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| PLENARY MEETING | **Addendum 4 toDocument WTDC-17/22-E** |
|  | **29 August 2017** |
|  | **Original: English** |
| Asia-Pacific Telecommunity Member Administrations |
| Revision to WTDC Resolution 9 - Participation of countries, particularly developing countries, in spectrum management |
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| **Priority area:** - Resolutions and recommendations**Summary:**Spectrum management is an important subject. WTDCs has a resolution on this matter –Resolution 9. Spectrum management is mainly under the mandate of ITU-R and the continuation of ITU-D effort will benefit developing countries. The report to WTDC-17, in response to Resolution 9 has made by ITU-D Study Group 1 in close collaboration with ITU-R Study Group 1. The report addresses national technical, economic and financial approaches to, and challenges of, spectrum management and spectrum monitoring, taking into consideration development trends in spectrum management, case studies on spectrum redeployment, licensing processes and best practices implemented in spectrum monitoring around the world, including consideration of new spectrum-sharing.The development of telecommunication applications and technologies create new challenges that requires regulators to deal with interference issues, finding frequency bands, accessing to spectrum resource.**Expected results:**The continuation of close collaboration between ITU-R and ITU-D to provide the technical assistance in existing and emerging needs of spectrum management.**References:**1. The report on WTDC-14 Resolution 9 (REV. DUBAI, 2014) of ITU-D Study Group 1.2. Director, Telecommunication Development Bureau, Report on the implementation of the Dubai Action Plan.3. RA-15 Resolution on Studies related to wireless systems and applications for the development of the Internet of Things (IoT).4. RA-15, Resolution ITU-R 69 on Development and deployment of international public telecommunications via satellite in developing countries.5. [ITU Academy report on Spectrum management training programme.](https://academy.itu.int/download.php?filename=Report_on_Spectrum_Management_Training_Programme.pdf)APT/AWG/REP-68 report on "Authorized/Licensed Shared Access as a National Solution to Access Spectrum for IMT. |

**PROPOSAL**

These issues express the needs of countries on spectrum management that are relevant to the scope of the Resolution 9. We would propose further the modification of the Resolution 9 to add some specific needs in spectrum management as follows:

**a. 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 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.

One of the primary principle on which Radio Regulations (RR) are founded is that *All stations, whatever their purpose, must be established and operated in such a manner as not to cause harmful interference to the radio services or communications of other Members or of recognized operating agencies, or of other duly authorized operating agencies which carry on a radio service, and which operate in accordance with the provisions of these Regulations (No.197 of the Constitution)*

In the BDT report on the implementation of the Dubai Action Plan also mentions that *the rapid growth of personal wireless devices, especially cellular phones and tablet computers, has raised new challenges as such devices are easily moved across national borders and conformance regimes.*

Since 2010, this Administration have to deal with 3200 interference cases of interference causing by digital enhanced cordless telecommunications (DECT) to mobile networks. This standard is primarily used for cordless telephone systems. The technology is nearly identical however frequency range is slightly different among countries. DECT 6.0 uses the frequency bands overlap with 3G mobile networks. This phone standard is prohibited to use in Viet Nam.

One Administration is continuously dealing with huge number of interference cases caused by Wi-Fi routers operating in wider frequency bands than the unlicensed band (2.4-2.4835 GHz). These Wi-Fi routers, manufactured in other countries, are permitted to be used as unlicensed radiocommunication devices within the administration. Since, there is no operational restriction on these devices, they are operating beyond the unlicensed bands and causing serious interference to mobile networks operating in the frequency band 2300-2400 MHz.

In this regard, the popularity, lack of user technical knowledge and potential growth of SRD, M2M, IoT and small size radiocommunication devices will pose an increasing challenge for national spectrum regulators. ITU-R and ITU-D should develop case studies, scenarios and strategies to assist developing countries to minimize the potential of harmful interference between devices.

**b. Assistance in resolving seasonal interference caused by anomalous propagation of radio frequency spectrum**

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

**c. Spectrum for IoT devices**

IoT considered as an application, technology is particularly interested by the international community currently. RA-15 Conference approved a new resolution on Studies related to wireless systems and applications for the development of the Internet of Things (IoT).

IoT relying on wireless networks, indicates the requirement to access to spectrum. It is clear that regulators should take into the account the development of IoT and machine-to-machine communications. From the view of spectrum authorities, the required amount of spectrum, the appropriate frequency band, harmonization and interference should be considered.

The dissemination of IoT development information and assistance of ITU-D will help developing countries to prepare the appropriate spectrum policy and identification to accommodate the development of IoT.

**d. Enhance the capacity of spectrum management of developing countries**

Spectrum management is a narrow subject. Very few colleges and universities have this subject. The ITU-D report on Spectrum Management Training Programme also states that *Today the national radio spectrum agencies and major wireless operators in need of professional spectrum managers have no choice but to train new recruits on the job, often simply through the “follow-me” examples of more experienced colleagues. Regulatory agencies in many developing countries, opportunities for acquiring the necessary qualifications are limited or non-existent.*

Specialized course on spectrum management and access to radio frequency resource i.e. Spectrum Management Training Programme (SMTP) of ITU Academy will be very helpful to developing countries. It proposes the enhancement of spectrum capacity for developing countries should be a priority of ITU-D.

**e. Innovation of spectrum licensing**

The continuing growth of existing and new radiocommunication applications places greater requirements on a scare resource. Finding new spectrum is becoming more and more difficult for spectrum authorities. Current spectrum allocation mechanisms are currently based on either exclusive licensing to an operator or unlicensed/licensed exempt operation. The continued growth of demand for radiocommunication services shall be putting pressure on spectrum managers, requiring them to find solutions to ensure unrestricted long term growth of those services. Finding innovative ways of spectrum licensing such as light-licensing, Authorized Shared Access/Licensed Shared Access, Pluralistic licensing, could improve the efficiency of spectrum utilization.

**f. Need to study Low Earth Orbit (LEO), Medium Earth Orbit (MEO) satellite based applications for providing reliable, affordable broadband access to remote and inaccessible areas**

New launch options and production methods change the economics of delivering satellites into space especially nano satellites and pico satellites. Satellite based broadband terminals are the best suited medium to serve remote and inaccessible areas as they need minimal infrastructure at the place of their deployment. Hence, there is a need to study LEO, MEO satellite based applications for providing reliable, affordable broadband access to remote and inaccessible areas, especially in developing countries.

The above issues express the needs of developing countries with regards to spectrum management that are relevant to the scope of the Resolution 9. We would propose further the modification of the Resolution 9 on spectrum management. The detail proposal is attached.

**MOD** ACP/22A4/1

RESOLUTION 9 (Rev. BuenoS Aires, 2017)

Participation of countries, particularly developing
countries, in spectrum management

The World Telecommunication Development Conference (Buenos Aires, 2017),

considering

*a)* that the continuing growth in demand for spectrum, from both existing and new radiocommunication applications, 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 marketplace drives 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 ongoing work, the ITU Radiocommunication Sector (ITU‑R) is well placed to provide worldwide information on radiocommunication technology and spectrum utilization trends;

*h)* 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;

*i)* that such information would assist spectrum managers in developing countries to develop their own national medium- or long-term strategies;

*j)* that such information would enable developing countries to benefit from sharing studies and other technical studies in ITU‑R, including new spectrum sharing approaches such as dynamic spectrum access (DSA);

*k)* 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 including satellite orbit resources;

*l)* that regional, bilateral or multilateral agreements could be a basis for fostering cooperation in the field of the radio-frequency spectrum;

*m)* that spectrum refarming[[1]](#footnote-1)1 could accommodate the increasing demand for new and existing radiocommunication applications;

*n)* 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;

*o)* the need, in studying spectrum-management best practices, to make broadband access more affordable to lower-income populations, especially in developing countries;

*p)* the need in studying Low Earth Orbit (LEO), Medium Earth Orbit (MEO) satellite based applications for providing reliable, affordable broadband access to remote and inaccessible areas, especially in developing countries;

*q)* the SRD, M2M, IoT devices and small size radiocommunication devices which are portable and likely movable across national borders without regulator approval has potential to cause interference;

*r)* the growing number of IoT devices and applications;

*s)* that while some short-term courses on spectrum management are being conducted by colleges, universities and organizations, there are few comprehensive courses on spectrum management. Spectrum Management Training Programme (SMTP) of the ITU Academy will be very helpful to developing countries,

recognizing

*a)* that it is the sovereign right of every State to manage spectrum use within its territories;

*b)* that there is a strong need for the active participation of developing countries in ITU activities, as expressed in Resolution 5 (Rev. Dubai, 2014) of this conference, Resolution ITU‑R 7‑3 (Rev. Geneva, 2015) of the Radiocommunication Assembly and Resolution 44 (Rev. Hammamet, 2016) of the World Telecommunication Standardization Assembly, which may be represented individually and through regional groups;

*c)* 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;

*d)* the successful cooperation between ITU‑R and ITU‑D to produce the reports entitled "WTDC-98 Resolution 9: Review of national spectrum management and use of the spectrum – Stage 1: 29.7-960 MHz", "WTDC Resolution 9 (Rev. Istanbul, 2002): Review of national spectrum management and use of the spectrum – Stage 2: 960-3 000 MHz"; "WTDC Resolution 9 (Rev. Doha, 2006): Review of national spectrum management and use of the spectrum – Stage 3: 3 000 MHz – 30 GHz"; "WTDC Resolution 9 (Rev. Hyderabad, 2010): Participation of countries, particularly developing countries, in spectrum management"; "WTDC Resolution 9 (Rev. Dubai, 2014): Participation of countries, particularly developing countries, in spectrum management";

*e)* the considerable support given by the Telecommunication Development Bureau (BDT) in the compilation of these reports, supporting developing countries;

*f)* the successful development of the Spectrum Fees Database (SF Database) and the initial compilation of guidelines[[2]](#footnote-2)2 and case studies to assist administrations in extracting information from the SF Database for use in the preparation of fee-calculation models that suit their national requirements;

*g)* 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;

*h)* 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;

*i)* that ITU‑R continues to update Recommendation ITU‑R SM.1603, which provides guidelines for spectrum redeployment;

*j)* 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;

*k)* that ITU-R Resolution 66 of the Radiocommunication Assembly 2015, Studies related to wireless systems and applications for the development of the Internet of Things;

*l)* that rapidly decreasing costs of delivering LEO, MEO satellites into space and crucial role played by satellite based connectivity especially in remote and in inaccessible areas,

taking into account

*a)* No. 155 of the ITU Convention, defining the aim of studies conducted within ITU‑R;

*b)* the current scope of ITU‑R Study Group 1, as defined by the Radiocommunication Assembly in Resolution ITU‑R 4-7;

*c)* Urgent studies required in preparation for the 2019 World Radiocommunication Conference Agenda item 9.1 Issue 9.1.8 Annex to Resolution **958 (WRC-15)**Issue 3 ‘Studies on the technical and operational aspects of radio networks and systems, as well as spectrum needed, including possible harmonized use of spectrum to support the implementation of narrowband and broadband MTC infrastructures, in order to develop Recommendations, Reports and/or Handbooks, as appropriate, and to take appropriate actions within the ITU Radiocommunication Sector (ITU-R) scope of work’,

resolves

1 to prepare a report over the period between WTDCs on national technical, economic, regulatory and financial approaches to, and challenges of, spectrum management and spectrum monitoring, taking into consideration development trends in spectrum management, case studies on spectrum redeployment, licensing processes and best practices implemented in spectrum monitoring around the world, including consideration of new spectrum-sharing approaches;

2 to continue the development of the SF Database, incorporating national experiences, and provide additional guidelines and case studies, 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 case studies and collect best practices regarding national uses of shared spectrum access, including DSA, and study the economic and social benefits arising from the effective sharing of spectrum resources;

5 to continue to gather the necessary information on activities carried out by ITU‑D Study Groups 1 and 2, ITU‑R Study Group 1 and relevant BDT programmes,

instructs the Director of the Telecommunication Development Bureau

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

2 to encourage Member States from developing countries, at national and/or regional level, to provide ITU‑R and ITU‑D with a list of their needs 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, development trends in spectrum management, spectrum redeployment and the installation and operation of spectrum-monitoring systems;

4 to take appropriate measures so that work in accordance with this resolution is carried out in the six official and working languages of the Union,

invites the Director of the Radiocommunication Bureau

to ensure that ITU‑R continues the collaboration with ITU‑D in the implementation of this resolution.

Annex 1 to Resolution 9 (Rev. Dubai, 2014)

Specific needs 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 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 changing.

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 course on spectrum management, access to radio frequency resource, preparatory process and leading productive conferences of ITU-R 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, the Telecommunication Development Bureau (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.

The dissemination of IoT development information and assistance of ITU-D will help developing countries to prepare the appropriate spectrum policy and identification to accommodate the development of IoT.

# 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 of 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 on 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 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 regional 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, 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 New spectrum-access approaches

With the ongoing demand for high data rates, there is pressure on the limited spectrum resource. Developing countries need to be aware of innovative schemes for improving spectrum efficiency and spectrum use, through training, seminars and case studies on actual deployments and trials. Areas of particular importance include:

– sharing information and best practice on the use of dynamic spectrum access (DSA) approaches;

– reviews around the possibility of applying DSA approaches to enable better and more cost-effective provision of services.

- reviews around the possibility of using high throughput satellites (HTS) for provision of cost-effective broadband services in remote and inaccessible areas.

# 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 for spectrum licensing such as light-licensing, Authorized Shared Access/Licensed Shared Access could be potential to improve the efficiency of spectrum utilization. Training and case studies can be offered to the developing countries in order for them to benefit from the experience of countries that have deployed such systems.

**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 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, lack of user technical knowledge and potential growth of SRD, M2M, IoT and small size radiocommunication devices will pose an increasing challenge for national spectrum regulators. ITU-R and ITU-D should develop case studies, scenarios and strategies to assist developing countries to minimize the potential of harmful interference between devices.

**13. Assistance in resolving seasonal interference caused by anomalous propagation of radio frequencies**

Coastal areas of the nations, Island nations, especially small island nations experience seasonal cross border interference to their mobile networks due to anomalous propagation of radio frequency waves. This interference becomes very critical if both the countries are using different frequency planning in the same frequency band. This issue continues to pose challenges to national spectrum management authorities. ITU-D may consider to develop case studies, scenarios and resolution mechanisms in collaboration with ITU-R to deal with this issue.

**Reasons:** Spectrum management is an important subject. WTDCs has a resolution on this matter – the Resolution 9. Spectrum management is mainly under the mandate of ITU-R and the continuation of ITU-D effort will benefit developing countries.

The development of telecommunication applications and technologies create new challenges that requires regulators to deal with interference issues, finding frequency bands, accessing to spectrum resource. The continuation of close collaboration between ITU-R and ITU-D to provide the technical assistance in existing and emerging needs of spectrum management. The proposal includes some texts to express the needs of developing countries on spectrum management.

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1. 1 As noted in Recommendation ITU‑R SM.1603, redeployment is also referred to as refarming. [↑](#footnote-ref-1)
2. 2 Here, "guidelines" refers to a range of options that may be used by ITU Member States in their domestic spectrum-management activities. [↑](#footnote-ref-2)