



SIM REFERENCE DOCUMENT Nº 07
Procedure for Registration and Disposition of SIM Comparisons

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OBJECTIVE AND SCOPE

Objective

In the context of the CIPM MRA, the set of results obtained through key and supplementary comparisons carried out (and published, if duly registered, in the Key Comparison Database, <https://www.bipm.org/kcdb/>) by the regional metrology organizations (RMOs) are crucial in forming the technical basis of the arrangement.¹ The objective of this reference document is to describe the steps required to register and follow the progress of comparisons carried out by members of the Interamerican Metrology System (SIM) and, as applicable, documented in the corresponding BIPM database, KCDB 2.0.

Scope

This procedure applies to current and planned multilateral or bilateral, key or supplementary comparisons or pilot studies that have been initiated, organized and reviewed by a SIM Metrology Working Group (MWG). Although previously registering comparisons that provided metrologically relevant information used the same procedure (but only with agreement of the corresponding CC) for results *already* available, this post-comparison registration is to be avoided in SIM.

DEFINITIONS AND ACRONYMS

Definitions¹⁻⁴

BIPM Key comparison database (KCDB): The database maintained by the BIPM that contains the information on the internationally recognized Calibration and Measurement Capabilities for services available from the participating institutes, and the key and supplementary comparisons supporting those CMCs. It is also the platform to register and follow the status of these comparisons.

CMC: Calibration and Measurement Capability(ies). As defined in the CIPM MRA⁵, a CMC is “calibration and measurement capability available to customers under normal conditions either (a) as published in the BIPM key comparison database (KCDB) of the CIPM MRA or (b) as described in the laboratory’s scope of accreditation granted by a signatory to the ILAC Arrangement.” The SIM procedure for review of CMCs (submitted at <https://www.bipm.org/kcdb/> under the “CMCS” tab) is found in SIM Reference Document 05 (SIM-D-05 current version).

Comparison: Measurement, by two or more National Measurement Institutes (NMIs) or their Designated Institutes (DIs), of an artifact, reference material or quantity generated according to a previously established and agreed upon protocol, to assess the comparability or proficiency of the participants, or some other purpose. In this document, a “comparison” may refer to a key or supplementary comparison, or a pilot study (although pilot studies are not registered on the KCDB platform). After a key or supplementary comparison (but not a pilot study) is initiated, a participant may change or withdraw their data only on the basis of a clear

failure of the artifact or some other phenomenon that renders the comparison or part of it invalid, and with the agreement of all participants.

Consultative Committees (CC): Technical groups, consisting of world experts from among the institutions who are party to the Metre Convention, which support the International Committee for Weights and Measures (CIPM) as advisers on scientific and technical matters.

Draft A: First draft of the comparison report, prepared as soon as all results have been received from the participants. Draft A includes the results transmitted by the participants, identified by name, and a first calculation of the comparison reference value. Results are not communicated if there are any outliers until those participants have been contacted to verify that there have been no arithmetic, typographical or transcription errors. There may be several versions of Draft A (Draft A1, A2, etc.) until all participants agree with the report. Draft A and all its versions are considered confidential and may be distributed only among the participants.

Draft B: Final revision of Draft A, including the proposed comparison reference value and degrees of equivalence if relevant, as approved by the participants. While the reference value and degrees of equivalence are still considered confidential, the individual participant's specific results are no longer confidential and may be used in publication and to support CMCs.

Final report: The version of the Draft B report approved by the relevant MWG (or CC, as appropriate) and to be published on the KCDB platform.

Key comparison: One of a set of comparisons selected by a consultative or technical committee (such as the MWGs) to test the principal techniques and methods in the field (note that "key" comparisons may include comparisons of representations of multiples and sub-multiples of SI base and derived units and comparisons of artifacts). Key comparisons may be organized by the Consultative Committees (CIPM KC) or by the Regional Metrology Organizations (RMO KC), and their associated key comparison reference values (KCRVs) may be linked.

Member: The institution or organization of each SIM member country responsible for the custody and maintenance of its National Measurement Standards or, in its absence, the organization responsible for the National Weights and Measure System.

Pilot Laboratory: An NMI or DI that organizes and controls the logistics of a comparison.

Pilot study: Measurement, by two or more NMIs or DIs, of an artifact, common sample or quantity generated according to a previously established and agreed upon protocol, whose main purpose is to provide information to help the participants improve their proficiency and plan future comparisons. The actual names of the participants may, or may not, appear in the final report. It should be noted that any participant may withdraw its data from the report (i.e., Draft A) before the final report (Draft B) for publication in a technical journal or other venue (but not on the KCDB platform).

Supplementary Comparison: Comparison carried out by the CCs, the RMOs or the BIPM to meet specific needs not covered by key comparisons, including comparisons to support confidence in calibration and measurement certificates

SIM Technical Committee: The collection of MWG chairs, representing the gamut of technical areas in SIM as well as support (e.g., uncertainties, quality) activities in addition to the sub regional representatives.

Acronyms

BIPM	International Bureau of Weights and Measures
CC	Consultative Committee of the CIPM
CIPM	International Committee of Weights and Measures
CIPM MRA	Mutual Recognition Arrangement promoted by the CIPM
DI	Designated Institute
KC	Key Comparison
KCDB	BIPM Key Comparison Data Base
JCRB	Joint Committee of the Regional Metrology Organizations and the BIPM
NMI	National Metrology Institute
MWG	SIM Metrology Working Group
SIM	Interamerican Metrology System
TC	SIM Technical Committee

PROCEDURE

The Help pages for the KCDB (<https://www.bipm.org/en/cipm-mra/kcdb.html#help>, a button is found at the bottom of the KCDB home page) has a variety of presentations and videos as resources for anyone using the platform:



The “Getting started on the KCDB web platform” button downloads the most recent version of the “Getting started - KCDB restricted web portal” document in pdf format.⁶

Access to the KCDB web platform

Access to the site for anything other than read-only is controlled through registration. On first access to the KCDB 2.0 (<https://www.bipm.org/kcdb/>), a guest login (tcguest@bipm) and password (tcontact) are used. Once entered into the platform, each user should complete the registration process for an individualized account based on these specific roles:

Writer - author of a CMC acting on behalf of his/her institute with an account approved by the corresponding MWG Chair

CMC Reviewer - technical expert invited to review CMCs with an account approved by the local RMO TC/MWG Chair (intraRMO and JCRB reviews)

Comparison pilot – the principal contact person for a comparison.

The following accounts are created by the KCDB Office on request:

CC WG Chair - optional coordinator of the CMC JCRB (previously called the “interRMO”) review process (at the Consultative Committee level) with an account approved by the KCDB office

SIM Executive Secretary – representing SIM and has full access to the review process in ‘read only’ mode. The account is generated by the KCDB office

MWG Chair (referred to as “TC Chair” in KCDB documents) - coordinator for the technical field in SIM, acting on behalf of the SIM, with an account (assigned by the KCDB) that has special access permissions [if information on the user account is lost, the KCDB secretary (bipm.kcdb@bipm.org) should be contacted for their reinstatement]

Registration of a proposed comparison

Any NMI, DI, or group of NMIs/DIs within SIM may present a comparison or pilot study (past, current or proposed) for consideration to the appropriate MWG, whether or not it was originally organized by the MWG. This includes sub-regional comparisons or pilot studies and those with the participation of laboratories from other RMOs. Once the MWG agrees to the comparison, the MWG chair notifies the proposed Pilot. The rules for registering such *comparisons* are described below. Pilot studies are not registered on the KCDB platform (MWGs should submit the results of pilot studies to the Executive Secretary of the relevant CC for recording purposes); pilot studies can be published in the *Metrologia tech Suppl* after approval by the relevant CC reviewers.

Registration of a current or planned comparison in the BIPM KCDB

All current and planned SIM comparisons are to be registered by the person piloting (the “Pilot”) the comparison on the BIPM KCDB platform (<https://www.bipm.org/kcdb/comparison/manage>), and shall be carried out in accordance with the Technical Supplement to the CIPM MRA (“Text of the CIPM MRA”). When the comparison has been approved by the MWG (or by the relevant CC), the person in charge of reviewing the final results (the MWG Chair or the Executive Secretary for the CC) communicates the final version to the Pilot. The Pilot posts the associated documents, including a listing of the anticipated participants, on the platform for publication by the KCDB office.

KCDB
All data listed in the KCDB have been reviewed and approved within the CIPM Mutual Recognition Arrangement.

Home > Comparison

INFORMATION & CONTACT

Comparison conducted by *
- Select -

Approved by *
- Select -

Comparison Identifier
[Text area]

Comparison type *
- Select -

Metrology area *
- Select -

Comparison sub-field *
- Select -

Comparison linked to
- Select -

Summary Description *
[Text area]

Measurand *
[Text area]

Measurand Values
[Text area]

Parameters
[Text area]

Transfer device or sample
[Text area]

Progress Status
Planned

Additional contact person(s)
→ Add additional contact person

Measurement start year
Enter start year yyyy

Measurement end year
Enter end year yyyy

Supporting document(s) (All documents uploaded here will automatically be published online)
→ Add supporting document(s)

Supporting link(s)
→ Add supporting link(s)

Comments
[Text area]

Optional message to the KCDB Office
[Text area]

SAVE **SUBMIT TO KCDB OFFICE** **QUIT**

Figure 2 Comparison registration

Comparison conducted by Organization piloting the comparison.

Approved by Indicate under which organization the comparison is to be run.

Comparison identifier This is given by the KCDB office after submitting the form. If the Pilot has a suggestion, this can be indicated in the bottom of the form under "Optional message to the KCDB Office."

Comparison type "Key" or "Supplementary" Comparison

Metrology area Indicate the metrology area concerned.

Comparison sub-field Indicate the sub-field concerned.

Comparison linked to If the comparison should be linked to a key comparison that is carried out by the Consultative Committee, the comparison code should be indicated here.

Summary description Short description of the comparison.

Measurand Indicate the measurand.

Measurand values Indicate the nominal measurand value(s) or range and unit.

Parameters Any applied for the measurements (*optional*).

Transfer device or sample Indicate the transfer device or the type of sample that is circulated or distributed to comparison participants.

Progress status Indicate the present status of the comparison.

Additional contact person Only one person can be identified as the Pilot. If there are co-pilots, these persons should be listed as "Additional contact person."

Measurement start year Indicates the year when measurements started (or are planned to start).

Measurement end year Indicates the year when measurements ended (or are planned to end).

Supporting document(s) Documents linked to the comparison, such as the Technical Protocol. When uploaded, these documents will appear automatically on the KCDB web.

Supporting link(s) Indicates a URL associated with a title if relevant.

Comments to be published on the KCDB web.

Optional message to the KCDB Office Messages for the KCDB Office. This message will not be published on the KCDB web.

Comparisons organized at a sub-regional level, without the participation of the MWG, may be included in the BIPM KCDB if the participants wish to do so only if they meet the requirements of this, and related CC, procedures, and registration occurs before the comparison is completed. For this purpose, the organizing (pilot) NMI should present the protocol for consideration to the corresponding MWG. The chair will then follow the normal procedure as described above.

Acceptance of a SIM comparison as a comparison of the CC

Designation of a comparison as a CC key (or supplementary) comparison is approved by the corresponding CC. If asked by the comparison Pilot laboratory, the chair of the MWG will forward requests for registration of comparisons to the relevant CC, but it remains the responsibility of the CC to deem acceptance as a CC key (or supplementary) comparison.

TRACKING COMPARISONS

As a comparison is carried out, the comparison Pilot laboratory should keep the MWG chair apprised of progress and informed of any difficulties.

The Pilot will be requested to update the status of the comparison by an automatic e-mail issued at regular intervals by the KCDB platform. E-mail notifications are automatically generated and distributed to the TC Chair, relevant metrology working group Chair(s), the CC Executive Secretary, Pilot and KCDB Office when the

- Pilot registers a comparison;
- KCDB Office attributes a comparison code and make the comparison available on the KCDB website;
- Pilot updates the status;
- Pilot submits the results to the KCDB Office for publication;
- KCDB Office publishes the results on the KCDB website.

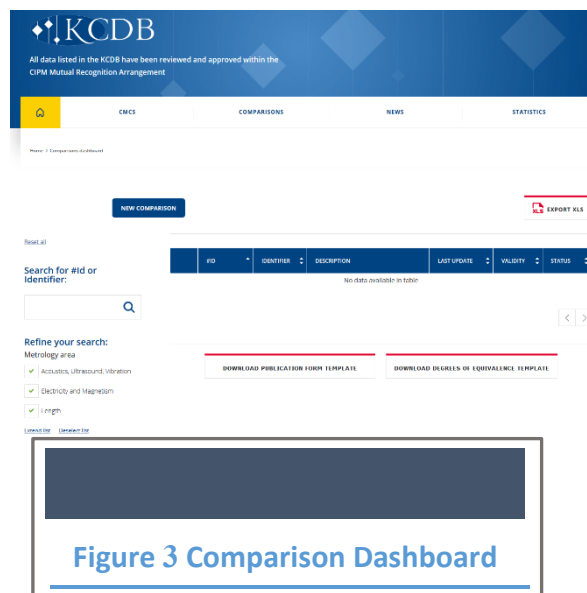
The Pilot will receive an automatic notification at regular intervals (twice each year) with the request to update the status. If the status has not changed, the Pilot is still invited to consult the comparison status and indicate “save” to confirm that the comparison is still active.

COMPLETED COMPARISONS

Two templates that are useful for the final report can be downloaded from the Comparison Dashboard

(<https://www.bipm.org/kcdb/comparison/dashboard>):

- One to be completed with the degrees of equivalence and result tables for **key comparisons** (“table-doe.xlsx”).
- One (“publication-form.docx”) to be completed if the final comparison report is to be published (strongly encouraged) in *Metrologia Technical Supplements* (<https://iopscience.iop.org/journal/0026-1394>)



Submitting the Final Report

Once the Final Report has been approved via the process as described in CIPM MRA-G-11 Section 8.2¹, the contact person for the comparison review (e.g., MWG chair or CC chair) sends it to the KCDB Office and informs the Pilot. The Pilot then posts the associated documents for publication via the tab “FINAL REPORT,” reachable by clicking the comparison listed on the Comparison Dashboard (<https://www.bipm.org/kcdb/comparison/dashboard>):

The final report should be submitted by the Pilot in a non-protected pdf format via the tab “FINAL REPORT”. In the case of key comparisons, the Pilot should also submit the determined degrees of equivalence using the template form available on the platform (only applicable when the comparison is linked to a key comparison). It is also recommended to provide the source document

(e.g., the Word document) of the report.

Figure 4 Tab for posting documents for the FINAL comparison report

RESULTS

The expected results of the application of this procedure are:

- Measurement results from comparisons or pilot studies are registered in the BIPM databases
- A list of past, current and planned comparisons in SIM are registered in the BIPM databases
- Points of contact for piloting comparisons are recorded
- Updates on the progress of on-going comparisons are available immediately

RESPONSIBILITIES

Members of the MWG:

- Participate in relevant comparisons
- Analyze the results of comparisons, approve the final reports and decide on suitability for inclusion in the BIPM KCDB
- Approve future comparisons and/or pilot studies
- Pilot relevant comparisons, including sharing the piloting responsibilities (e.g., one lab writes the protocol, another writes the report), in order to distribute effort and also to gain experience

Chairs of MWGs:

- Notify the chair of the TC the decision of the MWG to register the results of comparisons in the BIPM KCDB.
- Submit reports of pilot studies to the chair of the TC and the Executive Secretary of the relevant CC.
- Notify the chair of the TC the information for all current and planned comparisons and pilot studies on request.
- Submit (annually) a program of planned comparisons to the chair of the TC, in order to be presented to the Council, which may propose mechanisms for possible avenues of financial support (in particular, to acquire artifacts to be used in the comparison).
- Request acceptance of current and planned comparisons in the BIPM KCDB from the respective CC, copying the chair of the TC and members of the relevant MWG on all pertinent communications.
- Notify corresponding technical working group chairs in other RMOs of planned comparisons that can accept additional participants, as needed.

Chair of the TC:

- Supervise the MWG processes to verify, as needed, that they follow the described procedures.

Technical Committee:

- Consider the acceptance or rejection of a SIM comparison or pilot study, if requested to do so by the chair of an MWG.
- Develop and approve procedures for SIM activities related to comparisons as needed and to be presented to the SIM Council.

REFERENCES

1. CIPM MRA-G-11 (“Measurement comparisons in the CIPM MRA: Guidelines for organizing, participating and reporting”) Version 1.0 January 2021 (pdf downloaded from <https://www.bipm.org/en/cipm-mra/cipm-mra-documents/>)
2. “International vocabulary of metrology – Basic and general concepts and associated terms (VIM),” 3rd edition 2008 version with minor corrections (http://www.bipm.org/utis/common/documents/jcgm/JCGM_200_2012.pdf)
3. SIM Statute V2, approved in Miami, USA, December 2001.
4. Text of the CIPM MRA [“Comité international des poids et mesures: Mutual recognition of national measurement standards and of calibration and measurement certificates issued by national metrology institutes, Paris, 14 October 1999, Technical Supplement revised in October 2003 (pages 38-41)”] (pdf downloaded from <https://www.bipm.org/en/cipm-mra/cipm-mra-text/>).
5. CIPM MRA-G-13 (“CMCs in the context of the CIPM MRA: Guidelines for their review, acceptance and maintenance”) Version 1.0 January 2021 (pdf downloaded from <https://www.bipm.org/en/cipm-mra/cipm-mra-documents/>)

6. “Getting started – KCDB restricted web portal v2.0 - KCDB 2.0, v. 2020-08-17” (pdf downloaded from <https://www.bipm.org/en/cipm-mra/kcdb.html#help> under “Documents on the KCDB”).

SIM-D-07

Procedure for Registration and Disposition of SIM Comparisons

Version	Date	Modification (editorial/substantive)
1.0	September 2016	Original document
2.0	April 2019	First full revision submitted to SIM Council for acceptance
3.0 DRAFT	September/November 2020	Revision to align with KCDB 2.0, for approval by TC
3.0	November 2020	Second full revision submitted to SIM Council for acceptance