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|  | **ASIA-PACIFIC TELECOMMUNITY** | |
| **2nd Meeting of SATRC Working Group on Spectrum in SAP-IV** | **Document**  **WGSPEC-02/INP-03** |
| 11-12 March 2014, Tehran, Iran | **11 March 2014** |

Communication Regulatory Authority, Islamic Rep. of Iran

**NEW WORK ITEM PROPOSAL ON SPECTRUM RE-FARMING IN SATRC COUNTRIES**

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| **Work Item** | **Spectrum re-farming in SATRC countries** |
| **Responsible working group** | WG on Spectrum |
| **Document Type** | Report/ guideline |
| **Group/Chair** | Iran |
| **Scope** | Spectrum re-farming and actions to improve relevant procedure.  The action could include legal arrangement, executive procedure, foundation of re-farming fund and estimation of future spectrum requirement |
| **Purpose** | Framework of spectrum re-farming  Major spectrum re-farming cases  Methodology of spectrum re-farming and areas of international cooperation Exchanging experiences, preventing and easing spectrum re-farming  To study Implementation of re-farming  To study region potential for re-farming |
| **Related Document** | Recommendation ITU-R SM.1603-1 Spectrum redeployment as a method  of national spectrum management |
| **Related Organization** | ITU -APT-SATRC |
| **Time frame** | Total study period would be approximately 1 year |

Background paper on spectrum re-farming in SATRC countries

**Introduction**

Radio frequency spectrum is a limited resource of radiocommunication. Employment of a radio frequency channel by a device restricts or prevents its further employment by other devices. The preferred precedence of new radiocommunications technologies that brings new telecommunication services is a driving force of spectrum management authority for administration of evacuation of old and low priority technologies from spectrum. Technology advancement which requires wider bandwidths and introduces new channeling arrangement is one of main reasons of spectrum re-farming. Accordingly, spectrum re-farming is an inevitable duty of national spectrum management authority for obtaining of higher level of spectrum utilization performance, but could be costly and time consuming. For example homing of LTE technology requires supplying of integer multiple of 5 MHz frequency blocks in FDD or TDD multiplexing schemes. Most of the newly identified frequency bands for LTE are overlapping with spectrum used by other radiocommunication stations.

Expected advantage of re-farming, including technical and economic gains, should overweigh the implementation cost significantly and it should be a win-win process for all concerned parties conceptually.

**Implementation of re-farming**

In cases of having non-allocated spectrum situation for a new technology, administrations may also decide to provide a primary frequency allocation for relevant radio communications service, prior to performing re-farming of spectrum. It happened for Region 1 in 790-862 MHz once they decided to open it for IMT purpose.

During implementation phase of spectrum redeployment, the existing usages have to stop their operation or have to move their utilization from occupied frequencies to other parts of the available spectrum. The authority may avoid renewal of existing usages or it may set a condition of frequency change to a new frequency band for extension of license. The authority needs to force re-farming in case of facing a license with long validity period. Compensation of costs imposed to the existing licensees may be recovered by new comers or by the authority from governmental funds, if required. Therefore, redeployment funds should be created for compensation and efficient redeployment. The authority may decide to give some exclusive incentive rights to existing users of the spectrum under re-farming process for their voluntary evacuation of spectrum instead of by regulatory force. The relevant responsibilities and authorities of spectrum management should be listed in the national radiocommunication rules. Therefore, some legal provisions are required to empower spectrum management authority in this respect. ITU-R Recommendation **SM.1603-1** provides a logical ground to aid administrations in deciding for better spectrum re-farming.

In case of public radiocommunication services, the benefit of spectrum re-farming could be maximized if implemented in line with an international technological advancement. The economy of scale plays a key role not only in reduction of costs for network infrastructure, operation and user equipment; but also facilitates international roaming.

For major cases of spectrum re-farming, it is preferred that authority to provide and to publish a step-by-step re-farming plan and to receive an approval for its implementation.

**Challenges**

The existing experience shows that the spectrum redeployment is a lengthy complicated process and would possibly take some years. To override the defect of delay in provision of interference-free spectrum for new technologies, therefore, administrations have to be able to predict their future spectrum requirement, especially for the public radiocommunication networks. Moreover issuing of new licenses within the concerned spectrum has to be stopped much earlier than utilization date, and removal of existing users have to be started several years in advance. Otherwise, introduction of new technologies to the public sector would be postponed just for lack of spectrum.

Estimation of payable amount for compensation of existing spectrum users is a difficult issue. The paid value is mainly for change of RF sections of stations and/or technology replacement. For example a microwave link which is using concerned spectrum, may be replaced by a cable transmission system instead of changing frequency.

In most cases, redeployment of spectrum used by the government organizations is very difficult. Spectrum redeployment is more difficult as the spectrum is heavily been used by governmental bodies.

The re-farming difficulty of unlicensed spectrum is the highest. Actually, no one thinks to re-farm a frequency band such as 2 400-2 483.5 MHz.

**Region potential for re-farming**

Developing a national framework for systematic and regulated spectrum re-farming is necessary. Most of countries in region have no clear framework. Moreover, there are some major issues under discussion by international treaties which may require re-farming in national level if finalized. There have been some cases happened previously. Re-farming of 800 MHz in favor of mobile service identified for IMT and IMT advanced is a common interested case. After WRC-15 there would several more frequency bands subject to re-farming in effect of agenda item 1.1 (identification of additional spectrum for broadband IMT).

The proposed sub-working item could provide a ground for exchanging of administration’s experience on major spectrum re-farming case studies and may provide a helpful framework and guidance on how to reduce cost of redeployment implementation. Administrations may share their views on common re-farming issues happened in recent years such as re-farming of digital dividend bands, LTE bands, etc.