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| **The 5th Meeting of the APT Conference Preparatory**  **Group for WRC-23 (APG23-5)** | **APG23-5/OUT-25** |
| 20 – 25 February 2023, Busan, Republic of Korea | 24 February 2023 |

Working Party 3

**PRELIMINARY VIEWs on Resolution 655 (WRC-15)**

**Resolution 655 (WRC-15):**

*Definition of time scale and dissemination of time signals via radiocommunication systems*

**1. Background**

Coordinated Universal Time (UTC) is the international standard time-scale for all practical timekeeping in the modern world. The UTC time-scale is maintained by the International Bureau of Weights and Measures (BIPM) and adjusted by insertion or deletion of seconds (positive or negative leap-seconds) to ensure approximate agreement with mean solar time (UT1). A leap second was added most recently on 31 December 2016 at 23:59:60 UTC.

WRC-15 considered “Future of the Coordinated Universal Time time-scale” under AI 1.14 (WRC-15), including removal of the leap second insertion or deletion from the definition of UTC, and decided that further studies were required on current and potential future reference time-scales, including their impact and applications. The results of the ITU-R studies will be reported to WRC-23. Until then, UTC shall continue to be applied as described in Recommendation ITU-R [TF.460-6](https://www.itu.int/rec/R-REC-TF.460/recommendation.asp?lang=en&parent=R-REC-TF.460-6-200202-I) and as maintained by BIPM.

Since WRC-15, this issue has been studied by the ITU-R and the organizations of the Metre Convention in parallel and in cooperation with each other as per Resolution **655 (WRC-15)**.

The responsible group in ITU-R is WP 7A. In response to Resolution **655 (WRC-15)**, WP 7A has developed Report ITU-R TF.[2511-0](https://www.itu.int/pub/R-REP-TF.2511). WP 7A also developed the Note to provide the necessary information to the Director of the Radiocommunication Bureau (BR) to fulfil his task (Annex 4 to the WP 7A Chairman’s Report (Doc. [7A/64](https://www.itu.int/md/R19-WP7A-C-0064/en)))

In the meantime, the General Conference on Weights and Measures (CGPM) at its 26th meeting in 2018 confirms the definition of UTC in [Resolution 2](https://www.bipm.org/en/committees/cg/cgpm/26-2018/resolution-2) “On the definition of time scales”: that UTC is a time scale produced by the BIPM with the same rate as TAI (International Atomic Time) but differing from TAI only by an integral number of seconds.

The [27th CGPM](https://www.bipm.org/en/cgpm-2022) in November 2022 adopted [Resolution 4](https://www.bipm.org/en/cgpm-2022/resolution-4) on the use and future development of UTC and decided that the maximum value of the difference (UT1 – UTC) was going to be increased in, or before, 2035, which is currently 0.9 seconds, to be able to ensure the continuity of UTC for at least a century.

These activities under the Metre Convention are well recognized by WP 7A and reflected in the new Report ITU-R TF.2511-0 as well as the Note to the BR Director.

**2. Documents**

* Input Documents APG23-5/INP-[16](https://www.apt.int/sites/default/files/2023/02/APG23-5-INP-16_Japan-WP3-Preliminary_Views_on_WRC-23_Agenda_Items_1.12_1.13_1.14_9.1A_9.1D_and_RES.655WRC-15.docx) (J)
* Information Documents APG23-5/INF-[35](https://www.apt.int/sites/default/files/2023/02/APG23-5-INF-35_Brief_on_AI_Res655.docx) (DG Chair), [39](https://www.apt.int/sites/default/files/2023/02/APG23-5-INF-39_Status_of_CEPT_preparation_for_WRC-23_and_RA-23.pdf) (CEPT), [43](https://www.apt.int/sites/default/files/2023/02/APG23-5-INF-43_CITEL_preparation_for_WRC-23.pdf) (CITEL),   
  [45](https://www.apt.int/sites/default/files/2023/02/APG23-5-INF-45_Status_of_RCC_preparation_to_the_WRC-23.pdf) (RCC)

**3. Summary of discussions**

**3.1 Summary of APT Members’ views**

**3.1.1 Japan** - **Document APG23-5/INP-**[**16**](file:///D:\APT%20Docs\APG\APG2023\APG23-5\Documents\Original%20OUT%20documents\Guidance%20to%20describe%20APT%20view%20on%20CPM%20methods-final.docx)

The 27th meeting of the General Conference on Weights and Measures (CGPM, November 2022) adopted Resolution 4 on the use and future development of Coordinated Universal Time (UTC) and decided to increase the maximum value for the difference (UT1 – UTC) by, or before, 2035. This decision has led to the substantial stoppage of leap second adjustment and moved to the continuous reference time scale after a certain transition period.

Japan is of the view that the WRC-23 should amend Resolution **655** **(WRC-15)** and invite the ITU-R to revise Recommendation ITU-R TF.460-6, following this CGPM decision. In addition, Japan is of the view that the increase of the maximum value should be implemented as early as possible after a certain transition period, recognising that the specific implementation timeframe, i.e. when to increase before 2035, will be considered by the International Committee of Weights and Measures (CIPM) in consultation with the ITU.

**3.2 Summary of issues raised during the meeting**

The APT preliminary views were updated in the drafting group as presented in Section 4 below.

The proposed draft PACP for modification to Resolution **655 (WRC-15)** embedded below was reviewed briefly but due, to the time shortage, was carried forward to the APG23-6 meeting for further consideration.



**4. APT Preliminary View(s)**

APT Members support the ITU-R studies called for by Resolution **655 (WRC-15)**, recognizing that the 27th General Conference on Weights and Measures (CGPM) in November 2022 adopted Resolution 4 and decided that the maximum value for the difference (UT1 – UTC) would be increased. APT Members would like to end leap seconds.

**5. Other View(s) from APT Members**

None

**6. Issues for Consideration at Next APG Meeting**

APT Members are encouraged to contribute to the next APG meeting for further consideration on Resolution **655 (WRC-15)**, including with respect to further consideration of the draft PACP embedded in Section 3.2 above.

**7. Views from Other Organisations**

**7.1 Regional Groups**

**7.1.1 ASMG** - **Document APG23-4/INF-**[**21**](https://www.apt.int/sites/default/files/2022/08/APG23-4-INF-21_ASMG_Preparation_for_WRC-23.pdf)

To be developed

**7.1.2 ATU** - **Document APG24-4/INF-**[**02**](https://www.apt.int/sites/default/files/2022/07/APG23-4-INF-02_ATU_preparation.docx)

To be developed

**7.1.3 CEPT** - **Document APG23-5/INF-**[**48**](https://www.apt.int/sites/default/files/2022/08/APG23-4-INF-48_Status_of_CEPT_preparation_for_WRC-23_and_RA-23.pdf)

CEPT recognises that:

* the general definition of the international reference time scale UTC is provided in Resolution 2 (2018) of the 26th General Conference on Weights and Measures (CGPM), whereas Resolution 4 (2022) of the 27th CGPM determines its future relation with respect to mean solar time UT1;
* UTC is produced by BIPM and its definition is not a task of spectrum regulation; and
* the cooperation between BIPM and the ITU-R is settled by their Memorandum of Understanding, signed in 2020.

CEPT will address necessary revisions and amendments regarding Resolution **655 (WRC-15)**.

**7.1.4 CITEL** - **Document APG23-5/INF-**[**43**](https://www.apt.int/sites/default/files/2023/02/APG23-5-INF-43_CITEL_preparation_for_WRC-23.pdf)

Preliminary Proposal

**MOD** Resolution **655 (Rev. WRC-15)** **“Definition of time scale and dissemination of time signals via radiocommunication systems”**: One Administration proposes changes to this Resolution to reflect the completion of the work items as well as to acknowledge the ongoing cooperation between the ITU and other relevant organizations in the various aspects of current and potential future reference time scales and the role of the ITU-R in the dissemination of the international reference time scale by radiocommunication.

**7.1.5 RCC** - **Document APG23-5/INF-**[**45**](https://www.apt.int/sites/default/files/2023/02/APG23-5-INF-45_Status_of_RCC_preparation_to_the_WRC-23.pdf)

The RCC Administrations are of the view that, changes of the UTC scale may lead to the need to modify on-board equipment of GNSS, ground stations of the standard frequency and time signal service, transmitting reference signals of frequency and time, as well as navigation and frequency-time consumer equipment.

In the case to switch to a new time scale, it is necessary:

* + to keep the UTC term, while it is proposed to revise the limits on the maximum discrepancy between UT1 and UTC times, to meet the needs of current and future user communities;
  + to determine the maximum value of the discrepancy between the UT1 and UTC times not less then 100 s;
  + to establish a transition period, the duration of which should take into account the planned lifetime of the equipment, and ensure the principle of backward compatibility for consumers of all categories.

Transition period to continuous time scale should be established from the moment of taking decision into force, but not early than in 2040.

**7.2 International Organisations**

None

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