



Radiocommunication Bureau

(Direct Fax N°. +41 22 730 57 85)

Administrative Circular
CA/178

12 December 2008

To Administrations of Member States of ITU and Radiocommunication Sector Members

Subject: Call for papers for a BR Workshop on the efficient use of the spectrum/orbit resource (Geneva, 6 May 2009)

Efficient use of the spectrum/orbit resource is one of the most crucial challenges facing the international community in efforts to promote worldwide telecommunication development. Special attention was devoted to this issue at the last ITU Plenipotentiary Conference (Antalya, 2006) and World Radiocommunication Conference (Geneva, 2007). In particular, administrations, satellite operators and industry are invited to be forward-looking in seeking ways to improve the procedures governing access to orbits and frequencies in order to reflect the latest technologies (Resolution 86 (Rev.WRC-07)) as well as to develop concepts that enhance the Radio Regulations to meet the demands of current, emerging and future radio applications (Resolution 951 (Rev.WRC-07)). The Radiocommunication Sector is also invited to carry out studies on procedures for the measurement and analysis of the application of the basic principle contained in Article 44 of the ITU Constitution (Resolution 80 (Rev.WRC-07)). Furthermore, studies on the efficient use of spectrum/orbit resource are requested in Questions ITU-R 83-5/8 and 274/4.

The challenge for ITU, and thus for administrations and the satellite community, is the ability to continue carrying out the vital work of recording frequency assignments in the Master International Frequency Register (MIFR), thereby ensuring that frequencies and orbital positions associated with those assignments are compatible and do not result in interference. The questions behind this challenge are:

- Do ITU and the Radio Regulations, through the existing procedures for registration of frequency assignments pertaining to space services, bring added value to administrations and the satellite community?
- What mechanisms and practical strategies can be employed to ensure efficient use of the spectrum/orbit resource and to improve the current international satellite spectrum management systems?

To help respond to the above questions, the Radiocommunication Bureau (BR) is pleased to announce the holding of a one-day BR Workshop to address possible options to improve access to, and the efficient use of the spectrum/orbit resource. The Workshop will be held at ITU Headquarters in Geneva, Switzerland, on **6 May 2009**, immediately following the meetings of Working Parties 4A, 4B and 4C of Radiocommunication Study Group 4 – Satellite Services (see Circular Letter 4/LCCE/98 of 12 December 2008). Please note that the workshop will conduct its work in English.

Participation of experts from administrations, satellite operators and industry is strongly encouraged, as well as those with an interest in the topic. Moreover, presentations from prospective attendees are invited.

A web page, BR Workshop Forum at: <http://groups.itu.int/br-ssd> has been established for participants to this Workshop on which will be posted relevant documentation, including information relating to the submission of presentations and subsequent participation at the meeting. There is a free-read only guest access for all participants to the BR Workshop. In order to facilitate message distribution and electronic working, TIES or registered users would also have the possibility to post and reply to messages posted on this Forum. A detailed programme of the Workshop will be soon made available on this Forum and will be updated as new or modified information becomes available.

The Workshop will comprise four sessions, each of 90 minutes duration – 75 minutes for presentations and 15 minutes for general discussion. Each individual presentation should be limited to a maximum of 20 minutes. Prospective speakers are requested to submit the title and summary of their presentation to the BR, in electronic form, at brmail@itu.int, by **16 February 2009 at the latest**. A background paper addressing the theme of the workshop is contained in Annex 1.

For any additional information, you may contact:

Mr. Yvon Henri (convenor/facilitator), (yvon.henri@itu.int), tel.: +41 22 730 5536; or

Mr. Nelson Malaguti, (nelson.malaguti@itu.int), tel.: +41 22 730 5198.

Valery Timofeev
Director, Radiocommunication Bureau

Annex: 1

Distribution:

- Administrations of Member States of the ITU
- Radiocommunication Sector Members
- Chairmen and Vice-Chairmen of Radiocommunication Study Groups and Special Committee on Regulatory/Procedural Matters
- Chairman and Vice-Chairmen of the Radiocommunication Advisory Group
- Chairman and Vice-Chairmen of the Conference Preparatory Meeting
- Members of the Radio Regulations Board
- Secretary-General of the ITU, Director of the Telecommunication Standardization Bureau, Director of the Telecommunication Development Bureau

Annex 1

BR Workshop on the efficient use of the spectrum/orbit resource (Geneva, 6 May 2009)

<http://groups.itu.int/br-ssd>

Convenor/facilitator: Yvon Henri (BR/SSD)

Background paper

1 Introduction

Efficient use of the spectrum/orbit resource is one of the most crucial challenges facing the international community in efforts to promote worldwide telecommunication development. Special attention was devoted to this issue at the last ITU Plenipotentiary Conference (Antalya, 2006) and World Radiocommunication Conference (Geneva, 2007). In particular, administrations, satellite operators and industry were invited to be forward-looking in seeking ways to improve the procedures governing access to orbit and frequencies in order to reflect the latest technologies (Resolution **86 (Rev.WRC-07)**), develop concepts that enhance the Radio Regulations to meet the demands of current, emerging and future radio applications (Resolution **951 (Rev.WRC-07)**). The Radiocommunication Sector is also invited to carry out studies on procedures for the measurement and analysis of the application of the basic principle contained in Article 44 of the ITU Constitution (Resolution **80 (Rev.WRC-07)**). Furthermore, studies on the efficient use of spectrum/orbit resource are requested in Questions ITU-R 83-5/8 and 274/4.

2 Current situation regarding satellite services

Satellite systems continue to play an important role in the booming market of satellite applications within the fixed-satellite, broadcasting-satellite, mobile-satellite and radiodetermination-satellite services. Alongside the provision of traditional applications such as capacity leasing, the most dynamic growth areas for satellite operators are direct-to-business or direct-to-home applications, and the provision of triple-play application, i.e. telephone, high-speed data transmission/Internet and television and sound broadcasting programmes to fixed, transportable and mobile terminals. This is leading to the convergence of systems operating within the above-mentioned different space services and their gradual integration with terrestrial telecommunication networks. For global disaster management, it is extremely important to have a rapidly deployable solution that remains unaffected in the event of disasters or similar emergencies; satellite communications meet these criteria and thus constitute a key element in a cost- effective disaster management strategy.

To meet the above demand for satellite capacity, it will be necessary not only to replace the existing space capacity coming to the end of its lifetime, but also to bring additional one into use. The amount of the spectrum/orbit resource allocated to satellite systems together with the need to use it with ever-increasing efficiency in order to satisfy the growing demand constitutes therefore a crucial issue. In addition to the increased cost of satellite projects stemming from the electromagnetic compatibility (EMC) requirement, as orbit occupancy increases so too does the impact of an additional factor on the economic efficiency of satellite system projects, namely the cost of coordination (constraints on satellite service operation, as well as human resource investment (coordination meetings, special section publication follow-up...)) with other satellite systems and subsequent recording of the corresponding frequency assignments with ITU.

3 International regulation of spectrum/orbit access

3.1 Non-planned services

A broad survey of the ITU Space Radiocommunication Stations (SRS) database which contains information relating to satellite networks submitted to the Radiocommunication Bureau (BR) shows that less than 20% of networks at the advance publication information (API) stage will successfully complete the notification and recording procedures (last stage in the registration process for satellite network frequency assignments). What then is the purpose of this inflation of “paper API” submissions at the beginning of the international registration process?

Regarding requests for coordination, the Bureau is receiving filings for satellite networks with characteristics far beyond what may be considered reasonable for the normal operation and delivery of expected services, even allowing for a flexibility factor with regard to forecast use. For example, some coordination requests include characteristics of steerable beams for which the service area is restricted to the territory of one or a few administrations, whereas the area over which these beams can be steered is defined as worldwide. Moreover, some antenna gain contours, submitted in coordination or notification notices, may contain high gain areas outside the service area (the same approach is also adopted for planned services). This leads to almost absurd coordination requirements. For a particular satellite network received in June 2007, the coordination requirement consisted of 40 administrations and 600 networks. Completion of coordination for such requirements is extremely difficult. At the notification stage, therefore, most if not all frequency assignments will be recorded in the Master International Frequency Register (MIFR) provisionally under No. 11.41. For example, one notification of a satellite network received in December 2005 indicated coordination agreement with a single administration and requested the application of No. 11.32A and 11.41 for 34 administrations. In this regard, the Bureau is witnessing an increase in complaints of harmful interference (some of them involving frequency assignments recorded under No. 11.41).

In actual fact, independent information available today on the real use of the spectrum/orbit resource shows some divergence from the corresponding information submitted by administrations to ITU. This means that “paper satellite” issues – or, more precisely, fictitious frequency assignments recorded in the MIFR – still exist, with the majority of such assignments recorded with the indication that they have been brought into regular operation in accordance with the notified satellite network characteristics.

Space spectrum resources tend more and more to be considered as an administration or company share value which might to a certain extent impede competition and hinder the introduction of new and more spectrum efficient technologies.

One reason for this is that administrations have no real incentive to give up unused or underused spectrum/orbit resources or update their satellite network parameters at the stage of notification and recording of assignments in the MIFR in order to accurately reflect their intended operations. Rather, there is a fairly strong incentive to reserve (and thus freeze) spectrum/orbit resource for possible but as yet unknown future needs, thus *de facto* denying access to new entrants.

The enforcing mechanisms that exist at present to ensure that a satellite system is operating in accordance with recorded parameters are based mainly on the goodwill of administrations. When goodwill is linked to financial consequences, enforcing mechanisms of this kind tend to be disregarded.

3.2 Planned services

The space service Plans have been developed in order to guarantee in theory, for all countries, equitable access to the geostationary-satellite orbit and associated spectrum resources for specific satellite services, namely the fixed-satellite service (FSS) and broadcasting-satellite service (BSS), in specific bands. Many years after the establishment of those space Plans, not many resources allocated to the Plans have in fact been used for the original purposes, i.e. mainly for national systems. For example, in the FSS allotment Plan (Appendix **30B**) which contains near 160 national allotments, there is not yet a single system using frequency assignments in the 6/4 GHz band in use after conversion of a national allotment and there are less than 8 national systems in use in the 13/10-11 GHz band. In the BSS and associated feeder link assignment Plans (Appendices **30** and **30A**), the number of national systems is 42. In the Planned services, many systems are in fact implemented with extended coverage (around 30 systems in the FSS allotment Plan and 60 systems in the BSS and associated feeder link assignment Plans).

The upshot is that the space Plans as they have been adopted may not be attractive to many countries, in particular as a result of the national coverage restriction. By applying the modification procedures associated with the Plans, operating satellite systems with extended service areas are able de facto to use the capacity which was foreseen to be used by the original Plan assignments or allotments. Since, in practice, application of modification procedure often result in some deterioration in the conditions of future use of national allotments or assignments in the Plans, the proliferation of such systems could prevent administrations from implementing their national allotments or assignments in the future. Recently, one administration wishing to implement its national BSS assignments requested assistance from the Bureau when it realised that it was impossible for it to use its own national assignments owing to the adverse effects of a satellite system covering a large region for which the Appendices **30** and **30A** procedures had been correctly applied.

4 How to meet the outstanding challenges – items for discussions

The challenge for ITU and thus for administrations and the satellite community, is the ability to continue carrying out the vital work, embedded in the ITU Constitution, of recording frequency assignments in the MIFR, thereby ensuring that frequencies and orbital positions associated with those assignments are compatible and do not result in interference. The questions behind this challenge are:

- Do ITU and the Radio Regulations, through the existing procedures for registration of frequency assignments pertaining to space services, bring added value to administrations and the satellite community?
- What mechanisms and practical strategies can be employed to ensure efficient use of the spectrum/orbit resource and to improve the current international satellite spectrum management systems?

4.1 Technical options

One way to increase efficiency could be to adopt updated technical EMC principles which would foster spectrum/orbit sharing. Possible technical approaches to be further studied could include:

- further refining recommended antenna radiation patterns (to increase selectivity);
- increasing acceptable interference values (e.g. based on cases that better reflect reality and not systematically upon the worst scenario);
- encouraging use of higher frequencies permitting smaller antennas and spot beams;

- differentiate use of frequencies with type of application (e.g. higher frequencies for broad-band MSS applications, versus lower frequencies for narrow band MSS application...);
- expanded use of non-geostationary orbits (e.g. HEO, LEO, MEO);
- use of state-of-the-art modulation and error correction coding techniques (decrease of susceptibility to interference);
- use of new interference reduction, mitigation or compensation techniques;
- use of cognitive radio systems or software-defined radio technology for achieving better spectrum utilization, dynamic spectrum management and flexible spectrum use;
- increase the use of more homogeneous satellite network parameters in order to facilitate inter-system coordination;
- permitting greater use of satellite network integrated with terrestrial services (complementary ground components or ancillary terrestrial components) for more efficient use of spectrum.

4.2 Regulatory options

Possible imperfections and weaknesses in the ITU Radio Regulations may be seen as restraints to the development of satellite services. In this regard, the following items could be further developed:

- simplify the existing Radio Regulations procedures, e.g. to eliminate the six-month regulatory period between the submission of advance publication information (API) and the coordination request, or even suppress the API phase for satellite networks subject to coordination procedures;
- review the existing notification and recording procedure historically based on the notion of frequency assignments when a notion of frequency range could be more relevant to satellite network registration;
- provide satellite operators with enhanced responsibilities and rights in ITU registration procedures;
- maintain in the BR database, in addition to Resolution 49 information, updated records of satellite launches and changes in longitude of geostationary satellites;
- adopt harmonized regional or worldwide VSAT regulations/licensing approaches;
- introduce a satellite monitoring system to assist administrations in resolving interference and orbit occupancy issues;
- introduce in the Radio Regulations more deterrent enforcement mechanisms and administrative measures particularly against the use of orbit and spectrum resource that is not in compliance with the Radio Regulations;
- encourage increase in the convergence of services/applications;
- consider pros and cons of planned services vs. non-planned services procedures;
- introduce new due-diligence milestones before and after the notification, recording in the MIFR and bringing into use of a satellite network (e.g. to provide clear evidence of satellite construction, completion of Critical Design Review, successful launch and in-orbit deployment of satellites ...);
- dissociate clearly administrative and technical provisions.

4.3 Economic options

In addition to the above-mentioned technical and regulatory options, the following items could be studied:

- introduce fees (bonds) for spectrum (orbit) use;
 - introduce spectrum fees for satellite filings recorded in the MIFR.
-