

WRC 27 crystal ball gazing

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As we are nearing the 2023 World Radio Conference (WRC-23) the positions of the Regional organisations and individual country administrations have been developed and confirmed for the different agenda items. However, what is less clear is what agenda items might be agreed for consideration at WRC-27. The question is what agenda items may be appropriate, proposed and supported at WRC-27? We note below what may influence the decision on WRC-27 agenda items and present our views on some of these.

Preliminary Agenda Items

There are already a number of ‘preliminary’ agenda items that were identified at WRC-19 and will need to be supported by member states and/or industry groups for inclusion at WRC-27. If there is no support they will be removed. There have been inputs to the Conference Preparatory Meeting (CPM) process on the majority of the agenda items that address spectrum, predominantly below 5 GHz and above 22 GHz as shown below:

Figure 1: Preliminary agenda items (AI) below 5 GHz

Agenda Item	Frequencies	Topic
2.10	VHF	VHF maritime frequencies utilisation improvement
2.12	694 – 960 MHz	Consider use of IMT – removal of limitations on aeronautical mobile
2.9	1300 – 1350 MHz	Consider possible additional allocations to mobile services
2.13	1.5 – 5 GHz	Consider possible narrowband MSS worldwide allocations
2.8	1525 – 1544 MHz 1545 – 1559 MHz 1610 – 1645.5 MHz 1645.5 – 1660.5 MHz 2483.5 – 2500 MHz	Study technical and operational matters and regulatory provision for space to space links in MSS

Figure 2: Preliminary agenda items (AI) above 22 GHz

Agenda Item	Frequencies	Topic
2.11	22.55 – 23.15 GHz	Consider new EESS allocation (E-s)

Agenda Item	Frequencies	Topic
2.2	37.5 – 39.5 GHz (s-E) 40.5 – 42.5 GHz (s-E) 47.2 – 50.2 GHz (E-s) 50.4 – 51.4 GHz (E-s)	Study and develop technical, operational and regulatory measures for these bands by aeronautical and maritime ESIMs with GSO space stations in the FSS
2.3	43.5 – 45.5 GHz	Consider allocation to FSS
2.4	71 – 76 GHz 81 – 86 GHz	P.F.D. and e.i.r.p. limits in Article 21
2.5	71 – 76 GHz 81 – 86 GHz	Conditions for stations in the satellite services to ensure compatibility with passive services
2.7	71 – 76 GHz 81 – 86 GHz	Regulatory provisions for non GSO FSS feeder links
2.1	231.5 – 275 GHz 275 – 700 GHz	Consider additional co-primary allocations to radiolocation service Consider an identification for radiolocation service

Preliminary agenda item 2.6 addresses regulatory provisions for recognition of space weather sensors and their protection.

In addition there are “standing” agenda items which address general regulatory and procedural matters.

Focus of Regional Groups

The focus of the Regional Groups at WRC-23¹ is important as this might have implications for future agenda items. There are six Regional Groups as shown below.

¹ WRC-23: Regions prepare spectrum proposals - ITU Hub

Figure 3: ITU Regional Groups



The items covered in the Regional Groups are:

- APT: High Altitude Platforms (HAPs) and Earth Stations In Motion (ESIMs);
- ASMGM: Satellite technologies to enhance broadband services in remote areas;
- ATU: UHF band, spectrum sharing between satellite and mobile broadband services;
- CEPT: Future of UHF broadcasting band and unmanned aircraft;
- CITEL: Telecommunications for remote areas / vulnerable populations; and
- RCC: IMT-2020 and mega non-GSO satellite systems.

Developments since WRC-19

Since WRC-19, the telecommunications market has developed and there have been several changes. These may have implications for the WRC-27 agenda items. Specifically:

- Spectrum has been licensed in many countries for 5G but the applications foreseen are still developing. Demand for broadband mobile data is slowing,
- 6G standards are now under development and discussions are ongoing on potential frequency bands, including whether new frequencies need to be

identified (for example, within the 7 – 24 GHz range) or refarming of 2G, 3G and 4G bands will be a viable option.

- Demand for private mobile broadband networks for example in the 3.6 GHz band is developing with solutions based on the ability to share spectrum amongst low, medium and high power assignments.
- There is an ever increasing focus on services in unserved and/or underserved geographic areas and the role played by satellite communications. For example the development of direct-to-handset satellite capabilities, large low altitude NGSO constellations, multi-orbit satellite networks and various options for high-altitude platforms.
- Increasing prominence of the need for spectrum sharing and the potential role of Artificial Intelligence (AI) to facilitate this.
- Demand for improved service requirements (high data rates and increased reliability) associated with maritime and aeronautical sectors.
- Ethical implications of emerging technologies and the need to minimise the environmental impact of new services and solutions.

Additional agenda items proposed

The following new agenda items have also been proposed as part of the CPM process, **highlighting** those seeking new allocations. A number of these have been supported by more than one proposer, as indicated below:

Terrestrial IMT

- Consider **identification of frequency bands** within the range between 7 and 24 GHz for the future development of International Mobile Telecommunications (IMT), including possible additional allocations to the mobile service on a primary basis (GSM Association).
- Studies on frequency-related matters for IMT identification including possible **additional allocations** to the mobile services on a primary basis in portion(s) of the frequency range between AA-BB GHz and CC-DD GHz for the future development of IMT for 2030 and beyond² (Korea, Lao and Vietnam and APT).
- Consider **identification of the frequency band** 6 425-7 025 MHz for the terrestrial component of International Mobile Telecommunications (IMT) in Region 3 (China).

Satellite component of IMT

- Studies towards potential **new allocations** to the mobile satellite service (MSS) for satellite component of IMT in

² Frequency bands will be specified at next APG meeting

the frequency bands identified for IMT and/or allocated to MS below 7 GHz (China, APT).

- Identify frequency bands below 10 GHz for the satellite component of International Mobile Telecommunications (IMT) (Russia).

NGSO satellite Systems

- Expand use of the FSS (E-s) band at 51.4 – 52.4 GHz for non-GSO FSS (Luxembourg, France, APT).
- Consider the development of a regulatory framework for non-geostationary-satellite (non-GSO) FSS satellite systems, to ensure the protection of GSO FSS and BSS networks operating co-frequency as well as the long-term sustainability, the equitable access, and rational and compatible use of the non-GSO orbital and spectrum resources (China, APT).
- Develop possible regulatory and technical methods to ensure fair, equitable access and rational use of orbital resources on non-GSO and associated radio frequency spectrum (Russia).

Other satellite issues

- Review the usage and sharing conditions of the band 13.75-14 GHz to enable efficient use of the band by uplink geostationary (GSO) FSS earth stations, including FSS earth stations using smaller antenna sizes (China, APT).
- Consider a new primary allocation to the fixed-satellite service in the space-to-Earth direction in 17.3-17.7 GHz in Region 3 (APT).

Passive & science services

- Consider adequate regulatory measures regarding the protection of the EESS (passive) in frequency bands above 86 GHz from unwanted emissions of active services in accordance with Resolution [EESS protection above 86 GHz] (WRC-23) (France).
- Consider the results of studies regarding the compatibility between the radio astronomy service in bands above 76 GHz and the active space services in accordance with Resolution [RAS above 76 GHz] (WRC-23), in order to review and update, if appropriate, the consultation process and tables of threshold levels used for consultation that appear in Resolution 739 (WRC-19) (France).
- Technical and regulatory measures to ensure coexistence between spaceborne synthetic aperture radars (SAR) in the Earth exploration-satellite service (active) and radiodetermination service in 9 200-10 400 MHz frequency bands. (China, APT).

Other

- Consider new allocations to fixed, mobile, radio astronomy services and earth exploration-satellite service (passive) in the frequency range 275-325 GHz on a co-primary basis in the Table of Frequency Allocations of the RR with the consequential update of RR Nos. 5.138, 5.149, 5.340, 5.564A and 5.565.(APT).
- Consideration of modification to the RR to establish a status of Wireless Power Transmission (WPT) (APT)
- Removal of the limitation regarding aeronautical mobile in the frequency range 3 400-3 600 MHz for non-safety IMT applications (China).

There have also been proposals for the modification of the preliminary agenda items.

UK views on proposed agenda items

The UK regulator, Ofcom, issued a call for inputs on the provisional views and positions for WRC-23³ and one of the questions addressed suggestions for future WRCs. Some of the responses are summarised below:

- A new service category 'Utility Operations' should be included in the Radio Regulations, similar to Public Protection and Disaster Relief (PPDR). Utility Operations "play a major role in supporting resilient communities, the reduction of global carbon dioxide emissions and mitigating some of the extreme effects of climate change."
- Not surprisingly there are starkly differing views on whether an IMT agenda item is necessary to identify spectrum for 6G/IMT-2030. Potential bands mentioned include 7 – 15 / 20 /24.25 GHz and above 100 GHz or 92 – 120 GHz (band W) and 120 – 182 GHz (band D).
- The use of 51.4 – 52.4 GHz for NGSO FSS, whilst ensuring protection of GSO FSS networks and associated gateway earth stations, should be considered.
- Align new allocation to FSS downlinks in 17.3 – 17.7 GHz in Region 2 with a similar allocation in Region 3, to achieve a global allocation.
- A new global allocation for NB (narrow band) MSS should be made. It is proposed to consider 2010 – 2025 MHz.
- Possible allocations for lunar surface-to-surface radiocommunication, noting recent moon landings.

What can we conclude?

There are a significant number of preliminary agenda items proposed for WRC-27 and it is unlikely that it will be possible to

³ Call for input: UK preparations for the World Radiocommunication Conference 2023 (WRC-23) ([ofcom.org.uk](https://www.ofcom.gov.uk))

address them all, within the ITU Study Groups, over the forthcoming years. This will require prioritisation at WRC-23.

It appears that satellite issues are resurgent, and that more inventive approaches to sharing in a 6G and NGSO world are going to be of increasing interest.

How can Plum help

Plum has considerable experience of addressing co-existence and spectrum sharing across a wide range of terrestrial and space radio services. Our areas of expertise include radio system deployment, sharing scenario design, deterministic and statistical simulation analysis, derivation of licensing requirements for spectrum access, spectrum refarming, coverage and interference analysis, transition planning and interference mitigation techniques.

We also have an excellent understanding of radio service regulatory frameworks (for example, space, maritime and aeronautical) adopted by national regulators to maximise the efficient use of the radio spectrum.

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