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SERIES D: TARIFF AND ACCOUNTING PRINCIPLES AND INTERNATIONAL TELECOMMUNICATION/ICT ECONOMIC AND POLICY ISSUES

General tariff principles – Economic and policy factors relevant to the efficient provision of international telecommunication services

Shared uses of telecommunication infrastructure as possible methods for enhancing the efficiency of telecommunications

Recommendation ITU-T D.264

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Recommendation ITU-T D.264

Shared uses of telecommunication infrastructure as possible methods for enhancing the efficiency of telecommunications

Summary

Recommendation ITU-T D.264 proposes a set of possible methods to help telecommunication providers save costs and enhance efficiency through the shared uses of the telecommunication infrastructure, including passive and active infrastructure sharing, and including when enabled by aggregation of frequency bands assigned to operators who have acquired property rights over the spectrum to enable active infrastructure sharing implementation.

History

Edition	Recommendation	Approval	Study Group	Unique ID*
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Keywords

Infrastructure sharing, telecommunication infrastructure.

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* To access the Recommendation, type the URL http://handle.itu.int/ in the address field of your web browser, followed by the Recommendation's unique ID. For example, http://handle.itu.int/11.1002/1000/11830-en.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications, information and communication technologies (ICTs). The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementers are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database at http://www.itu.int/ITU-T/ipr/.

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Introduction

In recent years, emerging radio technologies, growth in the number of mobile users, an increasing consumer demand for telecommunication services, and an ever-increasing traffic have led to some challenges. These may include, for example, the 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 telecommunication infrastructure management. One of these methods may be to encourage the principle of shared uses of telecommunication infrastructure by telecommunication operators, including when enabled by aggregation of frequency bands assigned to operators who have acquired property rights over the spectrum to enable active infrastructure sharing implementation. This particular regulatory measure can enhance efficiency, through the reduction of operator's equipment and operating costs, which can result in lowering the telecommunication tariffs for customers.

Recommendation ITU-T D.264

Shared uses of 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, including when enabled by aggregation of frequency bands assigned to operators who have acquired property rights over the spectrum to enable active infrastructure sharing implementation.

Aggregation of frequency bands assigned to operators, who have acquired property rights over the spectrum, which in some cases enables active infrastructure sharing implementation is addressed in ITU-R publications, such as the most recent version of Report [ITU-R SM.2404-0], *Regulatory tools to support enhanced shared use of the spectrum*.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

[ITU-R SM.2404-0] Report ITU-R SM.2404-0 (2017), *Regulatory tools to support enhanced shared use of the spectrum*.
<https://www.itu.int/pub/R-REP-SM.2404>

3 Definitions

3.1 Terms defined elsewhere

None.

3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

3.2.1 active infrastructure sharing: Sharing of radio access network elements, e.g., antenna, base transceiver stations and radio network controllers.

3.2.2 passive infrastructure sharing: Sharing of passive elements of the network infrastructure e.g., masts, containers, towers, power supply and air conditioning equipment.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

BTS Base transceiver station

CAPEX Capital expenditure

GSM Global System for Mobile Communications

HF High Frequency

LTE Long-Term Evolution

OPEX Operating Expenditure

RAN Radio Access Network

RNC Radio Network Controller

UMTS Universal Mobile Telecommunications System

5 Conventions

None.

6 Possible methods of sharing

Possible options of shared use of spectrum and telecommunication infrastructure (network sharing) that might be implemented by Member States are set out below:

- passive infrastructure sharing;
- active infrastructure sharing, including when enabled by aggregation of frequency bands assigned to operators who have acquired property rights over the spectrum to enable active infrastructure sharing implementation.

The possibility of network sharing can lead to cost reductions for network deployment and operation, to an increase in quality of telecommunication services and their availability levels, as well as to increased competition and lowering of tariffs for telecommunication services.

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

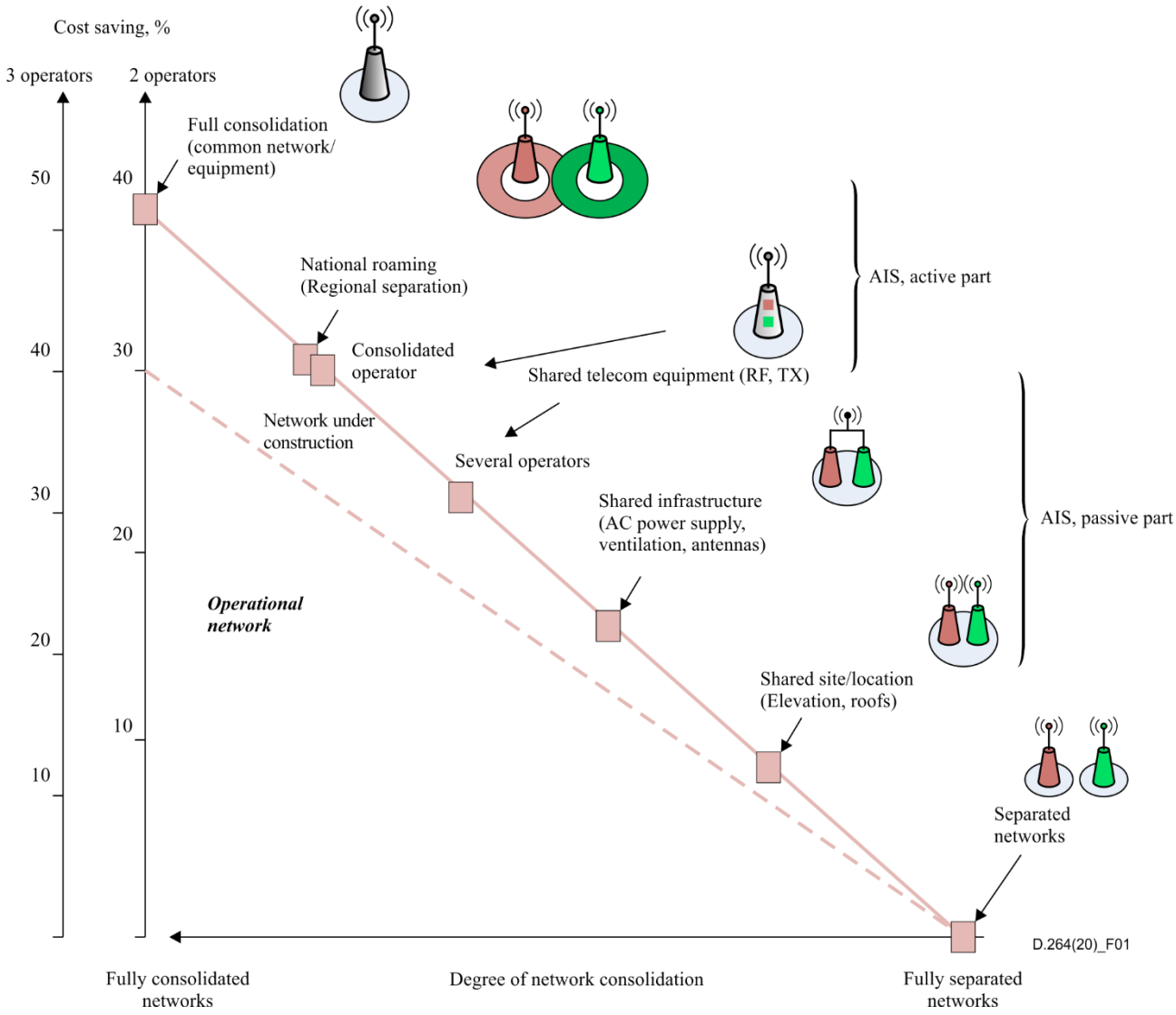

Figure 1 – Cost savings depending on the selected option of network sharing

6.1 Passive infrastructure sharing

Passive infrastructure sharing is the sharing of passive elements of the network infrastructure (masts, containers, towers, power supply and air conditioning equipment).

With passive infrastructure sharing, 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. Studies about a relevant market related to passive infrastructure and significant market power could be considered to evaluate potential risks of abuse of significant power by dominant players, which is likely to occur.

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

These 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.

Regulatory impact

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

Member States are encouraged to consider the appropriate regulatory framework for infrastructure sharing bearing in mind the principles of minimum intervention and proportionality.

6.2 Active infrastructure sharing

Active infrastructure sharing entails the sharing of radio access network (RAN) elements (antenna, base transceiver station (BTS) and radio network controller (RNC)).

Regulatory impact

Implementation of the active infrastructure sharing model could require some changes to the regulatory framework. Telecommunication operators can make commercial agreements on active infrastructure sharing in line with the allowance of registration of a radio system or a high frequency (HF) device for two and more operators and the rules of application for telecommunication equipment sharing RANs, for example for Global System for Mobile Communications (GSM), Universal Mobile Telecommunications System (UMTS), Long-Term Evolution (LTE).

Aggregation of frequency bands assigned to operators who have acquired property rights over the spectrum to enable active infrastructure sharing implementation

Implementation of active infrastructure sharing may use aggregation of frequency bands assigned to operators, who have acquired property rights over the spectrum, in order to improve network capacity and optimize RAN capital expenditure (CAPEX), as described in most recent version of Report [ITU-R SM.2404-0].

Regulatory impact

The active infrastructure sharing model could also require an enabling regulatory framework for the use of the spectrum assigned to one of the telecommunication operators by the other operators, based on the authorization from the regulator, where required, and commercial agreements between the operators.

When analysing regulatory interventions, as a result of an active infrastructure sharing model, including when enabled by aggregation of frequency bands assigned to operators who have acquired property rights over the spectrum to enable active infrastructure sharing implementation, Member States should consider at least the following aspects, such as, technical, competition and licensing, in view to avoid negative impacts of such interventions on the telecommunication market.

7 Impact of shared uses of 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.

Reduction of the CAPEX and operating expenditure (OPEX) due to shared uses of telecommunication infrastructure, including when enabled by aggregation of frequency bands assigned to operators who have acquired property rights over the spectrum to enable active infrastructure sharing implementation, could result in opening an opportunity for mobile operators to raising the efficiency of using the telecommunication infrastructure and making it possible for operators to reduce telecommunication tariffs for their subscribers.

As Table 1 shows, using the passive infrastructure sharing model can lead to the lowering of the telecommunication tariff by 30 per cent. Adding the active infrastructure sharing model, including

when enabled by aggregation of frequency bands assigned to operators who have acquired property rights over the spectrum to enable active infrastructure sharing implementation, can raise the savings of customers to 50-60 per cent. Increasing opportunities for efficiency gains potentially result in increasing competitiveness and improved customer loyalty.

Table 1 – Potential savings of operators using infrastructure and spectrum sharing models

Model of shared use	Savings of operators
Passive infrastructure sharing	Up to 30%
Active infrastructure sharing, including when enabled by aggregation of frequency bands assigned to operators who have acquired property rights over the spectrum to enable active infrastructure sharing implementation	Up to 50-60%

8 Encouragement of infrastructure sharing

It is recommended that Member States encourage infrastructure sharing between telecommunication operators, including the aggregation of frequency bands assigned to operators who have acquired property rights over the spectrum to enable active infrastructure sharing implementation, where appropriate, by an enabling regulatory framework tailored to market requirements that make it possible to:

- have the basic commercial, technical, legal and economic forms and procedures for infrastructure sharing, including the aggregation of frequency bands assigned to operators who have acquired property rights over the spectrum, along with the obligations and rights of operators;
- foster sharing negotiations between operators; and
- apply appropriate dispute resolution mechanisms.

9 Benefits of infrastructure sharing

The development of telecommunication network infrastructure and the increasing penetration of broadband Internet access in order to bridge the digital divide are key priorities for many Member States.

Commercially-based infrastructure sharing, including the aggregation of frequency bands assigned to operators who have acquired property rights over the spectrum to enable active infrastructure sharing implementation, could contribute a lot in attaining the desired objectives by providing opportunities to decrease operators' costs by increasing efficiencies. This may lead to benefits that include, but are not limited to encouraging sustainable investment, increasing network deployment, facilitating new services, increasing the competition and reducing telecommunication services' tariffs for end users.

Bibliography

[b-ITU-R SM.2012-6] Report ITU-R SM.2012-6 (2018), *Economic aspect of spectrum management*.
<https://www.itu.int/pub/R-REP-SM.2012>

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