



The WRC series  
Fair FSS Sharing - Safeguarding  
mobile growth

May 2017

# Introduction

How radio frequency spectrum is used is dependent on international allocations, regional harmonisation, national decisions and coordination. Technical, economic, social and at times political reasons all inform choices on how it is allocated to mobile, satellite, broadcasting TV or any of other users of the airwaves.

The upcoming World Radiocommunication Conference (WRC-19) and the preparation work that goes into it creates a great opportunity. A chance to let everyone maximise the use of this valuable resource. The mobile industry believes that doing so is vital for technologies like IMT-2020 (commonly known as 5G) and a generation of new services to reach their full potential.

The satellite and mobile industries both rely on efficient use of scarce spectrum to ensure they can continue to grow and deliver innovative services. Open discussions on spectrum allocation, based on a common understanding of a complex task, benefit both industries. We have more to gain from together rather than against each other.

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## Why now?

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The mobile industry is getting ready to launch 5G, a new generation of super-fast, low-latency mobile broadband services. It is an opportunity to create an agile, purpose-built network tailored to the different needs of citizens and the economy. But it is vital that all stakeholders work together to ensure that 5G is successfully standardised, regulated and brought to market. Existing frequencies will be used, but it will also be necessary to identify new, higher frequencies

to keep up with demand and reach the very fastest speeds. These new higher frequencies will typically be used in dense urban areas where capacity is needed most.

Other industries are also planning new generations of networks. This is placing unprecedented demands on spectrum resources. WRC-19 is a key point of development for new generation broadband.

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## Spectrum efficiency benefits

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As the backbone of mobile broadband, harmonised mobile frequencies has helped connect billions of people and been proven to generate significant economic and social benefits. However, all radio services have their own role and are important in that respect.

Regulators are responsible for ensuring spectrum use is maximised. Full, harmonised use of spectrum is vital. Sharing between different radio services in particular in the higher frequency bands is more feasible and would increase spectrum efficiency. For this to happen, sharing must be based on realistic assumptions.

In order for radio services to share spectrum it is necessary to agree, at the ITU, on technical conditions for avoiding interference. Such conditions are commonplace and must be made in a manner so both, or indeed all the allocated radio services can make use of the band efficiently. The needs of both radio services in question have to be taken into account to determine the possibilities of sharing. A number of technical measures can be used, such as geographical separation distances between systems, physical shielding, power limits where necessary, and other techniques, all of which are tried and tested.

## Modern rules for next generation networks

Standards, regulations and sharing parameters can sometimes lag behind the speed at which modern networks, be it in broadcast, mobile, satellite or any other radio service, are developing. Regulations developed for networks many generations old do not apply to mobile services and modern satellite networks. Furthermore, some ITU protection conditions or criteria being used for satellite networks were based on performance information for analogue networks three decades ago.

Today, radio services such as mobile and satellite are preparing for a new generation of networks that will become increasingly available going into the 2020s. Mobile operators are planning for 5G while satellite operators are launching new satellite infrastructures such as Eutelsat's planned Quantum network and Intelsat's Epic. Such modern, robust networks are not comparable to the network architectures of the past and today's sharing parameters must reflect that.



## Interference with satellite networks

Recommendation ITU-R S.1432 stipulates what interference other systems may give to a fixed satellite network operating in bands below 30GHz. However, this Recommendation only covers interference from fixed links into satellite systems. No information is currently available in the ITU on interference from mobile systems. The figures from this Recommendation are unnecessarily imbalanced and should therefore not be used to assess the sharing between mobile systems and satellite systems. Other satellite networks are permitted to contribute 78% of the interference, while all other primary services including mobile just 19% combined. A fair example of sharing would allow services equal rights. This will indeed make the repartition of interference towards satellite services s fairer while providing these satellite services adequate protection from other equal status services.

*Aggregate interference levels allowed to a satellite network under ITU-R S.1432 from:*

OTHER SATELLITE NETWORKS:

**78%**

ALL OTHER PRIMARY SERVICES (incl. mobile):

**19%**

ALL OTHER SOURCES OF INTERFERENCE:

**3%**

*Other fairer ways of developing broadband would see these figures brought significantly closer together.*

## Level playing field

Work on how two or more radio services can share spectrum should focus on how to benefit both services by creating a level playing field. Where two radio services, under the rules laid out by the ITU, carry the same status, sharing the spectrum should look at how they can use the spectrum together. This creates the highest possible efficiency and boosts the social and economic benefits.

The opposite is to give unnecessary protection to one radio service above another, wrapping one in cotton wool while making the spectrum difficult to use for the other service. Severe restrictions have severe consequences, including possibly preventing a service from using the band in question at all.

In the communications world, it is vital for an ecosystem of equipment to develop across as many markets as possible for any particular piece of spectrum to be used as efficiently as possible. Over-restriction of a service when sharing a band can

squeeze the development of such an ecosystem and the benefits brought by the possibility of sharing will be lost. Sharing must be on a fair basis to each service.

The underlying assumptions must also be realistic and should be laid out to share the band and not to block one or other service from using it. The technical details of how to share must take into account the realistic details of each network, how they will function and how they will use the spectrum. In the case of a mobile network these include typical and realistic assumptions on the power and other technical and deployment characteristics of the network. In the case of satellite systems these include realistic assumptions on the performance and interference robustness of modern satellites.

Without this, the ability to share the spectrum will be damaged. Any sharing must rely on adequate, realistic protection so that both services can continue functioning in harmony with one another.

### Sharing must:

- **Be based on realistic assumptions**
- **Take into account modern network characteristics**
- **Treat both radio services equally (the principle of the equality of right to operate is enshrined in the Radio Regulations)**
- **Ensure that focus is on sharing, not limiting use of the band**
- **Encourage development of viable ecosystems for both services**

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## Pioneering 5G

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Sharing parameters will be vital to the development of new communications services as we move towards the important decisions of WRC-19. If outdated or unreasonably conservative protection criteria are used for spectrum sharing studies, this will limit the development of mobile broadband. Assumptions must be realistic and rely on the characteristics of modern, robust networks sharing on equal terms with other radio services.

The airwaves are a busy place and a finite resource. The decisions on new mobile broadband spectrum at WRC-19 represent the next step in connectivity. It is only through right decisions on the most appropriate and equitable usage of this finite resource, which should be reviewed in a just and realistic manner, that this development can truly come to fruition.

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## Further reading

For technical details on the values outlined in this document please read the GSMA / Transfinite report which can be found at: [www.gsma.com/spectrum/wp-content/uploads/2017/05/FSS-protection-criteria.pdf](http://www.gsma.com/spectrum/wp-content/uploads/2017/05/FSS-protection-criteria.pdf)







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