Minutes of the Working group for Calibration and Measurement Capabilities (CCT-WG-CMC)

ITS 10. Disneyland, Anaheim, USA, 3 April 2023, 08:00-10:00 PT (Pacific Time)

Present:

Jovan Bojkovski (chairman) (MIRS/UL-FE/LMK)

Hisashi Abe (APMP/AIST-NMIJ), Steffen Rudtsch (EURAMET/PTB), Nasser Aldawod (GULFMET/SASO), Andrea Peruzzi (SIM/NRC)

Also present online: Ciro Sanchez (SIM/INM)

Action list:

Action 1: **All RMO representatives** to make review of the existing accepted CMCs because of final report of CCT.K9 has been published on 31. March 2023. The review should clearly indicate if the existing CMC is confirmed by the results of CCT.K9, suggestion about future steps for the particular entry/NMI. **Deadline 1. April 2024**.

Action 2: **Jovan** to prepare table with cut-off 25th percentile values based on the results of CCT.K9. This table is used for the review of the submitted CMCs and become part of the revised review protocols. **Deadline 1. August 2023**.

Action 3: **Jovan** to prepare list of comparison which can be used as a supporting evidence for other categories as well and to submit to CCT WG CMC for approval. **Deadline 31. May 2023**.

Action 4: **SIM together with Brazil,** to prepare updated document regarding Brazil submission of the humidity CMCs, which will additionally explain -30 °C frost point and submitted CMC uncertainty values. **Deadline 31. May 2023**

Agenda:

1) Review of submitted CMCs – problems and suggestions
2) Review protocol amendments – changes
3) Inter-RMO review process harmonization - difficulties and delays in CMC review process
4) Any other business

1) The final report of CCT.K9 has been published on 31. March 2023 in the KCDB. **Jovan** presented potential outcome of the results of the CCT.K9 to already accepted CMCs. Current CMCs in the categories related to the fixed point and calibration of SPRTs at the fixed points are mostly based on the results of the CCT.K3 comparison from year 2003 (report date). Furthermore, current report of the CCT.K9 is based on the measurements performed in years 2011 and 2012. The lengthy period of data analysis has been noted. **Andrea** emphasized that it is clear responsibility of the NMI and RMOs to review outcome of the CCT.K9 and its direct influence on the already accepted CMCs. This can also cause potential grey out of the CMCs as in accordance with MRA. **Steffen** informed that some NMIs will have to potentially increase CMCs at some fixed points. **Nasser** informed that GULFMET K9 is in draft B phase and that they should answer as soon as possible to the reviewer comments in order to finalize the report of the GULFMET K9 comparison. The influence of the potential non-

conforming result of the linking CCT.K9 laboratory to the RMO K9 results, which are under way, has been discussed. **Steffen** mentioned that there are existing mechanism, which enable potential improvement of CMC. This include additional research work and new bilateral/multilateral comparison. At the end, new review of the new data is performed. **Andrea** mentioned that change in key personnel can also lead to problems with results of comparisons. **Steffen** that there was already idea to organize key comparison using fixed point cells and not SPRTs. In previous years, there was indication by NMIJ, which was willing to lend some fixed point cell for such comparison. It was also discussed that it is responsibility of the quality system of the each NMI, which didn't confirm their existing CMCs, to inform customers about outcome of the CCT.K9.

2) The review protocols in some cases use 25th percentile values, as a cut-off criteria, for the CMC review process. These value has been based on the results of CCT.K3. In future these values should be updated to reflect results of CCT.K9. Furthermore, we have discussed about potential solutions for decrease number of CMC entries/categories. For example, it has to be clear that uncertainty for the pure metal thermocouple can't be used for base metal thermocouple, but it has to be larger. As a solution of harmonized approach, the current CCT Guideline on Thermocouples prepared by Frank Edler and others, could be updated to contain information about relevant uncertainty sources. **Hisashi** proposed similar approach like for CMCs of RH meters. One line to contain more entries with different ranges and uncertainties.
3) It is clear to the members of CCT WG CMC that it ss practically impossible to perform comparisons, which would cover each CMC category. As a consequence, we will have to decide which comparison can be used to cover also other CMC categories. The example has been prepared by **Andrea, Rien and Jovan** and presented at the meeting and as IMEKO 2018 world congress paper. Despite the fact, that currently no one is asking for the comparison in the field of liquid-in-glass thermometers (for example), It has been suggested to formalize this approach.
4) **Hisashi** prepared PowerPoint presentation which explained in more details potential ambiguities in the review process of Brazil humidity CMCs. After the discussion, it has been concluded that results of SIM comaprison should be amended to reflect fact, that measuremtns were performed at the -30 frost point. Furthermore, results and uncertainties of bilateral comparison between Brazil (INMETRO) and Argentina (INTA), can't be directly used as supporting evidence for better CMC uncertainties.

Drafted by Jovan Bojkovski, sent to participants for comments on 3. April 2023