



## ITU's Radiocommunication Sector

# How ITU manages the radio spectrum for the world

Every time you turn on your radio or television, hop on a plane, make a call on your mobile, access the Internet or find your location with your smartphone, you are using one of the vital services coordinated by ITU worldwide.

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ITU's Radiocommunication Sector (ITU-R), and its secretariat, the Radiocommunication Bureau (BR), is the global body responsible for management of the radio-frequency spectrum and satellite orbit resources. With the steady growth of wireless services worldwide, all services relying on radio waves are competing for a share of the radio-frequency spectrum to support new applications, growing user numbers, and exploding traffic. The importance and relevance of ITU-R's work are increasing every day. Its work takes place in four main areas:

#### **International regulations on the use of radio-frequency spectrum and satellite orbits**

International frequency management is based on the Radio Regulations (RR), the binding international treaty that determines how the radio frequency

spectrum is shared between different services. Covering terrestrial fixed and mobile radio services, space and satellite-based services, sound and video broadcasting, radionavigation, meteorological tracking and forecasting, space research and Earth exploration, as well as amateur radio, the RR encompasses over 2,300 pages of texts and charts that specify how equipment and systems must operate to ensure the successful coexistence of services in today's crowded airwaves.

ITU-R reviews and updates the RR through World Radiocommunication Conferences (WRCs), which meet every four years for a period of four weeks. WRC-19 was held in Sharm el-Sheikh, Egypt, and welcomed over 3,400 delegates, representing 163 out of ITU's 193 Members States, along with representatives from among

ITU's 600+ private sector members and 150 international and regional organization members.

These conferences review the way specific portions of the radio spectrum are allocated, along with procedures for coordinating, notifying and recording of frequency assignments and Plan modifications. They unite governments to negotiate and agree on the Radio Regulations to enable the introduction of new services and systems.

Preparations for WRCs involve extensive studies and preparatory discussions among all stakeholders (government regulators, public and private sector users of spectrum and equipment suppliers) at the national, regional, and worldwide levels. Many of these stakeholders also serve as members of national delegations at the conference itself.

This multi-stakeholder approach ensures consensus so the RRs provide a stable and predictable regulatory environment that secures the trillions of dollars of long-term investments of radio systems.

At a WRC, governments review and update the global technical, operational, and regulatory provisions that govern the use of the radio-frequency spectrum for terrestrial and satellite applications. In conducting its activities, the conference makes trade-offs between:

- the need for worldwide harmonization (generating economies of scale, connectivity, and interoperability) and the need for flexibility in spectrum allocations.
- the need to accommodate new and innovative systems, applications, and technologies as they arise and the need to protect existing radiocommunication services.

### **Implementation and application of international regulations on the use of the radio-frequency spectrum and satellite orbits**

The RR contain several regulatory provisions and procedures which describe how the administrations from the 193 ITU Member States may acquire and exercise rights to use spectrum in the various frequency bands allocated for this purpose, and the corresponding obligations. These rights and obligations may then be transferred to the operators of each specific radiocommunication station through licenses.

A key element of international frequency management is the Master International Frequency Register (MIFR). The MIFR is a database which contains the spectrum frequency assignments of the radio stations in operation throughout the world and confers to these stations

international recognition and protection against interference. This database is managed by BR and currently contains 2.6 million frequency assignments for terrestrial services and over 200,000 are added every year. For space services, more than 1.1 million of assigned frequencies are contained in this database. In addition, about 350,000 assigned frequencies for the broadcasting-satellite service and 25,000 allotted frequencies for the fixed-satellite service are planned for future uses.

The procedures in the RR are designed to ensure that every new spectrum usage in a particular geographical location is compatible with existing usages. They also ensure an interference-controlled environment for both terrestrial and satellite systems and guarantees equitable access to use of the resources of the frequency spectrum and geostationary-satellite orbit.

BR also publishes the list of maritime and coast radio stations help ensure safety of life at sea. This list also provides assistance to administrations in applying these procedures and in resolving cases of harmful interference, which currently concerns 1 in 5,000 assignments.

### **Establishment and updating of worldwide recommendations, reports, and handbooks for the most efficient use of the radio-frequency spectrum and satellite orbits, including best practices on national spectrum management activities**

ITU-R follows closely the increasing levels of radio-frequency noise in the environment and the consequential increase in instances of electromagnetic interference on several radiocommunication services. ITU-R Study Groups also carry out technical, economic, regulatory, and operational studies to



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help prepare in support of WRC decisions.

ITU-R also plays a central role in developing global standards for radio-based telecommunication systems, including terrestrial and space systems, and best practices. These worldwide technical standards (ITU-R Recommendations) are developed by the Study Groups of ITU-R, which gather experts drawn from government, industry, academia, and regional and international organizations, who collaborate in establishing the characteristics of the systems and services that will define tomorrow's wireless landscape.

There are currently six ITU-R Study Groups, which undertake studies and develop the technical bases for decisions to be taken at World Radiocommunication Conferences (WRCs), as well as develop international standards or Recommendations on radiocommunication matters. These recommendations are generally voluntary. However, a WRC may decide to incorporate by reference into the Radio Regulations, in part or wholly, specific ITU-R Recommendations, making their application mandatory.

Over 5,000 specialists, from administrations, specialized agencies, the whole telecommunication industry, and academic organizations participate in the work of the Study Groups on topics such as efficient management and use of the spectrum/orbit resource, radio systems characteristics and performance, spectrum monitoring and emergency radiocommunications for public protection and disaster relief, etc.

ITU-R Recommendations are good for business, for governmental operations and for the scientific community - driving economies of scale and economic development, supporting essential safety of life services, particularly safety at sea; enabling electronic news gathering and distribution; tracking aircraft and providing for air traffic control; enabling weather forecasting; providing for space travel and exploration etc. They are also essential to the proper and spectrally efficient functioning of all radio equipment in an environment where virtually everyone is now using spectrum resources.

In 2020, ITU-R finalized the detailed specifications for the

radio interface of "IMT for 2020 and beyond", paving the way for 5G mobile broadband services in a connected society. These specifications support their operation in any of the frequency bands that has been identified for IMT by various WRCs.

**Information and assistance to ITU-R membership in radiocommunication matters**

To inform and help its membership adapt to the results of its activities in adopting international regulations, global standards and best practices on spectrum use, ITU-R also regularly holds seminars, workshops, and symposia.

These address a range of issues, currently ranging from broadband and mobile applications, transition to digital television and allocation of the digital dividend, efficient use of the spectrum/orbit resources, and emerging spectrum management techniques.

This activity is also part of ITU's efforts to promote at all levels the creation of an enabling environment for the development of a sustainable and efficient use of spectrum at the most

affordable price in all regions of the world. ■