

## RESOLUTION 9 (Rev. Kigali, 2022)

### **Participation of countries, particularly developing countries, in spectrum management**

The World Telecommunication Development Conference (Kigali, 2022),

*recalling*

Nos. 120 to 129 of the ITU Constitution,

*considering*

- a)* that the continuing growth in demand for spectrum, from both existing and new radiocommunication applications and systems, places ever greater requirements on a scarce resource;
- b)* that, because of the investment in equipment and infrastructures, major changes in the existing use of the spectrum are often difficult to achieve, except in the long term;
- c)* that the needs of society and the marketplace drive the development of new technologies to find new solutions to address development problems;
- d)* that national strategies should take into account international commitments under the Radio Regulations;
- e)* that it is recommended that national strategies should also take into account global changes in telecommunications/information and communication technologies (ICTs) and developments in technology;
- f)* that increased spectrum access may be facilitated through technical innovation and greater sharing capabilities;
- g)* that, based on its mandate, the ITU Radiocommunication Sector (ITU-R) is well placed to provide worldwide information on radiocommunication technology and spectrum utilization trends;
- h)* that world radiocommunication conferences (WRCs) take many decisions that have a very significant economic and social impact on national spectrum-management strategies;

- i)* that some countries, particularly developing countries<sup>1</sup>, have some difficulties in implementing the outcomes of WRCs;
  
- j)* that the ITU Telecommunication Development Sector (ITU-D) is well placed to facilitate the participation of developing countries in ITU-R activities, and, for those developing countries that so request, to distribute to them the results of particular ITU-R activities;
  
- k)* that such information would assist spectrum managers in developing countries to develop their own national medium- or long-term strategies;
  
- l)* that such information would enable developing countries to benefit from sharing studies and other technical studies in ITU-R, including frequency sharing methodologies;
  
- m)* that, within spectrum management, one of the most pressing concerns of many developing countries, including least developed countries, small island developing states, landlocked developing countries and countries with economies in transition, is the difficulty of elaborating methods for the calculation of fees for use of the radio-frequency spectrum;
  
- n)* that regional, bilateral or multilateral agreements could be a basis for fostering cooperation in the field of the radio-frequency spectrum;
  
- o)* that spectrum redeployment<sup>2</sup> could accommodate the increasing demand for new and existing radiocommunication applications;
  
- p)* that spectrum monitoring includes effective use of spectrum-monitoring facilities to support the spectrum-management process, the evaluation of spectrum utilization for the purpose of spectrum planning, the provision of technical support for frequency allocation and assignment and the resolution of cases of harmful interference;
  
- q)* the need to disseminate best practices in spectrum management in order to make broadband access more available and affordable to lower-income populations, especially to bridge the digital divide in developing countries;

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<sup>1</sup> These include the least developed countries, small island developing states, landlocked developing countries and countries with economies in transition.

<sup>2</sup> As noted in Recommendation ITU-R SM.1603, redeployment is also referred to as refarming.

- r) that emerging telecommunications/ICTs could pose challenges for developing countries in terms of available spectrum and licensing policy;
- s) that developing countries can benefit from compiled information on national experiences on spectrum released for emerging technologies such as 5G and satellite networks;
- t) that, while short-term courses on spectrum management are being conducted by universities and other training institutions, there are few comprehensive courses on spectrum management, and that the Spectrum Management Training Programme (SMTP) of the ITU Academy and centres of excellence will continue to be very helpful to developing countries;
- u) that in accordance with Resolution ITU-R 22-5 (Rev. Sharm el-Sheikh, 2019) of the Radiocommunication Assembly (RA), personnel involved in spectrum management from developing countries are particularly invited to participate in spectrum-management studies of ITU-R Study Group 1;
- v) that the transition period to digital terrestrial television broadcasting for the developing countries which are party to the Regional Agreement (Geneva, 2006) (GE06 Agreement) ended on 17 June, 2020, after which terrestrial analogue television is no longer protected and is subject to the operating conditions prescribed in the GE06 Agreement,

*recognizing*

- a) that it is the sovereign right of every State to manage spectrum use within its territories;
- b) that ITU-D's specific functions include providing information and advice on possible policy and structural options, promoting the development, expansion and operation of telecommunication networks and services, taking into account the activities of other relevant bodies, by reinforcing capabilities for human resources development, planning, management, resource mobilization, and research and development, and assisting the implementation of best practices and guidelines;
- c) that there is a strong need for the active participation of developing countries in ITU activities, as expressed in Resolution 123 (Rev. Dubai, 2018) of the Plenipotentiary Conference, Resolution 5 (Rev. Kigali, 2022) of this conference, Resolution ITU-R 7-4 (Rev. Sharm el-Sheikh, 2019) of RA and Resolution 44 (Rev. Geneva, 2022) of the World Telecommunication Standardization Assembly, which may be represented individually and through regional groups;

- d)* that it is important to take into consideration the ongoing work in ITU-R and ITU-D, and the need to avoid duplication of effort;
- e)* the successful cooperation between ITU-R and ITU-D to assist developing countries in spectrum management, effective use of radio-frequency spectrum and dissemination of best practices;
- f)* the considerable support given by the Telecommunication Development Bureau (BDT) in the compilation of documents and other relevant outputs, supporting developing countries;
- g)* the successful development of the Spectrum Fees Database (SF Database) and the initial compilation of guidelines<sup>3</sup> and national experiences to assist administrations in extracting information from the SF Database for use in the preparation of fee-calculation models that suit their national requirements;
- h)* that, in connection with the ITU-R Handbook on National Spectrum Management and Report ITU-R SM.2012, additional guidelines have been compiled offering various national approaches to spectrum-management fees for spectrum use;
- i)* that there is significant activity across multiple ITU-R study groups to address spectrum sharing, which may have implications for national spectrum management and which may be of particular interest to developing countries;
- j)* that ITU-R continues to update Recommendation ITU-R SM.1603, which provides guidelines for spectrum redeployment;
- k)* that the report of ITU-D Study Group 1 on satellite regulation in developing countries, for the study period 2002-2006, provided valuable satellite regulatory information of countries;
- l)* that the ITU-R Handbook on Spectrum Monitoring provides guidelines for the installation and operation of spectrum-monitoring infrastructures and the implementation of spectrum monitoring, while Recommendation ITU-R SM.1139 prescribes administrative and procedural requirements for international monitoring systems;

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<sup>3</sup> Here, "guidelines" refers to a range of options that may be used by ITU Member States in their domestic spectrum-management activities.

m) that the ITU-D Report on exploring the value and economic valuation of spectrum (April 2012) provides some insight into how spectrum value may be assessed in different situations;

n) that Questions ITU-R 240/1, on assessment of spectrum efficiency and economic value, and ITU-R 241/1, on methodologies for assessing or predicting spectrum availability, are being studied within ITU-R Study Group 1,

*resolves to instruct the Director of the Telecommunication Development Bureau, in close consultation with the Director of the Radiocommunication Bureau*

1 to collect pertinent information and prepare, over the period between world telecommunication development conferences, appropriate documents and other relevant outputs, that are responsive to the specific needs of developing countries (including, but not limited to, the examples given in Annex 1 to this resolution and membership input to the ITU-D study groups), on national technical, economic, regulatory and financial approaches to, and challenges of, spectrum management and spectrum monitoring, taking into account ITU-R Recommendations, reports, handbooks and other outputs from ITU-R;

2 to continue the development of the SF Database, including methods for spectrum valuation and methods for pricing, incorporating national experiences, and to provide additional guidelines and national experiences, based on contributions from administrations;

3 to update the information available in national frequency allocation tables and make the Resolution 9 and ICT Eye portals complementary;

4 to compile national experiences, in order to prepare the documents identified in *resolves 1*, on the use of shared spectrum, different tools for spectrum management that allow for greater flexibility, efficiency and both economic and social benefits, as well as the economic aspects of spectrum management, including mechanisms to stimulate affordable and accessible services to low-income users;

5 to continue to assist Member States, in particular developing countries, in the implementation of the outcomes of WRCs, and to organize presentations on issues of interest for developing countries through seminars and workshops,

*instructs the Director of the Telecommunication Development Bureau*

1 to continue to provide the support described in recognizing f) above;

2 to encourage Member States from developing countries, at the national and/or regional level, to provide ITU-R and ITU-D with a list of their needs, national experiences and/or special requirements with respect to national spectrum management, to which the Director should endeavour to respond, and an example of which is given in Annex 1 to this resolution;

3 to encourage Member States to continue to provide ITU-R and ITU-D with practical examples of their experiences of using the SF Database, national trends in spectrum management, spectrum redeployment and the installation and operation of spectrum-monitoring systems;

4 to provide annual reports to the Telecommunication Development Advisory Group on the implementation of this resolution,

*invites the Director of the Radiocommunication Bureau*

to ensure that ITU-R continues the collaboration with ITU-D in the implementation of this resolution,

*invites the membership of the ITU Telecommunication Development Sector*

1 to contribute to the work of ITU-D by providing national experiences regarding spectrum sharing, national uses of different tools for spectrum management, including various licensing and authorization schemes, as well as economic and social benefits and challenges;

2 to contribute actively to the implementation of this resolution.

## ANNEX 1 TO RESOLUTION 9 (Rev. Kigali, 2022)

### **Examples of specific needs of developing countries in spectrum management**

The main types of technical assistance which developing countries expect from ITU are as follows:

#### **1 Assistance in raising the awareness of national policy-makers as to the importance of effective spectrum management for a country's economic and social development**

With the restructuring of the telecommunication sector, the emergence of competition, high demand for frequencies from operators, disaster mitigation and relief operations and the need to combat climate change, effective spectrum management has become indispensable for States. ITU should play a key role in raising the awareness of policy-makers by organizing special seminars designed specifically for them. To this end:

- In view of how important the regulators have become, ITU might include them in its regular distribution list for circulars providing information about the different education programmes and modules organized by the Union.
- ITU should include dedicated spectrum-management modules in the programmes of meetings (colloquiums, seminars) bringing together regulators and ministries responsible for spectrum management, with private-sector involvement.
- Within the limits of available resources, ITU should make fellowships available for least developed countries' participation at those meetings.

#### **2 Training and dissemination of available ITU documentation**

Spectrum management must be in accordance with the provisions of the Radio Regulations, regional agreements to which administrations are parties, and national regulations. Spectrum managers must be able to provide frequency users with relevant information.

Developing countries would like to have access to ITU-R and ITU-D documentation, which must be available in the six official languages of the Union.

Developing countries would also like to see suitable training (either on-site or remotely) provided in the form of specialized ITU seminars, in order to help frequency managers gain a thorough knowledge of ITU-R Recommendations, reports and handbooks, which are constantly updated.

Through its regional offices, ITU could set up an effective system to provide frequency managers with real-time information on existing and future publications.

Specialized courses on spectrum management, access to radio-frequency resources and the preparatory process for WRCs will be very helpful for developing countries.

### **3 Assistance in developing methodologies for establishing national tables of frequency allocations and spectrum redeployment**

Tables of frequency allocations form the mainstay of spectrum management; they identify the services provided and their category of use. ITU could encourage administrations to make available national frequency allocation tables to the public and stakeholders and facilitate administrations' access to information available in other countries, in particular by developing links between its website and the websites of administrations which have produced national tables of frequency allocations available to the public, allowing developing countries to obtain information on national allocations in a rapid and timely fashion. ITU-R and ITU-D could also compile guidelines for the development of the above-mentioned tables. Spectrum redeployment is sometimes necessary to allow the introduction of new radiocommunication applications. ITU could provide support in this regard by compiling guidelines for the implementation of spectrum redeployment, on the basis of practical experience of administrations and based on Recommendation ITU-R SM.1603 – Spectrum redeployment as a method of national spectrum management.

In certain circumstances, BDT could make available the assistance of its experts for the development of national tables of frequency allocations and for the planning and implementation of spectrum redeployments, at the request of the countries concerned.

To the extent possible, ITU-D should incorporate appropriate issues into its regional seminars on spectrum management.



#### **4 Assistance in setting up computerized frequency management and monitoring systems**

These systems facilitate routine spectrum-management tasks. They must be capable of taking local features into account. The establishment of operational structures also enables the smooth execution of administrative tasks, frequency allocation, spectrum analysis and monitoring. According to the specific features of individual countries, ITU can provide expert help in identifying the technical means, operational procedures and human resources needed for effective spectrum management. The ITU-R Handbook on Computer Aided Techniques for Spectrum Management and the ITU-R Handbook on Spectrum Monitoring may provide technical guidelines for setting up the above-mentioned systems.

ITU should improve the Spectrum Management System for Developing Countries (SMS4DC) software (including its availability in the other official languages), and ensure the necessary assistance and training in the implementation of the software in administrations' daily spectrum-management activities.

ITU should provide expert advice to administrations of developing countries and facilitate participation of developing countries in regional or international spectrum-monitoring activities, as necessary. ITU should also provide encouragement and assistance to administrations in setting up regional spectrum-monitoring systems, if required.

#### **5 Economic and financial aspects of spectrum management**

ITU-D and ITU-R could, together, provide examples of:

- a) reference frameworks for management accounting;
- b) guidelines for the implementation of management accounting, which could be very useful for calculating the administrative costs of spectrum management referred to in *recognizing g*) of this resolution;
- c) guidelines on the methods used for spectrum valuation.

ITU could further develop the mechanism set up under *resolves* 2 of this resolution in order to enable developing countries to:

- learn more about practices in other administrations, which could be useful for defining spectrum fee policies tailored to each country's specific situation;
- identify financial resources to be allocated to the operational and investment budgets for spectrum management.

## **6 Assistance with preparations for world radiocommunication conferences (WRC) and with follow-up and implementation of WRC decisions**

The submission of joint proposals is a way of guaranteeing that regional needs are taken into account. Alongside regional organizations, ITU could give impetus to the establishment and running of regional and subregional preparatory structures for WRCs.

With support from regional and subregional organizations, the Radiocommunication Bureau could communicate the broad outlines of decisions taken by the conferences, and thereby contribute to establishing a follow-up mechanism for such decisions at national and regional level.

## **7 Assistance with participation in the work of the relevant ITU-R study groups and their working parties**

The ITU-R study groups play a key role in the drafting of Recommendations which affect the entire radiocommunication community. It is essential that developing countries participate in study group work in order to ensure that their specific features are taken into account. For effective participation of those countries, ITU could – through its field offices – assist in running a subregional network organized around coordinators responsible for the Questions under study within ITU-R, as well as by providing financial assistance in order for the coordinators to participate in meetings of the relevant ITU-R study groups. The designated coordinators for the different regions should also assist in meeting the desired needs.

## **8 Transition to digital terrestrial television broadcasting**

Most of the developing countries are currently undergoing the transition from analogue to digital terrestrial television broadcasting. There is thus a need for assistance in many topics, especially for developing countries party to the GE06 Agreement, including frequency planning, service scenarios and technology selection, which all in turn affect spectral efficiency and the resulting digital dividend.

## **9 Assistance in identifying the most efficient ways to utilize the digital dividend**

Developing countries, upon completing digital switchover, will have some portions of a very valuable spectrum freed, which are known as the digital dividend. Different discussions are being conducted on how to optimally reallocate, and enable more efficient use of, the relevant part of these bands. In order to maximize both economic and social impacts, it will be appropriate to consider including potential use cases and best practices in ITU's library, and to hold regular international and regional workshops on that subject.

## **10 Emerging technologies and approaches in using spectrum**

With the ongoing demand for high data rates, there is pressure on the limited spectrum resource. Developing countries need to be aware of emerging technologies and approaches in using spectrum which are intended to improve spectrum efficiency and cost-effectiveness, through training, seminars and national experiences. Some examples include:

- dynamic spectrum sharing (DSS);
- use of satellite and high-altitude platform (HAPS) systems for the provision of services in remote and inaccessible areas;
- Internet of things (IoT);
- IMT-2020;
- short-range devices;
- emerging telecommunication/ICT technologies (e.g. 5G and satellite constellations).

## **11 Innovative ways of spectrum licensing**

As part of smart government, public services are increasingly being offered over mobile and online platforms. The process of spectrum licensing can also be automated, and the process of receiving requests for spectrum use and licensing can be made available online and on smart devices. Innovative ways of spectrum licensing such as light licensing and authorized shared access/licensed shared access could have potential to improve the efficiency of spectrum utilization. Training and national experiences can be offered to the developing countries in order for them to benefit from the experience of countries that have deployed such systems including the licensing regimes.

## **12 Assistance with interference caused by devices in derogation of national spectrum allocations**

Radiocommunication devices are required to operate in accordance with the Radio Regulations, national regulations and the Table of Frequency Allocations in order to avoid harmful interference. As spectrum allocations can vary among countries, radiocommunication devices manufactured to operate in one country can cause harmful interference if used in another country in specific bands allocated to different services.

In this regard, the popularity of small-size radiocommunication devices, their potential growth, and the lack of technical knowledge on the part of their users will pose an increasing challenge for national spectrum regulators.

## **13 Assistance in resolving seasonal interference caused by anomalous propagation of radiowaves**

Coastal areas of nations, and island nations, especially small island nations, experience seasonal cross-border interference to their mobile networks due to anomalous propagation of radiowaves. This interference becomes very critical if both countries are using different frequency planning in the same frequency band. This issue continues to pose challenges to national spectrum-management authorities.