



ANNUAL REPORT

TC 1.9 "Ionizing Radiation and Radioactivity" for 2021

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

COOMET TC 1.9 includes representatives of 14 countries: Azerbaijan, Armenia, Belarus, Bulgaria, Bosnia and Herzegovina, Georgia, Cuba, Lithuania, Moldova, Russia, Slovakia, Tajikistan, Uzbekistan and Ukraine.

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.

In 2021, the document COOMET D5.14/2021 "Regulations on the Technical Committee "Ionizing Radiation and Radioactivity" (TC 1.9)" was updated (replacing COOMET D5.14/2006).

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 complete the topic 641/BY-a/14 (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 November 22-23, 2021.

Representatives of 10 COOMET national metrological institutes were present (Azerbaijan, Armenia, Belarus, Bosnia and Herzegovina, Georgia, Moldova, Russia, Slovakia, Uzbekistan, Ukraine).

The Joint Committee for Measurement Standards chairperson A. Chunovkina, the BIPM staff: executive secretary of the Consultative Committee for Ionizing Radiation (CCRI) V. Gressier, C. Kessler, D. Burns and R. Coulon, as well as the chairman of the Section I (X- and γ -rays, charged particles dosimetry) of the Consultative Committee for Ionizing Radiation (CCRI(I)) M. McEwan (NRC, Canada) and the Head of the COOMET Secretariat N. Lyakhova participated the meeting.

THE MAIN TOPICS

1) Information on the COOMET projects implementation in the "Ionizing radiation and radioactivity" thematic area is presented in Section 3 of this report

2) Organizational matters

2.1. Updating the list of the COOMET technical experts on the CMCs review and QMS assessment of COOMET NMIs/DIs

2.2 Election and approval of a new coordinator of the “Dosimetry” in TC 1.9 – it was proposed to appoint A. Villevalde (VNIIM, Russia) as the coordinator of the work of TC 1.9 in the field of dosimetry instead of L. Buermann (Germany), who has terminated his membership in TC 1.9. A vote has been taken. The decision to appoint was adopted unanimously.

2.3 The new TC on-line editor on the COOMET portal was approved – D. Grishin (VNIIM, Russia).

3) Proposals for new projects

3.1 A new cycle of comparison in the field of specific activity of radionuclide solutions measurements (with a barium-133 solution), as a ten-year validity period for the previous comparison has expired. Agree on the technical protocol, open the proposed COOMET topic and register the comparison in the field of activity measurements of barium-133 solution in 2022 (proposed coordinator – I. Alekseev, VNIIM, Russia).

3.2 Comparison in the field of radon volumetric activity measurements.

The discussion was postponed due to the absence of the responsible representative of VNIIFTRI (S. Biryukov) at the TC meeting.

3.3 Comparison in the field of ambient dose equivalent measurements for X-ray qualities used in radiation protection.

Comparison was proposed by the representative of Uzbekistan Sh. Ismatullaev (UzNIM);

UzNIM dosimetry laboratory is under construction now. Ambient dose equivalent measurements are dependent on the measurements of air kerma, while air kerma comparisons for X-ray qualities used in radiation protection have been completed by COOMET recently (641/BY-a/14).

It was decided to postpone the discussion until the UzNIM laboratory is ready and/or search for alternative options to confirm the calibration capabilities (bilateral comparisons within COOMET or participation in comparisons with other regional metrological organizations).

The “Dosimetry” coordinator was instructed to collect additional information on the laboratories needs to conduct new comparisons of X-rays air kerma and related quantities, the laboratories opportunities to pilot such comparisons and needs for the preliminary training seminars. The results will be discussed at the next TC meeting.

4) The previous TC meetings decisions implementation

The VNIIFTRI representatives suggested to establish a new comparison in the field of radon volumetric activity. VNIIFTRI has the necessary equipment and experienced qualified personnel for carrying out comparisons. It was decided to instruct VNIIFTRI (S. Biryukov) to hold consultations with potential participants of comparisons, evaluate the prospects for such comparisons, and, in case of a positive result, develop and send a draft Technical Protocol to potential participants. At present there are no visible results, the next term for the Technical Protocol preparation has been set - 2021.

In 2017 VNIIFTRI representatives initiated comparisons in the field of measuring radon volumetric activity and EEVA. VNIIFTRI has the necessary equipment and experienced qualified personnel to carry out comparisons. It was decided to instruct VNIIFTRI (S. Biryukov) to conduct additional consultations with potential participants in comparisons, evaluate the prospects for such comparisons, and, in case of a positive result, develop and distribute to potential participants a draft Technical Protocol. To date, there are no visible results, the discussion has once again been postponed due to the absence of the responsible representative (S. Biryukov, VNIIFTRI) at the TC meeting, perhaps at the next meeting a decision will be made to exclude the topic from the TC work plan.

3. THE AGREED PROJECTS CURRENT STATUS

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

3.1.1 175/RU-a/99 Status of the measurement standards in the field of ionizing radiation and radioactivity in the countries-members of the COOMET

The aim of this work is to create a COOMET database on standards in the field of ionizing radiation and radioactivity. Participants - representatives of all COOMET member countries.

Within the framework of the implementation of the theme, representatives of COOMET member countries regularly provide information on the state of the reference base and the ongoing changes:

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

The topic is kept as a permanent one, the information is updated as the composition of the equipment changes and the capacities of COOMET member laboratories expand.

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 comparisons are completed. The draft report (Draft B) was sent for review to regional metrological organizations and the CCRI.

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.

Comparisons are carried out with Co-60, Cs-137, Eu-152 and Am-241 point spectrometric sources of OSGI type.

Measurements have begun, completion is scheduled for 2022.

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

The work was stalled due to the problems with the transport of the transfer standard by participants from Cuba. Logistics problems were the main reason for the delay.

A variant using a portable analog dosimeter with low working gas pressure and a highly stable control source of gamma radiation has been developed and is under implementation.

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 last TC meeting. The final version should be finalized during 2022.

4. INTERACTION WITH INTERNATIONAL AND REGIONAL ORGANIZATIONS

As part of the work on the implementation of the Memorandum of Cooperation between EURAMET and COOMET, in February 2021, the representative of TC 1.9 E. Lukyan took part in the meeting of the technical committee on ionizing radiation EURAMET TC-IR. The meeting was held online.

In May-June 2021, TC 1.9 representatives took part in the meetings of the working group on the use of liquid scintillators (LC WG), the interregional metrological organizations working group (RMO WG), the Consultative Committee on Ionizing Radiation (CCRI) and its sections (CCRI(I) - X-ray and gamma radiation, charged particles, CCRI(II) - radioactivity, CCRI(III) - neutron measurements).

5. PARTICIPATING IN THE IMPLEMENTATION OF THE AGREEMENT ON THE MUTUAL RECOGNITION OF NATIONAL BENCHMARKS

Current state of RI COOMET SMS

| Country | CMC number | Dosimetry | Radioactivity | Neutrons |
|-----------------|-------------------|---------------------|----------------------|------------------|
| Belarus | 51 | 21 | 30 | |
| Bulgaria | 23 | 7 | 16 | |
| Cuba | 68 | 13 | 55 | |
| Georgia | | 2 | | |
| Germany | 275 | 91 | 158 | 26 |
| Moldova | 2 | 2 | | |
| Romania | 37 | | 37 | |
| Russia | 329 | 161 (28+133) | 124 | 44 (6+38) |
| Slovakia | 71 | 30 | 32 | 9 |
| Ukraine | 15 | | 15 | |
| Turkey | 3 | | 3 | |
| China | 195 | 20 | 173 | 2 |

Last two years no new CMC were presented

TC representatives took part in the COOMET webinar for TC Chairmen on exchange of experience with KCDB 2.0 (January 26, 2021).

6. The next meeting time and place

The next TC meeting is scheduled for autumn 2022. The decision on the meeting location and format will be made taking into account the situation with the Covid-19.

TC 1.9 Chair
Nikolay Moiseev