10 things you need to know about...

Spectrum regulation & cognitive radio

1 – The importance of Radio Spectrum

The radio spectrum (or simply 'the spectrum') is indispensable for a number of services, whether for communications or other applications. Communications services include mobile telecommunications, broadcasting, wireless broadband, aeronautical and maritime radio navigation, communications for defense or emergency services, amateur radio and citizen radio. Non-communication uses include radiolocation (radar) and scientific applications such as radio astronomy.

2 – Why should spectrum be regulated at all?

The spectrum is a finite resource. The current technology allows only a portion of the electromagnetic spectrum, which is theoretically unlimited, to be used in practice. If used effectively the spectrum can enable creation of great economic and social value.

3 – The goals of spectrum management

The demand for spectrum exceeds the supply, therefore spectrum needs to be managed. The main goal of spectrum management is to enable as many users as possible to operate without harmful interference and at the same time to facilitate introduction of new wireless technologies. Effective spectrum management requires regulation at national, regional and global levels.

4 – What is the role of CEPT[1] and the European Commission in spectrum management?

National administrations are in charge of spectrum management at the national level. CEPT is the main spectrum management forum at a European level even though the European Commission plays an increasingly important role. The most important global event for spectrum management is the World Radiocommunications Conference (WRC) organised every 3-4 years by the ITU[2]. The next such conference will be held in early 2012 (WRC-12). The EBU is actively involved in CEPT and ITU work.

5 – The two ways of authorising the use of spectrum

There are two principal ways of authorising the use of spectrum: licensed and license-exempt. Licensed interference-free operation is ensured by stipulating the detailed conditions of use in the license, based on prior compatibility

[1)] European Conference of Postal and Telecommunications Administrations

[2)] International Telecommunications Union

studies and/or frequency plans. With license-exempt use there is no guarantee of spectrum availability nor is the interference situation known in advance.

6 – How is broadcasting's use of radio spectrum licensed?

Broadcasting is a licensed service, based on the internationally agreed frequency plans (e.g. GE84 for FM radio, GE06 for digital TV and DAB) and guaranteed quality of service. Licenses are issued for the transmitters and networks whereas the receivers are subject to international standards. Examples of license exempt devices are WiFi, various remote control systems and identification tags.

7 – Cognitive radio is a promising initiative

Cognitive radio is a new technology concept that would enable license-exempt operation within a frequency band that is already occupied by a licensed service. Cognitive technology is promising to significantly improve the efficiency of spectrum use. This would in turn enable access to spectrum for new services and applications. There is currently a lot of academic and industry research into cognitive radio while regulators are examining regulatory implications of deploying cognitive devices.

8 – Cognitive radio techniques can be used in broadcasting "white spaces"

Broadcasters are following with interest the proposal to introduce cognitive radio in the so-called 'TV white spaces'. The white spaces are frequencies within the UHF band that are unused by television services at a given location. The white spaces devices shall not cause interference to broadcasting services and program making applications, such as wireless microphones. Equally important, the license exempt operation shall not hinder future development of broadcasting technology.

9 – Is it possible now to use "TV white spaces" ?

The "TV white spaces" are already used by services ancillary to broadcasting like program making and special events (PMSE) services on a coordinated basis. In Autumn 2008, the Federal Communications Commission (FCC) in the United Sates authorized license-exempt use of the "TV white spaces" by Cognitive Radio systems under some conditions. The Electronic Communications Committee and the European Commission in Europe are studying the technical and operational requirements for the operation of cognitive radio systems in the white spaces of the UHF broadcasting band (470-790 MHz).

10 – Broadcasters are being encouraged to improve their spectral efficiency – so should everyone using licensed spectrum

In order to further improve the efficiency of spectrum use regulators encourage broadcasters to adopt the most advanced compression technology such as MPEG-4 and DVB-T2. It is the EBU view that the same principle should be applied to all spectrum users and not only to broadcasters.

European Broadcasting Union
L'Ancienne-Route 17A, CH-1218 Grand-Saconnex, Geneva, Switzerland
tech@ebu.ch, Tel.: +41 22 717 21 11, Fax: +41 22 747 40 00
tech.ebu.ch