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Agenda Items of the World Radiocommunication Conference 2027 Potentially Impacting Remote Sensing Radio Spectrum Users

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A World Radiocommunication Conference (WRC) is convened every four years by the International Telecommunication Union (ITU) to update the Radio Regulations (RR) that determine and coordinate the usage of the electromagnetic spectrum by the various radio services. The most recent World Radiocommunication Conference, WRC-23, took place in Dubai in November-December 2023 and was immediately followed by the first Conference Preparatory Meeting (CPM27-1) that set the agenda for the next WRC, to be held in 2027 (WRC-27), based on the Final Acts of WRC-23. The WRC-27 agenda contains several topics of relevance to microwave remote sensing and decisions taken on them could have an impact for years to come. Thus, it is essential that scientists and engineers working in this field are informed regarding the technical studies performed in preparation to WRC-27.

The following two WRC-27 agenda items are relevant to the acquisition of passive remote sensing measurements using the radio frequency spectrum:

- Agenda Item 1.18: potential regulatory measures for the protection of passive remote sensing and radio astronomy operations in certain frequency bands above 76 GHz from unwanted emissions coming from radiocommunication services, such as mobile, radio navigation and others.
- Agenda Item 1.19: possible primary allocations to passive remote sensing at C-band in the frequency ranges 4200-4400 MHz and 8400-8500 MHz.

These agenda items fall under the responsibility of the Working Party (WP) 7C, which oversees all activities related to remote sensing systems within the Study Groups of the International Telecommunication Union – Radiocommunication Sector (ITU-R). WP 7C is also responsible for Agenda Item 1.17, which considers regulatory provisions for receive-only space weather sensors and their protection in the RR. In addition, WP 7C is contributing to the studies related to other WRC-27 agenda items. Among them, the ones that may have a significant impact on remote sensing are:

- Agenda Item 1.1: use of the frequency bands 47.2-50.2 GHz and 50.4-51.4 GHz for Earth-to-space transmissions by aeronautical and maritime Earth stations in motion communicating with geostationary and non-geostationary space stations in the fixed-satellite service.
- Agenda Item 1.2: possible revisions of sharing conditions in the frequency band 13.75-14 GHz to allow the use of uplink transmissions from Earth stations with smaller antenna sizes.
- Agenda Item 1.3: use of the frequency band 51.4-52.4 GHz for Earth-to-space transmissions by gateway Earth stations to non-geostationary-satellite orbit systems.
- Agenda Item 1.6: fixed-satellite service satellite networks and systems in the bands 37.5-42.5 GHz (space-to-Earth), 42.5-43.5 GHz (Earth-to-space), 47.2-50.2 GHz (Earth-to-space) and 50.4-51.4 GHz (Earth-to-space).
- Agenda Item 1.7: development of technical conditions for the use of International Mobile Telecommunications (IMT) in the frequency bands 4400-4800 MHz, 7125-8400 MHz and 14.8-15.35 GHz.
- Agenda Item 1.8: possible additional spectrum allocations to the radiolocation service on a primary basis in the frequency range 231.5-275 GHz and possible new frequency identifications for radiolocation service applications in the bands within the range 275-700 GHz for millimetric and sub-millimetric wave imaging systems.
- Agenda Item 1.12: possible new allocations to the mobile-satellite service for development of low-data-rate non-geostationary mobile-satellite systems, in the frequency bands 1427-1432 MHz for space-to-Earth only transmissions and in the bands 1645.5-1646.5 MHz, 1880-1920 MHz and 2010-2025 MHz for both space-to-Earth and Earth-to-space transmissions.
- Agenda Item 1.13: possible new allocations for direct connectivity between space stations and IMT user equipment to complement terrestrial network coverage.

Each of these Agenda Items will be examined in regard to its potential impact on remote sensing operations.