

## KCDB REPORT TO THE 37th JCRB MEETING

1 September 2016 to 1 March 2017

### Introduction

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

The EXCEL files used as a basis for the CMC statistics are available on the [access-restricted JCRB CMC website](#) (on “KCDB statistics”). They are updated successively during the year and the CMCs that have been modified are highlighted in pink according to previous JCRB decisions.

Further information on the KCDB may be found on the BIPM KCDB web pages. Notably, the number of key and supplementary comparisons, as well as the number of CMCs by metrology area and by country, are updated successively during the year and may be consulted on the [KCDB Statistics](#) web page<sup>1</sup>.

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. Section 3 highlights the status of **Associates** of the BIPM, and a short summary on progress made on the **revision of the KCDB**, in the context of the Review in the CIPM MRA, is presented in Section 4.

## 1. CIPM MRA Appendix C : Calibration and Measurement Capabilities

### 1.1. Status of the KCDB CMC database

End of February 2017, the KCDB included a total of 25 896 CMCs:

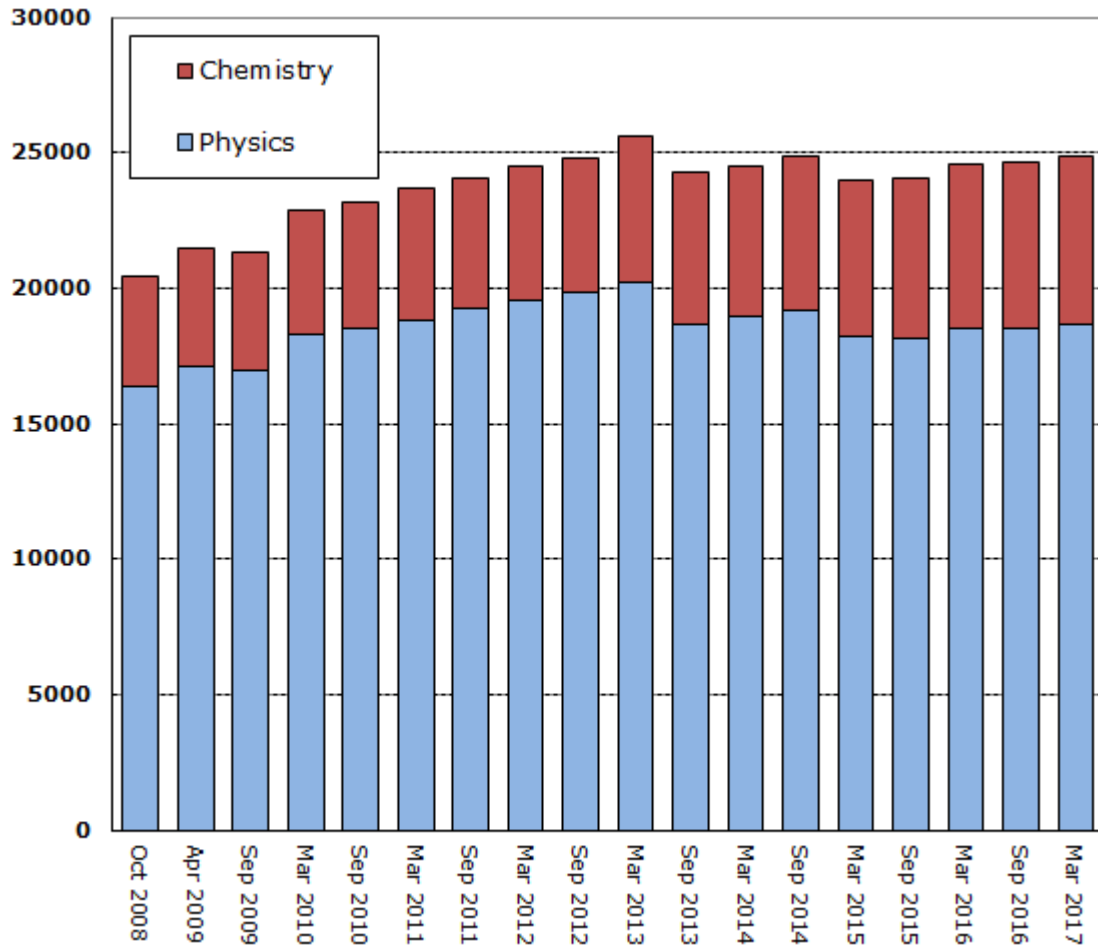
- 19 699 in Physics,
- 6 227 in Chemistry.

Over the last six months 39 countries published CMCs. The total number of CMCs increased by 310 over the last 12 months, corresponding to a relative increase of 1 % evenly distributed over Chemistry and Physics.

The evolution of the number of CMCs since 2008 is depicted in Figure 1. The number of CMCs presently published in the KCDB by state/economy and metrology area is constantly available on [KCDB Statistics](#).

---

<sup>1</sup> On request, the KCDB Office may provide an EXCEL file listing information on the present contents of the CIPM MRA Appendix B.



**Figure 1.** Number of CMCs registered in the KCDB since October 2008.

## 1.2. CMC publications (excluding revisions)

CMCs treated by the BIPM KCDB Office between 1 September 2016 and 1 March 2017 are listed in Table 1<sup>2</sup>

**Table 1.** Published CMCs from 1 September 2016 and 1 March 2017 (revised CMCs not included)

	<b>RMO / economy</b>	<b>Field</b>	<b>CMCs</b>
September 2016	APMP: TH	TF	+ 2
	EURAMET: BA	TF	+15
	COOMET: UA	EM	+1
	LV*	EM	-30
	EURAMET: BA, BK, PL	T	+19
	EURAMET: FR	RI	+40
	EURAMET : BG, CZ, DE, DK, PL, PT, RS, TR, UK	L	+36
October 2016	EURAMET: UK	QM	+1
	EURAMET: HR, NO	L	+4
	APMP: CN, HK, SG, TH, TW	QM	+65
	APMP: SG, JP	TF	+7
	IT*	QM	-2
	UK	AUV	-31
	EURAMET: AT, DE, FR, IT, PT, TR, UK	M	+6
November 2016	COOMET: BY, RU, UA	L	+6
	EURAMET: UK	M	-1
	IT*	M	-2
	COOMET: MD	RI	+2
	COOMET: KZ, UA	T	+23
	UK	L	-3
December 2016	APMP: AU CN ID JP NZ TH TW	EM	+84
	AFRIMETS: TN	EM	+4
	IT*	L	-1
January 2017	CN	AUV	+3
	DK	L	-1
	MX*	AUV	16
	SIM: BR, MX	L	+19
	SIM: PY	M	1
February 2017	MX*	PR	-22
	MX*	TF	-9
	DE	L	-8
	BE	L	-3

\* : result of greying out

<sup>2</sup> Published CMCs are announced in "[CMCs News](#)".

Bosnia Herzegovina provided their first CMCs in Time-Frequency and Thermometry, Macedonia published their first CMCs in Thermometry and Moldova registered their first CMCs in Ionizing Radiation.

### 1.3. Deleted CMCs, Greying out and Re-instatements

Greying-outs, deletion and reinstatements of CMCs are coordinated by the JCRB Executive Secretary, and carried out by the KCDB Office. Table 2 lists the CMCs concerned during the last six months.

**Table 2.** Deleted, greyed-out or reinstated CMCs from 1 September 2016 and 1 March 2017

	State/economy	Field	Action
12 September	Latvia	EM	Greyed out 30 CMCs in EM
13 October	Italy	QM	Greyed out 2 CMCs in QM
	UK	AUV	Deleted 31 (all) CMCs in acoustics
24 October	France	M	2 CMCs reinstated in fluid flow
10 November	Italy	M	Greyed out 2 CMCs in density
30 November	UK	L	Deleted 3 CMCs in dimensional metrology
21 December	Italy	L	Greyed out 1 CMC in dimensional metrology
3 January	Korea	QM	Deleted 5 CMCs in pH
5 January	Denmark	L	Deleted 1 CMC in dimensional metrology
	Mexico	AUV	16 CMCs reinstated in AUV
27 February	Mexico	PR	Greyed out 22 CMCs in photometry
	Mexico	TF	Greyed out 9 CMCs in time and frequency

The present situation regarding temporary removal (“greying-out”) of CMCs is available on-line of the [Statistics page of the KCDB](#) at the JCRB restricted web, illustrated in Table 3. **In total 231 CMCs are presently greyed out.**

The dates of the greying-out of CMCs are listed in the spreadsheet “Dates of CMCs greying-out” of the EXCEL file “CMCsNumber\_2017, available from the [access-restricted JCRB CMC website](#) (see “KCDB statistics”).

**Table 3.** Number of CMCs temporary removed (“greyed-out”) from the KCDB, by country and by metrology area, as at 1 March 2017.

Distribution of CMCs that are temporarily removed (“greyed-out”) from the KCDB

	AUV	M	PR	EM	T	RI	L	QM	TF	Total
<b>AFRIMETS</b>										
ZA		2								2
<b>Total AFRIMETS:</b>										<b>2</b>
<b>APMP</b>										
AU				27						27
NZ										0
TH						3				3
<b>Total APMP:</b>										<b>30</b>
<b>COOMET</b>										
KZ								1 partially Cat. 6		0
<b>Total COOMET:</b>										<b>0</b>
<b>EURAMET</b>										
BE				25					6	31
FI		6								6
FR		1		3						4
IAEA						1				1
IRMM										
IT		30		15			1	2		48
LV				30						30
PT							1			1
SK	6						2			8
<b>Total EURAMET:</b>										<b>129</b>
<b>SIM</b>										
MX	16		25					2	9	52
AR							1			1
CA							0			0
US		3	1	8		1				13
BR								4		4
<b>Total SIM:</b>										<b>70</b>
<b>TOTAL:</b>										<b>231</b>

#### 1.4. CMC statistics of RMOs

*(Follow-up of Action 17/1 from the 17th JCRB meeting)*

Table 4 summarizes the repartition of CMCs on the different RMOs and international signatories of the CIPM MRA.

**Table 4.** *Information on CMC statistics per RMO*

Entity	Total number of CMCs 1 March 2017
AFRIMETS	525
APMP	5776
COOMET	2431
EURAMET	11041
GULFMET <sup>3</sup>	0
SIM	4877
ESA	0
IAEA	26
IRMM	217
WMO	3

<sup>3</sup> The GULFMET was approved as an RMO on a provisional basis by the CIPM in October 2015.

## 2. CIPM MRA Appendix B : Key and supplementary comparisons

### 2.1. Present status

On 1 March 2017 the KCDB covered **1467 comparisons** distributed as listed in Table 5; 970 key comparisons and 497 supplementary comparisons. In fact, 68 of the 92 BIPM key comparisons are all part of the BIPM.RI(II)-K1 (SIR equivalent activity). On the other side, 22 continuous BIPM<sup>4</sup> comparisons cover each tens of completed comparisons carried out between the BIPM and different metrology institutes. It may be noted that GULFMET has started their first key comparison since the last JCRB meeting – a bilateral comparison in thermometry. They have also increased their participation in supplementary comparisons by 5 and are hence demonstrating comparison activities within four different fields.

Figure 2 shows the evolution of the total number of key (green) and of supplementary (violet) comparisons registered in the KCDB since September 2003. The annual increase of key comparisons seems to have stabilized to around some +40 taking into account the history since 2004. The annual increase of key- and supplementary comparisons is around 6 %. The ratio of Supplementary comparisons, 1 out of 5 in 2006, has progressively increased to 1 out of 3.

**Table 5.** Key and Supplementary Comparisons on 1 September 2016.

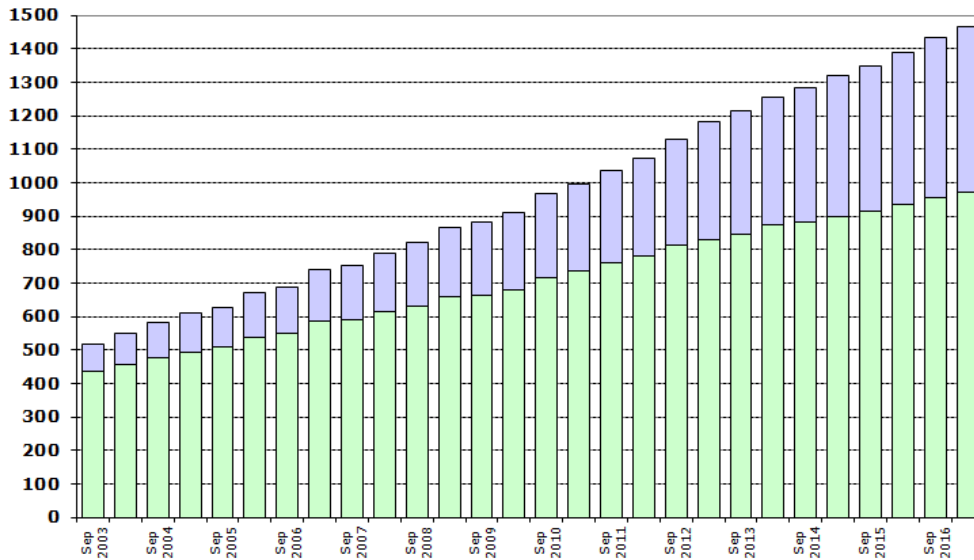
Entity	KC	SC
BIPM	92	1
CC	474	28
AFRIMETS	4	18
APMP	134	102
COOMET	47	82
EURAMET	156	176
GULFMET <sup>5</sup>	1	6
SIM	62	84

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.

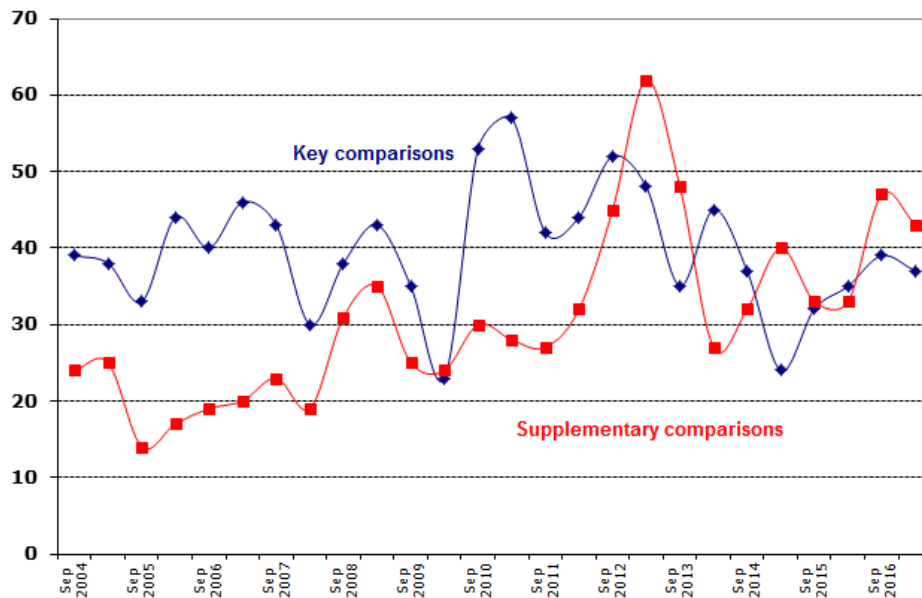
Updated graphs illustrating the participation in [key](#) and [supplementary](#) comparisons were made available on the [Statistics page of the KCDB](#) in March 2017.

<sup>4</sup> Of which two

<sup>5</sup> The GULFMET was approved as an RMO on a provisional basis by the CIPM in October 2015.



**Figure 2.** Total number of key comparisons and supplementary comparisons registered in the KCDB: evolution since September 2003



**Figure 3.** Number of new comparisons registered in the KCDB over the one-year period ending at the date indicated on the abscissa.



## 2.2. Registrations and modifications of comparisons

From 1 September 2016 the following 34 comparisons were registered as new:

AFRIMETS.EM.RF-S1	COOMET.EM-K5	GULFMET.EM.BIPM-K11
APMP.M.FF-S2.2016	COOMET.EM-S20	GULFMET.EM.RF-S1
APMP.M.F-S3	COOMET.M.P-K15	GULFMET.EM-S1
APMP.M.M-K6.1	COOMET.M.P-S2	GULFMET.EM-S2
APMP.M.P-S7.TRI	COOMET.PR-S10	GULFMET.EM-S3
APMP.T-K9	COOMET.PR-S9	SIM.L-K7.2016
APMP.T-S15	EURAMET.L-K3.2009.2	SIM.M.M-K6
BIPM.RI(II)-K4.C-11	EURAMET.L-K4.2015	SIM.M.M-S16
CCEM-K4.2017	EURAMET.L-K5.2016	SIM.PR-K6.2010
CCM.G-K2.2017	EURAMET.M.P-K15.1	SIM.T-K6.6
CCQM-K145	EURAMET.RI(I)-S16	SIM.T-S9
CCQM-K150		

End of August, 45 abandoned or superseded key and supplementary comparisons were kept in the KCDB archives.

## 2.3. Published results of key and supplementary comparisons

From 1 September 2016 the following 49 reports were published:

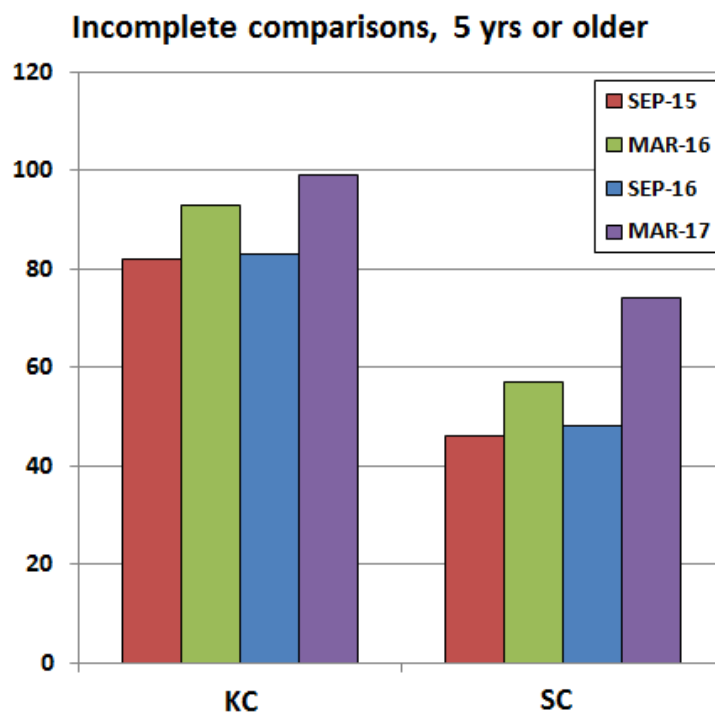
APMP.L-K3	CCAUV.V-K3	COOMET.EM-K4
APMP.M.FF-K2.a	CCL-K11 (2014)	COOMET.EM-K6.a
APMP.M.F-S1	CCL-K11 (2015)	COOMET.EM-S1
APMP.M.T-S1	CCM.D-K4 (linking report)	COOMET.EM-S14
APMP.QM-K91	CCM.FF-K2.2015	COOMET.EM-S4
APMP.RI(I)-K1.1.2010	CCM.M-K7	COOMET.M.G-S1
APMP.RI(I)-S2	CCM.P-K15	COOMET.M.T-S1
APMP.T-S6	CCM.P-K15.1	EURAMET.L-S22
BIPM.EM-K13	CCQM-136	EURAMET.L-S23
BIPM.QM-K1	CCQM-48.2014	EURAMET.M.P-K8
BIPM.RI(I)-K3	CCQM-K101	EURAMET.M.P-S9
BIPM.RI(I)-K5	CCQM-K115	EURAMET.M.T-S2
BIPM.RI(II)-K1.Co-60	CCQM-K130	EUROMET.M.D-K2
BIPM.RI(II)-K4.F-18	CCQM-K140	SIM.EM.RF-K5.b.CL
BIPM.RI(II)-K4.Tc-99m	CCQM-K97	SIM.M.F-S5
BIPM.RI(II)-K4.Tc-99m	CCT-K3.2	SIM.M.M-S15

CCAUV.U-K4

**2.4. Follow-up on JCRB Action 33/3**

**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.*

Information on the number of comparison of this category is not large enough to conclude whether or not the observed increase is significant, as illustrated in Figure 4 where statistics regarding key and supplementary comparisons have been illustrated for the period September 2015 to March 2017. A list of the comparisons concerned may be found in Appendix.



**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 6 summarizes the participation of the [41 Associates of the CGPM](#) in CIPM MRA activities as at 1 March 2017.

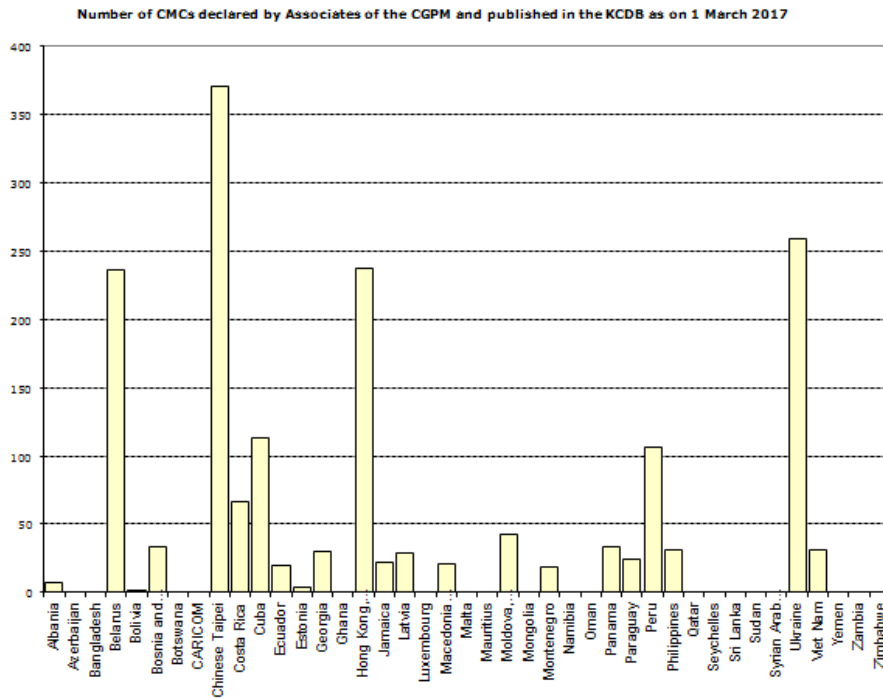
The increase of CMCs corresponds to 2 %. CMCs within new areas were published for Bosnia Herzegovina and Macedonia, but only half of the Associates have CMCs published in the KCDB. One country requested a number of CMCs to be greyed out which is the first time for an Associate. The repartition of CMCs among Associates is illustrated in Figure 5. The increase in Associate piloting and participation in comparisons increased by 8%, slightly more than the increase of the global the number. The comparison participation by Associates is illustrated in Figure 6.

**Table 6.** CIPM MRA activity of the NMIs of Associates of the CGPM: important dates, number of published CMCs and participation in key and supplementary comparisons.<sup>6,7</sup>

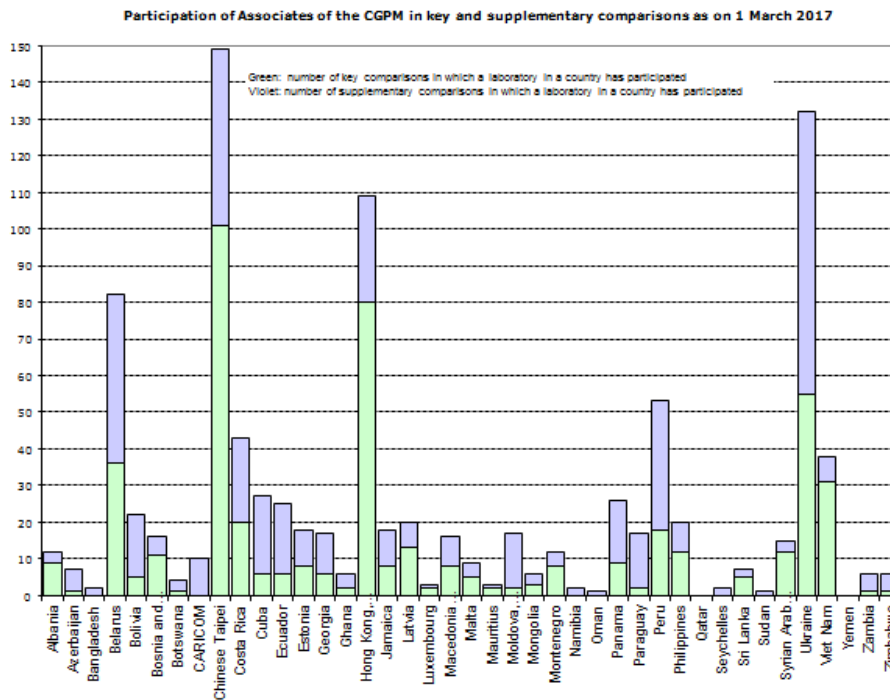
Associate of the CGPM	Date of becoming an Associate	Date of signature of the CIPM MRA	Published CMCs	Greyed-out CMCs	Date of publication of the first CMC	Area of the first CMC	Key comparisons	Supplementary comparisons
Albania	10 September 2007	10 October 2007	7	0	05 April 2013	Mass Standards	9	3
Azerbaijan	01 January 2015	28 January 2015	0	0	-	-	1	6
Bangladesh	29 March 2010	25 March 2011	0	0	-	-	0	2
Belarus	05 May 2003	14 October 2003	236	0	07 April 2004	Acoustics, Ultrasound and Vibration	36	46
Bolivia	04 April 2008	16 May 2008	2	0	19 July 2016	Chemistry	5	17
Bosnia and Herzegovina	24 May 2011	15 June 2011	33	0	08 June 2012	Mass Standards	11	5
Botswana	30 May 2012	26 July 2012	0	0	-	-	1	3
CARICOM	10 October 2005	12 October 2005	0	0	-	-	0	10
Chinese Taipei	26 April 2002	04 June 2002	371	0	21 October 2003	Mass Standards, Force, Hardness, Pressure	101	48
Costa Rica	29 January 2004	06 October 2004	67	0	26 November 2008	Mass Standards	20	23
Cuba	19 December 2000	18 June 2001	113	0	02 May 2005	Ionizing radiation (I and II)	6	21
Ecuador	20 November 2000	15 April 2001	20	0	16 September 2011	Mass Standards	6	19
Estonia	27 January 2005	23 March 2005	4	0	05 May 2014	Humidity	8	10
Georgia	01 January 2008	17 June 2008	30	0	20 March 2014	Thermometry	6	11
Ghana	17 September 2009	24 February 2010	0	0	-	-	2	4
Hong Kong, China	08 April 2000	31 May 2000	238	0	13 December 2000	Length (Laser, Dimensional)	80	29
Jamaica	15 September 2003	21 July 2004	22	0	24 August 2006	Mass Standards	8	10
Latvia	11 January 2001	13 March 2001	29	30	23 March 2005	Length (Dimensional)	13	7
Luxembourg	29 January 2014	01 October 2014	0	0	-	-	2	1
Macedonia (Former Yugoslav Rep. of)	10 October 2006	14 November 2007	21	0	02 July 2013	Fluid Flow	8	8
Malta	11 April 2001	20 June 2001	0	0	-	-	5	4
Mauritius	05 October 2010	09 March 2011	0	0	-	-	2	1
Moldova, Republic of	01 January 2007	14 November 2007	42	0	26 September 2013	Thermometry	2	15
Mongolia	07 August 2013	23 October 2013	0	0	-	-	3	3
Montenegro	01 August 2011	19 October 2011	19	0	20 November 2015	Thermometry	8	4
Namibia	10 August 2012	16 October 2012	0	0	-	-	0	2
Oman	08 May 2012	20 November 2014	0	0	-	-	0	1
Panama	03 August 2003	16 September 2003	34	0	11 September 2006	Mass Standards	9	17
Paraguay	06 May 2009	27 October 2009	24	0	31 January 2011	Mass Standards	2	15
Peru	28 May 2009	17 November 2009	106	0	03 August 2010	Mass Standards	18	35
Philippines	01 June 2002	19 December 2002	31	0	18 December 2013	Mass Standards	12	8
Qatar	10 March 2016	16 March 2016	0	0	-	-	0	0
Seychelles	10 September 2010	12 November 2010	0	0	-	-	0	2
Sri Lanka	14 November 2007	14 November 2007	0	0	-	-	5	2
Sudan	26 June 2014	26 June 2014	0	0	-	-	0	1
Syrian Arab Republic	31 May 2012	17 September 2012	0	0	-	-	12	3
Ukraine	19 August 2002	14 October 2003	259	0	10 January 2005	Length (Laser, Dimensional)	55	77
Viet Nam	10 October 2003	16 September 2004	31	0	21 July 2010	Time and Frequency	31	7
Yemen	21 July 2014	17 November 2014	0	0	-	-	0	0
Zambia	10 December 2010	3 February 2011	0	0	-	-	1	5
Zimbabwe	14 September 2010	14 January 2011	0	0	-	-	1	5

<sup>6</sup> 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.

<sup>7</sup> As the numbers on participation in key and supplementary comparisons change comparatively slowly with time, the corresponding KCDB statistics are updated every six months (in May and November of each year). However, the numbers of CMCs published in the KCDB varies more rapidly and are updated in "real-time". The numbers given here show the situation as at 1 March 2017.



**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. Revision of the BIPM KCDB

Since the last JCRB meeting, the following progress has been achieved on the revision of the BIPM KCDB, here under the working name “KCDB 2.0”:

Information on the possible design of the future web-platform was communicated to the JCRB and the Consultative Committees in August 2016, and feedback on a number of issues related to the [Report of the Working Group on the Implementation and Operation of the CIPM MRA](#) was requested from the CCs, received in October 2016. A tele-conference meeting was held with the CCQM *ad hoc* Working Group on the CIPM MRA revision in September where it was decided to remove independent information on Certified Reference Material in the KCDB 2.0. The issued recommendations by the Working Group on the Implementation and Operation of the CIPM MRA were adopted at the 105th meeting of the CIPM in October 2016, where several recommendations concerned a revision of the KCDB.

The BIPM is presently completing the Functional and Technical Specifications for the KCDB revision. A document has recently been drafted to inform the partners that are directly concerned by the revision on the facilities that have been foreseen.

Following the Working Group recommendations, the following main targets have been identified for the KCDB revision:

- 1) To create a restricted-access web-based CMC platform for exchange of CMC data and support of the entire CMC review process.

The approach is to abandon the Excel file as source for the CMC data. Excel files will no longer be sent to the actors. Instead, data will be made accessible in a DRAFT on the CMC Web Platform with the possibility for WRITER, REVIEWER and TC-CHAIR to alter the DRAFT at distinct occasions. The approved DRAFT can be automatically uploaded onto the KCDB.

The CMC Web Platform will have restricted and controlled access supported by user accounts.

The CMCs from different countries within the same field will still be regrouped for identification. However, possible problems encountered by one country will no longer delay the publication of approved CMCs of another country from the same group.

- 2) To create Improved search facilities

The search facilities will be enlarged with a possibility to obtain the numerical range for the measurand and uncertainties of CMCs, which are not available today.

- 3) To create the possibility to track comparison in “real-time”

Registration of new comparisons will be made by the Pilot using a web form which contents will be stored in a database. The pilot may supply supporting documents, e.g. the Technical protocol. Information on progress may be updated by the pilot. The database will allow searching on comparison progress. If the form has not been updated during the last 6 months, the Pilot will receive an automatic e-mail requesting to update the form if progress has been achieved.

**APPENDIX List of uncompleted comparisons older than 5 years**

**a) Key Comparisons**

KC identifier	Status Aug 2016	Indicated year	Pilot	Note
AFRIMETS.M.P-K2	In progress	2012 - 2013		Added in 2017
APMP.AUV.V-K1.1	Report in progress, Draft A	2010	NMIJ AIST	
APMP.EM.BIPM-K11	Report in progress, Draft B	2004	Puslit KIM-LIPI	
APMP.EM.BIPM-K11	In progress	2009 - 2011	KRISS	
APMP.EM.RF-K8.CL	Measurements completed	2012 - 2013		Added in 2017
APMP.EM-K2	In progress	2010 - 2011	KRISS	
APMP.EM-K5.1	Report in progress, Draft A	2010 - 2013	NIM	
APMP.L-K5.2006.1	Report in progress, Draft A	2012 - 2013		Added in 2017
APMP.M.D-K4	Report in progress, Draft A	2007 - 2008	KRISS	
APMP.M.F-K2	Report in progress, Draft A	2007 - 2013	KRISS	
APMP.M.F-K3.a	In progress	2011 -	NIM	Added in 2016
APMP.M.F-K3.b	In progress	2011 -	NIM	Added in 2016
APMP.M.H-K1.b	Report in progress, Draft A	2003 - 2005	NMIJ AIST	
APMP.M.H-K1.c	Report in progress, Draft A	2003 - 2005	NMIJ AIST	
APMP.M.M-K2.2	In progress	2010	KRISS	
APMP.M.M-K5	Planned		NIM	
APMP.M.P-K1.c.2	Report in progress, Draft B	2012		Added in 2017
APMP.M.P-K7.TRI	Report in progress	2001	NMIJ AIST	
APMP.M.P-K9	Report in progress, Draft A	2009 -	KRISS, NMIA	
APMP.PR-K2.a.1	Measurement completed	2010 - 2012	NMIA	
APMP.PR-K2.b.1	In progress	2010 - 2012	NMIA	
APMP.PR-K3.a	In progress	2012 - 2014		Added in 2017
APMP.PR-K3.a.1	Measurement completed	2006	NIM	
APMP.PR-K4	Report in progress, Draft B	2006 - 2007	NIM	
APMP.QM-K46	Report in progress, Draft A	2012		Added in 2017
APMP.RI(I)-K2.B	Report in progress, Draft A	2007	NMIJ AIST	
APMP.RI(I)-K4	Report in progress, Draft A	2009 - 2010	NMIJ AIST	
APMP.T-K3.5	Measurements completed	2011 - 2014	KRISS	Added in 2016
APMP.T-K7.1	Protocol complete	2011 - 2012	NMIJ-AIST	Added in 2016
APMP.T-K8	In progress	2011 - 2013	NMIJ-AIST	Added in 2016
CCEM.RF-K5.c.CL	In progress	2012 - 2015		Added in 2017
CCEM-K2.2012	In progress	2012 - 2015		Added in 2017
CCL-K1.2011	In progress	2011 - 2014	CENAM, NRC	Added in 2016
CCM.D-K3	Planned	2011 -	NMIJ-AIST	Added in 2016
CCM.F-K3.a	Report in progress, Draft A	2005 - 2007	PTB	
CCM.F-K3.b	Report in progress, Draft A	2005 -	PTB	
CCM.H-K2	Report in progress, Draft A	2003 - 2004	KRISS, NMIJ AIST	
CCM.H-K3	Planned	2011 - 2012	INRIM, NIST, NMIJ, PT	Added in 2016
CCM.P-K14	Report in progress, Draft A	2010 - 2011	METAS	
CCM.P-K14.1	Protocol complete	2011 - 2012	METAS	Added in 2016
CCM.V-K3.A	Report in progress, Draft A	2012 - 2013		Added in 2017
CCM.V-K3.B	Report in progress, Draft A	2012 - 2013		Added in 2017
CCM.V-K3.C	Report in progress, Draft A	2012 - 2013		Added in 2017
CCQM-K103	Report in progress, Draft B	2012		Added in 2017
CCQM-K104	Report in progress, Draft B	2012		Added in 2017
CCQM-K11.2	Report in progress, Draft B	2012		Added in 2017
CCQM-K12.2	Report in progress, Draft A	2012		Added in 2017

(continued...)

KC identifier	Status Aug 2016	Indicated year	Pilot	Note
CCQM-K6.2	Report in progress, Draft B	2012		Added in 2017
CCQM-K84	Report in progress, Draft A	2011	KRISS	Added in 2016
CCQM-K97	Report in progress, Draft B	2011	NIM, NMIJ	Added in 2016
CCRI(II)-K2.Fe-55	Report in progress, Draft B	2005 - 2006	BIPM	
CCRI(II)-K2.H-3	Report in progress, Draft B	2008 - 2009	BIPM	
CCRI(II)-K2.I-125(2)	Report in progress, Draft B	2004 - 2005	BIPM	
CCRI(II)-K2.Kr-85	Report in progress, Draft B	2008	BIPM	
CCRI(II)-K2.Mn-54	Report in progress, Draft B	2003	BIPM	
CCRI(II)-K2.P-32	Report in progress, Draft B	2002 - 2003	BIPM	
CCRI(II)-K2.P-32.2	Report in progress, Draft A	2005	BIPM	
CCRI(II)-K2.Pu-238	Report in progress, Draft B	2001	BIPM	
CCRI(II)-K2.Sr-89	Report in progress, Draft B	2000 - 2001	BIPM	
CCRI(II)-K2.Sr-90	Report in progress, Draft A	1997 - 1998	BIPM	
CCRI(II)-K2.Tc-99	In progress	2012 - 2013		Added in 2017
CCRI(II)-K2.Ti-204	Report in progress, Draft B	2002 - 2003	BIPM	
CCRI(III)-	Report in progress, Draft A	2012 - 2013		Added in 2017
CCT-K1.1	Report in progress, Draft A	2006 - 2014	NIST	
CCT-K3.2	Report in progress, Draft A	2010	A*STAR	
CCT-K4.1	In progress	2012 - 2014		Added in 2017
CCT-K6.1	Report in progress, Draft A	2008 - 2010	NPL	
CCT-K9	Measurements completed	2011 - 2012	NIST	Added in 2016
COOMET.AUV.V-K1	Report in progress, Draft B	2007 - 2008	VNIIM	
COOMET.L-K3	Report in progress, Draft A	2011 - 2012	VNIIM	Added in 2016
COOMET.M.H-K2	Report in progress, Draft B	2007 - 2010	VNIIFTRI	
COOMET.M.M-K8	In progress	2012 - 2016		Added in 2017
COOMET.PR-K3.a	Report in progress, Draft A	2009 - 2011	BeIGIM	Progress since 2/2016
EURAMET.EM-K12	Planned	2012 - 2013		Added in 2017
EURAMET.L-K3.2009	Report in progress, Draft A	2009 - 2015	PTB	Progress since 2/2016
EURAMET.L-K8	Report in progress, Draft B	2009 - 2010	LNE, NRC	
EURAMET.M.D-K1.1	Report in progress, Draft A	2008 - 2012	PTB	
EURAMET.M.FF-K5.a	Protocol complete	2009	PTB	
EURAMET.M.P-K1.c	In progress	2011 - 2014	FORCE	Added in 2016
EURAMET.M.P-K7	Report in progress, Draft B	2005 - 2007	MIKES	
EURAMET.PR-K2.a	Measurements completed	2010 - 2012	VSL	
EURAMET.PR-K3.a.1	Report in progress, Draft B	2004 - 2005	LNE-INM	
EURAMET.PR-K5	Measurement completed	2007 -	MKEH	
EURAMET.PR-K6.2	Report in progress, Draft A	2008 - 2009	BIM	
EURAMET.T-K1	Report in progress, Draft A	2008 - 2012	PTB	
EURAMET.T-K3.2	Report in progress, Draft B	2009 - 2010	UME	
EURAMET.T-K3.4	Report in progress, Draft A	2010 - 2011	MIRS/UL-FE/LMK	
EUROMET.M.D-K2	Report in progress, Draft B	2001	PTB	
EUROMET.M.F-K1	Report in progress, Draft B	2002 - 2004	MIKES	
EUROMET.M.F-K3	In progress	2005 -	PTB	
EUROMET.T-K8	In progress	2008 - 2012	PTB	
SIM.AUV.V-K1.1	Report in progress, Draft B	2005	INMETRO	
SIM.M.P-K1	Protocol complete	2008 - 2010	CENAM	
SIM.M.P-K1.c	In progress	2011 - 2013	INDECOPI	Added in 2016
SIM.M.P-K2	In progress	2011 - 2013	INTI	Added in 2016
SIM.M.P-K6	In progress	2008 - 2011	CENAM	
SIM.M.P-K6.1	In progress	2011 - 2013	LACOMET	Added in 2016
SIM.M.P-K7	Report in progress, Draft B	2001	CENAM	
SIM.QM-K1	Report in progress, Draft B	2009	INMETRO	



## b) Supplementary Comparisons

SC identifier	Status August 2016	Indicated year	Pilot	Note
AFRIMETS.L-S4	In progress	2012	PTB	Added in 2017
AFRIMETS.RI(I)-S1	In progress	2011 - 2013	NMISA	new in 2016
AFRIMETS.T-S1	Report in progress, Draft B	2009 - 2010	NMISA	
AFRIMETS.T-S2	In progress	2012	NMISA	Added in 2017
AFRIMETS.T-S3	In progress	2012	NMISA	Added in 2017
AFRIMETS.T-S4	Protocol complete	2012 - 2013	MIRS/UL-FE/LMK	Added in 2017
APMP.EM-S8	Protocol complete	2011 - 2013	NPLI	new in 2016
APMP.L-S5	In progress	2012	NMIJ AIST, CMS	Added in 2017
APMP.M.G-S1	Report in progress, Draft A	2012	NIM	Added in 2017
APMP.M.H-S4	Report in progress, Draft A	2011	KRISS	
APMP.M.MM-S1	In progress	2012 - 2013	KRISS	Added in 2017
APMP.M.M-S1	Planned	2007	NPSL Pakistan	
APMP.M.P-S1	Measurement completed	2003 - 2005	CMS/ITRI	
APMP.PR-S1.2	Protocol complete	2008	NMC, A*STAR	
APMP.PR-S5	Measurement completed	2008 - 2009	NMIJ AIST	
APMP.PR-S6	In progress	2012 - 2013	KRISS	Added in 2017
APMP.RI(I)-S1	Report in progress, Draft B	2010 - 2011	OAP	
APMP.T-S8	In progress	2011 - 2015	NMLPHIL	new in 2016
CCRI(II)-S10	Report in progress, Draft A	2011 - 2012	ENEA-INMRI	new in 2016
CCRI(II)-S6.Co-57	Report in progress, Draft B	2008	IAEA	
CCRI(II)-S6.I-131	Report in progress, Draft B	2006	IAEA	
CCRI(II)-S9	Report in progress, Draft A	2011	KRISS	new in 2016
CCT-S2	Report in progress, Draft B	2007 - 2010	LNE	Progress 9/2015 to 2/2016
CCT-S3	Report in progress, Draft A	2007 - 2008	NMIJ AIST	
COOMET.EM.RF-S1	In progress	2009	VNIIFTRI	
COOMET.EM-S10	Report in progress, Draft B	2010 - 2012	VNIIIMS	
COOMET.EM-S6	Report in progress, Draft B	2007 - 2010	VNIIIMS	
COOMET.EM-S7	Report in progress, Draft B	2009 - 2011	VNIIIMS	
COOMET.EM-S9	In progress	2009	VNIIFTRI	
COOMET.M.D-S1	Protocol complete	2012 - 2015	VNIIIM	Added in 2017
COOMET.M.FF-S2	Report in progress, Draft B	2008 - 2009	PTB	
COOMET.M.FF-S4	Report in progress, Draft B	2009 - 2010	SMU	
COOMET.M.F-S1	Report in progress, Draft B	2008 - 2010	VNIIIM	
COOMET.PR-S1	Measurements completed	2012 - 2013	VNIIOFI	Added in 2017
COOMET.PR-S2	Report in progress, Draft B	2011 - 2012	VNIIOFI	new in 2016
COOMET.PR-S5	Measurements completed	2008 - 2011	INIMET (Cuba)	Progress 9/2015 to 2/2016
EURAMET.EM-S31	Measurement completed	2009 - 2010	PTB	
EURAMET.EM-S33	In progress	2010 - 2011	LCOE (Spain)	
EURAMET.EM-S34	Protocol complete	2010 - 2011	LCOE (Spain)	
EURAMET.EM-S35	Protocol complete	2012 - 2013	INRIM	Added in 2017
EURAMET.EM-S36	Planned	2012 - 2014	SP	Added in 2017
EURAMET.EM-S37	In progress	2011 - 2013	CMI	new in 2016
EURAMET.M.F-S2	In progress	2012 - 2013	BEV	Added in 2017
EURAMET.M.M-S3	Report in progress, Draft B	2011 - 2012	UME	Progress since 2/2016
EURAMET.M.M-S5	Planned	2012 - 2013	NSAI NML	Added in 2017
EURAMET.M.P-S5	Report in progress, Draft B	2007	PTB	
EURAMET.PR-S4	Measurements completed	2012 - 2013	LNE	Added in 2017
EURAMET.PR-S5	Measurements completed	2012 - 2013	PTB	Added in 2017
EURAMET.T-S4	Report in progress, Draft B	2007 - 2009	NPL	
EUROMET.RI(III)-S1	Report in progress, Draft B	2003 - 2007	IRSN	
SIM.AUV.A-S1	Report in progress, Draft B	2001 - 2002	CENAM	
SIM.M.D-S4	Protocol complete	2012	INDECOPI	Added in 2017
SIM.M.D-S5	In progress	2012 - 2013	INM (CO)	Added in 2017
SIM.M.FF-S4	Report in progress, Draft B	2006	INIMET (Cuba)	

**(continued...)**

SC identifier	Status August 2016	Indicated year	Pilot	Note
SIM.M.F-S2	Planned	2012	IDIC	Added in 2017
SIM.M.F-S3	Report in progress, Draft B	2012 - 2013	NIST	Added in 2017
SIM.M.F-S4	Protocol complete	2012 - 2013	IDIC	Added in 2017
SIM.M.M-S11	In progress	2012 - 2013	INM (CO)	Added in 2017
SIM.M.M-S12	In progress	2012 - 2015	CESMEC Ltda.	Added in 2017
SIM.M.M-S13	Protocol complete	2012	INDECOPI	Added in 2017
SIM.M.M-S6	Report in progress, Draft B	2009	CESMEC (Chile)	
SIM.M.P-S1	Report in progress, Draft A	2007 - 2008	NIST	
SIM.M.P-S2	In progress	2009 - 2011	INMETRO	
SIM.M.P-S3	Protocol complete	2010	LCPN-P (Chile)	
SIM.M.P-S4	Protocol complete	2010	LCPN-P (Chile)	
SIM.M.P-S5	In progress	2011 - 2013	INMETRO	new in 2016
SIM.M.P-S8	Planned	2012	ENAER	Added in 2017
SIM.M.P-S9	Planned	2012	ENAER	Added in 2017
SIM.PR-S3	Protocol complete	2012	NIST	Added in 2017
SIM.QM-S3	Report in progress, Draft A	2012	NIST	Added in 2017
SIM.QM-S4	Report in progress, Draft A	2012	NIST	Added in 2017
SIM.T-S3	Report in progress, Draft B	2007 - 2008	CESMEC, INEN	
SIM.T-S4	Report in progress, Draft B	2008	PTB	
SIM.T-S6	Report in progress, Draft A	2012 - 2014	NIST	Added in 2017