).

THE MAIN TOPICS

- 1) **Information on the COOMET projects implementation** in the area “Ionizing radiation and radioactivity” is presented in Section 3 of this report.

2) Organizational matters

2.1 The list of technical experts of TC 1.9 on CMC review and QMS assessment of the COOMET NMIs is updated.

2.2 Decision was made to apply to the COOMET Committee for extension the powers of the Chairman of the TC N. Moiseev for 4 years.

3) Proposals for new topics

3.1 To organize a new cycle of comparison in the field of specific activity of radionuclide solutions measurements (with barium-133 solution), as a ten-year validity period for the previous comparison has expired.

Although the COOMET topic is not registered, the work was started at VNIIM (coordinator – G. Zhukov): the samples were prepared and the measurements were carried out. Negotiations are underway with BIPM to implement direct traceability of measurement results to SIR.

3.2 To organize a new cycle of comparison in the field of dosimetry in terms of air kerma and related quantities for caesium-137 gamma-radiation and/or x-rays

The coordinator of “Dosimetry” A. Villevalde presented information on the needs of laboratories in comparisons in the field of dosimetry in terms of air kerma and possibilities to pilot such comparisons (based on the results of an electronic survey of the TC members).

Taking into account the TC previous experience and the current situation, it was decided to conduct bilateral comparison with VNIIM upon the request from interested COOMET NMIs. The request should be sent to VNIIM by the NMI having need for the comparison. If such comparison is implemented, it is formalized as bilateral COOMET comparison within the COOMET topic. Such comparisons may be carried out under the auspices of cooperation with CEEMS countries.

3.3 To organize a new cycle of comparison in the field of soft beta-emitters activity measurements using liquid scintillator method

Comparison is proposed by the TC chair N. Moiseev. It is proposed to conduct comparison for activity of radionuclides H-3, Ni-63, C-14 measurements using the “beam” scheme with the distribution of samples to the participants from VNIIM. Armenia, Belarus, Uzbekistan reported on possible participation.

The final decision on the comparison conducting is to be made at the next TC meeting.

3.4 Identification of needs in e-learning and creation of courses on the BIPM e-learning platform

Following the recommendation of the COOMET TC Committee, it is necessary to choose a topic and create a course on the BIPM e-learning platform, based on the interests of the TC.

The TC secretary A. Villevalde proposed to create a focus group on e-learning within the TC. Representatives of Belarus (A. Kiyko), Moldova (S. Soroka), Uzbekistan (A. Taubaldiev) expressed their preliminary consent to be the members of the group.

4) The previous TC meetings decisions implementation

In 2017 VNIIFTRI representatives initiated comparison in the field of radon volumetric activity and EEVA measurements. VNIIFTRI has the necessary equipment and experienced qualified personnel to carry out the comparison. It was decided to instruct VNIIFTRI (S. Biryukov) to conduct additional consultations with potential participants of comparison, to evaluate the prospects for such comparison, and, in case of positive result, to develop and distribute the draft technical protocol.

The coordinator S. Biryukov (VNIIFTRI) informed on readiness to conduct the comparison and on availability of necessary equipment. It was proposed to the coordinator to send the draft technical protocol to the potential participants for approval by the end of March 2023.

3. CURRENT STATUS OF THE AGREED PROJECTS IN “IONIZING RADIATION AND RADIOACTIVITY”

3.1 Review of ongoing and completed topics and information on the results

3.1.1 175/RU-a/99 *The state of the measurement standard base of COOMET member countries in the field of ionizing radiation and radioactivity*

The topic is permanent.

The aim is to create a database on COOMET standards in the field of ionizing radiation and radioactivity. Participants are the representatives of all COOMET member countries. Within the framework of the implementation of the topic, representatives of COOMET member countries regularly provide information on the national standards and ongoing changes:

- list of the national and other standards;
- metrological and technical characteristics of the standards;
- information on the conducted and planned comparisons;
- information about the work on the standards improvement.

The topic is kept as a permanent one, the information is updated according to the changes in the equipment and expansion of the measurement capabilities of COOMET members.

3.1.2 641/BY-a/14 **Comparison of the national standards of air kerma for x-radiation qualities used in radiation protection and diagnostic radiology COOMET.RI(I)-S3** (pilot – BelGIM, Belarus)

The aim of the comparison is to publish new and/or maintain existing calibration and measurement capability entries (CMCs) for air kerma for the selected x-ray qualities used in radiation protection and diagnostic radiology.

Participants: BelGIM (Belarus), PTB (Germany), INM-MD (Moldova), IAEA, AzMI (Azerbaijan), VNIIM (Russia), CPHR (Cuba), GEOSTM (Georgia), NSC “IM” (Ukraine), NACEKS (Kazakhstan).

Three ionization chambers (Exradin A3, A4 and A5) were calibrated in terms of air kerma for the selected ISO 4037 narrow spectrum X-ray qualities (N-40, N-60, N-80, N-100, N-120, N-150, N-200) and IEC 61267 RQR X-ray qualities (RQR3, RQR5, RQR7, RQR9, RQR10). It was preferable to calibrate the chambers for all of selected radiation qualities, but it was also allowed to choose at least five ISO 4037 qualities with narrow spectrum and/or three RQR qualities.

The comparison is completed. The draft report (Draft B) was sent for review to the CCRI in 2021.

During the review of the Draft B by the CCRI members, including the EURAMET representative, and within the report correction, it turned out that the NSC “IM” (Ukraine) and NACEKS (Kazakhstan) did not provide the full uncertainty budgets for the comparison. The person responsible for the comparison S. Soroka (at the time of the comparison – representative of BelGIM, Belarus, at present – a member of the TC from Moldova) requested the full uncertainty budgets from these laboratories. The requested information has now been submitted, and Draft B is awaiting final approval.

3.1.3 833/RU-a/21 **Supplementary comparisons of the national standards of radioactivity of radionuclides in point sources COOMET.RI(II)-S3** (pilot – VNIIM, Russia)

The purpose of the comparison is to publish new and/or maintain existing CMCs for activity of gamma radiation spectrometric sources measurements.

The measurements were started at the end of 2021. The comparison suspended due to the problems with logistics. It was decided to carry out the comparison using the “beam” scheme with distribution of samples to the participants from VNIIM. To include Azerbaijan and Uzbekistan in the list of potential participants.

3.1.4 389/RU/07 Comparison of the well-type ionization chamber (IC) calibrations factors for the medical radionuclides (“Dosecalibrators”) (pilot – VNIIM, Russia)

The project was initiated by VNIIFTRI in 2007, in 2017 a decision was made about its importance and further work was entrusted to VNIIM.

The purpose of the comparison is to ensure the traceability of Tc-99m measurements in national metrological institutes and COOMET laboratories to the values of key comparisons BIPM.RI(II)-K4.Tc-99m and BIPM.RI(II)-K4.F-18 (through the results of VNIIM).

The first cycle of measurements was carried out in 2017. The comparison involved not only COOMET metrological institutes, but also other interested parties, such as the Minsk Cancer Center, Belarus, and “Amplituda” company, a Russian manufacturer of dosimeters for medical purposes.

The work was stalled due to the problems with the transport of the transfer standard by the designated institute from Cuba CENTIS, which remained unsolved. The comparison coordinator started communication with CENTIS on the intentions to participate in the comparison or to change the format of participation to calibration.

3.1.5 600/RU-a/13 Development of a calibration procedure for spectrometers with semiconductor detectors depending on the energy of gamma radiation (pilot – VNIIM, Russia)

The project was proposed by VNIIFTRI in 2013 and is considered relevant. In 2020, the topic was upgraded to the rank of agreed, VNIIM was appointed as the topic coordinator. A draft methodology was presented at the TC meeting in 2021. No comments on the draft of the calibration procedure were given.

In the absence of comments and suggestions, the coordinator should complete the development of the calibration procedure, taking into account the needs of VNIIM.

There were no completed COOMET topics in 2022.

4. INTERACTION WITH INTERNATIONAL AND REGIONAL ORGANIZATIONS

In June 2022, representatives of TC 1.9 took part in the work of the working group of regional metrological organizations CCRI RMO WG.

During the year, representatives of TC 1.9 took part as listeners in webinars organized by the Consultative Committee on Ionizing Radiation (CCRI) and BIPM, in particular, in the webinar “Fast neutron reference fields above 20 MeV: challenges and opportunities” (January 2023).

5. PARTICIPATION IN THE IMPLEMENTATION OF THE MUTUAL RECOGNITION ARRANGEMENT CIPM MRA

Current state of CMC RI COOMET

Country	Number of CMCs	Dosimetry	Radioactivity	Neutrons
Belarus	51	21	30	
Bulgaria	23	7	16	
China	195	20	173	2
Cuba	68	13	55	
Georgia*		2		
Germany	275	91	158	26
Moldova	2	2		

Country	Number of CMCs	Dosimetry	Radioactivity	Neutrons
Russia	329	161 (28+133)	124	44 (6+38)
Slovakia	71	30	32	9
Turkey	3		3	
Ukraine*	15		15	

* from February 1, 2023, the NMIs of Georgia and Ukraine carry out their activities on the implementation of the CIPM MRA through EURAMET

During the last two years no new CMCs were submitted.

6. TIME AND PLACE OF THE NEXT TC MEETING

The next meeting of the TC is scheduled for autumn 2023. The decision on the place and format of this event will be made in the regular course.

7. PROPOSALS TO COOMET COMMITTEE RESOLUTIONS:

Extend the powers of Nikolai Moiseev (VNIIM, Russia) as Chairman of TC 1.9 for 4 years.

The TC chair

Nikolay Moiseev