Joint ILAC – CIPM Communication regarding the Accreditation of Calibration and Measurement Services of National Metrology Institutes

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Authorship

This document was prepared by the International Laboratory Accreditation Cooperation (ILAC) Accreditation Committee (AIC) and the BIPM.

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Preamble

The National Metrology Institutes (NMIs) develop and maintain national measurement standards, based on the definitions of the quantities and units of the international system of units (the SI) or, where this is not yet possible, to other internationally recognized standards. The NMIs are the foundation of metrological traceability in their State, and disseminate metrological traceability to industries, laboratories, proficiency testing (PT) providers and others, in particular through the provision of calibration services to accredited calibration laboratories and accredited Certified Reference Material (CRM) providers which then go on to provide calibrations at a working level.

The NMIs from States which have acceded to the Metre Convention and which are therefore Members of the International Bureau of Weights and Measures (BIPM) or which are Associates of the General Conference on Weights and Measures (CGPM) established and signed a mutual recognition arrangement under the auspices of the International Committee for Weights and Measures (CIPM), namely the CIPM-MRA (The "Mutual Recognition of national measurement standards and of calibration and measurement certificates issued by national metrology institutes").

The main objective of the CIPM-MRA is to establish the degree of equivalence of the national measurement standards to insure world-wide uniformity of measurement and to provide for the mutual recognition of calibration and measurement certificates issued by the NMIs. In order to establish technical confidence at the core of the CIPM MRA, the leading NMIs participate in Key Comparisons organized by the Consultative Committees created by the CIPM. The Regional Metrology Organisations (RMOs) in turn, extend these comparisons into key and supplementary regional comparisons so that all NMIs are able to participate in appropriate comparisons.

These comparisons are the technical basis for the declaration of the Calibration and Measurement Capabilities (CMCs) by NMIs and underpin the subsequent peer review of the CMC claims. The peer review is a two step process. The first step is a review by the relevant RMO technical committees and claimed CMC may only go forward to the second step when any issues arising have been resolved. The second step is the inter RMO review in which questions and comments from regional technical committees from the other RMOs may be put to the submitting NMI. When the CMCs have successfully completed both of the reviews and

are approved they enter into the BIPM Key Comparison Database (KCDB). The CIPM MRA requires laboratories to operate an appropriate quality system (in practice compliant with ISO/IEC 17025) and NMIs must demonstrate to their RMO that they operate an acceptable quality system. Furthermore the CIPM MRA foresees the possibility that the demonstration of competence and capability may require visits and examination of procedures by peers selected by the local RMO. This CIPM MRA review process is documented on the BIPM website. In practice all of the RMOs have a policy that includes on-site peer reviews as a basic requirement, though this may be waived if, for example, on-site accreditation is carried out by personnel that meet the RMO guidelines. The CIPM MRA does not require NMIs to have their measurement and calibration services covered by accreditation, though many NMIs do choose accreditation for some or all of their services because they consider it beneficial. Thus many NMIs may have their measurements services assessed through both accreditation and the inter-regional review process of the CIPM MRA.

Appendix C of the CIPM MRA contains the approved CMCs from the NMIs and Designated Institutes. The CMCs can be searched from the following webpage http://kcdb.bipm.org/AppendixC/default.asp

1. Scope

This document provides guidance on the accreditation process of NMIs for their measurement services in order for the NMI to optimise the benefits from being accredited when it is, or is in the process of becoming, a signatory to the CIPM MRA, and to generally facilitate the process for Accreditation Bodies when accrediting the measurement services of NMIs.

2. Terms and definitions

For the purpose of this document, the terms and definitions given in ISO/IEC 17000, ISO/IEC 17011, the VIM, and the following apply:

National Metrology Institute (NMI): The institute that is responsible for establishment, maintenance and dissemination of national measurement standards in a State. It is defined in the glossary of terms in the CIPM MRA that the national metrology institute signatory to this (the CIPM MRA) arrangement is the metrology institute designated by the appropriate national governmental or other official authority as that responsible for national standards. However, the CIPM MRA covers not only the signatory NMI but also additional Designated Institutes (DIs), holding national standards and providing specialist measurements and calibration services not available in the NMI. For the purpose of this document, whenever the term, "NMI" is used, it implies both National Metrology Institutes signatory to CIPM MRA and Designated Institutes within the meaning of the CIPM MRA.

RMO: Regional Metrology Organisation, i.e. regional groupings of NMIs, covering a specific region i.e. AFRIMETS, APMP, COOMET, EURAMET, and SIM.

JCRB: The Joint Committee of the RMO and the BIPM. The body in which the RMOs are brought together, with the BIPM. The JCRB is chaired by the Director of the BIPM.

CIPM MRA: An international mutual recognition arrangement drawn up by the International Committee of Weights and Measures (CIPM), under the authority given to it in the Metre Convention, for signature by directors of the NMIs of Member States of the Metre Convention and Associates of the CGPM. Its objectives are:

- to establish the degree of equivalence of national measurement standards maintained by NMIs;
- to provide for the mutual recognition of calibration and measurement certificates issued by NMIs;
- thereby to provide governments and other parties with a secure technical foundation for wider agreements related to international trade, commerce and regulatory affairs.

Technical expert (TE): A person assigned by a national accreditation body to provide specific knowledge or expertise within the scope of accreditation. Technical experts do not necessarily have the relevant assessor qualifications to be a technical assessor (TA) as approved by the accreditation body.

Technical assessor (TA): A person who conducts the assessment of the technical competence of the laboratory or inspection body for specific area(s) of the desired scope of accreditation. It is expected that such assessors meet the requirements stipulated in ILAC Guide 11 - ILAC Guidelines on Qualifications and Competence of Assessors and Technical Experts.

Peer reviewer: A person participating in a peer review assessment of an NMIs technical competence who is recognized by the RMOs or CIPM. Peer reviewers may not necessarily have assessor qualifications.

3. Guidelines

When the calibration and measurement services of a NMI are accredited, the Accreditation Body (AB) should pay attention to the fact that the NMI will want to avoid duplication of effort and will want to use the work undertaken during the accreditation process as part of the evidence put forward to the RMO as part of the CIPM MRA review process. Likewise the activities undertaken by the NMI in establishing CMCs through the CIPM MRA process generates useful evidence of technical competence for the AB when accrediting NMIs. Therefore the following items need attention by the AB when accrediting NMIs who participate in the CIPM MRA (or have indicated their intention to do so in the near future):

(i) Assessors
(ii) Scope of accreditation
(iii) Inter laboratory comparisons
(iv) Supplementary criteria set by the RMO
(v) Assessment report
(vi) Decision-making and granting accreditation

(i) Assessors

The accreditation body should appoint an assessment team consisting of a lead assessor, a suitable number of assessors and/or technical experts to cover the applied scope of accreditation (ie, quantities, ranges and uncertainties). If the NMI wishes to use the status of accreditation to support their participation in the CIPM MRA, the accreditation body should, wherever practical, use TA/TEs who can also be accepted as peer reviewers by the RMO. The RMO requirements are based on the CIPM document (CIPM/2007-25) "**Recommendations for on-site visits by peers and selection criteria for on-site visit peer reviewers".** However care is needed as RMOs may issue more detailed requirements when transposing the CIPM guidance into Regional guidance

documents. The RMOs all publish their requirements for on-site peer reviewers on their websites. It is best if the AB specifically asks the NMI beforehand whether they need TA/TEs to comply with these RMO requirements, and to confirm a common understanding of the requirements.

The accreditation body should take into account any objection from the NMI regarding the composition of the team which may prevent the NMI from using the accreditation process to substitute the CIPM MRA on-site peer review. During surveillance other assessor competences for TA with more emphasis on the customer side may be appropriate.

Clearly it is also the responsibility of the NMI to respect and comply with the accreditation requirements and cooperate fully with the accreditation body including providing evidence, documents and records to demonstrate technical competence and effective operation of its quality management system.

(ii) Scope of accreditation

The accreditation body shall during assessment take into account approved entries in the KCDB and/or available documentation related to their approval in RMOs. It is the obligation of the NMI at any time to inform the accreditation body of changes which affect the scope of accreditation (in compliance with requirements to the accredited bodies in ISO/IEC 17011). It should be recognised that the appearance of accredited scopes and entries in the KCDB may differ due to the different practices for the presentation of the information. Although entries in the scope and the KCDB are not exactly the same they can represent the same information (coming from the same documentation for the services). Where NMIs operate different scopes for their accredited services and their services provided under the CIPM MRA the AB should encourage the NMI to align as far as is practical the scope of accreditation and the services provided under the CIPM MRA .

(iii) Inter laboratory comparisons

When assessing appropriateness of participation in inter laboratory comparisons, results from participation in comparisons registered in the KCDB should be taken into account. In the case where the NMI provides services only at industrial levels of calibration where no KCDB comparisons exist, further participation may be needed. In such cases where the NMI has organised or participated in a relevant PT activity this may be an appropriate substitution for participation in inter laboratory comparisons.

(iv) Supplementary criteria set by the RMO

If the RMO has set supplementary criteria that needs to be fulfilled outside criteria included in ISO/IEC 17025 and ISO/IEC 17011, this should be taken into account by the accreditation body. Regional accreditation bodies should co-operate with the RMO to ensure a consistent and harmonised approach in order for the individual NMI to benefit from being accredited. Accreditation bodies should support their NMI to gain as much benefit as possible from the accreditation. Furthermore the accreditation body and the NMI should collaborate and agree on contact with the RMO in order to identify relevant regional guidance.

(v) Assessment report

If the status of accreditation is to be used to support the CIPM MRA process it is extremely helpful for the NMI if the assessment report (or a summary of the assessment report depending on the specific regional requirements) is provided in the language used in the RMO review process. The accreditation body and the NMI should collaborate and agree on the reporting. ABs need to make it clear that they have no objection to the Assessment Report (or a summary thereof) being submitted by the NMI to the RMO as part of the CIPM MRA process, including the identity of technical assessors and technical experts.

(vi) Decision-making and granting accreditation

Generally the scope and the uncertainty of an NMIs accredited calibration and measurement services should neither be smaller nor larger than that for the CMC represented in the KCDB (the definitions of CMCs having been aligned between accreditation and the CIPM MRA). However this may not always be the case as differences in timing, processes and the sequence in which approvals are sought and granted can result in either the accredited CMC or the CIPM MRA CMC being published first. Additionally, an NMI may seek accreditation for a service that is only of national importance and that does not warrant processing through the CIPM MRA to gain international recognition. Whenever an NMI is seeking accreditation for a capability that is not listed in the CIPM KCDB or with an uncertainty smaller than that currently published for that NMI in the KCDB, the AB should pay particular attention to the evidence to justify the claim. As there has been no alignment between the way information is presented between scopes of accreditation and the KCDB it should not be expected that the format of the scope of accreditation and the entries in the KCDB be identical.

4. References

1. Text of CIPM MRA dated as of 14 October 1999: Mutual recognition of national measurement standards and of calibration and measurement certificates issued by national metrology institutes.
2. ILAC G11: 07/2006 ILAC Guidelines on Qualifications and Competence of Assessors and Technical Experts.
3. Key Comparison database – "the KCDB" http://kcdb.bipm.org
4. "Recommendations for on-site visits by peers and selection criteria for on-site visit peer reviewers" available from the BIPM website at: http://www.bipm.org/utils/common/documents/jcrb/CIPM_2007_25_Onsite_visits_accepted.pdf
5. ISO/IEC 17000:2004 Conformity assessment – Vocabulary and general principles
6. International Vocabulary of Metrology – Basic and General Concepts and Associated Terms, VIM, 3rd edition, ISO/IEC Guide 99:2007 or JCGM 200:2008 (available at http://www.bipm.org/en/publications/guides/vim.html)
7. ISO/IEC 17011:2004 Conformity assessment – General requirements for accreditation bodies accrediting conformity assessment bodies
8. ISO/IEC 17025:2005 General Requirements for the competence of testing and calibration laboratories