Consultative Committee for Time and Frequency

Nineteenth Session

(Sèvres, 13 and 14 September 2012)

Progress Report
from the
CCTF Working Group on the MRA
(WGMRA)

F.Cordara, chairman

1 Introduction

At the 18th CCTF in 2009 some important topics related to the Mutual recognition Arrangement implementation in the Time and Frequency field were deeply discussed and eventually some decisions were taken about the key comparison CCTF-K001, confirmed as the unique key comparison in this field, and about the way it has to be made available on the KCDB. It was also agreed to further develop some criteria for the evaluation of the uncertainty for the CMCs in Frequency and for the prediction uncertainty of clock time differences versus UTC, already reported in many approved CMCs, but expressed according to different criteria. Another action agreed at the last CCTF was the adoption of new terms of reference for the WGMRA that are reported here below, and are available since June 2012 in the BIPM website.

ToR of the WG on MRA

a) Authorization on a provisional basis for any action needed between meetings of the CCTF as indicated by the MRA, in consultation with the CCTF President;
b) Perform coordination activities related to MRA between RMOs;
c) Act as point of contact for BIPM and JCRB on MRA matters;
d) Report actions to the next CCTF meeting, the CCTF revising the decisions as required;
e) Identify areas where additional key comparisons and supplementary comparisons are needed, and develop necessary guidelines and procedures;
f) Provide guidance on the range of CMCs supported by particular key and supplementary comparisons;
g) Establish and maintain a list of service categories, and where necessary rules for the preparation of CMC entries;
h) Agree on detailed technical review criteria;
i) Coordinate the review of existing CMCs in the context of new results of key and supplementary comparisons.

2 WG MRA membership and meetings

According to a proposal received and agreed upon at the last CCTF, the membership to the WG, previously limited to the chairpersons of the RMOs Technical Committees for Time and Frequency, has been extended to include technical experts from timing laboratories, that for this term were namely Dr.B.Warrington (NMIA), Mr. E.Dierikx (VSL) and Dr.G.Panfilo (BIPM). The updated list of members as of June 2012 has been published on the BIPM website under “CCTF”.
During this term no meeting of the full group was organized, but the chairman met once per year with the BIPM TFG section experts Dr. F.Arias and Dr.G.Panfilo to develop the two new guidelines as agreed at the last CCTF and regarding “The Uncertainty in Frequency” and “The prediction Uncertainty” and to update the content of the already existing Guidelines 2 and 3, to have them consistent with the newly developed ones and with some new guidance documents related to the MRA published in the BIPM-CIPM website.
All the documents above have been mailed in June 2012 to the WG members to get comments together with information on the activities related to the MRA implementation performed in their RMOs.
In December 2011 the WG chair also met the JCRB Secretary to get information on the new documents developed in the frame of the CIPM MRA and about decisions taken within the JCRB Committee expecially regarding the interval of the CMCs review.

3 Status of the CMCs for Time and Frequency

At the beginning of 2012, a total of 45 countries were listed in the KCDB as suppliers of calibration services for Time and Frequency divided as follows, according to the service classification (upper level) of WGMRA Guideline 1: Time scale difference 34 countries, Frequency 44 countries, Time Interval 34 countries.
The dates of approval of these CMCs range from 2005 to 2011 and there is no information about any periodical review from the RMOs.
It should anyway be considered that new guidance documents related to this activity have been approved, published in the BIPM website under BIPM-CIPM MRA documents, that I will list below:

- CIPM-MRA-D-04 Calibration and Measurement Capabilities in the context of CIPM MRA, Jan 2011
- CIPM/2009-24 Traceability in the CIPM MRA, Oct 2009,
- CIPM-MRA-G-02, JCRB guidelines for the monitoring and reporting of the operation of quality systems by RMOs, Jan 2011,
- CIPM MRA-D-05 Measurement comparisons in the CIPM-MRA, Jun 2012.

Some topics are clearly related to the activity of this WG and of the RMOs and were considered in reviewing Guidelines 2 and 3.

4 Key Comparison CCTF.K001.UTC

Following the decision taken at the CCTF 2009, no degrees of equivalence between the key comparison results and the UTC(k) data is reported on the KCDB, the last table available being for MJD 55009 (2009 June 27). There is a link instead to the BIPM Circular T where the results of the key comparison every 5 days can be found for the 68 laboratories contributing to TAI. A note makes a reference to the CCTF 2009 decision and to the document Guidelines for participation in the ongoing key comparison in time CCTF.K001.UTC.

5 New and revised guidelines proposed to the CCTF

At the last CCTF the questions about the uncertainty in frequency calibration services and the uncertainty of the prediction of UTC-UTC(k) in the Time scale difference CMCs were left open, therefore they were studied by dr. G.Panfilo and two new guidelines were eventually prepared and agreed with the WGMRA chair by May 2012.
The guideline “Uncertainty in Frequency” completes the existing Guideline 3 “The uncertainty interpolation for T&F CMC entries” suggesting a way to compute the uncertainty for frequency calibration from the UTC-UTC(k) values and related uncertainties from Circular T.
The other guideline, “The prediction uncertainty”, is strictly related to the service category “Time scale difference – Local clock versus UTC” giving a model to compute the uncertainty in predicting the time error of two types of reference clocks (cesium and hydrogen maser) commonly used for a UTC(k) generation, over a time span of 20 days as is commonly found in the CMCs tables.
No review of WGMRA Guideline 1 was found necessary, meanwhile an editorial review of Guideline n.2 (The estimation of uncertainties for the T&F CMC entries) to update for the new time comparison links and for recent CIPM-MRA documents, and of Guideline n.3 for a more appropriate wording was done.

6 Proposed tasks for the 19th CCTF meeting

According to the duties assigned to the WGMRA and to the activities performed in this term, I propose that the following documents are discussed and approved:

- New Guideline “Uncertainty in Frequency” 2012,
- New Guideline “The prediction Uncertainty” 2012,
- CCTF WGMRA Guideline 2 “The estimation of uncertainties for the T&F CMC entries” (Rev Dec2011-July2012),
- CCTF WGMRA Guideline 3 “The uncertainty interpolation for T&F CMC entries” (Rev Dec2011-July2012).

I also propose, as requested by some WG member, that all the guidelines related to the CMCs are made available to users on the KCDB.

7 Open issues

From the experience gathered during this two terms as chairman of the WGMRA and from contribution received by the actual members, I would suggest some topics that need to be discussed during this meeting or to be faced in the next term:

a) Improve the effectiveness of communication between the RMOs representant and the other WGMRA members,
b) Develop a guideline on the technical criteria for the CMCs review and their periodical evaluation,
c) Collect regularly the information on regional time links calibration performed and agree with BIPM on a common calibration protocol;
d) Establish a rule for a periodical evaluation of the degree of equivalence of the CMCs claimed by the NMIs and available in the KCDB.

Annexes

CCTF WGMRA Guideline Uncertainty in Frequency, 2012

CCTF WGMRA The prediction Uncertainty", 2012

CCTF WGMRA Guideline 2 "The estimation of uncertainties for the T&F CMC entries" (Rev Dec2011-July2012),

CCTF WGMRA Guideline 3 "The uncertainty interpolation for T&F CMC entries" (Rev Dec2011-July2012).