Bureau International des Poids et Mesures

REPORT ON THE KCDB TO THE 45TH MEETING OF THE JCRB

v. 2022-03-01

www.bipm.org/

KCDB

Preface

The key comparison database - KCDB – is the supporting database for the implementation of the Mutual Recognition Arrangement of the International Committee for Weights and Measures (CIPM MRA) that was implemented in 1999. It contains data on Calibration and Measurement Capabilities (CMCs) and comparison results of measurements in physics, ionizing radiation, chemistry and biology. The KCDB is an evidence-based database: all data included have been reviewed by international groups of experts and approved for mutual recognition.

The KCDB website www.bipm.org/kcdb gives access to the following services with open access:

- searching on published CMCs in the KCDB
- searching on published comparison information, reports and results
- information on statistics and recent news on issues linked to CMCs and comparisons
- a set of guidance documents.

The KCDB Office is providing the KCDB report to each meeting of the Joint Committee of the Regional Metrology Institutes and the Bureau International des Poids et Mesures (JCRB). Those reports are made publicly available via the BIPM website:

https://www.bipm.org/en/cipm-mra/kcdb-reports

KCDB Report to the JCRB

September 2021 to March 2022

Executive Summary

The KCDB 2.0 is a platform providing search facilities, support to CMC reviews, a frame for comparison registration and publication, and a tool for user-generated statistics.

The number of CMCs is stable and the time for review has been decreased since the implementation of KCDB 2.0 in late 2019.

The number of comparisons obey a stable degree of increase in number, covering repeats of outdated comparisons and new supplementary comparisons within the RMOs. Digitized comparison data are successively being included.

The KCDB provides an Application Programming Interface for search on CMCs, and is presently subject as use case for the CIPM TG SI, presently examining the possible alternatives to provide a basis for interoperability.

Introduction

This report summarizes the major progress and evolution of the BIPM Key Comparison Database (KCDB) over the last six months.

The KCDB 2.0 is a platform providing search facilities, support to CMC reviews, a frame for comparison registration and publication, and a tool for user-generated statistics. It was implemented late 2019 and is used by experts of all metrology areas daily.

The status of the database concerning **Calibration and Measurement Capabilities** are given in Section 1. In Section 2, recent information concerning **Comparisons** carried out within the frame of the CIPM MRA is summarized, and Section 3 highlights the status of **Associates** of the BIPM. The **performance of KCDB 2.0** is discussed in Section 4, and a short view on its **status** is presented in Section 5. The **BIPM KCDB and digitalization** is brought to notice in Section 6.

This report reflects the status as of 22 February 2022.

1. CIPM MRA Appendix C: Calibration and Measurement Capabilities

1.1. CMC statistics

There were[1] 25 681 (25 887) CMCs published in the KCDB on 22 February 2022 of which 19 585 (19 510) are in Physics and 6096 (6377) in Chemistry and Biology, see
Figure 1. The total number of published CMCs have decreased by 0.2 % over a one-year period. However, a decrease by 4 % of CMCs is observed for Chemistry and Biology, linked to the successive

[1] The numbers given within parenthesis represents the number of CMC reported six months earlier.

implementation of broad-scope CMCs and more than 100 CMCs greyed out since the most recent CMC review.

The repartition of CMCs on metrology area, expertise and state or economy is available in real-time from the KCDB home page in “CMC statistics”

https://www.bipm.org/kcdb/cmc/statistics/public .

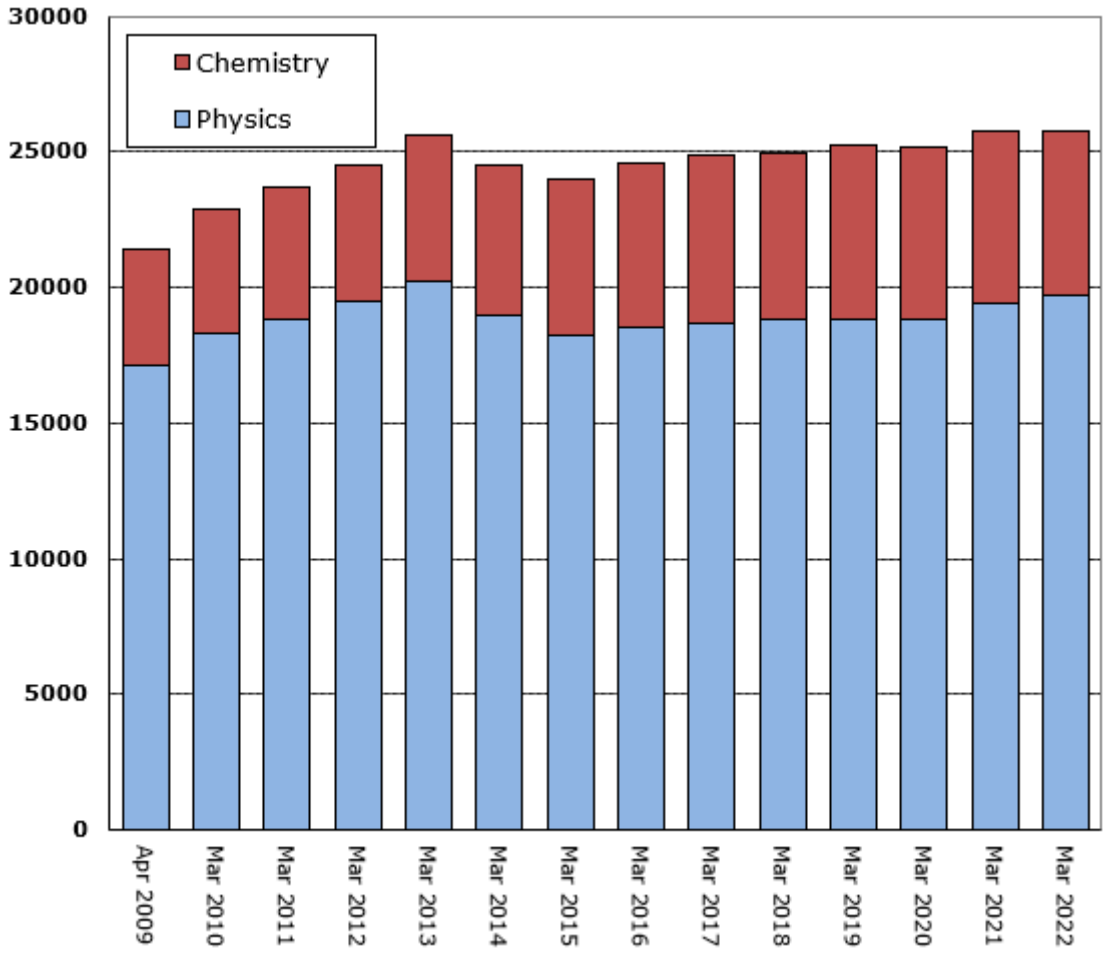

Figure 1 *Number of CMCs registered in the KCDB since April 2009.*

The distribution of published CMCs along the RMOs is listed in Table 1.

The status of not yet published CMCs that are placed on the platform is listed in Table 2; 2505 (1893) CMCs are presently in an “intermediate” state.

Table 1 Number of published CMCs in KCDB per RMO on 22 February 2022 (follow-up of Action 17/1 of JCRB 2006).

RMO	Number of CMCs 2021-08-17	Number of CMCs 2022-02-22
AFRIMETS	655	708
APMP	6545	6639
COOMET	2720	2569
EURAMET	11474	11326
GULFMET	0	34
SIM	4493	4405
TOTAL	25887	25681

Table 2 Status of not yet published CMCs in KCDB on 22 February 2022.

Status	number of CMCs 2021-03-01	number of CMCs 2022-02-22
Draft	337	320
RMO: Submitted	558	367
RMO: Under Review	13	61
RMO: Review Completed	6	92
RMO: Accepted	16	35
RMO: Revision Requested	103	191
Submitted to the JCRB	1	3
JCRB: Under Review	225	686
JCRB: Revision Requested	74	136
JCRB: Revision Completed	41	60
JCRB: Approved	49	4
JCRB: Waiting for VOTE	23	2
Greyed out	445	538
Submitted to the KCDB	2	10

TOTAL	1893	2505

The first CMC that was drafted, reviewed and approved on the KCDB web platform was published on 2 April 2020 - there are now 2190 such CMCs in the database.

The total number of published CMCs during the last 6 months for each metrology area is listed in Table 3. The total number gives the impression that the number of submitted CMCs have suddenly decreased. However, a larger number of CMCs issued from the former JCRB site were published during the previous 6-month period while still compensating for the previous delay (linked to the implementation of the new software).

Table 3 Number of published CMCs per metrology area during the last 6 months.

Metrology area	Published CMCs 2021-08-17	Published CMCs 2022-02-22
AUV	8	12
EM	306	206
L	15	12
M	34	41
PR	2	112
T	25	12
TF	0	45
QM	289	44
RI	0	28
TOTAL	679	512

1.2. Greyed out CMCs and reinstatements

There are presently 538 (445) greyed out CMCs. Table 4 displays all greyed out CMCs where the most recent events are highlighted in yellow and green for increased and decreased number of greyed-out CMCs, respectively. Only one CMC was reinstated during the last 6 months – the other CMCs no longer being greyed out were deleted.

Table 4 Status of greyed out CMCs on 22 February 2022

RMO	Country	AUV	EM	L	M	PR	QM	RI	T	TF	Total
AFRIMETS	ZA				2			11			13
APMP	CN			0			0				0
APMP	IN			3							3
APMP	JP			0							0
APMP	KR						37				37
APMP	NZ		1							2	3
APMP	SG			4							4
APMP	TH			1				0			1
COOMET	KZ									21	21
COOMET	RU						23				23
EURAMET	BG						5				5
EURAMET	DE		1				34	3	1		39
EURAMET	ES							2			2
EURAMET	FI			1							1
EURAMET	FR						1				1
EURAMET	IT		4	0	1		1	98			104
EURAMET	JRC						82	110			192
EURAMET	LT			9	5						14
EURAMET	LV		4								4
EURAMET	NO			1	4						5
EURAMET	PL			1			6				7
EURAMET	PT			1				1			2
EURAMET	SE		2								2
EURAMET	SK	6					10				16
GULFMET	AE									0	0
SIM	AR						6				6
SIM	BR				3		0				3
SIM	CA		7		1						8
SIM	MX			0			17				17
SIM	US		5		0						5
	TOTAL:	6	24	21	16	0	222	225	1	23	538

Increased in number

Decreased in number

2. CIPM MRA Appendix B : Key and supplementary comparisons

2.1. Comparison statistics

On the 22 February 2022 the KCDB covered 1763 (1735) comparisons online distributed as listed in Table 5; 1112 of these are key comparisons and 651 supplementary comparisons. This represents a total increase of 28 comparisons.

Table 5 Key and Supplementary Comparisons on 22 February 2022.

Entity	KC	SC
BIPM	96	1
CC	543	34
AFRIMETS	8	28
APMP	150	121
COOMET	49	121
EURAMET	185	209
GULFMET	6	22
SIM	75	115
TOTAL	1112	651

Figure 2 shows the evolution of the total number of key (dark blue) and of supplementary (light blue) comparisons registered in the KCDB since September 2003. The annual increase of key comparisons seems to have stabilized to around 30, corresponding to an increase of 6 %. The ratio of supplementary comparisons, 20 % in 2006, keeps progressing and constitutes 37 % of all comparisons, see Figure 3. The graphs include repeats of key comparisons.

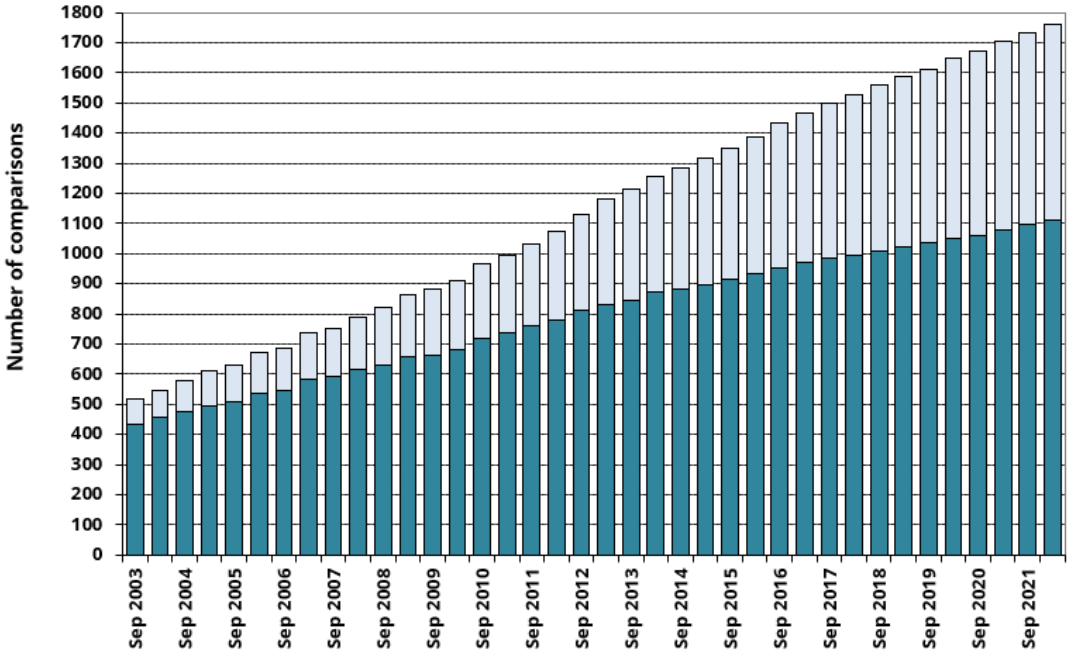

Figure 2 *Total number of key comparisons (dark blue) and supplementary comparisons (light blue).*

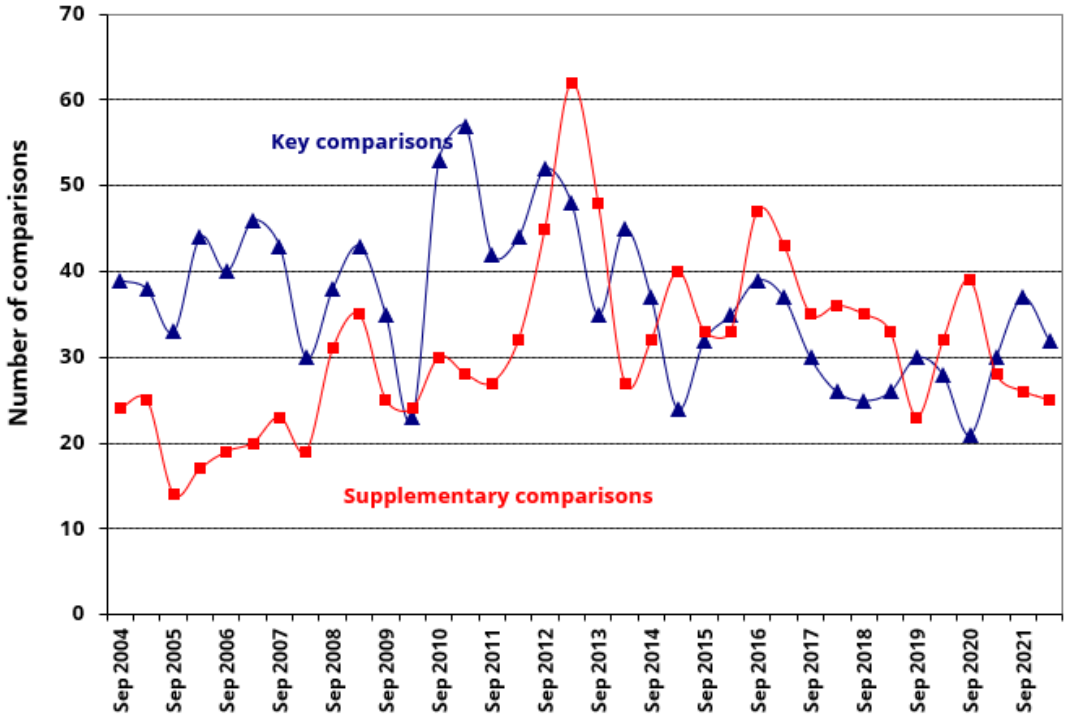

Figure 3 *Number of new comparisons registered in the KCDB over the one-year period.*

The number of new key and supplementary comparisons registered in the KCDB over the one-year period ending at the date indicated on the the abscissa is illustrated in Figure 3.

Graphs generated in real-time illustrating the participation in key and supplementary comparisons are available under the Statistics menu on the KCDB home page:

https://www.bipm.org/kcdb/comparison/statistics/key
https://www.bipm.org/kcdb/comparison/statistics/supplementary.

The following 35 comparisons were registered as new during the last 6 months:

AFRIMETS.M.P-S2	CCQM-K175	EURAMET.L-K1.n01
APMP.L-K4.n01	CCQM-K178	EURAMET.M.FF-S16
APMP.M.FF-K4.2022	CCQM-K73.2018.1	EURAMET.M.FF-S17
APMP.QM-S18	CCQM-K91.2022	EURAMET.PR-K5.2022
APMP.RI(I)-K7	CCRI(III)-S2	EURAMET.RI(I)-K1.3
BIPM.EM-K10	CCT-K9.2	EURAMET.RI(I)-K4.3
BIPM.EM-K13	COOMET.EM-S27	GULFMET.EM-S9
CCL-K1.n01	COOMET.M.M-S6	GULFMET.PR-K4.2021
CCM.F-K1.a.2022	COOMET.T-S5	SIM.M.F-S11
CCM.M-K8.2021	EURAMET.AUV.V-K3.1	SIM.QM-S12
CCQM-K10.2018	EURAMET.AUV.V-S2	SIM.QM-S13
CCQM-K167	EURAMET.EM.RF-S46	

The following 48 reports were published during the last 6 months:

AFRIMETS.EM-S1	BIPM.RI(I)-K6 (NRC)	CCQM-K74.2018
AFRIMETS.M.F-S1	BIPM.RI(I)-K7 (NMIJ)	CCRI(II)-S10
APMP.M.FF-S1	BIPM.RI(II)-K1 (POLATOM)	CCRI(III)-K9.AmBe.1
APMP.QM-S13	BIPM.RI(II)-K1.Ac-225	CCRI(III)-K9.AmBe.2
APMP.RI(I)-K5	BIPM.RI(II)-K1.Cd-109	COOMET.M.D-S1
APMP.RI(I)-K8	BIPM.RI(II)-K1.Co-60	COOMET.PR-S7
APMP.RI(I)-K8	BIPM.RI(II)-K1.Ga-67	COOMET.PR-S9
APMP.RI(I)-S1	BIPM.RI(II)-K1.Gd-153	EURAMET.EM-K11.1
BIPM.EM-K10.b (MIKES)	BIPM.RI(II)-K1.Tl-201	EURAMET.L-K4.2015
BIPM.EM-K11.b (NSAI-NML)	CCAUV.V-K5	EURAMET.M.D-K4.2020
BIPM.EM-K12 (NMC, A*STAR)	CCL-K11	GULFMET.EM-S1
BIPM.EM-K13.a and b (NSAI-NML)	CCQM-K10.2018	SIM.M.F-S3
BIPM.QM-K1 (ISCIII)	CCQM-K117	SIM.M.M-S12
BIPM.RI(I)-K1 (NRC)	CCQM-K154.b	SIM.M.M-S6
BIPM.RI(I)-K3 (ARPANSA)	CCQM-K167	SIM.M.P-S8
BIPM.RI(I)-K4 (NRC)	CCQM-K19.2018	SIM.PR-K6.2010

On 22 February 2022, 87 (80) abandoned or superseded key and supplementary comparisons were stored in the KCDB archives (included in the presented statistics).

2.2. **Comparisons older than 5 years** (Follow-up Action 33/3 of JCRB 2015)

Action 33/3: *The BIPM KCDB office, as part of the KCDB report to the JCRB, to identify Key and Supplementary Comparisons which were started 5 or more years ago and have not reached a conclusion.*

"Sleeping" Key Comparisons, connected to the Consultative Committees, have reduced in number since the follow-up action was triggered by the JCRB six years ago. While the same 30 % of the most recent listed comparisons, listed at start, were still indicated as uncompleted in August 2021, there has now been a real progress and there are now very few comparisons being around 20 years old. Seven comparisons were as a consequence declared as abandoned and were archived.

The total number is illustrated in Figure 4. A list of the comparisons concerned is available in Appendix I.

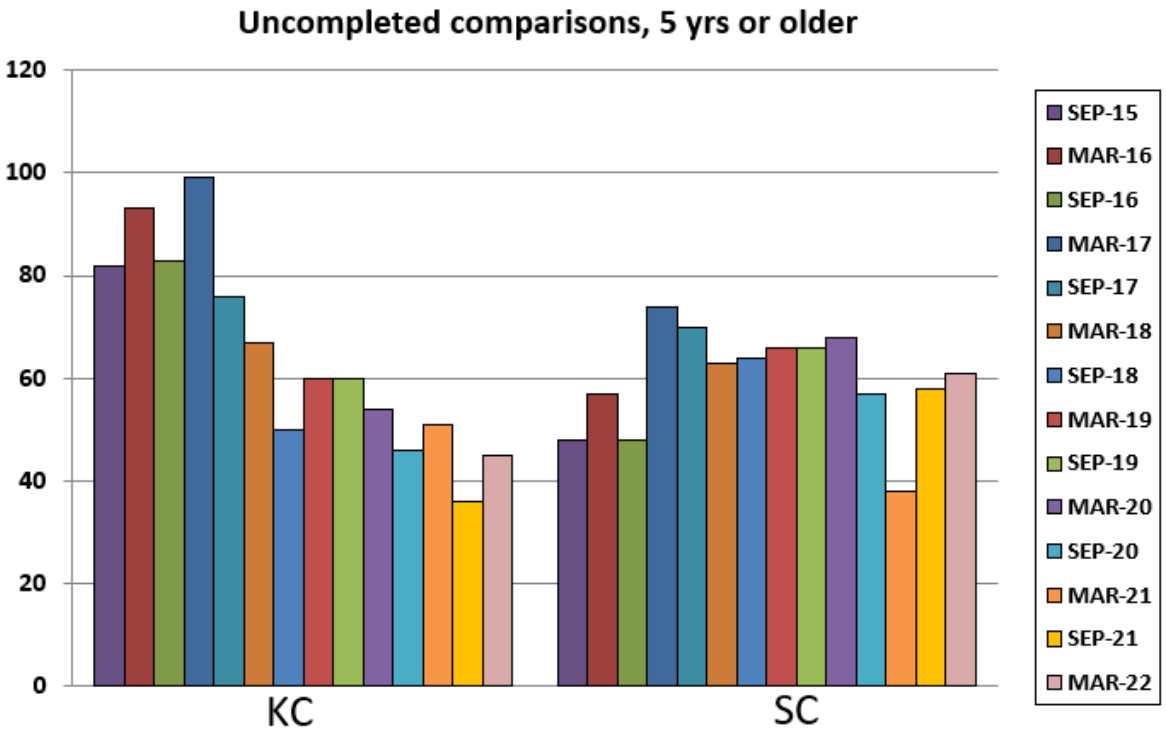

Figure 4 *Histogram showing the number of incomplete comparisons that started more than 5 years ago.*

3. Participation of Associates of the CGPM in CIPM MRA activities

Table 5 summarizes the participation of the 40 Associates of the CGPM in CIPM MRA activities as of 22 February 2022.[2]

Country	Published CMCs	Greyed out CMCs	Key Comparisons	Supplementary Comparisons
Albania	10	0	8	4
Azerbaijan	31	0	1	8
Bangladesh	0	0	2	3
Bolivia	21	0	9	27
Bosnia and Herzegovina	82	0	14	17
Botswana	3	0	1	5
Cambodia	0	0	0	0
CARICOM (Caribbean Community)	1	0	1	11
Chinese Taipei	392	0	108	50
Costa Rica	69	0	19	33
Ethiopia	0	0	0	4
Georgia	65	0	6	19
Ghana	0	0	2	7
Hong Kong, China	298	0	103	30
Jamaica	22	0	6	11
Kuwait	0	0	2	2
Latvia	15	4	14	9
Luxembourg	10	0	4	2
Malta	0	0	4	3
Mauritius	0	0	2	3
Moldova, Republic of	76	0	6	19
Mongolia	16	0	4	4
Namibia	7	0	0	3
North Macedonia	21	0	9	11
Oman	0	0	0	2
Panama	37	0	8	22
Paraguay	8	0	2	19
Peru	108	0	30	37
Philippines	32	0	14	10
Qatar	0	0	3	2
Seychelles	0	0	0	3
Sri Lanka	0	0	10	2
Syrian Arab Republic	0	0	12	3

[2] These numbers take into account all comparisons registered in the KCDB, disregarding status, for which at least one laboratory of the Associate is listed in the participants list.

Tanzania	0	0	0	1
Uzbekistan	0	0	2	5
Viet Nam	31	0	39	10
Zambia	11	0	2	7
Zimbabwe	19	0	1	3
Total	**1385**	**4**	**448**	**434**

Table 6 CIPM MRA activity of the Associates of the CGPM: number of published CMCs and participation in key and supplementary comparisons.

The repartition of CMCs and comparisons among Associates is illustrated in Figure 5 and

Figure 6, respectively.

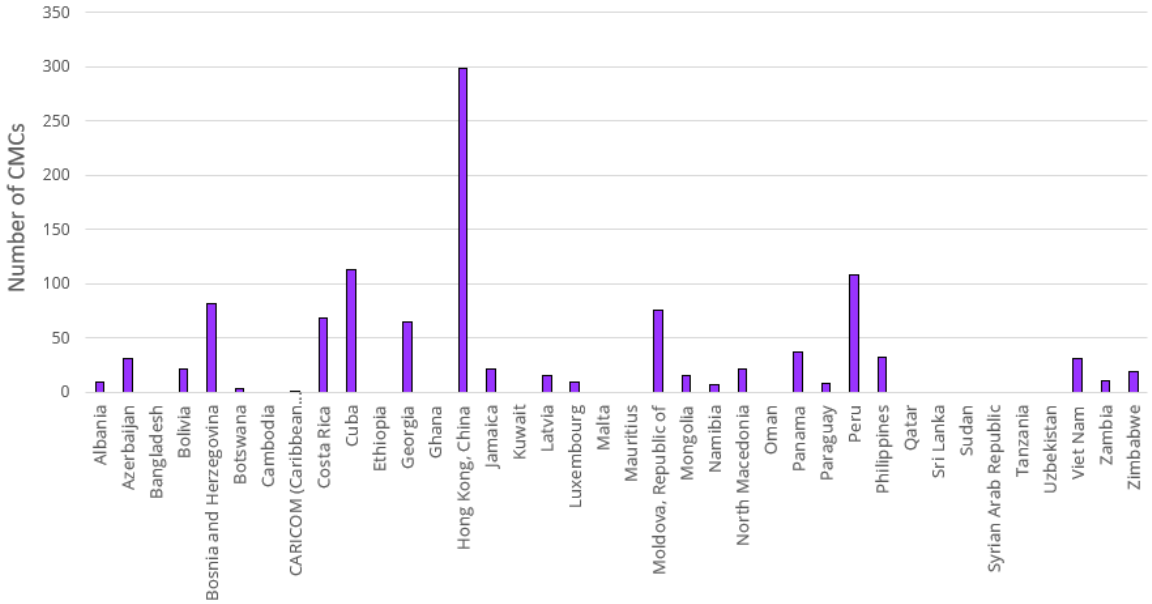

Figure 5 *Graph on the number of CMCs declared by Associates of the CGPM.*

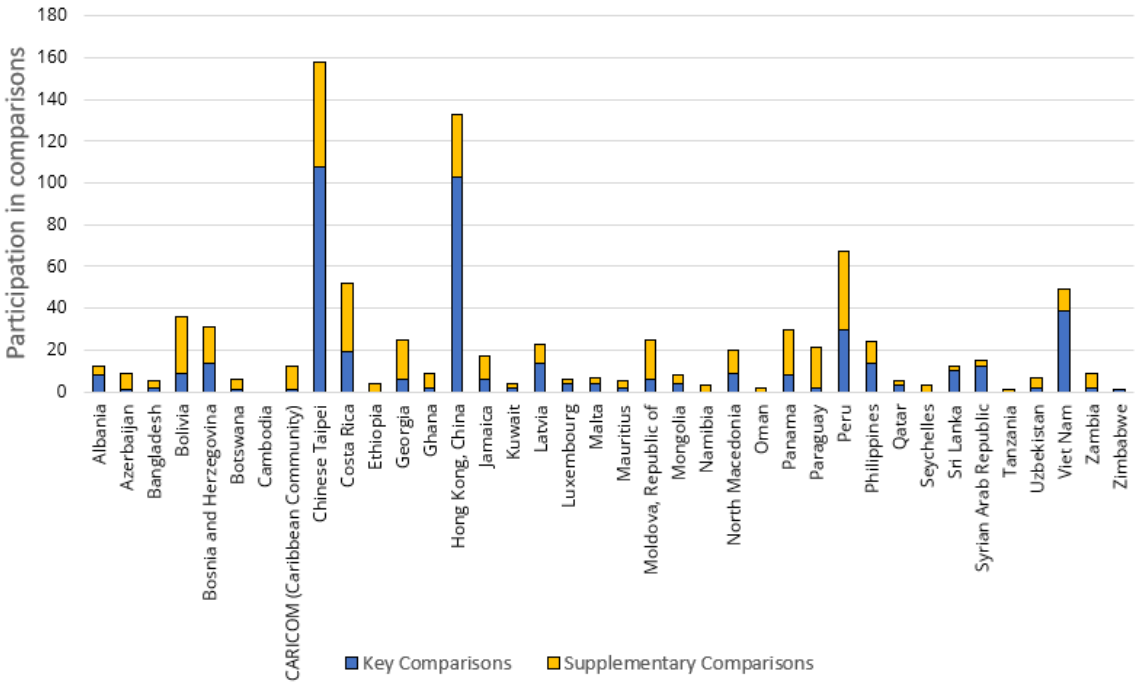

Figure 6 *Graph on the participation of Associates of the CGPM in key and supplementary comparisons.*

4. System's Performance

An evaluation of the performance of the CIPM MRA activities as documented by the KCDB has been undertaken for the KCDB Report to the 45th JCRB as in the following.

An analysis was started in March 2021 comparing review durations of CMCs completely processed on the KCDB 2.0 platform to the corresponding numbers on CMCs from 2004 to 2019 that were processed in the previous KCDB version. This evaluation has been continued in the previous KCDB Report (to the 44th JCRB) and so it is in the present report.

Statistical data on JCRB review durations of CMCs are delivered by the Statistics Menu of the KCDB 2.0 platform and are illustrated in Fig 7 which shows the average, maximum, and minimum time it took for the CMCs to pass the JCRB review.

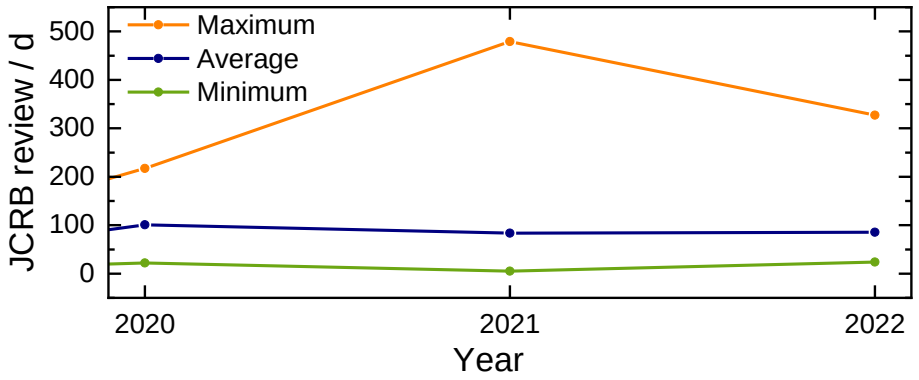

Figure 7 : *Graph on the duration of the CMC approval for the JCRB review as directly retrieved from the statistics on the CMCs menu of the KCDB. The KCDB 2.0 has started in 2020.*

A more detailed picture is given in Fig. 8 for the time of the last six months. Here, the CMC approval time from first submission to the KCDB, to intraregional RMO and subsequent JCRB review is depicted for CMCs submitted by the respective RMOs. Metrology areas for which the highest review time outliers have been recorded are indicated as well.

From Fig. 8 it is obvious that, this time, the median review durations are varying with submissions from different RMOs. This can be observed for both, the intra-RMO and the JCRB review. Interesting to note that those RMOs with short intra-RMO review times had to wait longer for their CMCs to get approved in the subsequent JCRB review.

As the picture indicated by Fig. 8 shows only the last six months it is interesting to also look at the long-term data. Intra-RMO and JCRB review durations for those CMCs processed on the KCDB 2.0 platform since 2020 are displayed in Fig. 9. Additionally, a column is provided that shows the mean value across all RMOs to the very right of the graph. Fig. 9 mitigates the heterogeneous picture from Fig: 8 with a more smoothing of data yielding more reliable review durations.

Based on this, the overall picture is summarized in Table 7 where JCRB review durations computed in the 'old' system of the previous KCDB are compared to the more recent data of CMCs processed

on the KCDB 2.0 platform. Here the picture is such that review times have been decreased from 140 days (median) in the old systems to less than 60 days nowadays on the KCDB 2.0.

Table 7 *JCRB review durations for CMCs at different times.*

	2004 – 2019 / d	Year 2020 / d	Sep. 21 / d	45th JCRB	KCDB 2.0
minimum	*not computed*	*not computed*	5	24	0
median	140	*not computed*	63	75	57
mean	188	93	84	85	78
maximum	>365	*not computed*	479	327	475
*Computed from the KCDB 2.0 menu 'Statistics on review performance'					

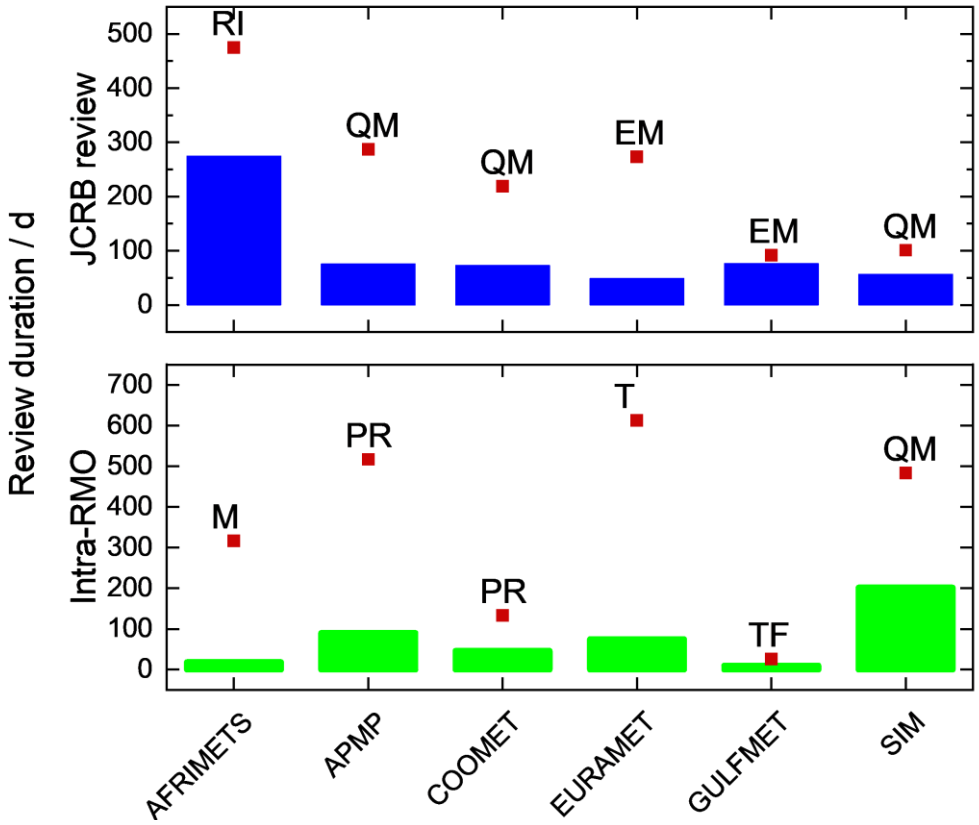

Figure 8 : *Review durations for CMCs published in the KCDB 2.0 in from September 2021 to March 2022. The timing reflects intraregional reviewing in the bottom panel and JCRB reviewing durations in the upper panel for those CMCs submitted by RMOs indicated in the x axis. The bars represent the mean durations. Red squares in both panels indicate the most upper duration and the metrology area where this occurred.*

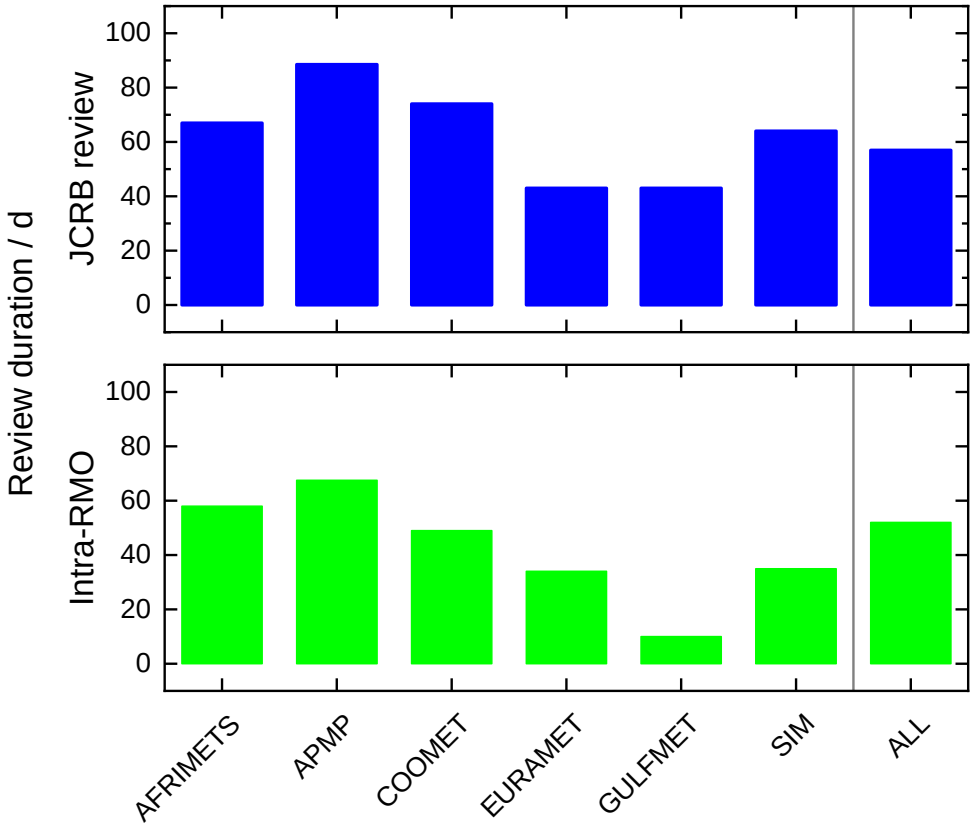

Figure 9 : *Review durations computed on CMCs fully processed in the KCD 2.0 platform since 2020. Bottom, the intra-RMP review for all RMOs that submitted CMCs. Top, JCRB review on the same CMCs. Median data on both review stages averaged across all RMO submissions at the very right coloumn.*

Review durations are different for different metrology areas as it can be seen from Fig. 10. However, the most prominent differences from the other areas are seen in the RI and QM area. Outliers like that are typically related to some changes in responsibilities within TCs/WGs where in some cases a smooth transition has been disturbed. In the QM this is also explained by the fact that a special practical approach has been established by the CCQM KCWG.

Faster publication of chemistry and biology CMCs with the KCDB 2.0 platform is possible now as already reported by the previous KCDB Report. However, due to the special approval process of the CCQM KCWG in the JCRB review, the average duration depends on when the 6-month time window is applied for statistics so when the 6-month window is studied. The review duration for the QM area on the longer-term perspective will be interesting. For the time being, September 2021 showed lower JCRB review durations followed by a comparably large median JCRB duration in March 2022.

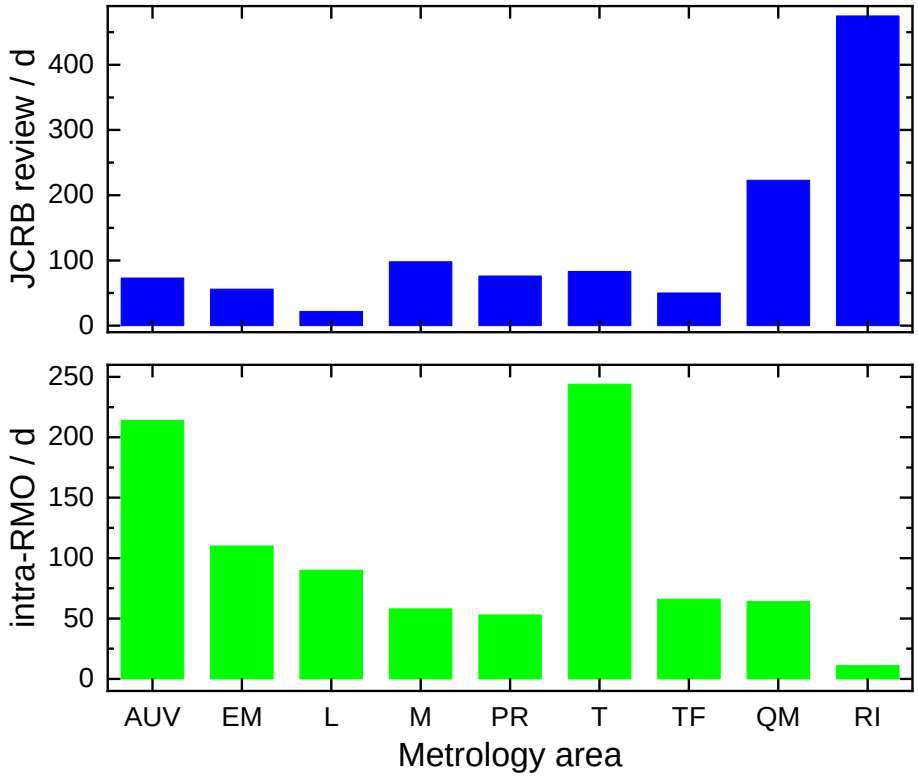

Figure 10 : *Median review durations of CMCs published during the last six months and contributing metrology areas.*

Table 8 *Duration of CMCs submitted in the QM area for JCRB reviewing.*

Year	Mean / d	Maximum / d	Minimum / d
9/2021	110	164	22
3/2022	189	287	22

The adoption of the KCDB 2.0 platform by the metrology areas with finally QM coming in 2021 was underpinned by preparatory work commencing the previous year. This preparatory work included the organization of BIPM Capacity Building and Knowledge Transfer Programme (CBKT) training sessions for potential CMC writers, reviewers and regional metrology organization (RMO) technical TC/WG Chairs, as well as mock review exercises. In parallel, guidance documents were prepared for JCRB review using the platform and the CMC review guidelines developed by many of the CC KCWG/WGRMO were reviewed, often supported by the KCDB Office.

5. Present Status of the BIPM KCDB 2.0

The KCDB facility is accompanied by providing a variety of guidance material, cf. https://www.bipm.org/en/about-us/kcdb-help.html. Several online demonstrations to users within the frame of the CBKT https://www.bipm.org/en/cbkt/ have been organized during the last 6 months, focused on different user profiles or requested needs.

The KCDB 2.0 software is supported by an Application Management contract, presently giving the opportunity to make smaller adjustments of the software. Anomalies and suggestions for improvements may be communicated by the users by completing the form https://www.bipm.org/utils/common/pdf/KCDB_2.0/Form_for_declaring_an_anomaly_or_request.docx.

The Quality System underpinning the previous version of the KCDB has been updated. An internal audit was held in June 2021.

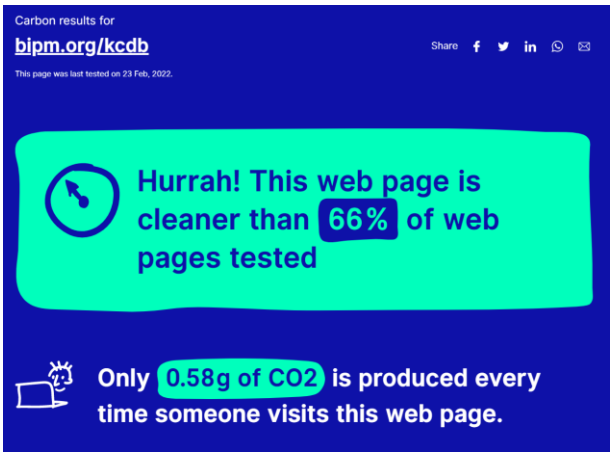

Figure 8 *Estimated CO2 emission when using https://www.bipm.org/kcdb/ (ref: https://www.websitecarbon.com/).*

6. BIPM KCDB and digitalization

Much attention is drawn by the metrology community to FAIR[3] machine-readable data for calibration issues but also for future emerging applications. Industrial sectors request urgently possibilities to use Digital Calibration Certificates which will contribute to versatile technical advantages, cost effectiveness and improvements from a quality perspective.

[3] Findable Accessible Interoperable Reusable

The BIPM implemented an Application and Programming Interface for the KCDB (API KCDB) in 2021. This interface allows external users to make CMC queries from a support other than the KCDB web and to collect machine readable data: https://www.bipm.org/en/cipm-mra/kcdb-api .

Within the frame of an Expert Group, under the auspices of the CIPM Task Group on the Digital SI, the KCDB is presently studied as a use case in relation to a supporting interoperable unit and quantity system.

Acknowledgement

Many thanks to the BIPM IT team Laurent Le Mée and Thierry N'Guyen for their continued support.

APPENDIX I List of uncompleted comparisons older than 5 years

a) Key Comparisons

KC indentifier	Indicated year	Status Sep-2020	Pilot
APMP.EM.BIPM-K11.2	2004	Report in progress, draft B	Puslit KIM-LIPI
APMP.EM.RF-K8.CL	2012 - 2013	Measurements completed	NMIJ AIST
APMP.M.D-K4	2007 - 2008	Report in progress, draft A	KRISS
APMP.M.F-K3.a	2013 - 2017	Measurements in progress	NIM
APMP.M.P-K15	2013 - 2014	Measurements completed	NMIJ AIST
APMP.M.P-K4	2015 - 2016	Measurements completed	KRISS
APMP.M.P-K7.2	2015 - 2016	Report in progress, draft B	NIMT
APMP.M.T-K1	2015 - 2016	Planned	KRISS
APMP.PR-K2.b	2014	Report in progress, draft A	KRISS
APMP.PR-K3.a	2012 - 2014	Measurements in progress	NMIJ AIST
APMP.PR-K3.a.1	2006	Measurements completed	NIM
APMP.RI(I)-K3.2013	2015 - 2016	Planned	NRSL/INER
APMP.RI(I)-K7		Measurements in progress	NIM
APMP.T-K3.6	2013 - 2014	Planned	NIM
APMP.T-K4.1	2013 - 2014	Planned	NIM
CCEM.RF-K26	2014 - 2016	Measurements completed	NMIJ AIST
CCEM.RF-K5.c.CL	2012 - 2015	Measurements in progress	NMIJ AIST
CCL-K1.2011	2011 - 2014	Report in progress, draft A	CENAM
CCL-K4.2015	2015 - 2017	Report in progress, draft B	NIST
CCM.FF-K2.2011	2013 - 2015	Report in progress, draft B	VSL
CCPR-K2.b.2016	2016 - 2017	Measurements completed	KRISS
CCPR-K3.2014	2014	Report in progress, draft B	NRC
CCQM-K118	2017	Report in progress, draft A	VSL
CCQM-K150	2017	Report in progress, draft A	NPL
CCQM-K169		Protocol complete	NMIJ AIST
CCRI(II)-K2.Pa-231	2017	Report in progress, draft B	BLC
CCRI(II)-K2.Tc-99	2012 - 2013	Measurements in progress	NPL
CCT-K1.1	2006 - 2014	Report in progress, draft A	NIST
CCT-K10	2014 - 2016	Report in progress, draft B	NPL
CCT-K4.1	2012 - 2014	Report in progress, draft B	NMIA
CCT-K6.1	2008 - 2010	Report in progress, draft A	MSL
CCT-K8	2016 - 2017	Measurements completed	INTA
CCT-K9	2011 - 2012	Measurements completed	NIST
COOMET.AUV.V-K1	2007 - 2008	Report in progress, draft B	VNIIM
COOMET.L-K3	2011 - 2012	Report in progress, draft A	VNIIM
EURAMET.PR-K3.2020		Protocol complete	METAS

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KC indentifier	Indicated year	Status Sep-2020	Pilot
EURAMET.T-K7.4	2015 - 2017	Measurements in progress	UME
EURAMET.T-K8	2008 - 2012	Report in progress, draft A	PTB
EURAMET.T-K9	2014 - 2016	Protocol complete	LNE-LCM/Cnam
GULFMET.T-K9	2017	Measurements in progress	UME
SIM.L-K7.2016	2016 - 2017	Report in progress, draft A	INRIM
SIM.M.M-K6	2015 - 2017	Measurements completed	CENAM
SIM.M.P-K6.1	2011 - 2013	Report in progress, draft B	LACOMET
SIM.M.P-K7	2001	Report in progress, draft B	CENAM
SIM.QM-K1	2009	Report in progress, draft B	INMETRO

b) Supplementary Comparisons

SC indentifier	Indicated year	Status Sep-2020	Pilot
APMP.EM.RF-S5.CL	2013 - 2015	Protocol complete	NMIJ AIST
APMP.EM-S8	2011 - 2013	Protocol complete	NPLI
APMP.M.FF-S2.2016	2016 - 2017	Report in progress, draft B	RCM-LIPI
APMP.M.G-S1	2012	Report in progress, draft A	NIM
APMP.M.H-S4	2011	Report in progress, draft A	KRISS
APMP.M.MM-S1	2012 - 2013	Measurements in progress	KRISS
APMP.M.P-S1	2003 - 2005	Measurements completed	CMS/ITRI
APMP.M.P-S7	2015	Report in progress, draft B	NIMT
APMP.PR-S5	2008 - 2009	Measurements in progress	NMIJ AIST
APMP.PR-S7	2015 - 2016	Protocol complete	NIM
APMP.PR-S8	2015 - 2017	Measurements in progress	KRISS
APMP.RI(II)-S3.Cs-134.Cs-137	2013	Report in progress, draft B	NMIJ AIST
APMP.T-S10	2013	Planned	KRISS
APMP.T-S11	2013 - 2016	Report in progress, draft A	NMIJ AIST
APMP.T-S13	2014 - 2016	Measurements in progress	NMC, A*STAR
APMP.T-S14	2017	Measurements in progress	NMIM
APMP.T-S8	2011 - 2015	Measurements in progress	NMLPHIL
APMP.T-S9	2013	Measurements in progress	NMIJ AIST
CCRI(II)-S9	2011	Report in progress, draft A	KRISS
COOMET.EM-S10	2010 - 2012	Report in progress, draft B	VNIIMS
COOMET.EM-S18	2013 - 2016	Report in progress, draft A	VNIIMS
COOMET.EM-S19	2015 - 2017	Measurements completed	GEOSTM
COOMET.EM-S21	2016 - 2017	Report in progress, draft B	VNIIMS
COOMET.EM-S6	2007 - 2010	Report in progress, draft B	VNIIMS
COOMET.EM-S7	2009 - 2011	Report in progress, draft B	VNIIMS
COOMET.L-S20	2016	Report in progress, draft A	NMI (MD)
COOMET.M.FF-S4	2009 - 2010	Report in progress, draft B	NSC IM
COOMET.M.F-S1	2008 - 2010	Report in progress, draft B	VNIIM
COOMET.M.H-S2	2014 - 2016	Report in progress, draft A	VNIIFTRI
COOMET.M.H-S3	2014 - 2016	Measurements completed	NSC IM
COOMET.M.M-S2	2015 - 2017	Report in progress, draft A	NSC IM
COOMET.M.M-S3	2016 - 2017	Measurements in progress	NMI (MD)
COOMET.M.P-S1	2014 - 2015	Report in progress, draft A	NSC IM
COOMET.PR-S1	2012 - 2013	Measurements completed	VNIIOFI
COOMET.PR-S10	2016 - 2017	Protocol complete	BelGIM
COOMET.PR-S5	2008 - 2011	Measurements completed	INIMET
COOMET.RI(I)-S3	2016 - 2017	Report in progress, draft B	BelGIM

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SC indentifier	Indicated year	Status Sep-2020	Pilot
EURAMET.M.F-S2	2012 - 2013	Measurements in progress	BEV
EURAMET.M.P-S16	2016	Protocol complete	GUM
EURAMET.M.T-S4	2015	Measurements completed	LNE
EURAMET.PR-S4	2012 - 2013	Measurements completed	LNE
EURAMET.QM-S11	2017	Protocol complete	UME
EURAMET.RI(I)-S17	2016	Protocol complete	IST-LPSR
EURAMET.T-S6	2015 - 2016	Measurements in progress	NPL
SIM.M.FF-S4	2006	Report in progress, draft B	CENAM
SIM.M.FF-S8	2014	Report in progress, draft B	CENAMEP AIP
SIM.M.FF-S9	2016	Report in progress, draft A	CENAM
SIM.M.F-S2	2012	Report in progress, draft A	IDIC
SIM.M.F-S6	2017	Report in progress, draft A	IDIC
SIM.M.M-S17	2017	Measurements completed	CENAM
SIM.M.P-S2	2009 - 2011	Measurements in progress	INMETRO
SIM.M.T-S1	2016	Report in progress, draft B	CENAM
SIM.QM-S3	2012	Report in progress, draft A	NIST
SIM.QM-S4	2012	Report in progress, draft A	NIST
SIM.QM-S5	2015	Report in progress, draft A	CENAM
SIM.QM-S6	2016	Protocol complete	INMETRO
SIM.T-S11		Measurements in progress	PTB
SIM.T-S4	2008	Report in progress, draft B	LATU
SIM.T-S6	2012 - 2014	Report in progress, draft A	NIST
SIM.T-S8	2014	Report in progress, draft A	CESMEC
SIM.T-S9	2017	Planned	NIST

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