

Guidelines for approval and publication of the final reports of key and supplementary comparisons

Consultative Committee for Mass and Related Quantities

1. Introduction

The technical basis of the CIPM MRA is the set of results obtained over the course of time through scientific key comparisons (KCs) carried out by the Consultative Committees of the CIPM, the BIPM and the RMOs. Once approved, the results are published by the BIPM in the BIPM key comparison database (KCDB) and are normally published in the Technical Supplement of *Metrologia*. Tables of degrees of equivalence and graphs of equivalence are also displayed in the KCDB for KCs. These tables and graphs are extended with results of linked RMO KCs when they become available.

These guidelines were prepared by the CCM Working Group on Strategy and MRA coordination (WGS) and approved by the CCM by correspondence. The objective of these guidelines is to ensure that reports of CCM comparisons are prepared in an efficient, fair and uniform manner. This document supplements Document [CIPM-MRA-G-11](#) (Measurement comparisons in the CIPM MRA).

2. Preparation and distribution of Draft A and Draft B reports

Measurement comparison reports should be written to reflect the experiment that was actually performed, including summary results from all participants. The Draft A report should be circulated to all participants as soon as possible according to the protocol. The time between completion of all the measurements of the comparison and distribution of the Draft A report should in general not exceed six months. The coordinating group of a Key Comparison may help the pilot laboratory to prepare the Draft A, and especially in the statistical treatment of the data, and should check the conformity of the report with the requirements of the CIPM MRA or the RMOs. Comments from the participants should be received by the pilot laboratory and support group within two months of them circulating the Draft A report.

When the final version of Draft A, which includes the proposed Key Comparison Reference Value (KCRV) and degrees of equivalence¹, has been agreed by all the participants, it becomes the Draft B report. The report should be accompanied with a note indicating the impact of the comparisons results on the CMC claims of the participating institutes (see Appendix 2 for more details).

This Draft B is submitted to the corresponding WG for approval. The approved version of the Draft B report is called the final report.

¹ See Note at the end of Section 4 regarding degrees of equivalence between pairs of participants.

Note:

In the event of disagreement concerning the results or the interpretation of the results of a KC, which cannot be resolved by the participants, the WG organizing the comparison shall provide as soon as possible a statement about this dispute to the CCM-WGS, including the advice of the WG. If still no agreement between the participants can be achieved, the matter is referred to the CCM President for decision. S/he may seek advice from statisticians that are experts in the evaluation of comparisons, from technical experts, and from other CCs, and will then decide. Only if the issue is relevant to other CCs, shall the CIPM make the final decision. In all these cases, the report of the KC will then contain a section that briefly describes the points where agreement among the participants could not be achieved and how the final decision was made.

3. Getting approval of the report of a comparison

3.1. CCM KCs

In the case of a CCM KC, the corresponding CCM technical working group is charged with examining Draft B prior to recommending it for formal approval (see 3.4). Participants of the comparison and members of the technical working group are normally included in the review process.

3.2. RMO KCs

For RMO KCs, the chairperson of the relevant RMO Technical Committee on Mass and related quantities (TCM) or on Fluid Flow (TCFF), together with the participants in the comparison, checks the Draft B report and then forwards it to the relevant CCM technical working group for further consideration and recommendation for formal approval (see 3.4).

3.3. RMO SCs

For the CCM, the relevant working group is the CCM technical working group dealing with the involved quantity. This CCM technical working group is responsible for commenting and performing final editorial checking of the report within a period of six weeks. No further formal approval is necessary at the level of the CCM-WGS.

3.4. Formal approval and deadlines

CCM approval (of final reports of CCM and RMO KCs) may be given by correspondence and is based on the recommendation of the corresponding WG chair to the CCM Executive Secretary. The CCM Executive Secretary checks the formal aspects of the report and makes his/her recommendation as soon as possible to the CCM-WGS.

The CCM-WGS is responsible for the formal CCM approval of the final reports of CCM and RMO KCs.

The recommendation for formal approval within the corresponding CCM technical WG and the formal approval within the CCM-WGS are each limited to six weeks.

4. Publication of the results and entry into the KCDB

For all KCs, the final report approved by the CCM forms the basis for the entry of results into the KCDB. For the CCM KC, only results from MRA signatories or designated institutes listed in the Appendix A of the MRA can be included for the KCRV calculation. The graphs and tables of

equivalence explicitly shown include results only from MRA signatories and designated institutes. If a participant is an MRA accepted participant (signatory or DI) at the time the KC is approved and the comparison measurements are initiated, the participant is allowed to remain in the KC through completion. The results of non-signatory participants are included in the comparison reports but not in the graphs and tables of equivalence. The results should be considered as evidence of metrological competence for any future CMC submissions in the event that the laboratory becomes a signatory to the CIPM MRA. Usually, the results of an RMO KC are linked to the KCRV established by the CCM KCs by common participation of some institutes in both, CCM and RMO comparisons. For SCs, normally no results will be published in the KCDB except the final report.

In all cases, a non-protected PDF version of the final report must be provided to the BIPM KCDB Office by the CCM Executive Secretary together with a statement that it has been approved according to the agreed CCM process. The pilot must post the final report and associated documents onto the KCDB web platform for publication by the KCDB office. All documents should be submitted un-protected.

Note:

The CCM decided at its 14th meeting (February 2013) that pair-wise degrees of equivalence should no longer be published in the KCDB and that information on pair-wise degrees of equivalence published in KC reports be limited to the equations needed to calculate them, with the addition of any information on correlations that may be necessary to estimate them more accurately. The CCM stresses the importance of continuing to report the values and the graphs representing the degrees of equivalence relative to the key comparison reference value.

The Draft B report of CIPM / RMO key comparisons can be used to support Calibration and Measurement Capabilities (CMCs, see document [CIPM-MRA-G-13](#)). At this stage, the measurement values are not considered confidential and may be used for presentations and publications. However, the key comparison reference value and the degrees of equivalence shall be considered confidential until they are approved by the Consultative Committee and published in the KCDB.

The results of comparisons should also be used to control the impact of KCs and SCs on the CMCs of the participating institutes, as published in the KCDB (see Appendix 2 for more details).

Appendix 1. Pilot Studies within the CCM

Pilot studies are a third category of comparison normally undertaken to establish measurement parameters for a “new” field or instrument, or as a training exercise. The results of pilot studies alone are not normally considered sufficient support for CMCs and the studies are not registered nor published in the KCDB.

The naming of a Pilot Study follows the same conventions used for Key and Supplementary Comparisons. For example, the first Pilot Study carried out within WG D-kg would be designated as CCM.D-kg-P1, but this would not appear on the KCDB.

Because the KCDB is not involved in the registration or publication of Pilot Studies, the CCM has adopted the following procedures.

CCM rules and procedures

1. **Registration.** A Pilot Study should be registered and progress updated using [form](#), sent to the CCM Executive Secretary for the information/approval of the CCM President. Participants in the Pilot Study can be any NMI or DI that would normally qualify for participation in a similar Key Comparison within the CCM. The CCM President will decide whether other potential participants meet the criteria quoted above from Section 6 of [CIPM-MRA-G-11](#). As with Key Comparisons, Pilot Studies should be registered at the earliest opportunity.

2. **Approval for Publication.** Pilot Studies need not follow the strict procedures of Key Comparisons in order to proceed to publication. The CCM WGS, which is chaired by the CCM President, decides whether the work may be published with the designation of a CCM Pilot Study on the CCM website. It is possible to publish a Pilot Study in the Technical Supplement of *Metrologia* as long as there is a link to the final report on the CCM website.

Appendix 2. Impact on CMC claims

The participating laboratories should send a declaration to the pilot laboratory that they checked their results against their CMC claims. This declaration includes a statement of whether or not these claims are supported by their results. If not, they describe the measures to be taken to remove this inconsistency. The declaration is to be included in a separate executive report, and is not part of the comparison report. The pilot laboratory is responsible for the collection of the information and for including a note with the Draft B report saying if there is any impact on the CMCs of any of the participants. In case of inconsistencies, the CCM Executive Secretary sends the information to the relevant RMO TC-M chairs. The rules are given in [CIPM-MRA-G-11](#) in case there is an impact on the participants’ CMCs.

Declaration of the impact of a CCM or RMO comparison on the CMC claims

1. Subfield:	RMO internal identifier		
2. KCDB identifier:			
3. Pilot/Coordinating laboratory(ies) (<i>acronyms and countries</i>):			
4. Participating institute (<i>acronym and country</i>):			
<p>Person who declares on behalf of the participating laboratory</p> <p>Name:</p> <p>Tel:</p> <p>e-mail:</p> <p>The declarer affirms that the comparison results of his/her NMI have been checked against their CMC claims and states (please add rows as needed in the following table):</p>			
measurand	our CMC claims	our comparison results	Yes or No, our claims are supported by our comparison results
<p>If case of inconsistencies, please describe the steps that will be taken so that the CMC and comparison results will be consistent (some examples: modify CMC*, withdraw CMC, carry out a follow-up comparison in hopes of maintaining present CMC).</p> <p>*CMCs should not be modified merely to accommodate the erroneous results of a KC. Any changes should be supported by a sound rationale based on a modification to the existing uncertainty budget.</p>			

Document History

Version	Date	Approval	Remarks
2.12	29.08.2013	CCM-WGS	First approved document
3.0	10.12.2013	WGS Chair	Appendix on Pilot Studies added
3.1	16.12.2014	WGS Chair	Document History added. Compatibility with revised BIPM website. New hyperlinks to current documents. New BIPM logo used.
4.1	30.06.2016	CCM-WGS	Appendix on CMC claims added Clarification of the policy on reporting comparison results into the KCDB added
4.2	23.05.2017	CCM-WGS	Further action added in the Appendix on CMC claims: information to relevant RMO TC-M chairs in case of inconsistencies
5.2	24.02.2022	CCM-WGS	Update following KCDB 2.0, updated CIPM MRA Guidance documents and new BIPM website