On improving the implementation of the CIPM MRA

D.I. Mendeleyev Institute for Metrology
Deputy Director Yuri A. Kustikiov

1. Achievements of the CIPM MRA

The CIPM MRA has a significant impact on the Russian Government to support metrology. Declaration and to support Calibration and Measurement Capabilities (CMCs) included in the BIPM database (BIPM KCDB). They are important factor affecting the state funding allocated to development of the national standards. The number of the NMI’s CMCs, in comparison to other NMI’s, characterizes the level of development of national measurement standards in specific measurement fields and subfields, which is a basis for decisions with regard to the state funding of this development.

The CIPM MRA facilitated the introduction of quality systems to NMIs, meeting the requirements of ISO 17025 and ISO Guide 34, and establishment of the degree of equivalence of national measurement standards.

Although the BIPM KCDB is free to access for all users of metrological services, they seem to prefer NMIs websites, where the services offered are also based on CMCs of the KCDB. At the same time, from the user’s point of view, only in case of insufficient validity of services on the NMI’s website or dissatisfaction with their quality (measurement range and/or uncertainty in this case) the user addresses the BIPM KCDB directly in order to choose a service provider by comparing CMCs of different NMIs.

Therefore, the KCDB data can be used for «arbitration» purposes making it possible to compare CMCs submitted by various NMIs and to make well-founded choice of a metrological service provider. This makes it necessary to establish general requirements for presentation of metrological services based upon CMCs on NMIs’ websites. The presentation should be of cause constantly improved taking into account surveys of NMIs and other users of these data.

The practice of the implementation of the CIPM MRA has underpinned the multilateral cooperation not only between NMIs, but also involved users of metrological services in this cooperation. It can be understood from the demand for calibration certificates which bear the CIPM MRA Logo. Such certificates are asked for by testing laboratories (organizations) undergoing accreditation in compliance with ISO 17025 and ISO Guide 34, metrological services of companies with mixed capital, companies exporters, and foreign instrument-making companies importing to Russia their measuring instruments subject to type approval testing. Calibration certificates with the CIPM MRA Logo provide for recognition of the quality of services and confidence in certificate holders.

High demand for metrological documents with the CIPM MRA Logo concerns not only calibration certificates, but also verification certificates and documents for Certified Reference Materials (CRMs). This is the case in those countries where in the sphere of national regulations verification certificates are the main form of confirmation of characteristics of measuring instruments. In the
first place these are countries-members of the Eurasian Union and CIS (where millions of measuring instruments are in circulation). In this regard it is important to mention the significance and relevance of new guidelines CIPM MRA-D-02 «Use of the CIPM MRA logo and certificates statement» stipulating for the possibility to affix the CIPM MRA Logo to the documents which contain information about compliance or verification of characteristics of measurement instruments with an amendment that the CIPM MRA Logo attests only to the measurement component of the certificate. Implementation of this document will help to avoid multiple duplication of verification certificates by calibration certificates bearing the CIPM MRA Logo.

2. Resulting complexity (deficiencies of the CIMP MRA implementation)

The resulting difficulties in implementing the CIPM MRA due to the constantly increasing scope of the work related to comparisons and CMC reviews, as well as the complexity of forming and maintaining the KCDB are obvious, but it can hardly be called “deficiency”.

The remark of some countries that there is a competition among countries in the number of submitted CMCs appears not to be relevant. The main role of the CIPM MRA is to ensure the mutual recognition of the national measuring standards supported by results of comparisons, and the recognition of the calibration and measurement certificates issued by NMIs, the measurement information of which is supported by the KCDB data. The international recognition of calibration and measurement certificates is of interest, first of all, for the buyers of NMIs services who request certificates with the CIPM MRA Logo. NMIs do not compete with each other on the number of CMCs, but rather on quality and scope of measuring services they are able to provide to their customers on the basis of the internationally recognized CMCs included in the KCDB.

The availability of the required CMCs in BIPM KCDB guarantees that a national buyer (customer) will apply to “his” NMI and not to a foreign NMI.

The availability of CMCs is demonstrates the level of metrological self-sufficiency of the country where the NMI is situated, and metrological independence when providing metrological services to both national organizations and enterprises and foreign private and state-owned organizations.

Unreasonable simplification of review procedures will reduce the quality of regional and interregional CMC reviews, which undoubtedly will affect the level of confidence in the CMCs included in the KCDB and, consequently, in calibration and measurement certificates with the CIPM MRA Logo.

3. Suggestions for optimizing the process of implementation of the CIPM MRA

3.1. Reducing the number of comparisons by forming Core Key Comparisons (KC) and core CMCs supported by these comparisons.

Core KC is a stable group of Key Comparisons covering the subjects of comparisons having similar characteristics of their properties. To conduct one comparison from the Group is equivalent to carrying out any other comparisons from that Group. Such comparisons demonstrate the NMI’s
core expertise in specific subjects and exclude the need to repeat all comparisons at regular intervals established by decisions of the corresponding working groups. Core KC Group can be extended, if necessary, if there is need for new subjects for comparisons. There can be several Core KC Groups in different measurement areas. Such Core Comparisons have already been conducted in gas analysis.

3.2. Reducing the number of KC participants organized by Consultative Committees through enhancing the activities within RMOs.

Setting up a limited group of NMIs with high level of recognized expertise and representing all the RMOs participating in KCs organized by the Consultative Committees.

NMIs from this Group organize, carry out and coordinate the corresponding Key Comparisons within their RMOs. These NMIs can suggest (in coordination with CCs) different priorities to be pursued by RMOs and carry out corresponding supplementary comparisons within RMOs without raising them to the level of Consultative Committees.

3.3. Declaration of Core CMCs.

Core Key Comparisons support a large group of Core CMCs. If one or two core comparisons are successful, the previously claimed CMCs will thereby be confirmed and will belong with the Core KC Group. Depending on the comparison results (after the evaluation of equivalence), characteristics of the Core CMCs can be changed. Each group of Core CMCs is supported by a group of Core KC.

In case of a new measurement tasks for which the compatibility of national standards should be ensured at the interregional level, Key Comparisons should be carried out under the guidance of Consultative Committees.

3.4. Reduction of time and simplification of the procedure of regional and interregional review of claimed CMCs by unifying approaches for evaluating the CMC characteristics (range, uncertainty) in the review process (this is being explored in the WGs of the CCQM).

3.5. Development of general recommendations for presentation of measurement services on the basis of the CMCs included in the KCDB on NMI websites in order to ensure a reasonable choice of measurement service providers.

In this case, a significant part of the work to develop the user-friendly database of measurement services falls to the lot of NMIs, due to which the workload of the BIPM can be reduced.