Documento del
Director General

IAC/Inf.18-4S W/02/14
Original: inglés
13 de enero de 2014

INFORME DEL DIRECTOR GENERAL
SOBRE EL SIMPOSIO MUNDIAL PARA ORGANISMOS REGULADORES

I. RESUMEN

1. En el presente documento se informa acerca del 13° Simposio Mundial para Organismos Reguladores (GSR13), que tuvo lugar del 3 al 5 de julio de 2013 en Varsovia, Polonia, con el siguiente tema principal: "Regulación de 4ª Generación: abriendo camino a las comunicaciones digitales". El GSR13 ofreció una oportunidad singular a los formuladores de políticas, las autoridades reglamentarias y otras partes interesadas clave del sector de TIC para examinar la naturaleza transformadora de las comunicaciones y la evolución a la reglamentación de las TIC de 4ª generación en una sociedad conectada, al impulso de la cambiante naturaleza del ecosistema de comunicaciones, la cambiante dinámica del mercado y los correspondientes patrones de tráfico, y las cambiantes prácticas y funciones reglamentarias. Al igual que el año pasado, la estructura del GSR13 incluyó un diálogo mundial específico entre los reguladores y el sector, de dos días de duración, como parte importante del simposio. Antes del GSR13, la ITSO y GVF, organización no gubernamental que reúne a importantes partes interesadas del sector satelital, organizaron conjuntamente una sesión a la hora del almuerzo, el 2 de julio, en la cual se abordaron distintas cuestiones atinentes a la reglamentación del ámbito de los satélites. En el Anexo No. 1 a este documento se presenta una copia del documento de información preparado por el sector.

II. ANTECEDENTES

2. Bajo la Extensión del Plan Estratégico de la ITSO hasta 2014 inclusive, aprobada por la Trigésima Quinta Asamblea de Partes (AP-35) en el documento AP-35-18, la ITSO tiene tres objetivos principales:

- <u>Objetivo 1</u>: Mantener la continuidad del suministro de servicios públicos de telecomunicaciones por satélite
- <u>Objetivo 2</u>: Proteger las posiciones orbitales y asignaciones de frecuencias conexas del Patrimonio Común de las Partes
- <u>Objetivo 3</u>: Contribuir a promover una infraestructura mundial de la información y las comunicaciones

3. Desde su lanzamiento en el año 2000, el Simposio Mundial para Organismos Reguladores (GSR) ha venido reuniendo a los directivos de las autoridades nacionales reglamentarias tanto de los países desarrollados como de los países en desarrollo, y se ha granjeado la reputación de ser el foro anual mundial al que las autoridades reglamentarias acuden para compartir sus opiniones y experiencias. La reunión promueve un diálogo abierto entre la comunidad mundial de autoridades reglamentarias y las principales partes interesadas del ámbito de las TIC, y la ITSO ha sido una participante activa en este foro desde sus inicios.

Para cualquier aclaración sobre este documento antes de la reunión, favor de comunicarse con:
José Toscano Tel.: +1 202 243-5050 Fax: +1 202 243-5018

III. EL GSR

4. El 13° Simposio Mundial para Organismos Reguladores (GSR13) tuvo lugar del 3 al 5 de julio de 2013 en Varsovia, Polonia, con el siguiente tema principal: "Regulación de 4ª Generación: abriendo camino a las comunicaciones digitales". El GSR13 ofreció una oportunidad singular a los formuladores de políticas, las autoridades reglamentarias y otras partes interesadas clave del sector de TIC para examinar la naturaleza transformadora de las comunicaciones y la evolución a la reglamentación de las TIC de 4ª generación en una sociedad conectada, al impulso de la cambiante naturaleza del ecosistema de comunicaciones, la cambiante dinámica del mercado y los correspondientes patrones de tráfico, y las cambiantes prácticas y funciones reglamentarias. Los participantes en el GSR13 compartieron sus puntos de vista sobre una amplia gama de temas, incluidos los siguientes: construcción de la futura sociedad digital; espacios blancos de televisión; la función de las normas en una economía digital; infraestructura 4.0 y más allá; fondos de servicio universal; transacciones digitales, y necesidad de un mayor número de direcciones de IP. . Al igual que su predecesor en 2012, el GSR13 se diferenció especialmente de eventos anteriores en la manera en que se lo estructuró, partiendo del hecho de que se lo reformó para dar lugar a un diálogo mundial de dos días entre los reguladores mundiales y el sector como parte integral del simposio.

5. De conformidad con el objetivo de contribuir a promover una infraestructura mundial de la información y las comunicaciones, la ITSO ha venido trabajando con la Unión Internacional de Telecomunicaciones (UIT) y su Oficina de Desarrollo de las Telecomunicaciones (BDT) a fin de estudiar maneras para sensibilizar a los responsables de la formulación de políticas y las autoridades reglamentarias acerca del carácter crítico que el acceso a la banda ancha reviste para el crecimiento económico de todos los países en general y para la utilización de las tecnologías de satélite en particular. Fue precisamente en consonancia con ese objetivo que la ITSO y GVF organizaron conjuntamente un evento a la hora del almuerzo el 2 de julio de 2013 en Varsovia, Polonia, que trató la evolución del sector satelital y el impacto de la regulación de 4ª generación . El evento también brindó la oportunidad de que el sector efectuara una presentación a los formuladores de políticas y las autoridades reglamentarias, acerca de los principales temas para consideración respecto de las comunicaciones por satélite en preparación para la próxima Conferencia Mundial de Radiocomunicaciones (CMR-15) y, en particular, las preocupaciones acerca de la cuestión del espectro de banda C (en el Adjunto No. 1 se presenta una copia del documento de información). Durante el simposio, las autoridades reglamentarias y los responsables de la formulación de políticas adoptaron las "Directrices del GSR13 sobre Prácticas Óptimas" (véase el Adjunto No. 2). Las Directrices sobre Prácticas Óptimas relativas a las funciones en evolución tanto de la reglamentación como de las autoridades reglamentarias en un entorno digital representan un medio idóneo para facilitar por vía rápida la adaptación al cambio y la adopción de nuevas tecnologías a fin de fomentar el desarrollo y las actividades comerciales. Las principales directrices identificadas fueron las siguientes:

- Reglamentación 4.0: enfoques reglamentarios innovadores e inteligentes que fomentan la igualdad de trato de los actores del mercado sin imponer cargas adicionales a los operadores y los proveedores de servicios, cuyos principales elementos comprenden los siguientes: reconocimiento de la necesidad de que los organismos reguladores tengan presentes los aspectos transformadores y transnacionales de la reglamentación en el entorno digital; la importancia de efectuar análisis de mercado; la importancia de adoptar un marco reglamentario incluyente; prácticas reglamentarias poco invasivas; fomentar la aceptación de los servicios y el acceso a servicios y aplicaciones en línea.
- La evolución del papel del organismo regulador: el regulador como asociado para el desarrollo y la integración social
- Necesidad de adaptar la estructura y el diseño institucional del organismo regulador con miras a la elaboración de la futura reglamentación

El evento global del GSR13 está cubierto en el Informe de su Presidente[1].

IV. CONCLUSIÓN

6. La organización conjunta de un evento a la hora de almuerzo por la ITSO y GVF, así como la participación en el evento principal del propio simposio, fueron elementos importantes en la puesta en práctica global del Plan Estratégico de la ITSO. El evento también contribuyó a las actividades de sensibilización acerca del valor y el uso de las tecnologías de satélite.

[1] El informe del Presidente del GSR13 aparece en el siguiente enlace: http://www.itu.int/osg/gsr13/report/july03.html

ADJUNTO NO. 1 al
IAC/Inf.18-4S W/02/14

GVF: DOCUMENTO DE INFORMACIÓN DEL SECTOR DE SATÉLITES SOBRE EL PUNTO 1.1 DEL ORDEN DEL DÍA DE LA CMR-15

(Disponible solamente en inglés)

Global VSAT Forum ("GVF")

Information Paper on WRC-15 Agenda Item 1.1

25 July 2013

1 Introduction

The World Radiocommunication Conference 2012 ("WRC-12") decided in its Resolution 807 to recommend to the Council the agenda for the World Radiocommunication Conference 2015 ("WRC-15"), which includes an item (Agenda item 1.1) "*to consider additional spectrum allocations to the mobile service on a primary basis and identification of additional frequency bands for International Mobile Telecommunications (IMT) and related regulatory provisions, to facilitate the development of terrestrial mobile broadband applications, in accordance with Resolution **233 (WRC-12)***".[1]

The first session of the Conference Preparatory Meeting for WRC-15 ("CPM15-1") decided to establish a Joint Task Group among Study Groups 4, 5, 6 and 7 ("JTG 4-5-6-7") as responsible for conducting the relevant studies in accordance with the Terms of Reference specified in Annex 10 of the Administrative Circular CA/201.[2] ITU-R Working Party 5D ("WP 5D") is tasked with determining "suitable frequency ranges" for International Mobile Telecommunications ("IMT") systems.

WP 5D is continuing to work on the identification of "suitable frequency bands". At present, a large number of frequency bands have been identified, totalling 3,765 MHz below 6 GHz. These frequency bands are in addition to the total of 1,177 MHz which have already been identified for IMT in the Radio Regulations, and the 738.5 MHz which are available for Radio Local Area Networks ("RLANs"). Some frequency bands above 6 GHz have also been suggested by WP 5D, these bands totalling an additional 5,100 MHz of spectrum. In all, more than 10,000 MHz of spectrum has been suggested as potentially suitable for use by IMT systems.

Several of the identified bands for IMT systems are allocated to satellite applications, and are either currently used or are planned for use by satellite applications. The frequency bands of particular concern to the global satellite community are the following:

- 1,452-1,492 MHz
- 1,518-1,559 MHz
- 1,610-1,660.5 MHz
- 1,660.5-1,668 MHz

[1] Resolution 807 (WRC-12) (available at http://www.itu.int/oth/R0A0600004D/en).

[2] CPM15-1 Decision on the Establishment and Terms of Reference of Joint Task Group 4-5-6-7 (available at http://www.itu.int/oth/R0A0600004A/en). See also, ITU-R Administrative Circular CA/201 (19 March 2012) (available at http://www.itu.int/md/R00-CA-CIR-0201/en).

- 1,668-1,675 MHz
- 3,400-4,200 MHz
- 4,500-4,800 MHz
- 5,850-6,425 MHz
- 13.75-14 GHz
- 18.1-18.6 GHz
- 27-29.5 GHz
- 38-39.5 GHz

This document examines the potential for operation of IMT systems in some of these frequency bands. In particular, this document provides detailed discussion on the L-band geostationary mobile-satellite service ("GSO MSS") bands and the C-band fixed-satellite service ("FSS") bands, which are widely used by satellite applications and for which there currently appears to be interest for terrestrial IMT applications.[3]

2 Overview of satellite applications and services

Satellite systems support a broad range of applications and services, both domestically and internationally. A snap-shot of typical services includes:

- Broadband Internet access;
- Backhaul for terrestrial mobile networks, especially LTE and 4G;
- Broadcasting of high quality TV in digital or High Definition formats;
- Disaster relief;
- Distance learning;
- Rural telecommunications;
- Telemedicine;
- Government closed-user groups;
- National and multi-national networks;
- PSTN infrastructure extension;
- Land mobile communications;
- Maritime services;
- Oil & Gas operation services;
- News distribution;
- Machine-to-machine data transfer; and
- Aircraft communications (manned and unmanned);

The use of satellites to support broadband and mobility applications is discussed in more detail below.

[3] This document may be updated in the future to address other frequency bands as the work of WP 5D and JTG 4-5-6-7 progresses. Furthermore, the list of frequency bands of interest to the satellite industry is not final, and if other bands of concern to the satellite community are added, this document may be updated to also address those frequency bands.

2.1 Satellite broadband capabilities and characteristics

Broadband access is an important indicator for economic development. Increasingly, governments around the world have developed goals and strategies to ensure broadband access to all citizens, but have been challenged to meet objectives in rural and remote areas. Many countries' broadband goals may not be achieved without a mix of broadband technologies, including cable, fiber, wireless and satellite. Terrestrial infrastructure is often concentrated in urban centers, with limited coverage for rural and remote areas, preventing segments of the population from benefiting from the information society. Ongoing advancements in satellite networks, ground equipment and applications have made satellite technologies an increasingly cost effective solution – and a critical component of telecommunications and broadband access strategies and national broadband plans, particularly to ensure coverage in remote and rural areas.

Satellite-based Internet and broadband services provide an opportunity to extend connectivity to even the most remote areas, where terrestrial-based (wired or wireless) services are unavailable or expensive to deploy. With increased demand and the development of rural or universal access broadband strategies in both developed and developing country markets, there has been a surge in demand for satellite-based solutions for rural and remote areas, including through government-led projects or public-private partnerships which aim to increase access. Satellite-based services offer many advantages, such as:

- Ubiquitous coverage to all corners of the globe;
- Cost-effective and easy-to-install solutions, even for remote and rural areas;
- No significant ground infrastructure investment required;
- Sustains large end-user populations;
- Capable of large network deployments;
- Fixed and mobile applications; and
- Reliable and redundant services in the case of a disaster or emergency situation.

Given their unique regional and global coverage capabilities, satellites are able to deliver immediate Internet and broadband connectivity. This gives the flexibility and capacity to extend the service footprint based on market demand, instantly and easily covering rural and remote areas. Importantly, particularly for developing regions, end-user and community connectivity is possible without huge capital investments or extensive build-out programs. Once a satellite system is operational, connectivity can be further extended to user locations with easy-to-deploy and install ground terminals. As users increase, economies of scale enable cheaper equipment, making satellite an even more competitive solution since build out is not sensitive to distance or location, as it is the case with fiber.

Moreover, high-density, small-dish services, which can be enabled by higher power flux density levels, offer the opportunity for even more cost-effective connectivity. As next generation satellite networks are launched, capacity is increasing, and higher speed and lower latency options make satellite even more attractive as a solution.

Within the past few years, satellites have been instrumental in bringing broadband services to users located in areas where terrestrial infrastructure, such as xDSL or cable, cannot reach, and offering a layer of redundancy for terrestrial links in the case of a disaster or other outage.

Countries throughout the developing world are experiencing tremendous growth in Very Small Aperture Terminal ("VSAT") deployments, as e-governance initiatives, corporate networks and rural demand for broadband, television, and mobile phone and mobile broadband services also increase. Corporate or organizational VSAT networks have become increasingly vital, as companies and their metropolitan and rural workforces depend on reliable and scalable connectivity for everything from email, Internet and Intranet access. Such networks are also critical in providing redundancy or back up connectivity for critical networks in the case of a disaster or other outage.

Moreover, consumer satellite broadband is a growing service option for developing countries. Service providers seeking alternative solutions for Internet access in rural and remote locations have found satellite broadband to be a compelling solution – and one that is proven and easy to deploy.

The combination of VSAT and wireless is an effective solution for many rural applications. Rural populations are often clustered in or around villages, with most of the populations within a range of 1 to 5 km. A single VSAT can provide service to an entire village using a wireless local loop solution for the last mile connection. Wireless has the added advantage of spanning rivers or other obstacles, and provides a more reliable connection when cable theft is a problem.

One possible solution involves an integrated system of a VSAT, a wireless local loop base station and a solar power system, all mounted on a 10 meter post. Such a solution is easy to install, helps overcome obstructions from buildings, addresses power source concerns and is very secure.

The combination of a satellite VSAT connection to the Internet plus WiFi for local access by multiple users can provide the lower per-subscriber costs that the market requires, particularly in rural and remote areas. The satellite connection brings the Internet stream to the village, and WiFi access points extend that connectivity to homes, schools and public buildings. Users can share both equipment and connection costs through subscription or other joint payment plans.

The keys factors to reducing costs are:

- Use low cost equipment – Off the shelf, open standard equipment (DSL/WiFi/cable modem) leverages mass production. Integrating satellite equipment that is based on widely-accepted global standards dramatically reduces equipment cost.
- Maximize subscribers per gateway – A larger pool of subscribers reduces the equipment cost per subscriber. A larger subscriber base is also more efficient in sharing a single connection. The key issue is to extend the range of standard WiFi equipment to allow a single VSAT to service an entire village.

Such solutions integrate interactive satellite broadband service with the existing last mile infrastructure, such as copper line, TV cable or wireless network. A single central satellite antenna is installed at an aggregation point – i.e., a street cabinet in the community, cable TV head-end, or WiFi mast. The broadband connection to the end-users is then supplied via the existing last mile infrastructure or the WiFi access, providing all households with Internet access. End-users do not have to install a satellite antenna at home, but pay only for a DSL connection and a standard broadband equipment.

2.2 Mobile satellite services and applications

The demand for satellite supported mobility applications and services is growing quickly, driven in part by the growth in mobile terrestrial communications. The ability to communicate or access the Internet from any location is becoming an expectation for many, and a necessity for some. One of the key attractions of such mobile applications is that they provide communications from almost any location on Earth, often at locations not possible or practical to serve by other means. Examples of common mobility applications supported by satellite systems are:

- Handheld satellite phones providing voice and low datarate communications;
- Tracking systems, providing the location of vehicles, workers and explorers in remote or hostile regions;
  Low data rate SCADA[4] or machine-to-machine applications, for example to monitor and control of pipelines;
- Transportable terminals (for example the size of a laptop computer), which provide broadband Internet and voice communications to remote users such as the media, relief agencies and workers in remote locations;
- Communications for ships, used to support day-to-day ship operations and safety related services;
- Communications for aircraft, for example to provide the air traffic control communications to and from the pilot in oceanic airspace;
- Government communications, on land, sea and in the air;
- Backhaul for small-cell mobile communication to aircraft, ships and trains, used to support Internet access and mobile telephony for aircraft passengers, crew and passengers on ships, and train passengers.

All these mobile applications are provided globally, by satellite systems operating in a variety of frequency bands ranging from 137 MHz to 30 GHz, each band having different characteristics which are more suited to some mobile applications than others.

Advanced Media / TV Services

Another important use of satellite systems is for the distribution of advanced media services to everyone, e.g. for broadcasters delivering video services in digital or in High Definition (HD) or in any other advanced TV formats. Satellite also plays a fundamental role in carrying video content from all over the world to these media distribution platforms (contribution links).

3 L-band GSO MSS (1,518-1,559 MHz, 1,626.5-1,660.5 MHz, 1,668-1,675 MHz)

3.1 Description of use of L-band by GSO MSS systems

The band 1,525-1,559 MHz is allocated to the MSS (space-to-Earth), and the band 1,626.5-1,660.5 MHz is allocated to the MSS (Earth-to-space). These frequency bands are of great importance to the

[4] SCADA is short for "supervisory control and data acquisition."

MSS. These frequency bands were some of the first bands to be used by the MSS, and they are now shared among many GSO MSS operators.

Globally, these frequencies are currently shared by 9 operators: Inmarsat (UK), Thuraya (UAE), RSCC (Russia), ESA (Europe), Optus (Australia), Telecom México (Mexico), LightSquared (USA), ACeS (Indonesia), and MLIT (Japan). Among these 9 operators, there are 36 satellites in orbit that operate with MSS frequencies. All of the frequencies in these bands are assigned to and used by these operators, with frequencies re-used where possible on a geographic basis. The assignment of frequencies is conducted under the framework of two Memoranda of Understanding between the administrations responsible for the coordination of the satellite networks.

Some L-band GSO networks have from the outset been a key component of safety communications for the maritime community, as the main provider of satellite communications within the Global Maritime Distress and Safety System ("GMDSS"). Consequently, in some of the frequencies, priority is given to the spectrum requirements for the GMDSS through the ITU's Radio Regulations ("RR") footnote No. 5.353A.

L-band networks also provide safety communications for aircraft within the aeronautical mobile satellite (route) service ("AMS(R)S") in oceanic regions. RR footnotes No. 5.357A and No. 5.362A give priority to AMS(R)S services in some parts of these frequency bands. Inmarsat and MLIT currently provide AMS(R)S services. Within the European Union's Single European Sky ATM Research ("SESAR") initiative, it is anticipated that aircraft safety systems will make much greater use of the L-band MSS spectrum in the near future, including use in continental airspace. Similar initiatives to make greater use of the L-band MSS spectrum to support aviation safety systems are being considered in other parts of the world, increasing the importance of these bands for satellite applications.

The bands 1,544-1,545 MHz and 1,645.5-1,646.5 MHz are limited to distress and safety communications. These bands are used by the Cospas-Sarsat systems, whose transponders are used on various geostationary and non-geostationary satellites.[5] These frequency bands will also be used on the 30 satellites of the Galileo networks,[6] and are planned to be used also on the future satellites of the Global Positioning System ("GPS")[7] and Glonass[8] networks.

---

[5] The International Cospas-Sarsat Program is a satellite-based search and rescue ("SAR") distress alert detection and information distribution system, established by Canada, France, the United States, and the former Soviet Union in 1979. It is best known as the system that detects and locates emergency beacons activated by aircraft, ships and backcountry hikers in distress. Over the years, many countries around the world have joined the project, either as providers of ground segments or as user states.

[6] Galileo is a global navigation satellite system ("GNSS") currently being built by the European Union ("EU") and European Space Agency ("ESA").

[7] GPS is a space-based satellite navigation system that provides location and time information in all weather conditions, anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites. The system provides critical capabilities to military, civil and commercial users around the world. It is maintained by the United States government and is freely accessible to anyone with a GPS receiver.

The bands 1,518-1,525 MHz and 1,668-1,675 MHz were allocated to the MSS at WRC-03. They will be used by the MSS from mid-2013 with the launch of the Inmarsat "Alphasat" satellite.

3.2 Potential for sharing between IMT and MSS

Older L-band satellites (still in use today) use global beams where the footprint of the beam would cover the entire Earth surface as seen from the satellite. More recent satellites use regional beams to cover smaller areas, typically the size of Europe. The most recent L-band satellites use spot beams which cover much smaller areas, of the order of 1,000 km in diameter.

There are two main benefits from the use of smaller beams. First, the higher satellite antenna gain improves the link budget on the forward and return links, allowing the use of smaller user terminals. Second, the use of spot beams allows the same frequencies to be used many times on the same satellite.

The ability of the MSS systems to share with other services is very limited, partly due to the ubiquitous coverage provided by the MSS and partly due to the high sensitivity to interference (user terminals and satellites have to be sufficiently sensitive to receive the desired signal from 36,000 km; and both the user terminals and satellites are limited in the available power to transmit the desired signal). Most of the ITU frequency allocations to the MSS in L-band are not shared with other services, and the few MHz of spectrum which is allocated to other services has very little use by those services. This reflects the limited scope for frequency sharing. The possible use of wireless microphones in L-band was studied by the European Conference of Postal and Telecommunications Administrations ("CEPT") between 2008 and 2010, concluding that sharing between those devices and the MSS is not feasible.[9] Ultra-wideband ("UWB") systems are authorised to operate in L-band (and many other bands), but with very stringent limits applying to emissions in L-band.[10] Recommendation ITU-R M. M.1799 recommends that cellular or similar high-density mobile systems cannot share with MSS uplinks in the band 1,668-1,675 MHz.[11]

Based on these studies, it is clear that terrestrial IMT systems cannot share with L-band GSO MSS systems, and hence the frequency bands 1,518-1,559 MHz, 1,626.5-1,660.5 MHz and 1,668-1,675 MHz are not suitable for identification for terrestrial IMT.

4. C-band (3,400-4,200 MHz, 4,500-4,800 MHz, and 5,850-6,425 MHz)

---

[8] Glonass is an acronym for Globalnaya Navigatsionnaya Sputnikovaya Sistema, or Global Navigation Satellite System. Glonass is a radio-based satellite navigation system operated by the Russian Aerospace Defence Forces. It both complements and provides an alternative to the GPS system.

[9] See ECC Report 121 and Report 147 (available at http://www.ecodocdb.dk/).

[10] See, for example, European Commission Decision 2009/343/EC (available at http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32009D0343:EN:NOT).

[11] Recommendation ITU-R M.1799 (03/2007), Sharing between the mobile service and the mobile-satellite service in the band 1 668.4-1 675 MHz (available at http://www.itu.int/rec/R-REC-M.1799-0-200703-I/en).

4.1 Characteristics of C-band FSS networks

The frequency bands 3,400-4,200 MHz (space-to-Earth) and 5,925–6,725 MHz (Earth-to-space) are usually referred as "C-band", and are used for satellite applications. More specifically, the bands 3,700–4,200 MHz (space-to-Earth) and 5,925-6,425 MHz (Earth-to-space) are usually referred as "Standard" C-band, and the bands 3,400–3,700 MHz (space-to-Earth), 5,850–5,925 MHz (Earth-to-space), and 6,425–6,725 MHz (Earth-to-space) are usually referred as "Extended" C-band.

The frequency band 4,500-4,800 MHz, allocated to FSS (space-to-Earth), is specified in the Appendix 30B Plan, which aims to guarantee, for all countries, equitable access to the geostationary-satellite orbit in this and certain other frequency bands.[12] The bands 3,400-4,200 MHz and 5,850-6,425 MHz are part of the non-planned C-band FSS spectrum.

The C-band was allocated to and used by the satellite industry since the first networks were deployed over 40 years ago. Even though today's satellite networks also use higher frequency bands, the C-band remains of outstanding importance primarily because transmissions in this band do not appreciably degrade in rainy condition. While other frequency bands may be used by commercial FSS operators, specifically Ku-band and Ka-band, these bands are not practical alternatives for many C-band applications. The increased rain attenuation in the Ku- and Ka-bands means that the high availability of C-band cannot be achieved in many regions of the world. This is one of the reasons that C-band is used for feeder links for some MSS networks and is planned to be used for the foreseeable future.

Furthermore, the favourable (signal) spreading loss in C-band means that "global" coverage satellite antennas may be used – the lower spreading loss allows the use of lower gain satellite antennas needed to produce wide coverage beams. Therefore, C-band coverage area tends to be large, providing coverage to sparsely covered regions that might otherwise be located outside of a satellite spot beam. This also allows widely-dispersed earth station sites to be connected within a single satellite beam, meaning the satellite network is fully adaptable to geographic changes in traffic distribution. These unique features of C-band are particularly relevant to some developing countries, whereby due to their geographic location or limited traffic requirements may not be adequately serviced by Ku- or Ka-band satellite networks.

In addition to the reasons given above, it should be emphasized that other satellite bands cannot be substituted for C-band because the capacity is simply not there. Ku-band is heavily in demand and spectrum requirements are increasing. The geostationary arc is very congested with Ku-band satellites in many regions, giving very limited opportunities to expand satellite capacity. Ka-band infrastructure developments are only now starting. Accordingly, current C-band traffic cannot be transferred to other existing Ku- and/or Ka-band satellites.

The FSS frequencies may be re-used by satellites that are sufficiently spaced from one another in the geostationary arc. In the non-planned C-band, frequencies can be re-used by satellites networks

[12] It is worth mentioning that RR Appendix 30B contains worldwide Plans in the 4/6 GHz and 10 11/13 GHz bands. The Plans and their associated procedure are a worldwide treaty. This Appendix and its 4/6 GHz Plan are envisaged and used by many countries as supporting backbone to the telecommunication infrastructure of many developing countries, in particular those which are located in high rain fall zones/areas of the globe.

typically spaced by 2-3 degrees in longitude. In some cases, satellites are located closer than 2-3 degrees, with one satellite operating in one part of C-band and/or servicing one geographic region while and another satellite operates in another part of C-band and/or services another region. Nevertheless, all C-band frequencies are used and are required to meet the current and future FSS capacity requirements. Today, there are approximately 180 geostationary satellites operating in the C-band. C-band satellites continue to be launched, reflecting an ongoing demand for C-band FSS applications around the world. Annex 1 to this document provides a list of C-band satellites currently in operation, and those planned to be launched in the next few years. In addition, several regional and sub-regional networks are using frequency bands contained in Appendix 30.

The use of C-, Ku- and Ka-bands are all growing, reflecting the different needs of end users and the different characteristics of each frequency band. Terrestrial mobile systems seek a range of frequency bands with technically different characteristics, with some bands more suited to particular applications than others. Similarly, the FSS requires access to C-, Ku- and Ka band, although the differences between these FSS bands are more pronounced than is the case for terrestrial mobile bands.

4.2 C-band FSS applications

There is a wide range of applications in use through C-band FSS networks. Some examples of services delivered through C-band satellite networks are distance learning, telemedicine, universal Internet access through low-cost VSAT equipment, video transmissions to homes, video transmissions to cable head-ends for distribution to homes, backhaul for linking terrestrial mobile base stations to the core network, and communications in support of aviation air traffic management, among other.

Thanks to its robust qualities, satellite services operated in C-band play a vital role in recovery and relief operations for many disasters, including those that occurred in recent years such as the 2004 Asian tsunami, the 2010 Haiti earthquake, and other major natural disaster events.

C-band is also used for the exchange of telemetry, telecommand and control ("TT&C") information between satellites and earth stations used to manage their operations. This application requires particular protection from all interferences, due to the risk of losing control of the affected space station (and the associated loss of commercial/non-commercial services supported by the satellite) and the possibility of causing catastrophic damage to other spacecraft. Due to its high reliability, C-band is often used for TT&C satellite operations.

Some satellite operators use C-band frequencies for MSS feeder-links, through which hundreds of thousands of customers can enjoy connectivity on L-band mobile platforms – on land, at sea and in the air – where other communication means are not available. This includes safety communication services, provided through C-band feeder links, for example, for GMDSS and AMS(R)S applications. The use of C-band for feeder-links for the MSS is of high importance for disaster recovery and relief, when terrestrial networks cannot fulfil the communication needs after a major disaster.

C-band is also used for the support of air traffic control systems in regions where terrestrial coverage is poor or unreliable. For example, in Africa and Latin America, the interconnection between the remote VHF aeronautical communication towers and the air traffic control centres is provided by C-band FSS systems. Only C-band can cost-effectively provide the necessary reliability for such safety services.

The characteristics of C-band frequencies described in the previous section have led to the use of this band for satellite distribution of TV broadcast channels in many parts of the world. These transmissions are either received directly by the end user or through a cable head-end facility, which then re-distributes the signal to end users. For example, in the United States C-band FSS is used to transmit video programming to over 7000 cable head-end stations for subsequent distribution to 60 million customers. In Brazil, there are over 20 million C-band receiving earth stations.

Annex 2 contains information on the deployment of registered C-band FSS earth stations provided by one FSS operator. The information in this Annex shows that many of the countries where C-band is used with the greatest density of earth stations are in Africa.

4.3 Potential use of C-band frequencies by IMT

The band 3,400-3,600 MHz was identified for terrestrial IMT in a number of countries at WRC-07. Before and since that time, several administrations have licensed parts of this band for IMT systems.

The use of this band for terrestrial mobile broadband has not been successful. In several countries, licences have been returned.[13] Where terrestrial systems have been deployed, mostly based on WiMAX technology, there has been little commercial success.

This lack of success is likely a consequence of a number of factors. First, the propagation conditions for terrestrial mobile applications are not favourable. For example, the range of a macro-cell base station in this band is about 2.5 km[14] and is probably lower in an urban environment.

Second, in comparison to other lower frequency bands in use today by terrestrial wireless systems, the wall and glass penetration losses at C-band are relatively high. This means that indoor coverage is poor when compared to those lower frequency systems.

Third, there is limited availability at present of consumer equipment for terrestrial mobile broadband systems in C-band.

Under Agenda Item 1.4 of WRC-07, the band 4500-4800 GHz was eliminated from further consideration at early stage of the discussion of that Agenda Item. The prevailing situation for the use of this Appendix has not changed since then, with the only exception that it is more frequently used and applied to achieve the objectives of establishing telecommunication infrastructure of national, sub-regional or regional nature.

These factors raise doubts as to whether C-band frequencies are suitable for meeting the spectrum demand for terrestrial mobile systems.

4.4 Sharing issues

[13] For example, references to licenses for Broadband Wireless Access ("BWA") systems in C-band returned in 2010 are included in document RSPG13-511 Rev.1 of the European Radio Spectrum Policy Group.

[14] Report ITU-R M.2109 gives the inter-site distance for macro cells as 5 km.

4.4.1 Sharing issues in FSS downlink bands

Due to the limited power available on a satellite, ground terminals are designed to receive very low-power signals transmitted by a satellite located thousands of kilometers away; the distance between the satellite and that the receiving earth station is around 36,000 km–40,000 km. As a consequence, receiving hardware is usually very sensitive to any external interference. Once in orbit, satellites cannot be re-tuned to other frequency bands and are typically in operation for about 15-20 years.

Historically, the C-band FSS frequencies have also been used for terrestrial radio-relay systems. Sharing with such systems is made feasible by the limited number of radio-relay stations required in most countries and the fact that radio-relay stations use highly directional antennas, which concentrate the power in a narrow beam. Furthermore, radio-relay systems are typically authorised on a station-by-station basis, making coordination practicable. These factors facilitate the use of the band by both the FSS and point-to-point radio relay systems.

In contrast, sharing with terrestrial broadband systems is much harder to achieve. Terrestrial networks normally make use of an extensive distribution of base stations within a given geographic area, transmitting high power simultaneously in every horizontal direction. The use of networks using carriers with the same centre frequency and wide bandwidths, as is the norm for terrestrial networks, means there is unlikely to be any possibility of being able to plan for an adequate frequency and geographical separation between IMT systems and FSS earth stations. ITU-R studies conducted in the run-up to WRC-07[15] showed that distance separations of at least tens of kilometres, and in some specific cases more than 100 km, between a transmitting IMT station and a receiving FSS station would be required in order to avoid harmful interference to the FSS earth station.

The requirement to protect ubiquitously deployed FSS earth stations by maintaining large separation distances leads to large holes in any potential coverage by terrestrial IMT networks. In countries where FSS earth stations are extensively deployed, the combined exclusion areas may consist of virtually the entire country, making IMT operations impractical or impossible. Conversely, implementation of IMT stations would preclude the use of C-band receiving stations within a relatively large area around each IMT station, thus restricting further development/expansion of C-band satellite services.

There are significant numbers of receive only satellite earth stations in operation today, typically used for reception of on-air television programming. In order to encourage the use of satellite communications, in many countries licensing of receive-only stations is not required. However, some administrations have proposed that such stations should no longer be entitled to protection from interference. Such a proposal could potentially lead the existing FSS C-band customer base to experience disruption of service. This would undermine decades of effort, time and money spent by satellite operators to build up their C-band service offerings and networks.

4.4.2 Sharing issues in FSS uplink bands

---

[15] Report ITU-R M.2109; "Sharing studies between IMT-Advanced systems and geostationary satellite networks in the fixed-satellite service in the 3 400-4 200 and 4 500-4 800 MHz frequency bands" (available at http://www.itu.int/pub/R-REP-M/en).

The band 5,850-6,425 MHz is an FSS uplink band, which has been proposed as a potential band for terrestrial IMT applications. There are two interference issues to be considered: 1) interference from a transmitting FSS earth station to terrestrial IMT receivers; and 2) interference from transmitting terrestrial IMT stations to FSS satellite receivers.

The satellite industry is not aware of existing studies which address these issues, and hence studies would be necessary if this band would continue to be considered.

However, due to the large distance between the earth station and the satellite, it must be recognized that FSS earth stations typically transmit with high power levels towards a geostationary satellite. Although such earth stations employ highly directional dish antennas, there would still be large power levels that would be "leaked' in all directions. Accordingly, it is very likely that a significant geographical separation would have to be maintained between a transmitting FSS earth station and a receiving IMT base (and mobile) station. Such a separation, when considered in conjunction with the expected ubiquitous deployment of IMT stations, would either cause interference to terrestrial IMT systems or would further constrain the deployment of new earth stations. Moreover, in view of the existing ubiquitous deployment of existing transmitting FSS C-band earth stations in the 5,850–6,425 MHz band, the aforementioned distance separation would place significant restrictions on the deployment of IMT stations. For these reasons, the satellite industry is doubtful that this band would be a candidate band for new IMT applications.

5 Positions

5.1 Position for the bands 1,518-1,559 MHz, 1,626.5-1,660.5 MHz, and 1,668-1,675 MHz

Regarding the L-band MSS frequencies which are used by GSO MSS systems (1,518-1,559 MHz, 1,626.5-1,660.5 MHz, and 1,668-1,675 MHz), these bands are either currently used by MSS systems throughout the world, or are planned to be used in the very near future. **It is not practicable for terrestrial IMT systems to share with the MSS, and hence these bands are not suitable for identification for terrestrial IMT by WRC-15**.

5.2 Position for the band 3,400-4,200 MHz

Regarding the C-band FSS downlink frequencies 3,400-4,200 MHz, these are well used throughout the world for FSS applications, and will continue to be used for the foreseeable future. **Sharing studies have already been conducted in Report ITU-R M.2109, which show that the required separation distances are such that sharing is not feasible. Hence, this band is not suitable for identification for terrestrial IMT by WRC-15**.

5.3 Position for the band 4,500-4,800 MHz

Regarding the Appendix 30B C-band FSS downlink frequencies 4,500-4,800 MHz, this band has a special regulatory status, being intended to guarantee, for all countries, equitable access to the geostationary-satellite orbit. **The use of this band by terrestrial IMT systems is not compatible with the intended use of the same band by the FSS**.

5.4 Position for the band 5,850-6,425 MHz

Regarding the C-band FSS uplink frequencies 5,850-6,425 MHz, it does not appear to be possible for this band to be used by terrestrial IMT systems without constraining the future deployment of FSS earth stations. Moreover, existing use of this band by the FSS would place significant restriction on the deployment of any IMT system, or would lead to interference to IMT systems. **Unless a means of authorising IMT operation in this band could be found that would not constrain current and planned FSS operations, this band should not be consider for terrestrial IMT applications**.

Annex 1

TABLE 1A

Space stations operating in the 3.4-3.7 GHz band as of December 2012

Satellite Name	Orbital location (°E.L.)	Service Area
Inmarsat 3 F3	178.1	(Global) East Asia, Indonesia, Australia, western North America
Gorizont	177.7	(Global) East Asia, Australia, west North America, Northern Hemisphere
Apstar 1	163.0	East Asia, Indochina
JCSAT-2A	154.0	East Asia, Australia, southeast Asia, Far East Russia
Inmarsat 4 F1	143.5	(Global) India, China, eastern Asia, Australia
Express AM3	140.0	East Asia, northeast Russia
Telstar 18	138.0	East Asia, Australia
Apstar 6	134.0	India, China, east Asia, southeast Asia, north Russia, Australia, New Zealand
Vinasat 1	132.0	India, east Asia, southeast Asia, Australia
Asiasat 4	122.2	India, east Asia, southeast Asia, Australia
Chinasat 6B	115.5	India, east Asia, southeast Asia, Australia
Palapa D	113.0	Southeast Asia, Indochina
Chinasat 10	110.5	Middle East, India, east Asia, southeast Asia, north Australia
Inmarsat 2 F4	109.0	(Global) East Africa, Asia, Australia
Telkom 1	108.2	Southeast Asia, Indochina
Asiasat 7	105.8	Middle East, India, southeast Asia, Australia (Assumed)
Asiasat 3S	105.5	India, east Asia, southeast Asia, Australia, Russia
Raduga	103.2	No information
Express A2	103.0	Middle East, Russia, China, east Asia, Indonesia
ST 1	103 (Moving)	India, east Asia, southeast Asia, Indonesia
Express 6A	102.9	Asia
Asiasat 5	100.5	Middle East, Russia, China, east Asia, southeast Asia, Australia
Thuraya 3	98.6	No information
Express AM3	96.5	(Steerable Global) east Africa, Asia, Australia,
Measat 3	91.3	Africa, Middle East, India, east Asia, southeast Asia, Australia, Indonesia
Yamal 201	90.0	Russia, Middle East, north China, east Asia
Gorizont	89.8	(Global) Africa, Asia, Australia, Northern Hemisphere
ST 2	88.0	India, east Asia, southeast Asia
Raduga	85.0	No information
Raduga	84.7	No information
Raduga	83.5	No information
G-Sat 12	83.0	India (Assumed)
G-Sat 10	83.0	India (Assumed)

Satellite Name	Orbital location (°E.L.)	Service Area
Express AM2	80.0	Russia, north China, east Asia
Express MD1	80.0	Russia
Raduga	79.7	No information
Thaicom 5	78.5	India, southeast Asia, Indonesia
Apstar 7	76.5	Africa, Asia, Australia
ABS 1	75.0	Europe, north Africa, Asia
Raduga	73.9	No information
Intelsat 22	72.1	Africa, Europe, east Asia, southeast Asia, Indonesia, Australia
Raduga	70.5	No information
Raduga	70.2	No information
Raduga	70.0	No information
Intelsat 7	68.6	Africa, Europe, Asia
Raduga	66.4	No information
Intelsat 17	66.0	Europe, Africa, Middle East
Raduga	65.9	No information
Inmarsat 3 F1	64.5	(Global) Africa, Europe, Asia, west Australia
Intelsat 906	64.1	Africa, Europe, Asia, west Australia
Intelsat 902	62.0	Africa, Europe, Asia, west Australia
Intelsat 904	60.0	Africa, Europe, Asia, west Australia
NSS 12	57.0	Africa, Europe, Asia, west Australia
Gorizont	54.4	(Global) Africa, Europe, Middle East, India, China, Russia, west Australia, Northern Hemisphere
Chinasat 5D	51.5	East Asia, Indonesia
NSS 5	50.5	Africa, Europe, Asia, west Australia
Yamal 202	49.0	Europe, Middle East, north Africa, Asia
Raduga	47.2	No information
Thuraya 2	44.0	No information
Raduga	41.4	No information
Express AM1	40.0	Europe, Russia, Middle East, northern China
Raduga	39.9	No information
Gorizont	39.9	(Global) Africa, Europe, Middle East, India, China, Russia, Northern Hemisphere
Raduga	38.4	No information
Intelsat 28	32.8	Africa, Europe, Middle East
Inmarsat 4 F2	25.0	(Global) Africa, Europe, Russia, Middle East, India
Inmarsat 3 F5	24.7	(Global) Africa, Europe, Russia, Middle East, India
Amos 5	17.0	Africa, Europe, Middle East
Raduga	12.2	No information
Eutelsat 10A	10.0	Africa, Europe, Middle East
Gorizont	6.2	(Global) East South America, Africa, Europe, Middle East, Northern Hemisphere

Satellite Name	Orbital location (°E.L.)	Service Area
SES 5	5.0	(Global) South America, Europe, Africa, Middle East (Assumed)
Intelsat 10-02	-1.0	South America, Europe, Africa, Middle East
ABS 3	-3.0	East South America, south and east Africa, Middle East
Eutelsat 5 West A	-5.0	East United States, northern South America
Express AM44	-11.0	East United States, northern Africa, Europe
Inmarsat 3 F2	-15.6	(Global) East North America, South America, Africa, Europe, Middle East
Intelsat 901	-18.0	East North America, South America, Africa, Europe, Middle East
NSS 7	-20.0	East North America, South America, Africa, Europe, Middle East
SES 4	-22.0	East North America, South America, Africa, Europe, Middle East
Intelsat 905	-24.5	East North America, South America, Africa, Europe, Middle East
Intelsat 907	-27.5	East North America, South America, Africa, Europe, Middle East
Intelsat 801	-29.5	East North America, South America, Africa, Europe, Middle East
Raduga	-30.1	No information
Intelsat 25	-31.5	East North America, Africa
Gorizont	-33.1	(Global) East North America, South America, Africa, Europe, Northern Hemisphere
Intelsat 903	-34.5	North America, South America, Africa, Europe
NSS 806	-40.5	North America, South America, Europe
Inmarsat 3 F4	-54.1	(Global) North America, South America, western Europe, west Africa
Intelsat 805	-55.5	North America, South America, Europe
Amazonas 1	-61.0	South America, United States, Mexico, Central America
Amazonas 3	-61.0	South America, United States, Mexico, Central America
Star One C1	-65.0	South America, Caribbean
Brasilsat B2	-68.0	South America
Star One C2	-70.0	South America
Star One C3	-75.0	South America
Intelsat 603	-81 (Moving)	North and South America
Brasilsat B4	-84.0	Brazil
Brasilsat B3	-92.0	Brazil
Inmarsat 4 F3	-98.1	(Global) North America, South America
Inmarsat 2 F2	-142.1	(Global) North America, Mexico, Central America, western South America, east Australia, New Zealand
Raduga	-172.2	Northern Hemisphere
NSS 9	-177.0	(Global) West North America, Australia, East Asia

TABLE 1B

Space stations operating in the 3.7-4.2 GHz band as of December 2012

Satellite name	Orbital location (°E.L.)	Service area
Intelsat 18	180.0	Central Asia, Western United States, Pacific Ocean, Global
Gorizont	177.7	(Global) East Asia, Australia, west North America, Northern Hemisphere
Eutelsat 172A	172.0	East and SE Asia, Australasia, and Western North America
Intelsat 8	169.0	East Asia, northern Australia
Intelsat 5	169.0 (Moving)	East Asia, Indonesia, Australia, New Zealand,
Intelsat 19	166.0	East Asia, Australia, west North America
Apstar 1	163.0	East Asia, Indocina
Intelsat 701	157.0	(Global) East Asia, southeast Asia, Australia
Intelsat 706	157.0	(Global) East Asia, southeast Asia, Australia
JCSAT 2A	154.0	East Asia, Australia, southeast Asia, Far East Russia
Palapa C2	150.5	East Asia, southeast Asia, Australia, New Zealand
Measat 2	148.0	Southeast Asia, Australia
Chinasat 5B	142.0	China (Assumed)
Express AM3	140.0	(Steerable Global) India, east Asia, Australia, New Zealand, Pacific Ocean
Telstar 18	138.0	East Asia, Australia
N-STAR c	136.0	East Asia
Apstar 6	134.0	India, China, east Asia, southeast Asia, north Russia, Australia, New Zealand
JCSAT 5A	132.0	India, East Asia, Australia, southeast Asia, Far East Russia
Chinasat 1A	130.0	China (Assumed)
Chinasat 20A	130.0	China (Assumed)
JCSAT 3A	128.0	China, India, east Asia, southeast Asia, Australia, Far East Russia
JCSAT RA	128.0	China, India, east Asia, southeast Asia, Australia, Far East Russia
Chinasat 6A	125.0	India, east Asia, Russia, northeast Asia
Garuda 1	123.0	No information
Asiasat 4	122.2	India, east Asia, southeast Asia, Australia
Telkom 2	118.0	Southeast Asia, Indochina
Chinasat 6B	115.5	India, east Asia, southeast Asia, Australia
Palapa D	113.0	India, east Asia, southeast Asia, Australia, New Zealand, Russia
Chinasat 10	110.5	Middle East, India, east Asia, southeast Asia, north Australia
Telkom 1	108.2	Southeast Asia, Indochina
Asiasat 7	105.8	Middle East, India, southeast Asia, Australia (Assumed)
Asiasat 3S	105.5	India, east Asia, southeast Asia, Australia, Russia
Raduga	103.2	No information
Express A2	103.0	Middle East, Russia, China, east Asia, Indonesia
ST 1	103 (Moving)	India, east Asia, southeast Asia, Indonesia

Express 6A	102.9	Asia
Chinasat 22A	101.5	China
Asiasat 5	100.5	Middle East, Russia, China, east Asia, southeast Asia, Australia
Express AM3	96.5	(Steerable Global) east Africa, Asia, Australia,
Insat 1C	94.0	India (Assumed)
Insat 3A	93.5	Middle East, India, southeast Asia, China
Insat 4B	93.5	Middle East, India, southeast Asia, China
Measat 3A	91.5	Africa, Middle East, India, east Asia, southeast Asia, Australia, Indonesia
Meastat 3	91.3	Africa, Middle East, India, east Asia, southeast Asia, Australia, Indonesia
Yamal 201	90.0	Russia, Middle East, north China, east Asia
Yamal 300K	90.0	Russia
Gorizont	89.8	(Global) Africa, Asia, Australia, Northern Hemisphere
Chinasat 5A	87.5	India, China, east Asia, southeast Asia, Indonesia
Raduga	85.0	No information
Raduga	84.7	No information
Raduga	83.5	No information
G-Sat 10	83.0	India (Assumed)
Insat 4A	83.0	India, Middle East, south China, southeast Asia
Express AM2	80.0	Russia, north China, east Asia (Assumed)
Express MD1	80.0	Russia
Raduga	79.7	No information
Thaicom 5	78.5	India, southeast Asia, Indonesia
Apstar 7	76.5	Africa, Asia, Australia
ABS 1	75.0	Europe, Africa, Australia, Asia except India
Insat 3C	74.0	India
Raduga	73.9	No information
Intelsat 22	72.1	East Asia, Indonesia, Australia
Raduga	70.5	No information
Raduga	70.2	No information
Raduga	70.0	No information
Insat 1D	68.7	India (Assumed)
Intelsat 20	68.5	Africa, Europe, Asia, northern Australia
Raduga	66.4	No information
Intelsat 17	66.0	Europe, Africa, Asia, Australia
Raduga	65.9	No information
Intelsat 906	64.1	(Global) Africa, Europe, Asia, west Australia
Intelsat 902	62.0	(Global) Africa, Europe, Asia, west Australia
Intelsat 904	60.0	(Global) Africa, Europe, Asia, west Australia
NSS 12	57.0	(Global) Africa, Europe, Asia, west Australia
Insat 3E	55.0	India (Assumed)
Gorizont	54.4	(Global) Africa, Europe, Middle East, India, China, Russia, west Australia,

		Northern Hemisphere
Express AM22	53.0	Russia (Assumed)
Yahsat 1A	52.5	Europe, Africa
Chinasat 12	51.5	No information
Chinasat 5D	51.5	East Asia, Indonesia
NSS 5	50.5	(Global) Africa, Europe, Asia, west Australia
Galaxy 26	50.0	Africa, Europe, Asia
Intelsat 26	50.0	Africa, Europe, Middle East, India, southeast Asia
Yamal 202	49.0	Europe, Middle East, north Africa, Asia
Intelsat 10	47.5	Europe, Africa, Asia
Yahsat 1B	47.5	Africa, Europe, Middle East
Raduga	47.2	No information
Africasat 1	46.0	Africa
Azerspace 1	46.0	Central Asia, Europe, Africa
Galaxy 27	45.1	Northern Africa, Europe, Middle East
Nigcomsat 1R	42.5	Middle portion of Africa
Raduga	41.4	No information
Express AM1	40.0	Europe, Russia, Middle East, northern China
Gorizont	39.9	(Global) Africa, Europe, Middle East, India, China, Russia, Northern Hemisphere
Raduga	39.9	No information
Raduga	38.4	No information
Paksat 1R	38.0	East Africa, Middle East, Pakistan, India
Arabsat 2B	34.5 (Moving)	North Africa, Middle East
Intelsat 702	33.0	(Global) Africa, Europe, Middle East
Intelsat 28	32.8	Africa, Europe, Middle East
Arabsat 5A	30.5	Africa, Europe, Middle East
Badr 6	26.0	Africa, Europe, Middle East
Arabsat 5C	20.0	Africa, Europe, Middle East
Amos 5	17.0	Africa, Europe, Middle East
Raduga	12.2	No information
Eutelsat 10A	10.0	Africa, Europe, Middle East
Gorizont	6.2	(Global) East South America, Africa, Europe, Middle East, Northern Hemisphere
SES 5	5.0	(Global) South America, Europe, Africa, Middle East (Assumed)
Eutelsat 3A	3.0	Europe, the Mediterranean basin and North Africa
Rascom QAF 1R	2.8	Africa
Intelsat 10-02	-1.0	South America, Europe, Africa, Middle East
ABS 3	-3.0	East South America, south and east Africa, Middle East
Eutelsat 5 West A	-5.0	Africa, Europe, Middle East and parts of the Americas
Express AM44	-11.0	East United States, northern Africa, Europe
Intelsat 901	-18.0	East North America, South America, Africa, Europe, Middle East
SES 4	-22.0	East North America, South America, Africa, Europe, Middle East

Intelsat 905	-24.5	East North America, South America, Africa, Europe, Middle East
Intelsat 907	-27.5	East North America, South America, Africa, Europe, Middle East
Intelsat 801	-29.5	East North America, South America, Africa, Europe, Middle East
Raduga	-30.1	No information
Intelsat 25	-31.5	East North America, Africa
Gorizont	-33.1	(Global) East North America, South America, Africa, Europe, Northern Hemisphere
Intelsat 903	-34.5	North America, South America, Africa, Europe
NSS 10	-37.5	North America, South America, Africa, Europe
SES 6	-40.5	North America, South America, Europe
Intelsat 11	-43.0	North America, South America, Europe
Intelsat 9	-43.1	North America, South America, Europe
Intelsat 14	-45.0	North America, South America, Europe, Africa
TDRS 6	-46.0	North America, south America
NSS 703	-47.0	North America, South America, Europe, Africa
TDRS 3	-49.0	No information
Intelsat 1R	-50.0	North America, South America, Europe, Africa
Intelsat 23	-53.0	North America, South America, Europe, Africa
Galaxy 11	-55.5	United States, Caribbean
Intelsat 805	-55.5	North America, South America, Europe
Intelsat 21	-58.0	North America, South America, Europe
Amazonas 1	-61.0	South America, United States, Mexico, Central America
Amazonas 3	-61.0	South America, United States, Mexico, Central America
Star One C1	-65.0	South America, Caribbean
AMC 3	-67.0	North America, Mexico, Caribbean
Brasilsat B2	-68.0	South America
Star One C2	-70.0	South America
AMC 6	-72.0	United States, Mexico
Star One C3	-75.0	South America
Simon Bolivar	-78.0	South America, Caribbean
Intelsat 603	-81 (Moving)	North and South America
AMC 9	-83.0	North America
Brasilsat B4	-84.0	Brazil
SES 2	-87.0	North America
Galaxy 28	-89.0	North America
Galaxy 17	-91.0	North America
Brasilsat B3	-92.0	Brazil
ICO G1	-92.9	No information
Galaxy 25	-95.0	North America, Mexico
Galaxy 3C	-95.0	North America
Galaxy 19	-97.0	North America, Mexico

Galaxy 16	-99.0	North America, Mexico
SES 1	-101.0	North America, Mexico
AMC 1	-103.0	North America, Mexico
SES 3	-103.0	North America, Mexico
AMC 18	-105.0	North America, Mexico
Anik F1	-107.3	South America
Anik F1R	-107.3	North America, Mexico
Anik F2	-111.1	North America
Satmex 6	-113.0	North America, South America
Solidaridad 2	-114.9	Mexico, Central America, north and west South America
Satmex 5	-116.8	United States, Mexico, Central America, north and west South America
Anik F3	-118.7	North America
Galaxy 23	-121.0	North America, Mexico, Central America
Galaxy 18	-123.0	North America
Galaxy 14	-125.0	North America
Galaxy 13	-127.0	North America
Galaxy 12	-129.0	North America
AMC 11	-131.0	North America, Mexico
Galaxy 15	-133.0	North America, Mexico
AMC 10	-135.0	North America, Mexico
AMC 7	-137.0	North America, Mexico
AMC 8	-139.0	North America, Mexico
TDRS 5	-167.5	East Asia, western United States, Pacific Ocean
Raduga	-172.2	No information

Table 2 – Planned C-band Satellites

Appox. year of launch	Satellite name	Appox. year of launch	Satellite name	Appox. year of launch	Satellite name
2013	Alphasat	2013	Express AM5	2014	G-Sat 15
2013	Amazonas 3	2013	Express AM6	2014	Intelsat 30
2013	AzerSpace/Africasat 1A	2013	Thaicom 6	2014	Express AM7
2013	SatMex 8	2013	Arsat 2	2014	SatMex 7
2013	G-Sat 11	2014	Turksat 4B	2015	Belarus Sat 1
2013	Anik G1	2014	Mexsat 1	2015	G-Sat 13
		2014	Express AM8	2015	Intelsat 31
2013	G-Sat 6	2014	Eutelsat 3B	2015	Eutelsat 8 West B
2013	G-Sat 7	2014	AsiaSat 6/Thaicom 7	2015	Amos 6
2013	ABS 2	2014	Express AM4R	2015	Turksat 5A
2013	Yamal 401	2014	Measat 2a		

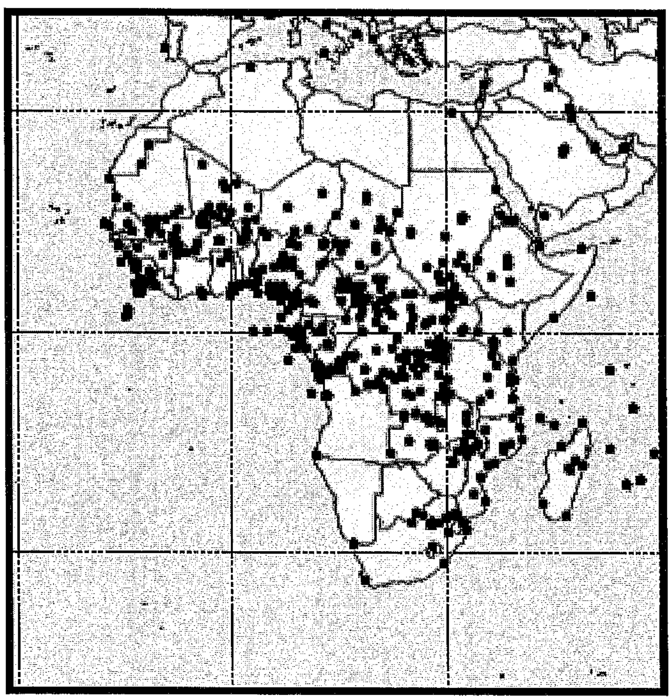
Annex 2

Deployment of FSS Earth Stations in the 3.4-4.2 GHz Band

Figures 1 and 2 below shows the number of earth stations registered with one satellite operator and receiving in the bands 3.625-3.7 GHz and 3.7-4.2 GHz. This information is taken from Report ITU-R M.2109. It should be noted that the information presented covers only those earth stations whose operator has registered its facility with this satellite operator. These figures do not show the receiving earth station(s) whose operator(s) have elected not to register their facility with the satellite operator. Furthermore, it should be emphasized that these figures do not show ubiquitously deployed earth stations, such as receive only earth stations or earth stations that are exempt from individual licensing (e.g. VSATs). Based on this limited set of data alone, it is apparent that operation of IMT systems in these bands is not feasible in Africa.

Figure 1

Locations of Earth stations registered with one satellite operator and receiving in the 3.625-3.7 GHz band

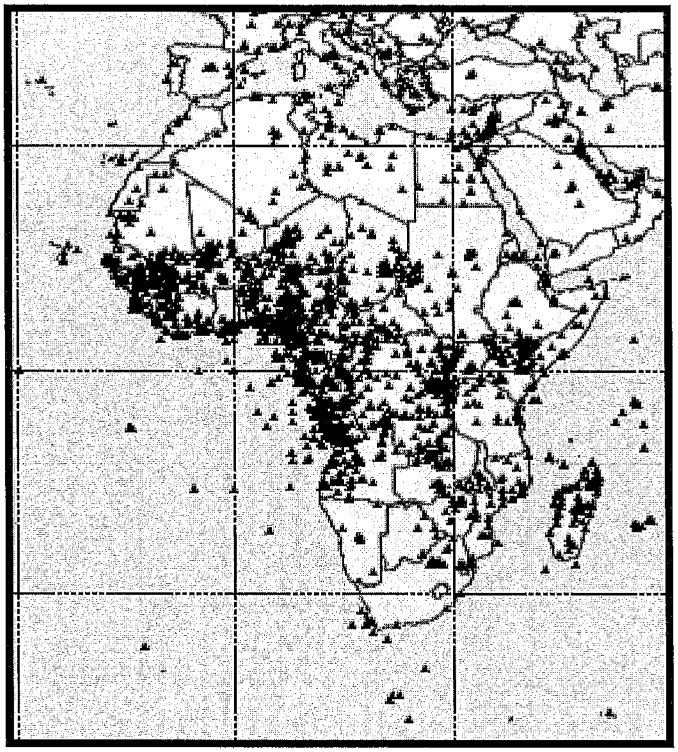


Notes:

1) Each denoted site may include one or more stations.
2) Map does not show earth stations not registered with this satellite operator.
3) Sites that are located on water are associated with stations on marine platforms.

FIGURE 2

Locations of Earth stations registered with one satellite operator and receiving in the 3.7-4.2 GHz band



Notes:

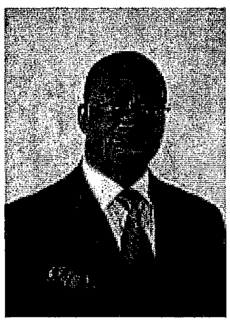
1) Each denoted site may include one or more stations.
2) Map does not show earth stations not registered with this satellite operator.
3) Sites that are located on water are associated with stations on marine platforms.

DIRECTRICES SOBRE PRÁCTICAS ÓPTIMAS DEL GSR13

GSR13 DIRECTRICES DE PRÁCTICAS ÓPTIMAS SOBRE LA EVOLUCIÓN DEL PAPEL DE LA REGLAMENTACIÓN Y DE LOS ORGANISMOS REGULADORES EN UN ENTORNO DIGITAL

Reglamentar un sector de las TIC en evolución continua es como disparar a un blanco en movimiento. Elaborar y aplicar prácticas óptimas es la mejor manera de acelerar nuestros esfuerzos para adaptarnos al cambio y adoptar nuevas tecnologías a fin de favorecer el desarrollo y las empresas.

Por iniciativa de:



La puesta en marcha de la consulta destinada a determinar cuáles son las directrices de prácticas óptimas reglamentarias, basada en las contribuciones de los organismos reguladores, supone el primer paso de un proceso de consulta integrador y basado en la colaboración que concluye con la adopción por consenso de un conjunto de directrices de prácticas óptimas.

Para responder a las expectativas de un ecosistema digital que evoluciona con rapidez, los responsables políticos y los organismos reguladores tendrán que adaptarse y elaborar unos marcos reglamentarios más flexibles, innovadores y poco intrusivos, que se expandan más allá del sector de las telecomunicaciones para tener en cuenta el carácter polifacético y las múltiples partes interesadas del mundo digital.

Deseo expresar mi agradecimiento a todos los organismos reguladores que han contribuido a la elaboración de estas directrices.

Sr. Brahima Sanou, Director de la Oficina de Desarrollo de las Telecomunicaciones (BDT) de la UIT

GSR13
3-5 July 2013
WARSAW
POLAND

Coordinado por:

El GSR es el lugar perfecto para compartir prácticas óptimas e informar acerca de numerosas actividades de las administraciones. Polonia se ha comprometido con firmeza en la construcción de una sociedad de la información plenamente integradora en todo el mundo. Esto requiere desarrollar la infraestructura de banda ancha y, al mismo tiempo, promover un uso generalizado de las TIC. Nuestro objetivo es alentar a todas las personas y comunidades a participar en diversos aspectos de la sociedad de la información. Con esto en mente, considero que el Simposio es una excelente plataforma en la que gente de todo el mundo se reúne y comparte ideas y experiencias.

Sra. Magdalena Gaj, Presidenta de la Oficina de Comunicaciones Electrónicas (UKE) de Polonia y Presidenta del GSR13.

ITU

1 Reglamentación 4.0: Enfoques reglamentarios innovadores e inteligentes que fomentan la igualdad de trato de los actores del mercado sin imponer cargas adicionales a los operadores y los proveedores de servicios

El sector de las tecnologías de la información y la comunicación (TIC) está experimentando cambios espectaculares a raíz de la implantación de redes de banda ancha (redes de la próxima generación), que facilitan la convergencia de medios , Internet y servicios de comunicaciones, la aparición de nuevos actores en el mercado, la rápida evolución de dispositivos inteligentes, la conectividad de las cosas (Internet de las cosas) y las personas, así como una demanda creciente por parte de los consumidores de acceso permanente, inmediato y ubicuo a las TIC. Además, la aparición de nuevos proveedores de contenidos y aplicaciones, tales como los proveedores de servicios superpuestos (over-the-top), están cambiando las reglas del juego, la dinámica del mercado y las prácticas empresariales. La creciente complejidad de los mercados mundiales de las TIC, junto con el fuerte incremento del flujo de datos y el rápido desarrollo de nuevos servicios y aplicaciones, tales como los servicios en la nube y las aplicaciones móviles, dificultan el papel y mandato tradicionales del organismo regulador y hacen necesaria modernizar la reglamentación en el ecosistema digital.

Habida cuenta del papel esencial que desempeñan las comunicaciones electrónicas en la sociedad digital de hoy y reconociendo la necesidad de una reglamentación eficiente de las TIC que responda a la variación de las expectativas del mercado y, a su vez, mejore la integración social, la seguridad en caso de catástrofe y el desarrollo, nosotros, organismos reguladores participantes en el Simposio Mundial para Organismos Reguladores de 2013, reconociendo que las reformas reglamentarias se efectúan desde un espectro continuo de perspectivas cambiantes, hemos determinado y refrendado las presentes directrices de prácticas óptimas que constituyen medidas reglamentarias innovadoras e inteligentes que facilitarán la integración generalizada.

Reconocemos que, ateniéndose a sus esferas de competencia, los organismos reguladores tienen que tener presente los aspectos transformadores y transnacionales de la reglamentación en el entorno digital y tomar en consideración los cambios en la conducta y las normas sociales resultantes de la aparición de nuevas aplicaciones y medios sociales. La revisión de los actuales marcos de política y reglamentación de las TIC para adaptarlos a los constantes cambios es un proceso continuo que requiere la coordinación con diversas partes interesadas. La función de los reguladores es esencial a la hora de garantizar la evolución paulatina del sector de las TIC para que la sostenibilidad y el desarrollo socioeconómico redunden en beneficio de la población. La utilización y aplicación más eficaz de las tecnologías digitales en ámbitos tales como la asistencia sanitaria, el gobierno electrónico, el medio ambiente y el transporte, facilitará la creación de empleo y el aumento de la productividad y garantizará una mejor calidad de vida.

Reconocemos la importancia de realizar estudios de mercado para evaluar la situación del mercado en un entorno convergente, con el fin de identificar a los operadores con peso significativo en el mercado y estimular la competencia en el mismo. Para promover igualdad de condiciones entre actores regulados y no regulados es preciso velar por que sigan prevaleciendo los principios de un trato justo, equitativo y no discriminatorio de todos los actores del mercado.

Reconocemos que la adopción de un marco reglamentario que elimine las barreras a los nuevos actores y vele por la inclusión de disposiciones competitivas que garanticen una relación saludable entre todos los actores autorizados en el mercado del caso (operadores, proveedores de Internet, proveedores OTT, etc.) es una de las maneras de promover la implantación de redes de banda ancha de la próxima generación y el acceso a las aplicaciones y los servicios en línea. Asimismo, los reguladores pueden fomentar la compartición de redes e instalaciones mediante medidas tenues, tales como la descripción de infraestructura intersectorial que permita la coordinación de obras civiles. Habilitar a los consumidores para que tomen decisiones informadas a través del desarrollo de herramientas en línea que permitan comprobar las velocidades, la calidad de servicio y el precio del acceso es otra de las medidas que pueden adoptar los organismos reguladores para fomentar la competencia.

Reconocemos asimismo que, al revisar su política de gestión del espectro radioeléctrico, los organismos reguladores tienen que velar por que el espectro disponible e infrautilizado se ponga rápidamente a disposición en beneficio de los usuarios y que existan normas vigentes para gestionar las interferencias. La utilización eficiente y efectiva del espectro de radiofrecuencias puede lograrse mediante la aplicación, en su caso, de nuevas modalidades de subasta o adjudicación, y permitiendo una utilización flexible del espectro. Se puede aprovechar el espectro del "dividendo digital" para ampliar el acceso en banda ancha móvil y los "espacios en blanco" de la TV pueden destinarse a la utilización sin licencia que permita prestar servicios de banda ancha. Reconocemos que es preciso mantener la radiodifusión terrenal para prestar servicio a la población. Consideramos que la adopción de modelos simplificados y flexibles desde el punto de vista administrativo, tales como las autorizaciones generales o las licencias unificadas, según proceda, pueden contribuir a facilitar el acceso al mercado y a estimular la competencia y la innovación.

Creemos que los organismos reguladores y los responsables políticos deberían tratar de aplicar medidas para controlar la utilización de técnicas de gestión del tráfico, con el fin de garantizar que no discriminen injustamente a actores del mercado. Asimismo, es preciso que los organismos reguladores revisen la legislación en materia de competencia para determinar si ésta prevé medidas, tales como la igualdad de trato entre todos los actores, y si estas medidas responden adecuadamente a los problemas que suelen afectar a la neutralidad de la red. Para ello, es indispensable que los reguladores sean conscientes de la necesidad de tratar equitativamente a todos los proveedores de servicio.

Reconocemos que es importante que reguladores comprendan todos los parámetros del entorno digital, para garantizar no sólo la asequibilidad del acceso, sino también un nivel suficiente de compatibilidad y de calidad de servicio para el usuario (en particular en los servicios de comunicaciones sensibles al retardo), sin imponer una carga adicional a los operadores y proveedores de servicios.

Alentamos a los organismos reguladores a garantizar el mayor nivel de transparencia y apertura, por ejemplo poniendo a disposición pública la normativa y los datos del mercado pertinentes, y a llevar a cabo consultas multipartitas acerca de las cuestiones de política y reglamentación que afectan al desarrollo de la sociedad digital, con el fin de adoptar decisiones reglamentarias por consenso, garantizando así una mayor conformidad por parte de los actores de la industria.

Somos conscientes de la necesidad de que el regulador de 4ª generación adopte un enfoque reglamentario "poco invasivo", donde sólo intervenga en caso necesario y, a su vez, garantice que las fuerzas del mercado funcionan sin obstáculos y orientadas a la innovación con arreglo al régimen jurídico nacional, teniendo en cuenta los nuevos conceptos reglamentarios y los tradicionales. En particular, los organismos reguladores deberían seguir velando por que la reglamentación fuera predecible y fomentar, en la medida de lo posible, la correglamentación (por ejemplo, normas voluntarias), facilitando la adopción de una solución reglamentaria preparada y administrada de manera colectiva por el organismo regulador y la industria. Los reguladores podrían colaborar también con otras partes interesadas para reducir o suprimir los obstáculos prácticos al despliegue de infraestructura de la banda ancha. Reconocemos especialmente que alentar a los operadores y proveedores de servicio a proponer y aplicar soluciones innovadoras para desarrollar el sector puede ser beneficioso tanto para el Estado como para la industria. La reglamentación debería garantizar el desarrollo sostenible del sector de las TIC, que resulta esencial para incentivar la inversión necesaria en el entorno digital mundial.

Fomentar la aceptación de los servicios y el acceso a servicios y aplicaciones en línea

Reconocemos que para fomentar la aceptación de los servicios y el acceso a aplicaciones y servicios en línea es preciso adoptar una reglamentación flexible.

Somos conscientes de que una condición necesaria para la innovación es entender las necesidades de los ciudadanos y la manera en que éstas pueden beneficiarse de la utilización de las TIC, por cuanto las empresas y los consumidores también incentivan la innovación.

Alentamos a los gobiernos a que trabajen en colaboración con todas las partes interesadas y, en particular, con la industria y los organismos reguladores, a fin de facilitar y sustentar el desarrollo de infraestructura y la prestación de servicios, especialmente en las zonas rurales, carentes de servicio o insuficientemente atendidas. Desde el lado de la oferta, se requiere una reglamentación predecible y estable para mantener una competencia efectiva y orientar la creación de servicios innovadores. En particular, se alienta a los reguladores a modernizar los programas del servicio universal con el fin de hacer llegar la banda ancha a zonas carentes de servicio o mal abastecidas, en particular mediante la redefinición del servicio universal. Desde el lado de la demanda, medidas tales como la exoneración temporal o incluso definitiva de cargas fiscales pesadas o especiales a equipos y servicios de TIC, el fomento de la investigación y el desarrollo, así como la ejecución de programas específicos de formación en informática, darán lugar a un aumento de la penetración, de la demanda y de la integración social, y contribuirán al crecimiento económico nacional. La función de los gobiernos y los reguladores es fundamental a la hora de promover y mejorar la sensibilización acerca de la utilización y los beneficios de las TIC.

Reconocemos el papel que pueden desempeñar los reguladores a la hora de fomentar el desarrollo de contenido digital local en los planos nacional y regional, y de estimular la creación de viveros de empresas que promuevan la creación de nuevas aplicaciones y servicios, así como de ciudades digitales, habida cuenta de la necesidad de minimizar los efectos negativos para el medio ambiente, estimular la utilización de tecnologías "ecológicas", en particular la gestión "inteligente" de recursos y la disminución del consumo de energía y de residuos electrónicos.

2 La evolución del papel del organismo regulador: el regulador como asociado para el desarrollo y la integración social

Reconocemos que la función del regulador es esencial a la hora de asesorar a los gobiernos en la elaboración de políticas de desarrollo e integración social. Los reguladores también pueden actuar como asociados para el desarrollo de las TIC y la integración social, propiciando (y, en ocasiones, creando) asociaciones, tales como las asociaciones público-privadas (APP), con donantes, gobiernos, ministerios y ONG, en particular para cumplir las metas de acceso universal para las zonas rurales, distantes o carentes de servicio y para las personas con necesidades especiales. Los reguladores pueden facilitar y ampliar las asociaciones con escuelas y comunidades locales a través de proyectos para mejorar su conectividad y ampliar la utilización de las aplicaciones de TIC, además de proporcionar acceso a la tecnología y de promover el desarrollo económico. Los reguladores también podrían recurrir a alianzas voluntarias y estratégicas para ofrecer soluciones integradas (por ejemplo, conectividad, formación y equipos) a consumidores con bajos ingresos, y para garantizar que las personas con discapacidad tengan acceso a nuevos servicios, aplicaciones y tecnologías de banda ancha.

También alentamos las asociaciones entre reguladores y otros organismos públicos a fin de que su coordinación beneficie al gobierno y la comunidad en su conjunto. El regulador puede proporcionar además asesoramiento y asistencia didáctica a las comunidades locales.

Destacamos la necesidad de que el regulador sea autónomo en el cumplimiento de su mandato y cuente con líneas de información y comunicación con el Ministro del sector a fin de garantizar la armonización y viabilidad de los objetivos nacionales.

Reconocemos asimismo la importancia de colaborar con el ministerio del sector a fin de que proactivamente promueva, informe, fomente y sensibilice a todas las partes interesadas acerca de los beneficios derivados de la aceptación de las aplicaciones y servicios tecnológicos. Para fomentar esa aceptación, los gobiernos y reguladores pueden facilitar el acceso a dispositivos móviles de banda ancha de bajo coste, permitiendo así a los ciudadanos acceder a aplicaciones web para eliminar la necesidad de ordenador para acceder a Internet y los obstáculos que ello supone (distancia, coste y disponibilidad).

Reconocemos la importancia de colaborar con institutos de investigación, organismos públicos, proveedores de contenido, proveedores de servicio y ONG para que Internet sea un lugar más seguro para los niños.

3 Necesidad de adaptar la estructura y el diseño institucional del organismo regulador con miras a la elaboración de la futura reglamentación.

Reconocemos que, con la aparición y convergencia de nuevas tecnologías y servicios, los gobiernos también pueden considerar la posibilidad de hacer converger las instituciones reguladoras o de adaptar su estructura con arreglo a la evolución del mercado de las TIC. Por otra parte, para responder a la naturaleza transnacional e interconectada del ecosistema digital convergente, es necesario adaptar la estructura del regulador para aumentar su capacidad de reacción y flexibilidad.

El regulador tiene que disponer de suficiente flexibilidad y autonomía a la hora de tomar decisiones y velar por el cumplimiento de los instrumentos legales y reglamentarios, para poder fomentar la innovación, el crecimiento y el desarrollo sostenible.

Reconocemos la necesidad de que los reguladores y sus empleados estén al día de los últimos adelantos tecnológicos para que puedan solucionar problemas tales como la interconexión IP, los mecanismos de facturación, y la transición de IPv4 a IPv6.

Creemos que es fundamental el papel que han de desempeñar los reguladores para generar confianza en el consumidor y en la seguridad de los servicios, mediante la protección adecuada de los datos, la privacidad y la ciberseguridad. Para ello es necesario estrechar la cooperación con otros organismos gubernamentales a escala nacional, y la colaboración con otros organismos reguladores y asociados a escala regional e internacional. Somos conscientes de que el intercambio de experiencias, conocimientos e ideas resulta vital para afrontar los nuevos desafíos en el ecosistema mundial interconectado y sin fronteras. Por último, alentamos a los reguladores a publicar en línea la información relativa al sector y la reglamentación inteligente que se hayan adoptado.