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|  | **ASIA-PACIFIC TELECOMMUNITY** |
| **1st Meeting of SATRC Working Group on Spectrum in SAP-IV** | **Document****SAPIV/WGS01/INP-07** |
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**Telecommunication Regulatory Authority of India**

**PROGRESS OF THE WORK ITEM ON “MARKET BASED METHODS OF SPECTRUM ALLOCATION IN SATRC COUNTRIES”**

**Proposed Questionnaire**

**Work Item: (S3) Market Based Methods of Spectrum Management**

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| Sl.No. | Issue |
| 1. | How the spectrum for 2G, 3G and 4G has been assigned so far by SATRC countries? What is the current practice being followed for the assignment of these spectrum? |
| 2. | Pros and Cons of different Assignment methods & Recommendations:Opinion of SATRC countries on the issue view and on the recommendations that can be made. |
| 3. | Whether the use of spectrum in different bands is restricted to use a particular technology? Band wise description may be provided.  |
| 4. | Pros and Cons of Liberalised use of Spectrum & Recommendations:Opinion of SATRC countries on the issue and on the recommendations that can be made. |
| 5. | Whether spectrum trading is permitted in the country? Please elaborate existing provisions of trading. |
| 6. | Pros and Cons of allowing Spectrum Trading & Recommendations:Views of SATRC countries on the Pros and Cons on Spectrum Sharing and Trading. Also view on the recommendations on spectrum sharing and trading that can be made from this platform. |

**CHAPTER-I**

**INTRODUCTION**

1. **General:**
2. The traditional approach to spectrum management is based on deciding the allocation and assignment of the spectrum administratively ie who has the right to use a particular block of spectrum and for what exact purpose. Historically, regulators have assigned frequencies by issuing licences to specific users for specific purposes. It may also involve specifying what equipment a licensee can use and where, and at what power levels it can be used. Though it may be an effective way to control interference yet such methods are often slow and unresponsive to new technological opportunities, as the spectrum regulator may not always have all the information to make best use of the spectrum.
3. Over a period of time there is shift towards adopting market mechanisms as an alternate to the traditional command and control mechanism of spectrum management.
4. **Requirement for adopting Market based Mechanism**
5. When the demand for the spectrum in any band is less than its availability, definitely, assignment of spectrum needs to be done over the counter on an administratively determined price. But, when the demand for a spectrum in band outstrips its availability considerably, the market based approach is best suited for ensuring the optimal use of the spectrum. The emergence of new services, particularly mobile wireless broadband, is constantly fuelling commercial demand for spectrum. Demand for internationally harmonised spectrum now outstrips supply. Unlike administrative decisions which are also vulnerable to bureaucratic delays, market dynamics can allow rapid redeployment of scarce resources to more efficient use by using better technologies.
6. There is trend towards converging markets for integrated services through different communication technologies. Networks and services convergence and the rapid innovation have created a need for more flexible access to spectrum, than is possible under traditional methods. All these developments point to the need for greater flexibility in the management of spectrum resources, while maintaining harmonisation. The trend towards greater flexibility and more competition in spectrum use is facilitated through a market-based approach to individual rights of use. The market based methods puts resources in the hands of those who value them the most.
7. **Moving towards Market based approach**
8. There has been a gradual shift from administrative approach towards the market based approach of spectrum management. There are some countries which allowed the auctioning of licences but did not permit trading and change of use. On the other hand, there are some markets for spectrum and spectrum licences under which both the ownership and use of spectrum can change in the course of a licensee's operation. Methods of Assignment of frequency, removal of restrictions on the usage of spectrum rights, allowing the change in the ownership through spectrum trading are important tools that have been instrumental for this shift of approach, each of them are discussed below.

**CHAPTER-II**

**ASSIGNMENT OF SPECTRUM**

1. **Methods of Assignment**
2. Minimizing harmful interference is the focal point in the traditional model which places an emphasis on the technical management of radio spectrum. As a consequence, different services are sometimes allocated to different frequency bands. In the administrative method there are two stages involved in authorizing spectrum use viz. the allocation stage and the assignment stage. At the allocation stage, broad decisions on spectrum use are made on ITU radio-communication conferences. National spectrum regulators prepare their own allocation decisions, which are published in form of a National Frequency Allocation Table.
3. Once an allocation has been determined, licences are issued to authorize the use of spectrum to particular users at the assignment stage with the issuance of a license(s) which is assigned. Historically, assignments were made by methods such as first-come, first-served basis or by way of comparative evaluation (also known as ‘beauty contests’) and/or consultation rather than by market based methods.
4. **Prevailing International Practices**
5. Various methods have been followed by different countries for the assignment of the spectrum for mobile services. Also, there is variation between the methods for assignment for spectrum for 2G, 3G and 4G services. These methods are discussed below:
6. **India**:
7. **2G spectrum (800/900/1800)**:
8. In March, 1992 the DoT invited tenders for grant of GSM based cellular mobile telephone service license in four Metropolitan cities of India and eight (8) CMTS licenses in the four Metros were awarded to private companies in November, 1994 on beauty contest principle. In year 1995, after following competitive bidding process, 34 Cellular Mobile Telephone Service (CMTS) licences were awarded in 18 state service area. The licensee was required to pay licensee fees annually. After the announcement of National Telecom Policy 1999, these licensees were allowed to migrate from fixed licence fee to revenue sharing arrangement. The government reserved the right to bring in the third operator and PSUs (MTNL/BSNL) were given CMTS licence in 1997 for Delhi and Mumbai and in 2000 for the rest of the country. The fourth cellular operator was chosen thrugh a multi-stage bidding in the year 2001 and licences were issued in 2001/2002. Afterwards, Universal Access Service Licences(UASL) were given in 2003, 2004, 2006, 2007 and 2008 following the principle of First Come First Served (FCFS). The Entry Fee discovered in the 2001 auction was applied for all the UAS licences. There was no separate fee for the assignment for the spectrum, which was bundled with the spectrum. Initially, 2x4.4 MHz of 900/1800 spectrum for GSM or 2x2.5 MHz of 800 MHz for CDMA service providers was allotted and subsequently additional spectrum was assigned based on the subscriber linked allocation criteria administratively.
9. 122 new licences, which were awarded in the year 2008, were cancelled by the Hon’ble Supreme Court of India vide its order dated 2nd February 2012. As a result, auctions are going to conducted for award of spectrum in 800 and 1800 MHz bands.
10. **3G Spectrum (2100 MHz) & BWA spectrum (2300 MHz)**
11. Spectrum in 2100 MHz band and 2300 MHz band was assigned through two separate e-Auctions in 2010.

**Question 1:** How the spectrum for 2G, 3G and 4G has been assigned so far by SATRC countries? What is the current practice being followed for the assignment of these spectrum?

1. **Pros and Cons of different Assignment methods & Recommendations**

**Question 2:** Opinion of SATRC countries on the issue.

**CHAPTER-III**

**LIBERALISED USE OF SPECTRUM**

1. **General**
2. Liberalisation of spectrum refers to the removal of technology restrictions to give the licensee an option to deploy latest and more spectrum efficient technologies, which shall result in optimal use of spectrum. Change of use (also known as service neutrality) allows different types of services and technologies to compete for the same spectrum.
3. In the 1990s, during the evolution phase of 2G mobile communication, spectrum was assigned mainly using command and control approach. The use of spectrum was restricted to using a particular technology. Over a period of time, the use of 900 and 1800 MHz bands has been liberalized in many countries.
4. **International Practices:**
5. The status of various spectrum bands with respect to their liberalized use in the SATRC countries is discussed below.
6. **India**: In India, for mobile services, spectrum has been assigned from different spectrum bands depending upon whether licensee is deploying CDMA or GSM technology. Therefore, the spectrum assigned in 800/900/1800 for 2G mobile services is bound with the technology chosen by the licensee, whereas ITU has assigned the spectrum in the 800, 900 and 1800 MHz bands for IMT applications. However, the spectrum in the 1800 MHz band that shall be assigned through the upcoming auction shall be liberalised spectrum.
7. There is no such restriction on the ‘3G’ and ‘BWA’ spectrum which was assigned through auction and their use is governed by the terms and conditions of the licence that is obtained by the spectrum holder.

**Question 3:** Whether the use of spectrum in different bands is restricted to use a particular technology? Band wise description may be provided.

1. **Pros and Cons of Liberalised use of Spectrum & Recommendations**

**Question 4:** Opinion of SATRC countries on the issue.

**CHAPTER-IV**

**SPECTRUM TRADING & SHARING**

1. **Spectrum Trading:**
	1. Spectrum trading is a tool available in the market-based approach which enables new entrants to acquire the right to use spectrum from other users. It is a price-based tool for allowing change of ownership and reconfiguration of spectrum in the secondary market. It may also allow purchaser to change the use to which the spectrum was initially put. Spectrum trading is a tool available in the market-based approach which enables new entrants to acquire the right to use spectrum from other users. Trading can determine a market value for spectrum and can help reconcile demand and supply. The approach could stimulate innovation and benefit consumers by enabling more and better services. The first steps towards secondary trading of spectrum usage rights have already been taken in Europe and more and more Member States have the necessary legal provisions in place.
	2. Spectrum trading provides an option to align their spectrum holdings with their spectrum requirements. It may reduce the shortage of spectrum by making it freely available in the market. Trading can determine a market value for spectrum and can help reconcile demand and supply. The approach could stimulate innovation and benefit consumers by enabling more and better services. In contrast to spectrum re-assignment, in a spectrum trade, the right to use the spectrum is transferred voluntarily by the present user, and a sum is paid by the new user of the spectrum. Spectrum trading contributes to a more efficient use of frequencies because a trade will only take place if the spectrum is worth more to the new user than it was to the old user, reflecting the greater economic benefit the new user expects to derive from the acquired spectrum.
	3. It enables licensees to expand more quickly than would otherwise be the case; makes it easier for prospective new market entrants to acquire spectrum; if spectrum trading were combined with an extensive liberalization of spectrum usage rights, there would be a considerable incentive for incumbents to invest in new technology in order to ward off the threat of new entrants in the absence of other barriers to entry (i.e., the unavailability of spectrum); and this, in turn, would boost market competition.
2. **Spectrum Sharing**
3. Spectrum can be shared in several dimensions; time, space and geography. There are diverse approaches such as administrative, technical and market-based approaches to sharing frequencies. In-band sharing, use of unlicensed spectrum commons combined with the use of low power radios or advanced radio technologies including ultra-wideband and multi-modal radios are some of the ways of spectrum sharing.
4. Obviously, the sharing of spectrum results in better utilisation of spectrum resource. But it has its own challenges. Not only it requires some extra spectrum management techniques, it may well cause some degree of interference.
5. **Prevailing Practices**

Present provisions on ‘Spectrum Trading’ in SATRC countries are discussed below.

* 1. **India**:

In India, the 2G spectrum till date has been either given along with the licence or given based on Subscriber Linked Criteria, without any additional charges for the spectrum. Regarding spectrum for 3G and BWA services, though the spectrum will be given through the auction process, but presently, the amount of spectrum available is limited. Therefore, spectrum trading is not permitted.

However, sharing of spectrum is permitted in India with following broad guidelines:

1. Spectrum sharing only within the same licence service area with the prior permission of the licensor. Permission for Spectrum sharing will be given initially for a period of 5 years. Government may renew the permission for a further one term of five years, on terms to be prescribed. Spectrum can be shared only between two spectrum holders both of which are holding spectrum either in 900/1800 MHz band or in 800 MHz band. Total quantum of spectrum, as a result of the spectrum sharing, shall not exceed the limit prescribed in case of mergers of licences. As per the existing guidelines of the merger of licences in a service area, the total spectrum held by the Resultant entity shall not exceed 25% of the spectrum assigned, by way of auction or otherwise, in the concerned service area in case of 900 and 1800 MHz bands. In respect of 800 MHz band, the ceiling will be 10 MHz.
2. In respect of spectrum obtained through auction, spectrum sharing will be permitted only if the auction conditions provide for the same. Parties sharing the spectrum will be deemed to be sharing their entire spectrum for the purpose of charging. Both the parties shall fulfill individually the roll out obligations as well as the QoS obligations prescribed under the licence.
3. Spectrum usage charges will be levied on both the operators individually but on the total spectrum held by both the operators together. In other words, if an operator ‘X’ having 4.4MHz of spectrum shares 4.4 MHz of spectrum of another operator ‘Y’, then both ‘X’ and ‘Y’ will be liable to pay spectrum usage charges applicable to 8.8 MHz of spectrum.
4. Spectrum sharing would involve both the service providers utilising the spectrum. Leasing of spectrum is not permitted. Decision on matters related to pricing of spectrum, post sharing, would be taken separately. Spectrum sharing will not be permitted among licensees having 3G spectrum.

**Question 5:** Whether Spectrum Trading and Spectrum Sharing is permitted in the country? Please elaborate existing provisions of trading and sharing.

1. **Pros and Cons of allowing spectrum sharing & trading AND**

**Recommendations.**

**Question 6: Views of SATRC countries on the recommendations on spectrum sharing and trading that can be made from this platform.**