Satellite Communications: An Overview of the Regulatory Framework and Resource Management

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INTRODUCTION

Satellite communications represent an increasingly significant component of modern communications strengthened by the development of new satellite technologies and the comparatively high costs associated with terrestrial communications. Under the stimulus of competition and changing technologies, new global services provided by satellites are constantly being developed. This is reflected and stimulated by the commitments made by the various global satellite operators that offer global broadband services via satellite. Given the growing importance of satellite technologies in communications, there is a need to formulate a policy and regulatory framework to facilitate the development of a local satellite communications industry.

THE REGULATORY FRAMEWORK

With the dramatic development in telecommunication services, demand is increasing for spectrum/orbit usage for practically all space communication services. This increase is attributable to many factors. These include not only technological progress, but also political, social and structural changes around the world and their impact on telecommunication services, a growing market orientation, changes in ways that this widening market is shared between private and government-owned service providers and the general globalisation and commercialisation of communication systems.

In using the frequency bands for radio services, bear in mind that radio frequencies and any associated orbits, including the geostationary-satellite orbit, are limited natural resources and that they must be used rationally, efficiently and economically, so that countries or groups of countries may have equitable access to those orbits and frequencies, taking into account the special needs of the developing countries and the geographical situation of particular countries.

During the past years, the regulatory framework has been constantly adapted to changing circumstances and has achieved the necessary flexibility in satisfying the two major, but not always compatible, requirements of efficiency and equity. These elements lead to the discussion of the role of the International Telecommunication Union as the international organisation and the Ministry of Energy, Water and Communications as the national policy makers.

INTERNATIONAL TELECOMMUNICATIONS UNION

The International Telecommunications Union (ITU) was established as an impartial, international organisation within which governments and private sectors could work together to coordinate the operation of telecommunication networks and services, as well as advance the development of communications technology. Whilst the organisation remains transparent to the public for over more than one hundred years, ITU's work has helped create a global communications network which now integrates a huge range of technologies.

While the ITU's standardisation activities has helped foster the growth of new technologies such as mobile telephony and the Internet, its continuing role in managing the radio-frequency spectrum ensures that radio-based systems (i.e. cellular phones and pagers, aircraft and maritime navigation systems, scientific research stations, satellite communication systems and radio and television broadcasting) remains indispensable.

Amongst the main purposes of ITU are:

- to maintain and extend international cooperation between all countries for the improvement and rational use of telecommunications of all kinds;
- to promote and offer technical assistance to developing countries in the field of telecommunications, and also to promote the mobilisation of the material, human and financial resources needed to improve access to telecommunications services in such countries;
- to promote the development of technical facilities with a view to improve the efficiency of telecommunication services and increase their usefulness;
- to promote the extension of the benefits of new telecommunication technologies to all the world's inhabitants;
- to promote the use of telecommunication services with the objective of facilitating peaceful relations.

The three Sectors of ITU – Radiocommunication (**ITU-R**), Telecommunication Standardisation (**ITU-T**), and Telecommunication Development (**ITU-D**) - work today to build and shape tomorrow's networks and services. Their activities cover all aspects of telecommunication, ranging from setting standards that facilitate seamless interworking of equipment and systems on a global basis to adopting operational procedures for the vast and growing array of wireless services and designing programmes to improve telecommunication infrastructure in the developing world.

Each of the three ITU Sectors works through conferences and meetings as well as study groups made up of experts drawn from leading telecommunication organisations worldwide, where members negotiate the agreements which serve as the basis for the operation of global telecommunication services.

THE RADIO REGULATIONS

At the heart of this wireless world lies ITU-R, which is in charge of determining the technical characteristics and operational procedures for a huge and growing range of wireless services. The ITU-R also plays a vital role in the management of the radio-frequency spectrum, a finite natural resource which is increasingly in demand due to the rapid

INTERNATIONAL TELECOMMUNICATIONS UNION SECTORS
ITU-R draws up the technical characteristics of terrestrial and space-based wireless services and systems, and develops operational procedures. It also undertakes the important technical studies which serve as a basis for the regulatory decisions made at radiocommunication conferences.
ITU-T experts prepare the technical specifications for telecommunication systems, networks and services, including their operation, performance and maintenance. Their work also covers the tariff principles and accounting methods used to provide international service.
ITU-D experts focus their work on the preparation of recommendations, opinions, guidelines, handbooks, manuals and reports, which provide decision-makers in developing countries with 'best business practices' relating to a host of issues ranging from development strategies and policies to network management.

development of new radio-based services and the enormous popularity of mobile communications technologies.

ITU-R prepares the technical groundwork which enables radiocommunication conferences to make sound decisions, developing regulatory procedures and examining technical issues, planning parameters and sharing criteria with other services in order to evaluate the risk of harmful interference.

In their role as global spectrum coordinator, the countries of the Radiocommunication Sector develop and adopt the Radio Regulations (RR), an extensive set of rules governing the use of the radio spectrum by approximately 40 different services around the world. The RR is very lengthy and complex set of agreements. It is decided by the administrations during the ITU World Radiocommunication Conferences (WRC). It is governed by more sophisticated use of spectrum where individual requirements of administrations are considered. It follows the trend towards simplification or improvement to certain procedures. The RR makes sure of the efficient use of spectrum, equitable access, as well as the opportunity to resolve interference before any operations. Most importantly, it prevents loss of investment, customers and revenue from unusable capacity due to interference.

Apart from that, the ITU-R also acts as a central registrar of international frequency use. It records and maintains the Master International Frequency Register (MIFR) which currently includes around 1,265,000 terrestrial frequency assignments, 87,096 assignments servicing 590 satellite networks, and another 46,179 assignments related to 3,163 satellite earth stations.

In addition, the ITU-R is also responsible for coordinating efforts to ensure that the communication, broadcasting and meteorological satellites in the world's increasingly crowded skies can co-exist without causing harmful interference to one another's services. In this role, the ITU facilitates agreements between both operators and governments, and provides practical tools and services to help frequency spectrum managers carry out their daily work.

Since the global use and management of frequencies requires a high level of international cooperation, one of the principal tasks of ITU-R is to oversee and facilitate the complex inter-governmental negotiations needed to develop legally binding agreements between all administrations. These agreements are embodied in the RR and in regional plans adopted for broadcasting and mobile services. The RR applies to frequencies ranging from 9 kHz to 400 GHz, and incorporates information describing how the spectrum may be used and shared around the globe. In an increasingly 'unwired' world, some 40 different radio services now compete for spectrum allocations to provide the bandwidth needed to extend services or support larger numbers of users.

NATIONAL RESOURCE MANAGEMENT

The role of the Ministry of Energy, Water and Communications is to facilitate and regulate the growth of industries in these sectors to ensure the availability of high quality, efficient and safe services at a reasonable price to consumers throughout the country. The regulatory function of the Ministry is undertaken through its regulatory bodies, namely, the Energy Commission and the Communications and Multimedia Commission. While policy issues are within the realm of the Ministry, the Communications and Multimedia Commission is the single autonomous regulatory body for the convergent industry.

Spectrum and numbering schemes are a national resource and the design, adoption and management of their plans affect national interest. It is therefore the responsibility of the government to ensure that the utilisation and assignment of these resources are structured in such a way that the development of existing services and infrastructures or introduction of new ones are not constrained by their shortages.

In this regard, the government will continue with the existing strong pro-competitive approach with regard to the scarce resources utilisation and assignment for the future development of the communications and multimedia industry. Applications for spectrum will be considered on a case-by-case basis.

Requests for spectrum from existing assignment holders to expand their infrastructures and services will be given due consideration. In addition, to reflect its scarcity and to ensure that the future spectrum management meets the needs of the competitive market, the assignment of high-value spectrum is carried-out through an open and competitive bidding process.

6.0 CONCLUSIONS

The outer space is free for exploitation and use by all countries in conformity with both the national and international regulations. However, the countries retain the jurisdiction and control over objects they have launched into outer space. As such, further detailed regulations and procedures governing orbit/spectrum is very essential to maintain equitable access to orbits and frequencies to all countries. ■

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