PTB Position paper concerning the revision of the CIPM-MRA

Starting point and observations
The aims of the MRA are to establish mutual confidence in the equivalence of national measurement standards maintained by NMIs and to provide for mutual recognition of calibration and measurement certificate.

In the sixteen years of implementation, the MRA has been a great success, with the effect, however, that the efforts to maintain it have grown to a level which puts it at risk not to be sustainable and acceptable. Reasons are e.g.:

- The number of contributing metrology institutes (NMI’s and DI’s) has grown. While the number of NMI is limited to one per country, there is no mechanism to limit the number of DI’s.
- The number of measurement quantities under consideration has grown.
- Some key comparisons take too long or require too many resources because
  - there are too many participants, esp. those with secondary standards, for which a calibration would be more appropriate
  - they are used as a kind of joint research and development project.
- There is no mechanism to limit the number of CMC’s and comparisons. It is up to the individual NMI and DI to decide about its participation, but there is an internationally or nationally/politically generated pressure to participate in order not to be seen lagging behind. The sheer number of CMC’s that an NMI offers is often interpreted as a measure of performance and e.g. used for budget negotiations on the national level.
- There are no effective measures to enforce the rules of the MRA. For example,
  - the requirements for participation in comparisons, as described in chapter 6 of the MRA, are qualitatively, but not quantitatively specified, and they are not enforced
  - there is no way to suspend DI’s not complying with the MRA, e.g. those seeking commercial market advantage or not being impartial (not in line with chapter 2.5 of CIPM 2005-07).

Guiding consideration
The two aims, to establish mutual confidence among the metrology institutes and to maximize benefits for service customers and stakeholders, need different approaches.

The detailed mechanisms implemented by the metrology institutes for the establishment of recognition of capabilities may be not relevant for many service users, who may only need to
know the measurement range and uncertainty of a service and rely on its international recognition.

The NMI’s, in contrast, look far beyond a specific service. Their mission is to reliably provide the fundamental measurement infrastructure, in many cases striving to develop highest-level standards even in anticipation of future customer requests. They have been cooperating since decades bilaterally and in the CC’s and TC’s, they have a joint research history, and mutually review QM systems. This consideration leads to the following picture of comparisons, CMC’s, and services.

**Key Comparisons** are matter of NMI’s and DI’s. International key comparisons are needed for - and shall focus on - highest-level, primary standards; they are complemented by regionally organized supplementary comparisons. Key comparisons and supplementary comparisons shall be as generic as possible to underpin a larger number of CMC’s.

**CMC**’s address capabilities under international review and recognition. The CC’s and TC’s define their scope. They shall be as generic as possible to underpin a larger number of services.

**Services** are offered by an institute. The institute has to demonstrate under its QM system how a service relates to a CMC entry, but the service itself is not subject to international review. Services are documented and advertised by the institute, but not in a BIPM data base.

**Specific PTB positions**

The existing CIPM-MRA text is well suited, it shall not be changed. The weakness lies in the enforcement and in the interpretation of technical requirements.

Specific positions are:

- The freedom of choice between the equivalent options of self-declaration and accreditation has to be maintained.

- The MRA needs efficient enforcement, such as for requirements described for comparisons in chapter 6 of the MRA text, and for DI’s in chapter 2.5 of CIPM 2005-07.
  - Secondary standards shall be excluded from international key comparisons - only primary realizations necessarily require key comparisons and shall be used for mean value calculations. Secondary standards can just be calibrated, no matter whether operated by a metrology institute or by an accredited calibration laboratory. For proof of competences of NMI’s and DI’s holding secondary standards, RMO’s shall organize comparisons under participation of some participants in relevant international KC’s. Additionally, RMO’s may offer training comparisons.
  - Quality thresholds shall be specified for participation in international KC’s, uncompetitive standards shall be compared or calibrated on regional or bilateral level, respectively.
- Acceptance of all DI’s (not only supranational bodies) shall require CIPM approval, based on recommendations of the RMO’s; the CIPM shall have the right to withdraw this approval in case a DI does not comply with the rules.

• The CC’s and the regional TC’s are responsible for the setting the scope of CMC’s and comparisons, and they agree on the participation in comparisons. Top-down elements shall be added e.g. in form of a platform for the NMI’s directors to jointly define targets for the scopes of CMC’s and comparisons (which shall be as generic as possible) and for participations in comparisons (restricted to the appropriate levels).

• Another possibility to limit the volume of CMC’s could be that CMC’s without real, associated customers services are not maintained after a given period of time.

• In case there are no partners for key comparisons it must be possible to get CMC entries on the basis of a validation report to be presented to the relevant TC/CC.

• Chemical, biological and bio-technological quantities need a different approach, revision of technical guides is necessary.