

# WORLD RADIOCOMMUNICATIONS CONFERENCE 2023, WRC-23

MONISHA GHOSH

The International Telecommunications Union (ITU) will conduct its World Radiocommunications Conference 2023 (WRC-23) during November 20–December 15, 2023, in Dubai [1]. WRCs are held about every four years, with the previous two being held in 2019 (WRC-19) and 2015 (WRC-15). Previous columns in the magazine have described the goals [2] and outcomes [3] of WRC-19 and the aim is to do the same for WRC-23. This column will discuss some of the agenda items that may be of interest to wireless researchers and future columns will present outcomes from WRC-23, including study items that are agreed upon for WRC-27.

The principal objective of the WRCs is to review and revise, if necessary, the international regulations governing the use of radio-frequency (RF) spectrum for terrestrial and non-terrestrial applications. The activities are governed by a specific agenda, with Agenda Items (AI) that are based on recommendations made at previous WRCs, in this case WRC-19.

## AGENDA ITEMS (AIs) FOR WRC-23

There are 10 AIs that will be discussed in WRC-23, with sub-sections, as described in detail in [4]. In this section we will highlight a few that may be of interest to wireless communications researchers. The ITU Regions are depicted in [5]. These Agenda Items were recommended for further study in WRC-19 via various resolutions as described in detail in [4].

- **Agenda Item 1.2** is one of the most watched in WRC-23 since it seeks to identify a number of bands for International Mobile Telecommunications (IMT), perhaps on a primary basis. These are 3300–3400 MHz (Regions 1 and 2), 3600–3800 MHz (Region 2), 6425–7025 MHz (Region 1), 7025–7125 MHz (globally), and 10.0–10.5 GHz (Region 2). It should be noted, as described in [6], that the U.S. has already allocated the full 6 GHz band from 5.925 GHz to 7.125 GHz to unlicensed services that will share the band with existing incumbents and hence is not affected by the outcome of WRC-23. Many other countries have also allocated the full band for unlicensed services, while some have allocated only the lower half, 5.925–6.425 GHz to unlicensed and yet other nations are undecided. Similarly, the 10.0–10.5 GHz band in the U.S. is allocated primarily to federal radiolocation services (RLS) and an IMT identification for this band may be problematic.
- **Agenda Item 1.13** will consider a possible upgrade of the allocation of the frequency band 14.8–15.35 GHz to the space research service. This band is currently allocated in the U.S. to space research as a secondary allocation [7].
- **Agenda Item 1.15** seeks to harmonize the use of the frequency band 12.75–13.25 GHz (earth-to-space) by earth stations on aircraft and vessels communicating with geostationary space stations in the fixed-satellite service globally. It should be noted that in the U.S., the Federal Communications Commission (FCC) has issued a Notice of Proposed Rulemaking (NPRM) that considers permitting high-power terrestrial service in the 12.7–13.25 GHz band as described in a previous column in this magazine [8].
- **Agenda Item 1.16** will develop technical, operational, and regulatory measures, as appropriate, to facilitate the use of the frequency bands 17.7–18.6 GHz, 18.8–19.3 GHz, and 19.7–20.2 GHz (space-to-Earth) and 27.5–29.1 GHz and 29.5–30 GHz (Earth-to-space) by non-geostationary fixed-satellite service earth stations in motion, while ensuring due protection of existing services in those frequency bands. Some of these frequency ranges are allocated in the U.S. to nonfederal fixed links on a primary basis.
- **Agenda Item 1.19** will consider a new primary allocation to the fixed-satellite service in the space-to-Earth direction in the frequency band 17.3–17.7 GHz in Region 2, while protecting existing primary services in the band. In the U.S. this band is currently allocated to Broadcast Satellite and fixed satellite in the Earth to-space direction.

The above listing is a very small sample of all the Agenda Items (1.1–1.19, 2–8, 9.1–9.3, 10) that will be considered in WRC-23 and the reader is encouraged to consult [4] for a complete list.

## PRELIMINARY AGENDA FOR WRC-27

One of the outcomes from WRC-23 will be a complete agenda for WRC-27. However, [4] describes some potential agenda items, based on resolutions adopted in WRC-19 that were not on the agenda for WRC-23. A sample of these are:

- Additional spectrum allocations to the radiolocation service on a co-primary basis in the frequency band 231.5–275 GHz and an identification for radiolocation applications in frequency bands in the frequency range 275–700 GHz for imaging systems.
- To consider the allocation of all or part of the frequency band 43.5–45.5 GHz to the fixed satellite service.
- To study and develop technical, operational, and regulatory measures, as appropriate, to facilitate the use of the frequency bands 37.5–39.5 GHz (space-to-Earth), 40.5–42.5 GHz (space-to-Earth), 47.2–50.2 GHz (Earth-to-space), and 50.4–51.4 GHz (Earth-to-space) by aeronautical and maritime earth stations in motion communicating with geostationary space stations in the fixed satellite service.

In addition to the above, there will be new agenda items that emerge from WRC-23, as well as study items that will be of interest to researchers.

## CONCLUSIONS

Commercial spectrum stakeholders in the mobile terrestrial, satellite and unlicensed industries as well as scientific users of spectrum such as radio astronomers will be watching the outcomes of WRC-23 with keen interest. The reader may have noted that some of the bands that will be considered in WRC-23, e.g., the 6 GHz and 12 GHz bands, already have either been allocated or are being proposed for allocation in the U.S. ahead of the WRC-23 outcomes, and other bands, such as 3.3–3.4 GHz, being considered for IMT are federal bands in the U.S. This is not unusual since every nation has different preexisting allocations. Future columns will report on the outcomes of WRC-23 and agenda items for WRC-27 that will set the stage for spectrum allocations for the next generation of wireless systems. The National Telecommunications and Information Administration (NTIA) in the U.S. released its National Spectrum Strategy on November 13 [9], where the bands 3.1–3.45 GHz, 5.03–5.091 GHz, 7.125–8.4 GHz, 18.1–18.6 GHz and 37.0–37.6 GHz were identified for study over the next 2 years for possible allocations to commercial wireless services. The next few months will see a number of interesting developments in the world of spectrum policy.

## REFERENCES

- [1] ITU World Radiocommunication Conference 2023 (WRC-23); <https://www.itu.int/wrc-23/>.
- [2] M. J. Marcus, "ITU WRC-19 Spectrum Policy Results," *IEEE Wireless Commun.*, vol. 26, no. 6, Dec. 2019, pp. 4–5. DOI: 10.1109/MWC.2019.8938175.
- [3] M. J. Marcus, "Current ITU-R Study Group Issues of Likely Interest to Wireless Researchers," *IEEE Wireless Commun.*, vol. 27, no. 2, Apr. 2020, pp. 4–5. DOI: 10.1109/MWC.2020.9085255.
- [4] WRC-23 Booklet: Agenda and Relevant Resolutions; <https://www.itu.int/wrc-23/booklet-wrc-23/>.
- [5] ITU Regions, <https://www.itu.int/net/ITU-R/information/docs/emergency-regions.jpg>.
- [6] M. Ghosh, "Evolution of Sharing in 6 GHz," *IEEE Wireless Commun.*, Oct. 2023.
- [7] FCC Online Table of Frequency Allocations, <https://transition.fcc.gov/oet/spectrum/table/fcctable.pdf>.
- [8] M. Ghosh, "Sharing in the 12 GHz Band," *IEEE Wireless Commun.*, vol. 30, no. 3, June 2023, pp. 10–11. DOI: 10.1109/MWC.2023.10183719.
- [9] The National Spectrum Strategy, [https://www.ntia.gov/sites/default/files/publications/national\\_spectrum\\_strategy\\_final.pdf](https://www.ntia.gov/sites/default/files/publications/national_spectrum_strategy_final.pdf).