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| ITU Logo | INTERNATIONAL TELECOMMUNICATION UNION  **TELECOMMUNICATION STANDARDIZATION SECTOR**  STUDY PERIOD 2017-2020 | | SG3-C300 | | |
| **STUDY GROUP 3** | | |
| **Original: English** | | |
| **Question(s):** | | 3/3 | | Geneva, 23 April – May 2 2019 | |
| **CONTRIBUTION** | | | | | |
| **Source:** | | United States of America | | | |
| **Title:** | | Proposed edits to D.SpectrumShare | | | |
| **Purpose:** | | Proposal | | | |
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| **Keywords:** | D.SpectrumShare |
| **Abstract:** | The United States proposes edits to TD37/WP2 with a view towards stabilizing the text and requests an outgoing liaison statement to, and a review by ITU-R WP1B to ensure collaboration and coordination across sectors. |

**1 Introduction & Background**

During the previous study period, at the March 2016 meeting of Study Group 3 (SG3), the United States (and others) objected to the creation of the work item D.SpectrumShare. At the April 2017 SG3 meeting, the United States similarly raised concerns about the initial proposed text of this draft new Recommendation.

The United States reiterates that if and how a country approaches infrastructure or spectrum sharing within its borders is a national matter, not an international telecommunications services issue within the purview of SG3.

Given that draft ITU-T Recommendation D.SpectrumShare is intended to provide guidance to interested Member States “in the development of new regulatory methods of spectrum and telecommunication infrastructure management,” as described in the Introduction, this effort most appropriately belongs in ITU-D, not in an ITU-T Recommendation. ITU-D’s [ICT Regulation Toolkit](http://www.ictregulationtoolkit.org/index) already contains information on [spectrum sharing](http://www.ictregulationtoolkit.org/toolkit/5) ([Section 5.4](http://www.ictregulationtoolkit.org/toolkit/5.4)), as well as [best practice guidelines on infrastructure sharing](http://www.ictregulationtoolkit.org/document?document_id=3463) from the perspective of affordable access.

Moreover, the draft ITU-T Recommendation D.SpectrumShare draws heavily on [Report ITU-R SM.2404-0 (06/2017): “Regulatory Tools to Support Enhanced Shared Use of the Spectrum](https://www.itu.int/dms_pub/itu-r/opb/rep/R-REP-SM.2404-2017-PDF-E.pdf)” (which is cited in the References, and in the body of the draft itself). There is also already a comprehensive ITU-R study on the “Economic Aspects of Spectrum Management,” available as [Report ITU-R SM.2012-6 (06/2018)](https://www.itu.int/pub/R-REP-SM.2012-6-2018), as well as several existing ITU-R Recommendations in the SM (Spectrum Management) series on the same topic (such as Recommendation ITU-R [SM.1265-1](https://www.itu.int/dms_pubrec/itu-r/rec/sm/R-REC-SM.1265-1-200107-I!!PDF-E.pdf)

which provides for “National alternative allocation methods”). This raises concerns not only about the duplication of efforts across sectors, but also about possible inconsistencies among various Reports and Recommendations on largely the same topic coming out of different sectors.

The United States also notes that ITU-R Working Party 1B is finalizing a comprehensive study on the “Assessment of Spectrum Efficiency and Economic Value,” which is currently available in Annex 7 to the Working Party 1B Chairman’s Report in Document [1B/341-E (Annex 7)](https://www.itu.int/dms_ties/itu-r/md/15/wp1b/c/R15-WP1B-C-0341!N07!MSW-E.docx).

Despite its misgivings, the United States has nevertheless actively participated in improving the draft text of D.SpectrumShare, including at the last SG3 meeting in April 2018. Most recently, the United States participated in the Q3/3 Rapporteur Group E-Meeting (RGM), which was held on March 21, 2019 with the purpose of finalizing the work on D.SpectrumShare. Following the RGM, the new base text is contained in [TD37/WP2](https://www.itu.int/md/T17-SG03-190423-TD-WP2-0037/en).

**2 Discussion**

As detailed in Report ITU-R SM.2404-0, spectrum sharing can refer both to various regulatory approaches in spectrum management implemented by Administrations and to technology solutions developed by industry, and it can take place at different levels. Spectrum sharing may also be understood as usage of the same spectrum resource by more than one user, more than one service, and/or more than one application in a way that avoids interference.

As evident from the body of the text (but not the Scope), draft ITU-T Recommendation D.SpectrumShare only narrowly addresses spectrum sharing in the context of active infrastructure sharing. Nonetheless, given the generally broader understanding of spectrum sharing, the limited definition of “spectrum sharing” in the Definitions section could prove misleading or confusing.

**3 Proposal**

The United States has serious concerns that ITU-T Study Group 3 is proceeding hastily with determining D.Spectrum Share without completing necessary coordination with the R-sector. Therefore, the United States proposes the edits included in the attachment to this Contribution, primarily to clarify the Scope and Definitions sections.

The United States also proposes an outgoing liaison statement to ITU-R WP1B to ensure cooperation and collaboration between the development of D.SpectrumShare and the ongoing ITU-R study highlighted above. The United States notes that ITU-R WP1B is scheduled to meet in June 2019; therefore, an outgoing liaison statement to WP1B would be extremely timely.

It is the United States’ understanding that the work in the ITU-R Study Group 1 addressing this contribution has been finalized. It is also the United States’ understanding that the ITU-R Study Group opposed the insertion of national infrastructure or spectrum sharing. Due to the overlap with ITU-R Study Group 1 as described in the “Introduction & Background” section (above), the United States proposes and requests that the “determination” of this draft Recommendation at the next meeting of ITU-T SG3 must be based upon a review by ITU-R WP1B and a response to the liaison statement. This proposal will further ensure coordination between the 2 sectors on this topic.

Finally, because there was minimal participation in the recent Q3/3 RGM, the United States encourages all Members to carefully review the current text of draft ITU-T Recommendation D.SpectrumShare, as contained in [TD37/WP2](https://www.itu.int/md/T17-SG03-190423-TD-WP2-0037/en), with a view towards stabilizing the text as soon as possible.

The United States requests that this contribution be made available publicly without restriction.

[Attachment.]

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| ITU Logo | INTERNATIONAL TELECOMMUNICATION UNION  **TELECOMMUNICATION STANDARDIZATION SECTOR**  STUDY PERIOD 2017-2020 | | **SG3-TD37/WP2** | |
| **Study Group 3** | |
| **Original: English** | |
| **Question(s):** | | 3/3 | Geneva, 23 April – May 2 2019 | |
| **TD** | | | | |
| **Source:** | | Associate Rapporteur on Q3/3 | | |
| **Title:** | | Draft new ITU-T Recommendation Shared use of spectrum and telecommunication infrastructure as possible methods for enhancing the efficiency of telecommunications | | |
| **Purpose:** | | Discussion | | |
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**Keywords:** Q3/3; Shared use of spectrum; Rapporteur Group; SG3

**Abstract:** This TD contains the new base text for the Draft new ITU-T Recommendation Shared use of spectrum and telecommunication infrastructure as possible methods for enhancing the efficiency of telecommunications (output of Rapporteur Group E-meeting on Q3/3 on 21 March 2019).

Please refer to the document annexed below.

**ANNEX**

**Draft new Recommendation ITU-T**

**Shared use of spectrum and telecommunication infrastructure as possible methods for enhancing the efficiency of telecommunications**

**Introduction**

In recent years, emerging radio technologies, growth in the number of mobile users, increasing consumer demand for telecommunication services, and ever-increasing traffic have led to some challenges. These may include, for example, increasing capital and operational expenses of telecommunication operators and coverage of telecommunication services for remote and rural settlements, as well as situations that hamper the deployment of telecommunication infrastructure, such as limited physical space in cities and environment-related issues. These can generate increased costs for telecommunication operators, which in turn will have an impact on tariffs for telecommunication services. It has therefore become increasingly necessary to support Member States in the development of possible methods of spectrum and telecommunication infrastructure management. One of these methods may be to encourage the principle of shared use of spectrum and telecommunication infrastructure by telecommunication operators. This can foster enhanced competition efficiencies and operators saving.

**Draft new Recommendation ITU-T**

**Shared use of spectrum and telecommunication infrastructure as possible methods for enhancing the efficiency of telecommunications**

**1 Scope**

The intention of this Recommendation is to present a set of possible methods to help telecommunication providers save costs and enhance efficiency through the shared use of spectrum and telecommunication infrastructure, including the following main types of sharing:

• Passive infrastructure sharing;

• Active infrastructure sharing;

• Spectrum sharing in the AIS model.

**2 References**

Report ITU-R SM.2404-0 Regulatory tools to support enhanced shared use of the spectrum;

ITU-T Technical Report on Methodologies for valuation of spectrum.

**3 Definitions**

Active infrastructure sharing - sharing of radio access network elements, *e.g.*, antenna, base transceiver stations, and radio network controllers

Passive infrastructure sharing - sharing of passive elements of the network infrastructure, *e.g.*, masts, containers, towers, power supply and air conditioning equipment

Spectrum sharing - aggregation of frequency bands assigned to operators

NOTE – This Recommendation only concerns spectrum sharing in the context of active infrastructure sharing.

**4 Abbreviations**

AIS Active infrastructure sharing

BTS Base transceiver station

CAPEX Capital expenditures

GSM Global System for Mobile Communications

HF High frequency

LTE Long-Term Evolution

OPEX Operating expenditures

PIS Passive infrastructure sharing

RAN Radio Access Network

RNC Radio Network Controller

UMTS Universal Mobile Telecommunications System

**5 Possible methods of sharing**

Possible options of shared use of spectrum and telecommunication infrastructure (Network Sharing) that might be implemented in the Member States are set out below:

• Passive infrastructure sharing (PIS), including non-discriminatory access to the telecommunication infrastructure;

• Active infrastructure sharing (AIS);

• Spectrum sharing in the AIS model.

The possibility of network sharing can lead to cost reduction for network deployment and operation, increase in quality of communication services and their availability level, as well as increased competition.

Figure 1 shows cost savings depending on the number of cooperating operators and the option they have selected for network sharing.

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***Operational  
network***

**Figure 1 Cost savings depending on the selected option of network sharing**

**5.1 Passive infrastructure sharing (PIS)**

Passive infrastructure sharing is the sharing of passive elements of the network infrastructure (masts, containers, towers, power supply and air conditioning equipment). A typical PIS model is shown in Figure 2.

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Operator A

Operator B

**Figure 2. Typical PIS model**

With this model, it is also useful to consider the principle of non-discriminatory access to telecommunication infrastructure, which means ensuring equal conditions for the enjoyment of the rights of infrastructure users of whatever organizational or legal form, and irrespective of their legal relationship with the infrastructure owner.

In order to ensure non-discriminatory access, it is essential to have or develop rules defining the conditions and procedures for ensuring non-discriminatory access to infrastructure that is or may be used to provide telecommunication services.

Those rules presuppose that the following principles will be respected:

– consumers have access to choice in a competitive market and therefore can obtain telecommunication services from an operator of their choosing;

– conditions are established to promote competition on the public telecommunication market;

– information is available on conditions of access to infrastructure.

Economic impact

When using PIS model, the average annual economy is 10 per cent-30 per cent of CAPEX and OPEX, for 5-7 years’ period.

Regulatory impact

Implementation of the Passive infrastructure sharing model does not necessarily require changes to the regulatory framework. Communications operators can make commercial agreements on passive infrastructure sharing in line with their respective legal framework.

**5.2 Active infrastructure sharing (AIS)**

Active infrastructure sharing supposes the sharing of radio access network (RAN) elements (antenna, BTS and RNC).

Figure 3 shows a typical chart of the AIS model.

Economic impact

When using the active infrastructure sharing model, approximate savings in CAPEX and OPEX are up to 50 per cent.

If one base station is used by several operators, each operator pays for the usage of the assigned radio spectrum according to the authorization.

Regulatory impact

Implementation of the Active infrastructure sharing model could require some changes to the regulatory framework. Communications operators can make commercial agreements on active infrastructure sharing in line with the allowance of registration of a radio system or an HF device for two and more operators and the rules of application for communication equipment sharing RANs, for all basic mobile standards (GSM, UMTS, LTE).



Operator A

Operator B

**Figure 3. Typical chart of AIS model**

**5.3 Spectrum sharing in the AIS model (spectrum sharing)**

Spectrum sharing in the AIS model supposes the aggregation of frequency bands assigned to operators in order to improve network capacity and optimize RAN CAPEX.

Figure 4 shows a typical chart of spectrum sharing in the AIS model.

 **Figure 4. Typical chart of spectrum sharing in the AIS model**

Operator B

Operator A

Economic impact

When using the spectrum sharing in the AIS model, approximately up to 10 per cent of CAPEX and OPEX can be saved. More detailed this model is described in Report ITU-R SM.2404-0 Regulatory tools to support enhanced shared use of the spectrum.

Regulatory impact

In the context of the regulatory framework, spectrum sharing in the AIS model could be considered as the use of the spectrum assigned to one of the communication operators by the other operators, based on authorization from the regulator – where required and commercial agreements between the operators. In order to to use this model, an enabling regulatory framework may be required for spectrum sharing by more than one communication operator. More detailed this model is described in Report ITU-R SM.2404-0 Regulatory tools to support enhanced shared use of the spectrum.

In this case, general practical implementation of the spectrum sharing in the AIS model is as follows:

1) Operators notify for spectrum sharing

2) For radio monitoring, the communication facilities using the spectrum sharing method are assigned with additional identifier of the user;

3) Spectrum sharing fee may require approvals as per the legal and regulatory framework.

**6 Impact of shared use of spectrum and telecommunication infrastructure on telecommunication tariffs**

Spectrum and infrastructure sharing has a direct impact on costs, and subsequently on tariffs and investment; it may also enhance competition in the telecommunication market.

Shared use of spectrum and/or telecommunication infrastructure will not lead to the changes in the structure of telecommunication tariff. Base formula for tariff is:

Tariff = Primary cost + Rate of return

Reducing the CAPEX and OPEX by the help of shared use of spectrum and/or telecommunication infrastructure could result in opening an opportunity for mobile operators to raising the efficiency of using the telecommunications infrastructure making it possible for operators to reduce telecommunication tariff for their subscribers.

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| *Model of shared use* | *Savings of operators* |
| PIS | Up to 30% |
| AIS | Up to 50% |
| Spectrum sharing in AIS | Up to 10% |

As emerges from the above data, using the PIS model can lead to lowering the telecommunication tariff by 30 per cent. Adding the AIS model of infrastructures and spectrum sharing can raise the savings of customers to 50 per cent. Increasing opportunities for efficiency gains potentially result in increasing competitiveness and improved customer loyalty.

**7 Promotion of infrastructure and spectrum sharing**

It is recommended that Regulators and Member States promote infrastructure and spectrum sharing between telecommunication operators, where appropriate, and supported by an enabling regulatory framework tailored to market requirements that make it possible to:

• Establish the basic commercial, technical, legal and economic forms and procedures for infrastructure and spectrum sharing along with the obligations and rights of operators.

• Foster sharing negotiations between operators.

**8 Benefits of infrastructure and spectrum sharing**

Development of communications network infrastructure and increasing penetration of broadband Internet access in order to bridge the digital divide are key priorities for many countries.

Infrastructure and spectrum sharing could contribute a lot in attaining the desired objectives by providing opportunities to decrease operators’ costs by increasing efficiencies. That may lead to benefits that include but are not limited to encouraging sustainable investment, increasing network deployment, facilitating new services and reducing telecommunication tariffs for end users.

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