TC Chair Annual Report 2022 - 2023

TC for Ionising Radiation (IR)

TC Chair: Jacco de Pooter

1. General Aspects

This report summarizes the activities of the EURAMET Technical Committee for Ionizing Radiation (IR) for the period of May 2022 to May 2023. TC-IR currently has contact persons from 30 EURAMET member countries. Recently GEOSTM joined TC-IR.

The TC-IR annual contact person meeting (2.5 days) was held as in person meeting after 2 years of online meetings at the Spanish DI for IR metrology, CIEMAT in Madrid. More than 45 participants attended the meeting. Two sessions were organized as hybrid sessions, with both attendees and presenters participating online. Topics were CMCs and comparisons (workflow and strategic planning), new structures for CMCs and experience with KCDB2.0. New upcoming trends in the IR metrology fields, Health, Environment and industrial applications were collected and discussed regarding their future relevance and the resulted metrological questions. PRTs submitted for the EMP 2023 Calls were presented. The progress of three European Metrology Networks (EMNs) closely related to the TC-IR was presented and ideas were shared.

2. Projects

There are five ongoing EURAMET-TC-IR projects. One project was completed (EUR-1435) in the period from May 2022 to May 2023. One new project was started (EUR-1554).

ID	Starting Date	Title	Coordinating institute	Collaboration type
1398	2017-01-01	Comparison of personal dose equivalent at 0.07 mm and 3 mm depth, Hp(0.07) and Hp(3), for beta radiation	PTB	Comparison
1467	2019-02-01	EURAMET DOSEtrace supplementary comparison	VINS	Comparison
1531	2021-06-21	Bilateral comparison of the H*(10) calibration coefficients for photon radiation	IMBiH	Comparison
1541	2021-10-12	Key Comparisons of air kerma and absorbed dose to water standards in ^{60}Co radiation beam for radiation therapy	STUK	Comparison
1554	2022-05-16	Bilateral key comparison on Cr-51 standardisation	POLATOM	Comparison

Projects completed from May 2022 to May 2023

ID	Starting Date	Title	Coordinating institute	Collaboration type

1435	2017-11-27	Measurement of Ho-166 specific activity under nuclear decay data	CMI	Comparison

3. Comparisons

For the field of dosimetry and radioactivity the continuous key comparisons conducted by the BIPM cover most of the needs of laboratories with primary standards in either dosimetry or radioactivity. The needs for comparisons in TC-IR comes from secondary laboratories that need regional key comparison, from laboratories that needs (supplementary) comparisons for quantities, beam qualities or radionuclides not covered by the BIPM key-comparisons or from the neutron field where key comparisons are not piloted by BIPM. These needs are discussed at the TC-IR annual meetings. In the meeting in 2023 two new proposals were discussed and approved.

4. CMCs

The first proposal to restructure CMCs following the new broad scope approach following from these developments was discussed at the RMO meeting in 2021 to identify non-technical issues which could prevent the submission. The first Euramet submission of CMC's according to this reduced scheme was done end of 2021. In 2022 these first submissions were finalised. The experience with the reduced scheme was discussed in the annual meeting. Following their internal policy as international organisation, IAEA has moved their CMC review process to another RMO (SIM). Therefore CMCs of IAEA are no longer included in the overview below.

Status of CMC review:

- Greyed out : ENEA: All (98) claims in dosimetry and radioactivity: reinstatement plan is in preparation and has been discussed with TC-Q and TC-IR end of 2022.
- Greyed out: JRC: Since 2018 all (63) claims in radioactivity were greyed out. Discussions on reinstatement have been held in 2021 and 2022. Eventually JRC has decided to grey out all their CMC claims in IR metrology.

Overview of the ionizing radiation CMCs

Country	Dosimetry	Radioactivity	Neutrons	Total
Austria	52	100	0	152
Belgium	2	0	0	2
Bulgaria	7	16	0	23
Croatia	2	0	0	2
Czech Republic	7	104	12	123
Denmark	7	0	0	7
Finland	30	0	0	30
France	82	206	3	291
Germany	93	153	20	266
Georgia	2	0	0	2
Greece	35	0	0	35

Hungary	26	78	0	104
Moldova	2	0	0	0
Netherlands	23	0	0	23
Norway	22	0	0	22
Poland	4	68	0	72
Portugal	42	0	0	42
Romania	0	37	0	37
Serbia	18	0	0	18
Slovakia	30	37	9	76
Slovenia	9	5	0	14
Spain	52	105	0	157
Sweden	23	0	0	23
Switzerland	3	21	0	24
Turkey	0	3	0	3
United Kingdom	22	116	42	180
Total (EURAMET TC-IR)	**595**	**1049**	**86**	**1730**

5. Activities of the Subcommittees

Working group *CMCs and Comparisons* (WG leader: Linda Person, SSM, Sweden)

The TC-IR working group (WG) for CMCs and comparisons is split into three teams aligned with the three different branches of IR metrology; Radioactivity, Dosimetry and Neutrons, for the CMC reviews and for monitoring of comparisons. This working group has CMC reviewing as its main task. The work is under the supervision of the CIPM MRA. The WG-leader organizes the CMC reviewing, follows the results of comparison projects and coordinates the TC-IR activities in all aspects concerning CIPM MRA. End of 2022, Carole Frechou stepped down as WG leader CMC and comparisons. Initially, Linda Person took over this role on ad interim basis. At the TC-IR annual meeting she was officially elected as WG leader.

The membership of the review teams was updated at the last annual meeting. In particular new members for the review team radioactivity were welcomed; detailed information is given in the annex. Members of this working group are strongly involved in TC-IR activities and many discussions at different meetings regarding the proposed TC-IR approach as answer to the revised MRA.

Working group *Ionizing Radiation and Radionuclides in Health* (leader: Ulrike Ankerhold, PTB, Germany)

This working group focuses on important topics concerning the application and use of ionizing radiation in the field of Health. The working group establishes connections with stakeholders, standardization bodies and research organizations and institutes to enhance the interdisciplinary work in metrology for Health, making sure to realize important topics in project proposals for EPM calls and other research programs.

In the TC-IR 2023 meeting, the theme of medical device certification was discussed by the WG, from a presentation of Jiri Suran (CMI). The WG plans to organize a brain storm meeting to prepare for the digital call of 2024.

Working group *Ionizing Radiation and Radionuclides in Environment, Energy and Industry* (Arunas Gudelis, FTMC, Lithuania)

This working group (WG) aims at the metrological support of research and applications related to radioactivity and ionizing radiation in the fields of Environment, Energy and Industry. In the TC-IR 2023 meeting the WG the theme of decommissioning of nuclear facilities was discussed. This discussion was closely related to a SIP project on free release technology.

6. Participation in EMRP/ EMPIR/EPM

I. EPM JRPs with start in 2023:

Normative Call 2022:

TraMeXI Traceability in Medical X-ray Imaging dosimetry, Paula Toroi (STUK), 2023-2026

GuideRadPROS Harmonisation, update and implementation of standards related to radiation protection dosimeters for photon radiation, Teemu Siiskonen (STUK), 2023-2026

Health Call 2022:

AlphaMet Metrology for Emerging Targeted Alpha Therapies, Jan Rusnak (CMI), 2023-2026

II. EPM JRPs with start in 2022:

Green deal Call 2021:

BIOSPHERE Metrology for Earth Biosphere: Cosmic rays, ultraviolet radiation and fragility of ozone shield, Faton Krasniqi (PTB), 2021-2024

MetroSoilMoist Metrology for multi-scale monitoring of soil moisture, Miroslav Zboril (PTB), 2021-2024

MetEnvPol Metrology for the harmonisation of measurements of environmental pollutants in Europe, Dirk Arnold (PTB), 2021-2024

III. EMPIR JRPs with start in 2021:

Fundamental Call 2020:

PrimA-LTD Towards new primary activity standardisation methods

based on low-temperature detectors, Philipp Ranitzsch (PTB), 2021-2024

IV. EMPIR JRPs with start in 2020:

Normative Call 2019:

MRgRT-DOS Traceable dosimetry for small fields in MR-guided radiotherapy, Jacco de Pooter (VSL), 2020-2023

Environment Call 2019:

traceRADON Radon metrology for use in climate change observation and radiation protection at the environmental level, Annette Röttger (PTB), 2020-2023

RemoteAlpha Remote and real-time optical detection of alpha-emitting radionuclides in the environment, Faton Krasniqi (PTB), 2020-2023

V. EMPIR JRPs with start in 2019:

Health Call 2018:

UHDpulse Metrology for advanced radiotherapy using particle beams with ultra-high pulse dose rates, Andreas Schüller (PTB), 2019-2022

Normative Call 2018:

PRISM-eBT Primary standards and traceable measurement methods for X-ray emitting electronic brachytherapy devices, Thorsten Schneider (PTB), 2019-2022

7. Capacity Building: Activities of the last year and future needs

Capacity Building (CB) (contact person capacity building: Denis Glavič-Cindro, MIRS/IJS, Slovenia)

TC-IR currently has 30 registered contact persons, 10 from NMIs and 20 from DIs. 11 contact persons come from EU member states with an emerging metrological infrastructure in IR, 3 institutes do not have any CMC claims. The TC-IR activities for capacity building are coordinated by TC-IR contact person *Capacity Building* in close collaboration with the EURAMET officer for capacity building.

Capacity building needs and activities in the field of ionizing radiation are covering researcher mobility grants (RMG), RPT projects and practical training courses in coordination of projects, in preparation of documentation for submitting CMCs in KCDB and in organization and coordination of comparisons.

In 2019 a training course on piloting comparisons was organized at NPL by Euramet TC-IR in collaboration with BIPM. In 2022 the process was started to transfer the course to an online settings as part of the BIPM-CB platform. In 2022 a Mentoring Scheme Award took place between STUK and ENEA on spectrometry for x-rays rubes.

8. Meetings

TC-IR Contact Person meeting in 2023:

The TC-IR Contact Person annual meeting was organized at CIEMAT (Madrid), from 28 February – 1 March. Topics were EURAMET IR projects (running and proposed comparisons), present status of TC-IR CMCs, news from the working group “Capacity Building”, presentations of highlights from single institutes and the 2022 Calls. A special focus was laid on the brainstorming of upcoming trends

in the IR fields and the discussion of the resulted future challenges for metrology. In addition, the experience with the use of the new KCDB2.0 within TC-IR was discussed and follow-up steps were defined. In a dedicated networking session, the two running JNPs and one European Metrology Networks (EMN), Radiation Protection, closely related to the IR-field were presented and discussed.

9. Issues

None

10. Strategic Planning

The topic of digitalization remains undiminished important in TC-IR. Therefore a dedicated brainstorm meeting will be organized in autumn 2023.

11. Outlook for 2023/2024

1. Next TC-IR CP meeting:
    - Spring 2023 physical meeting.
    - days meeting with special focus on activities regarding CMC review capacity building, the development of EMNs in the IR field as well as to discuss project proposals for the EMP calls 2023.
2. CMC review is ongoing.
3. Strategic planning of comparisons.
4. TC-IR will put a special focus on activities regarding the revised MRA, and the submission of CMCs according to the revised scheme. A few CMCs were submitted in 2022, more are expected for 2023.
5. TC-IR will closely collaborate with recently established EMN Radiation Protection and the EMN's in preparation (on the medical use of ionizing radiation, MIRA and pollution monitoring, POLMON), with the aim to promote the further development of the EMNs and to further identify their respective roles in the IR metrology field
6. TC-IR will contribute to transfer the course material of the course 'Piloting comparisons' to online material.