



**SIM REFERENCE DOCUMENT Nº 05**  
**SIM Procedure for Review of Calibration and Measurement Capabilities**  
**Submitted for Appendix C of the CIPM MRA**

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SIM review process consists of two parts: a technical review and a quality system review. This document covers only the technical review process for Calibration and Measurement Capabilities (CMCs).

**List of Acronyms**

BIPM	Bureau International des Poids et Mesures
CIPM	Comité International des Poids et Mesures
CMC	Calibration and Measurement Capability
DI	Designated Institute
intraRMO	Within the RMO (e.g., within SIM)
interRMO	Among the RMOs
JCRB	Joint Committee of RMOs and the BIPM
KCDB	Key Comparison Database

MRA	Mutual Recognition Arrangement
MWG	Metrology Working Group
NMI	National Metrology Institute
RMO	Regional Metrology Organization
SIM	Sistema Interamericano de Metrología
TC	Technical Committee

### Calibration and Measurement Capability (CMC)

For the purpose of this reference document, the definition of a CMC and associated notes are as provided in Section 1 of the CIPM MRA-D-04 ([http://www.bipm.org/utils/common/CIPM\\_MRA/CIPM\\_MRA-D-04.pdf](http://www.bipm.org/utils/common/CIPM_MRA/CIPM_MRA-D-04.pdf)):

***“A CMC is a calibration and measurement capability available to customers under normal conditions:  
(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.*”**

***Where the term NMI is used it is intended to include Designated Institutes (DIs) within the framework of the CIPM MRA.”***

As the CMC definition includes DIs in the term, “NMI,” this is maintained throughout this document itself (i.e., “NMI” is taken to mean either/both NMI and DI).

NMIs disseminate their CMCs to customers through calibrations/measurements and through the provision of certified reference materials (CRMs). To be published as a CMC, the measurement or calibration should be:

- performed according to a documented procedure and have an established uncertainty budget under the quality management system of the NMI;
- performed on a regular basis (including on demand or scheduled for convenience at specific times in the year); and
- available to all clients.

The availability of “special” calibrations or CRMs with exceptionally low uncertainties and not considered performed “under normal conditions” (usually offered only to a small sub-set of clients for research or for reasons of national policy) is acknowledged but are not considered within the scope of the CIPM MRA and bear neither the equivalence statement drawn up by the JCRB nor the logo of the CIPM MRA.

In the KCDB, a CMC is described by the measured quantity and its range; it is characterized by an uncertainty, generally given at a 95 % level of confidence, together with the method or instrument used, the values of any influence parameters, and any other relevant information. A complete statement of uncertainty may be expressed in a variety of ways but should always comply with the Guide to the Expression of Uncertainty in Measurement (GUM) and should include the components listed in relevant comparison protocols of the CIPM Consultative Committees and other documents. However, contributions to the uncertainty caused by the client’s device before or after its calibration or measurement at the NMI (including transport uncertainties) are normally excluded from the uncertainty statement. Reviewers of CMCs are encouraged to consult the

KCDB (<http://kcdb.bipm.org>) when reviewing the uncertainty statement and budget of a laboratory to ensure that the claimed uncertainties are consistent with those of the NMI through which the laboratory claims traceability and with the validation used to support the CMC claim.

## Scope

This SIM Reference Document no. 05, henceforth denoted SIM 05 document, specifies requirements and the procedures for reviewing CMCs declared by NMIs being Member or Associate of SIM under CIPM's *Mutual Recognition Arrangement* (CIPM MRA) of national measurement standards and of calibration and measurement certificates issued by national metrology institutes (NMIs) or their designated institutes (DIs) (<http://www.bipm.org/en/cipm-mra>).

The CMCs of each NMI are published after final approval in Appendix C of the BIPM key comparison database (KCDB), maintained by the BIPM and publicly available on <http://kcdb.bipm.org>. In order for CMCs to be approved for publication in Appendix C, they must first be reviewed and approved by the relevant SIM MWG (intraRMO review). Once this approval is obtained, CMCs undergo an interregional review (interRMO review) in which TC/WGs from other RMOs verify that the *Criteria for acceptance of data for Appendix C* ([http://www.bipm.org/utis/common/CIPM\\_MRA/CIPM\\_MRA-D-04.pdf](http://www.bipm.org/utis/common/CIPM_MRA/CIPM_MRA-D-04.pdf)) of the Joint Committee of Regional Metrology Organizations and the BIPM (JCRB) have been followed, thus providing the technical confidence required for publication.

## Drawing Up and Revising Existing CMC files

The following rules should be followed to ensure the reliability of the information included in Appendix C of the KCDB (<http://kcdb.bipm.org>). It is essential that the submissions be performed by following the prescribed formats to allow an interregional review and upload in Appendix C of the data reviewed and approved.

Appendix C of the KCDB provides information contained in the "white part" of the CMC Excel files, namely "Calibration and measurement service" (Columns A-C), "Measurand level or range" (Columns D-F), "Measurement conditions/independent variable" (Columns G-H), "Expanded uncertainty" (Columns I-M), and comments to be published with the CMC (Column Q) on the CMC entries. Three additional columns are also needed: yellow columns for the NMI service identifier (i.e., the number of the CMC; Column R), the service category (Column S) specific for each measurement field, and the acronym of the NMI (Column T). The remaining columns, especially the "blue part" (for the reference standards used and for validation of the CMC claim) and any additional columns of information useful for the regional and interregional review, are for review purposes only and are not part of the publicly-available Appendix C of the KCDB.

General instructions for drawing up CMCs are presented in *Calibration and Measurement Capabilities in the context of the CIPM MRA – Document CIPM MRA-D-04* which can be downloaded from [http://www.bipm.org/utis/common/CIPM\\_MRA/CIPM\\_MRA-D-04.pdf](http://www.bipm.org/utis/common/CIPM_MRA/CIPM_MRA-D-04.pdf). The template for a new CMC Excel file may be downloaded from: <https://www.bipm.org/en/cipm-mra/cipm-mra->

[documents/cmc\\_excel\\_files.html](#). Particular instructions for drawing up CMCs can be found on the JCRB CMC website (<https://www.bipm.org/en/committees/jc/jcrb/>).

There are two different cases to be taken into consideration:

- CMC files from an NMI not previously submitted (New CMCs);
- CMC files that are a modification or expansion of CMCs already published.

The documents cited above provide guidelines for both new CMCs and modification or expansion of CMCs already published.

Modifications of a published CMC usually arise for reasons falling into one of three categories:

- a) material or editorial errors and improvements to the explanatory text;
- b) increase of the uncertainty or reduction in scope;
- c) change of the method of measurement, reduction of the uncertainty, or increase in scope.

A CMC may also be withdrawn from publication with no need for further interRMO or intraRMO review. For modifications due to categories a) or b), the intra- and interRMO reviews are unnecessary. The NMI will send its proposal for change to the SIM WG Chair, who will contact the coordinator of the BIPM database. If an NMI decides to withdraw a CMC from the BIPM database, the same procedure will be applied. Modifications under category c) should follow the full procedure of intra- and interRMO review presented here as if they were new CMCs.

The process for modification or expansion of CMCs already published begins with the NMI requesting the relevant SIM WG chair to download the Excel file of the already-published CMCs from Appendix C of the KCDB from the “Get Published CMCs” link of the restricted-access CMC website of the JCRB (<http://www.bipm.org/en/committees/jc/jcrb/>). It is important to modify or expand the CMCs from that file so as to avoid future communication and version control problems.

The Excel hide/unhide function should be used to hide those CMC entries that are not changing, so that only those that are being changed (and those to be deleted) will be visible to the reviewers. In this way, only those entries that require the attention of the reviewers will be shown, while all the entries can be made visible when there is a need to show the complete set of CMCs.

### **IntraRMO Review of CMCs**

The way in which the SIM CMC intraRMO review is carried out is the responsibility of the SIM MWG. However, each SIM MWG should establish its own mechanisms to ensure that the review follows the rules of the JCRB. This section covers the process for the review from the moment the SIM CMCs are submitted to the SIM MWG.

- Section 1 presents the timelines for the intraRMO review.
- Section 2 describes the criteria for acceptance of CMCs by the relevant SIM MWG or from other RMOs
- Section 3 covers the SIM submission for review of CMCs by other RMOs for publication in Appendix C of the KCDB.
- Section 4 discusses the SIM review of CMCs from other RMOs.
- Section 5 presents the timelines for the interRMO review.

Direct participation in the CIPM MRA is limited to signatories of the CIPM MRA: NMIs of member States of the Meter Convention and their DIs, those who have agreed to participate in the CIPM MRA through an RMO as the NMI of an Associate State of the CGPM, or those which are signatory international organizations. NMIs submitting CMCs might have a designated person to act as coordinator for that NMI. Each NMI should submit its CMCs proposed for Appendix C of the KCDB directly to the SIM WG chair. Submission of CMCs for SIM review starts when the SIM MWG chair acknowledges the receipt of the CMCs.

Though all members of the SIM MWG are encouraged to participate in the review process, the technical basis of the CMC submissions from each NMI are usually reviewed mainly by a group of experts assigned by the SIM MWG. Participation in the technical review is not restricted to those NMIs listed in Appendix A of the KCDB (<http://kcdb.bipm.org>), even though only those have the right to vote.

One practice can be to name a reviewer and a deputy reviewer for each service category (this is so that CMC reviewers and their deputies can work closely together, especially when the reviewer may not be available, in order to ensure CMCs are reviewed within the committed time period). In this case, the CMC submissions from each NMI are grouped into service categories and distributed by the chair of the MWG to the corresponding reviewers.

A useful practice can be to add three columns to the excel CMC file to be labelled “Review Status,” “Reviewers’ Comments” and “NMI Response”, all of them headed by an umbrella column named “SIM Review”.

- The intra-regional review must cover all submitted CMCs.
- For inter-regional review, review of select CMCs can be acceptable.

Reviewers, either directly or through the SIM MWG Chair, should contact the NMI for any interpretation doubts, inconsistencies with the CIPM MRA requirements that are identified, reports of comparisons or other publications that support the CMCs presented (if they are not available in Appendix B of the KCDB <http://kcdb.bipm.org>) and other missing information, or any additional actions that should be taken.

Reviewer’s questions or interpretation doubts and corresponding answers from the submitting NMI can be exchanged by email. Once a basic understanding of the CMC has been reached by the reviewers, all the subsequent comments to a given CMC entry should preferably be summarized by filling in the corresponding cell of the “Reviewer’s Comments” column on the Excel spreadsheet, or by a report sent by email to the NMI. The NMI will then respond to the reviewer’s comments. Finally, the reviewer will decide on the approval or not of the given CMC entry:

- a) Accepted (or partially accepted): The claimed CMC entry is judged to be consistent (or partially so) and contains the relevant information such as validation support, uncertainties and traceability.
- b) UNDER REVIEW: This code refers to all the remaining cases. These include CMC entries that have not yet been examined by the reviewers, those for which more evidence is needed, and those for which the reviewers have raised an objection, but the issue has not yet been solved. Once the review is completed, the CMCs coded UNDER REVIEW are expected to be coded as acceptable or “OK.” An alternative approach that has also been accepted is to leave blank the “Review Status” column cell for a given CMC entry when it is under review.

The reviewers will send the CMC file to the SIM WG chair who will immediately forward it to the NMI.

Based on discussions with the reviewers, the NMI may modify its CMCs submitted, or withdraw its submission. If the NMI decides to submit its CMCs without resolving the inconsistencies or completing the actions recommended, this will be noted, and the CMCs will continue to be classified as “under review.” In this case, the SIM WG chair will contact the interested parties and try to resolve the situation, since only those entries for which an agreement has been reached are to be submitted to interRMO review for approval. If, even after discussions, the remaining issues are not successfully resolved, another group of experts, specifically appointed by the SIM MWG chair to finally decide if the CMCs are to be approved or withdrawn, may discuss the issue.

The review process is expected to be finished within 50 calendar days (except for those cases in which an extension of the deadline is agreed among the SIM WG chair, the NMI CMC submitter, and the reviewer). The MWG chair will follow up, keep a record of the CMCs sent to him/her, and collaborate by conducting discussions among the interested parties when applicable.

Once the discussions and any modifications have been completed and the CMCs reviewed for each service category, the NMI will forward the final version of the CMCs to the SIM WG chair, taking into account all comments from the reviewers.

Only those CMCs that are supported by a fully-implemented quality system, reviewed and approved by SIM, may be submitted for interRMO review. All SIM submissions for publication in Appendix C of the KCDB must be accompanied by a declaration from the SIM Quality System Task Force (SIM QSTF) chair attesting that this requirement has been met; this is usually achieved through the issuance of a certificate from the SIM QSTF.

## 1. Timelines for IntraRMO Review

The flowchart in Appendix 1 describes the step-by-step process.

- i. Receipt of CMC tables from SIM NMIs – The SIM MWG chair sends the notice of a new CMC review and the file set of new or modified CMC tables to the NMI and to the SIM assigned reviewers. This includes a date when the SIM review needs to be completed, generally within 50 days from the date the CMCs are distributed to the reviewers.

ii. Reviewers respond to the SIM MWG chair either agreeing to review the CMCs or declining to review some services or all. This shall occur within 10 working days.

iii. The MWG chair assigns additional reviewers if necessary.

iv. Reviewers study the CMC changes (color-coded) and determine those which are acceptable, and which are in question (requiring an exchange of information with the submitting NMI). They may make direct contact with the submitting NMI by e-mail copied to the SIM MWG chair or communicate through the MWG chair. This first contact message should describe the CMCs in question and the issues concerning them. This message should be sent within 20 days of receipt of the CMC tables.

v. The CMC reviewers should request a response from the NMI within 10 days and should review the response as soon as possible after it is received. If the issues are not yet resolved, they should reply immediately to the submitting NMI. If possible, all technical issues should be resolved within 35 calendar days after the receipt of the CMC tables. If any issues are not resolved by this time, the reviewers should notify the SIM MWG chair and the submitting NMI. The SIM WG chair should explain to everyone that if the issues cannot be resolved within 10 additional days, the CMC(s) in question would not be approved.

vi. By 45 days after receipt of the CMCs, all reviewers should either approve or not approve all the submitted CMCs that they have agreed to review and send their reviewed CMC files to the submitting NMII. The NMI should then send the reviewed (and perhaps revised) CMC files to the SIM MWG chair.

vii. These sets of files shall be sent to the SIM MWG chair by day 50. The MWG chair might be receiving similar, reviewed CMC files from other NMIs. The MWG Chair should create a compiled or individual SIM report with summary CMC proposals and associated documents for all submitting NMIs, and upload this and any other NMI QS documents needed along with the reviewed CMC tables to the JCRB CMC website, which will eventually reach all the RMO TC/WG chairs involved in the interRMO review by day 60.

## 2. The Process of Reviewing CMCs for Acceptability

The reviewers will check the CMC file of the submitting NMI for consistency with the following:

- a) General instructions for drawing up CMCs, found in Section 2 of CIPM-MRA-D-04 ([http://www.bipm.org/utis/common/CIPM\\_MRA/CIPM\\_MRA-D-04.pdf](http://www.bipm.org/utis/common/CIPM_MRA/CIPM_MRA-D-04.pdf));
- b) Additional instructions for drawing up CMCs, including uncertainty matrices ([https://www.bipm.org/en/cipm-mra/cipm-mra-documents/cmc\\_excel\\_files.html](https://www.bipm.org/en/cipm-mra/cipm-mra-documents/cmc_excel_files.html));
- c) CMCs already published by the NMI in Appendix C of the KCDB (<http://kcdb.bipm.org>), when available.

The reviewers will then check the range and uncertainty of the submitted CMCs for consistency with information from some or all of the following sources as described in Section 3 of CIPM MRA-D-04:

- a) key and supplementary comparisons listed in Appendix B of the KCDB (see <http://kcdb.bipm.org>);
- b) other multilateral or bilateral comparisons;
- c) knowledge of technical activities of the NMI, including publications or personal knowledge obtained by visits or other means;

- d) on-site peer-assessment reports;
- e) discussion between the reviewers and responsible scientists within the NMI;
- f) performance of equipment currently used;

While the results of key and supplementary comparisons are the ideal supporting evidence, all other sources listed above may be considered to underpin CMCs not directly related to available comparison results and those for which comparison results are not yet available.

The NMIs that issue the CMCs are primarily responsible for providing the SIM MWG with the information that they believe is necessary to support their claims. This information shall be provided at the earliest stage of the review process to avoid delays in the analysis.

Though recognizing that the implications of comparison results on published CMCs is the responsibility of the participating NMIs, the reviewer should check the CMCs of the submitting NMI for agreement between the results of the comparisons and the entries for similar levels claimed by the submitting NMI. The comparison results consist of the difference from the comparison reference value (CRV) at each level and its associated expanded uncertainty at a coverage factor  $k = 2$ . The reviewer will compare these benchmark *differences* and *uncertainties* to the CMC entries for the same level and measurement technique. Presumably, a CMC uncertainty should be approximately as large as its uncertainty in the comparison if the method used by the NMI is substantially the same and if the comparison achieved its goal of benchmarking the participant's capabilities.

NMIs that do not hold primary standards or primary measurement capabilities are required to have traceability to the SI (or, if not feasible, to another internationally agreed reference) of their national standards or measurement capabilities established through the BIPM or through adequate calibration services of another NMI or other designated institute published in Appendix C of the KCDB (<http://kcdb.bipm.org>). A CMC entry shall not have its *traceability* based on equipment calibrated by an accredited commercial laboratory, unless the latter is a designated institute listed in Appendix A of the KCDB (<http://kcdb.bipm.org>) and has relevant CMCs published in Appendix C of the KCDB. However, calibration certificates from such laboratories may be allowed for auxiliary equipment whose contribution exerts a negligible influence on the total expanded uncertainty for the CMC entry as well as part of the validation of the CMC claim.

It is strongly recommended that the reviewer (or the NMI CMC submitter) avoid making reference to a given CMC entry by writing its Excel file row number in the "Reviewer's Comments" column (or the "NMI Response" column). The precise row number on a CMC file may change significantly during the review process. Some reviewers may, for instance, request the suppression of several Excel file rows and their replacement by matrices, which will render obsolete many of those Excel file row numbers referenced previously. CMCs should be referenced by their Internal NMI service identifier number (e.g., SIM-RAD-CNEA-2109). Once the CMCs have been approved at the intraRMO level, a similar process is followed for the interRMO review, including discussions by email between the submitting NMI and reviewers (as described in Section 5 of CIPM-MRA-D-04 ([http://www.bipm.org/utis/common/CIPM\\_MRA/CIPM\\_MRA-D-04.pdf](http://www.bipm.org/utis/common/CIPM_MRA/CIPM_MRA-D-04.pdf))).



### 3. Submission for interRMO Review and Publication in Appendix C of the CIPM MRA's Key Comparison Database (KCDB)

Once the CMCs have been approved at the intraRMO level, a similar process is followed for the interRMO review, including discussions by email between the submitting NMI and reviewers (as described in Section 5 of CIPM-MRA-D-04 ([http://www.bipm.org/utis/common/CIPM\\_MRA/CIPM\\_MRA-D-04.pdf](http://www.bipm.org/utis/common/CIPM_MRA/CIPM_MRA-D-04.pdf))). The SIM MWG chair uploads the CMC file, along with its supporting documentation, to the restricted JCRB CMC review area (<https://www.bipm.org/JCRBCMCs/>) from <https://www.bipm.org/en/committees/jc/icrb/>.

Each SIM submission for interRMO review may contain CMCs from one or more NMIs belonging to the same field, although it is preferable to submit CMC files for each NMI separately to avoid impacting the approval process across organizations. If CMC files from several NMIs are submitted together in one file, and one NMI has an issue impacting the set, then that specific NMI's submission should be withdrawn. Once an NMI's CMCs have been approved in the intraRMO review and a declaration has been provided by the SIM QSTF concerning the status of the supporting quality system, the SIM MWG chair may summarize the review results in a report and then start the SIM submission for interRMO review and eventual publication in Appendix C of the KCDB (<http://kcdb.bipm.org>).

CMCs submitted for interRMO review on the JCRB CMC review area may be accompanied by documents (such as comparison reports or published papers) that support the CMC claim or a SIM MWG report (an example is available in Appendix 3) attesting that the working group has approved the range and uncertainty of the CMCs. This report may include:

- a) Months between which the SIM review of the CMCs was carried out;
- b) Number of submitting NMIs comprising the SIM submission;
- c) Number of new entries and matrices submitted;
- d) Number of modified entries and matrices submitted;
- e) Number of entries submitted with minor changes;
- f) Number of entries deleted;
- g) Number of entries that were not approved and consequently were not submitted for interregional review;
- h) A table detailing all information from the above items for each NMI (see Appendix 3);
- i) List of contact persons for each submitting NMI and, where applicable, for each service category.
- j) List of SIM reviewers for each service category.

The process leading to the publication of the SIM submission in Appendix C of the KCDB is described in Calibration and Measurement Capabilities in the context of the CIPM MRA Document CIPM MRA-D-04 ([http://www.bipm.org/utis/common/CIPM\\_MRA/CIPM\\_MRA-D-04.pdf](http://www.bipm.org/utis/common/CIPM_MRA/CIPM_MRA-D-04.pdf)). That document covers the process followed for the review from the moment that the SIM submission (comprising the NMI CMCs reviewed by SIM, the SIM QSTF declaration, and any additional documents) is uploaded in the JCRB CMC review website.

SIM CMCs submissions are named according to the following nomenclature:

**SIM.XX.N.Year**

where,

**XX** is an acronym for the measurement field,

**N** is a consecutive integer for SIM and **XX**, started with the first submission (not restarted each year).

**Year** the year when the CMCs are submitted to the JCRB

Both **N** and **Year** are automatically generated by the JCRB CMC website during the submission.

During the first stage of the interRMO review, comments or requests may arrive to the SIM MWG from other regions. Such comments must be forwarded to all the submitting NMIs to answer and, perhaps, respond by submitting an updated CMC file with modifications.

The interRMO review is a dynamic process; CMCs generally undergo changes due to comments from other RMOs during the review. Each NMI will likely be managing a number of CMC files: those reviewed and commented on by each RMO and one which will be created to incorporate all the reviewers' comments, CMC modifications and NMI responses resulting from the interRMO review. In order to make it easier for the RMO reviewers to understand what is going on, the NMI should try to answer the RMO reviewers' comments using the same CMC file that each reviewer is using. Responding to the RMO reviewers in the file that is ultimately created to incorporate *all* comments from the several RMOs and corresponding NMI responses which result from the full interRMO review should be avoided, if possible, for CMC version control, but it will sometimes be necessary.

Once the discussions and any modifications have been completed, and the SIM submission reviewed and tentatively approved by all participating RMOs, the NMI will forward the final version of their CMCs containing the entries for approval to the SIM MWG chair. The MWG chair *may* summarize the results in a report and submit the interRMO-accepted CMCs for final voting and publication in Appendix C of the KCDB. In the case of CMCs which have already been subjected to interRMO review, this submission is for final approval of the SIM CMC set by those RMOs already involved in the review. All interested parties, including the SIM TC chair, are informed about both the submission and the final publication of the CMC set in the Appendix C of the KCDB.

The report issued by the SIM MWG chair may include:

- List of NMIs included in the SIM submission;
- List of contact persons for each submitting NMI and, where applicable, for each service category;
- A summary report of the intraRMO review.
- The date when the SIM CMC set had been initially posted in the JCRB CMC website, if relevant;

#### 4. Review of CMCs from other RMOs

Submissions from other RMOs will be forwarded to the reviewers as soon as they are downloaded from the JCRB CMC website by the SIM MWG chair. A report issued by the RMO may accompany the submission, which would provide information concerning the RMO's intraRMO review and a list of contact persons for each submitting NMI from that region. The RMO report may also provide a list or table of the NMIs submitting new or revised CMC submissions for each service category. If this listing is not provided by the submitting RMO, the MWG chair will indicate to the reviewers all the NMIs involved in that submission and the service categories that each NMI has submitted for review. This information will be helpful to the reviewers.

The reviewers will examine the RMO submission according to the same CMC acceptance criteria as described in section 6. Occasionally, if the number of NMIs in the RMO submission is large, the SIM MWG chair may request additional reviewers from among the MWG.

The reviewers can add three columns, named "Review Status," "Reviewers' Comments" and "NMI Response," all of which are headed by an umbrella column named "SIM Review." They should contact the NMI contact persons listed in the RMO report for any interpretation doubts, inconsistencies with the CIPM MRA requirements that are identified, reports of comparisons or other publications that support the CMCs presented (if they are not available in Appendix B of the KCDB (<http://kcdb.bipm.org>), and other missing information, or any other additional actions that should be taken.

Reviewers' questions or interpretation doubts and corresponding answers from the submitting NMI can be exchanged by email. Once a basic understanding of the CMCs has been reached by the reviewer, all the subsequent comments on a given CMC entry should preferably be summarized by filling in the corresponding cell of the "Reviewer's Comments" column. The NMI contact person or the NMI expert responsible for that service category will then respond to the reviewer's comments in the appropriate cell of the "NMI Response" column. Finally, the reviewer will decide on the approval or not of the given CMC entry by assigning a specific code in the corresponding cell of the "Review Status" column, (the reviewer should not leave that column blank for any of the reviewed entries):

- a) Acceptable (or "ok") – Reviewer's name – Reviewer's NMI acronym: The claimed CMC entry is judged to be consistent with relevant information, as indicated above.
- b) NOT ACCEPTABLE – Reviewer's name – Reviewer's NMI acronym: This code refers to those CMC entries for which the reviewers have raised an objection, and the issue has not yet been resolved.

Based on such discussions, the NMI may modify its CMCs submitted, or withdraw its submission.

The review process should to be finished by the date that was registered in the KCDB (45 days is a reference every MWG can take as recommended). The deadline accorded will depend on the size of the RMO submission and the time of year (to account for holidays); SIM will relinquish its right to review if the self-imposed deadline is passed. The MWG chair will follow up and keep a record of all correspondences and CMCs sent to him/her.

Once the RMO submission review is completed within SIM, the reviewers will forward the final version of the CMCs reviewed containing all their comments and approvals to the SIM MWG chair who may then summarize the results in a report and upload the reviewed RMO submission in the JCRB CMC website. The process followed for the review of the RMO submission from this point on is described in detail in “Calibration and Measurement Capabilities in the context of the CIPM MRA” ([http://www.bipm.org/utils/common/CIPM\\_MRA/CIPM\\_MRA-D-04.pdf](http://www.bipm.org/utils/common/CIPM_MRA/CIPM_MRA-D-04.pdf)).

A report issued by the SIM MWG chair may include one or more of the following:

- a) Time period for the SIM review of the RMO submission;
- b) Number of submitting NMIs of the RMO submission;
- c) Number of CMC entries reviewed:
  - Number of reviewed entries that were approved as submitted;
  - Number of reviewed entries that were approved with comments;
  - Number of entries that were yet not approved;
  - Number of entries that were not reviewed;
- d) A table detailing the information about the above items for each NMI (see Appendix 4);
- e) List of SIM CMC reviewers and guest reviewers for each service category.

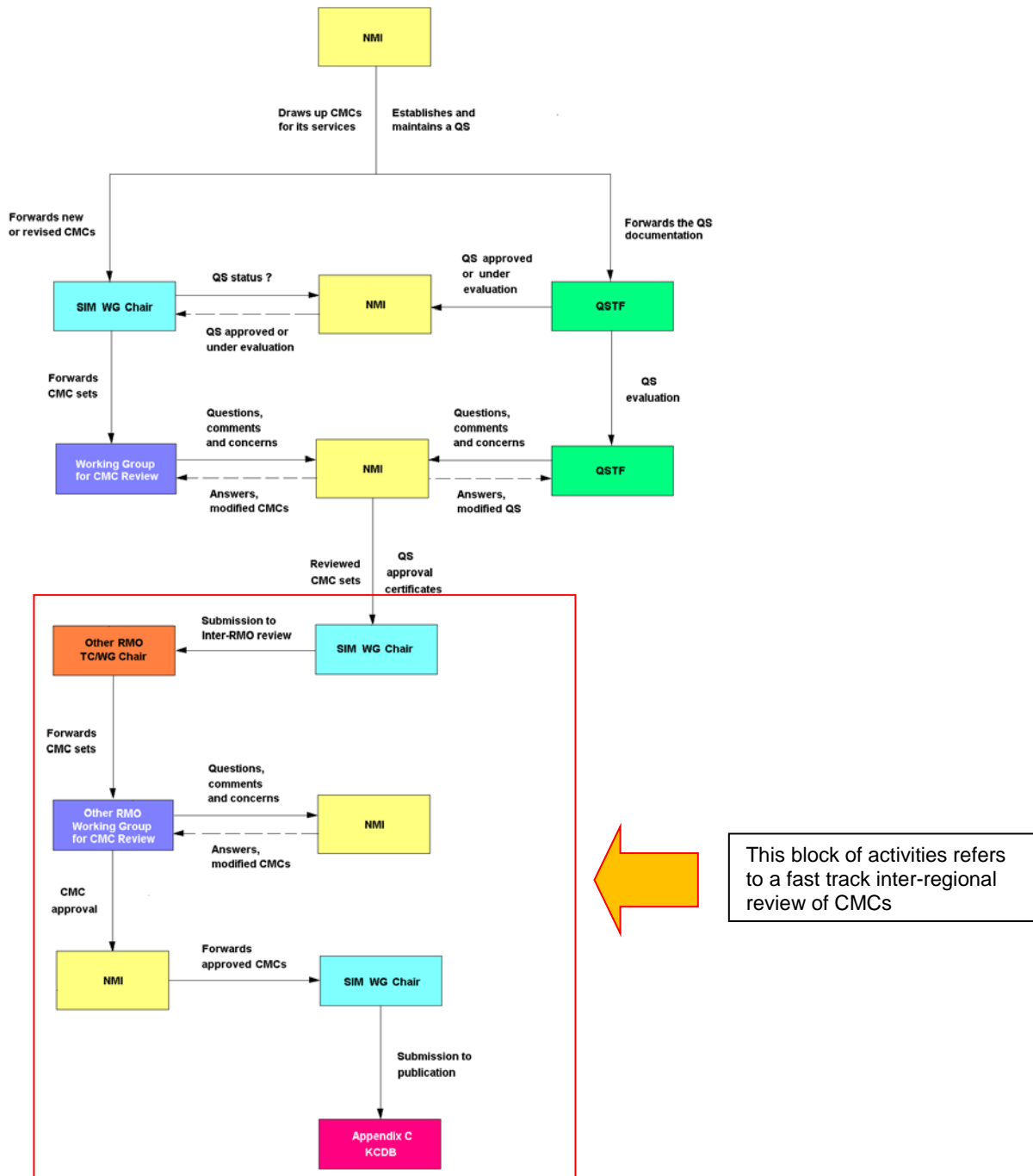
## 5. Timelines for SIM Review of CMCs from other RMOs

The flowchart in Appendix 2 should be followed.

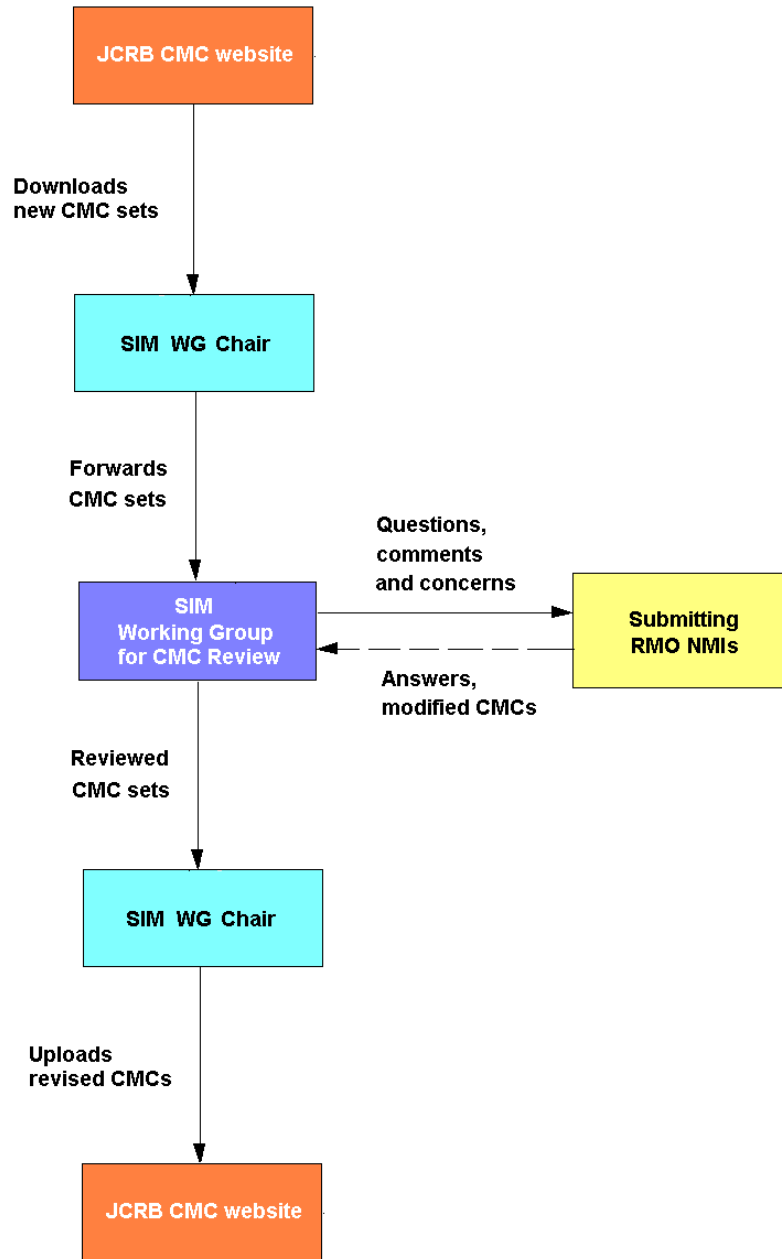
- i. Email notification and file attachment of CMC tables received from JCRB for review (alternatively, the CMC tables and associated documents may be downloaded from the JCRB CMC website).
- ii. The SIM MWG chair sends the notice of a new CMC review and the file set of CMC tables to (as appropriate) the SIM NMI CMC coordinators and to the SIM assigned reviewers, along with any summary or additional information from the originating RMO. This includes a date when the SIM review needs to be completed, generally within 45 days from the present date.
- iii. Reviewers respond to the SIM MWG chair, either agreeing to review the CMCs or declining some or all. This should occur within 5 days. MWG chair assigns new reviewers as needed, starting with the secondary reviewer if necessary.
- iv. Reviewers evaluate the CMC additions or changes (color coded) and determine which are acceptable and which are in question (requiring an exchange of information with the originating NMI). This first contact message should describe the CMCs in question and the issues concerning them. This message should be sent as soon as possible, and before half the time allotted for review has passed.
- v. The CMC reviewers should request a response within 10 days and should review the response as soon as possible after it is received. If the issues are not yet resolved, they should reply immediately to the NMI contact persons. If possible, all technical issues should be resolved within 10 calendar days before the review due date registered in the KCDB.

- vi. If any issues are not resolved by this time, the reviewers should notify the SIM MWG chair, their own NMI CMC coordinator (if relevant), and the originating NMIs' contact persons, as well as the NMI technical expert. The SIM MWG chair should contact the RMO TC chair and explain that if the issues cannot be resolved within 10 additional days the CMC(s) in question will not be approved.
- vii. Within 5 days of the review deadline, all reviewers should either approve or not approve all those CMCs that they have agreed to review and send their completed CMC files to the SIM MWG chair.
- viii. The SIM MWG chair should combine the reviews and save them, adding the SIM identifier to the end of the file name of each CMC table. The MWG chair should create a SIM RMO report with a summary of the results, and upload this and any other required documents along with the compiled CMC tables to the JCRB CMC website, which will reach the originating RMO TC/WG chair within a day or two.

Appendix 1. Review process



Appendix 2. Interregional review normal process (SIM and other regions)



**Appendix 3: Example of Format for reporting intraRMO review of CMCs**  
**Questionnaire Which May Be Used for the Review of CMCs**

<b>NMI/DI:</b>	
<b>Person responsible:</b>	
<b>Metrology area</b> <b>Branch:</b> <b>Service:</b> <b>Sub-service:</b> (Consistent with items in KCDB)	(Please specify area, branch and service to which the information reported below applies)

<b>Review Process</b>			
	<b>Yes</b>	<b>No</b>	<b>Comments</b>
<b>Participation in comparisons</b>			
<b>CC or RMO KCs?</b>			(Please name comparison identifier)
<b>Supplementary Comparisons?</b>			(Please name comparison identifier)
<b>Past comparisons?</b>			(CIPM, RMO or others, please specify)
<b>Bilateral comparisons?</b>			(Please specify)

<b>Technical activities</b>			
<b>Measurement methods</b>			(Brief description of method used)
<b>Traceability of standards</b>			(Name NMIs/DIs which provide traceability)
<b>Written measurement instructions</b>			(Written procedures available? Language?)
<b>Uncertainty budgets</b>			(Are they already available? If yes, are they calculated following the ISO Guide to the Expression of Uncertainty in Measurement?)
<b>Key publications</b>			(Please specify)



Quality management system			
<b>Status of implementation of QMS?</b>			(ISO/IEC 17025 and/or 17034 fully implemented?)
<b>Self-declared or accredited QM system?</b>			(If accredited, please name accreditation body)
<b>Which CMCs are covered by the accreditation?</b>			(Are all CMCs covered by the accreditation? If no, please specify the corresponding areas of measurement)
<b>Which CMCs are covered by self-declaration?</b>			(List here all areas of measurement which are not covered by accreditation)
<b>Engagement in TC-Quality</b>			. (Participation in meetings and other activities)
<b>QM system reviewed by TC-Quality?</b>			(Meeting when the QMS was presented, status of review)

Additional information			
<b>Participation in RMO technical activities?</b>			(Projects, meetings, etc.; please specify)
<b>Visits of technical experts?</b>			(Please specify name and date of visit)
<b>On-site visits by peers?</b>			(Please specify name and date of visit)
<b>Any other information?</b>			(i.e. publications, etc.)

**SIM-D-05**  
**SIM Procedure for Review of Calibration and Measurement Capabilities**  
**Submitted for Appendix C of the CIPM MRA**

<b>Version</b>	<b>Date</b>	<b>Modification (editorial/substantive)</b>
1.0	September 2016	Original document
2.0	April 2019	First full revision submitted to SIM Council for acceptance