

Digital Radio spectrum: regulation and allocation

Summary

The basic task of Radio Spectrum regulation is to avoid interference between users. Planning and coordination is needed to avoid situations when two users are using the same frequencies in the same place and time. Other important tasks of regulation are to ensure technical quality of service, safeguard efficient use of spectrum.

Bands allocated to services are harmonised for applications (e.g. Digital Radio) and particular users (e.g. networks operator) are authorised to use particular frequencies or radio channels.

The International Telecommunication Union (ITU) is the global authority for radio spectrum regulation. In Europe the regional authority is the European Conference of Postal and Telecommunications Administration (CEPT). Each country has its own national spectrum administration which decides on frequency allocation on the national level, in accordance with global and regional rules. International recognition of national allocations is granted via ITU and international treaties. Licenses are granted through auctions or beauty contests, and spectrum can be subject to spectrum trading or sharing.

International treaties

ITU organizes World Radio communication Conferences which consider changes to Radio Regulations. Radio Regulations are binding to States and are related to spectrum management as far as it has international implications. Radio Regulations are not directly applicable to individuals, operators or others. Compliance with those instruments therefore presupposes that each State will take the measures required to implement domestically those obligations to spectrum users. In addition to the procedures of Radio Regulation there are International conferences to provide for agreements between states including frequency plans for particular radio communication services and frequency bands.

One such example is the Geneva 2006 Agreement (GE06) regarding digital broadcasting (T-DAB and DVB-T). This Agreement is binding to European, African and Arabic countries having signed it. It consists of a number of Articles containing regulatory procedures and is supplemented by Annexes containing a frequency plan for T-DAB and DVB-T allocations in 174-230 MHz and for DVB-T allocations in 470-862 MHz. There are also Annexes containing technical criteria and bases for frequency coordination.

Countries party to this Agreement wanting to implement entries in accordance with the plan may proceed accordingly. If they want to make modifications or implement other services in the bands they have to apply the procedures stipulated in the Agreement.

Regional organisations also play a major role in the managements of the radio spectrum resource. The prime objective of the Electronic Communication Committee (ECC) within the CEPT is to develop harmonised European regulation for the use of radio frequencies. The implementation of ECC Decisions and Recommendations by national administrations is made on a voluntary basis.

In European Union the European Commission sets out the tasks to the CEPT for single market harmonisation, assisted by the Radio Spectrum Committee (RSC) and with support of the Radio Spectrum Policy Group (RSPG).

Authorising the use of the spectrum is a national prerogative. National Tables of Frequency Allocations primarily specify the radio services authorised in frequency bands and the entities which have access to them. Governmental use covers defence, civil aviation, maritime and waterways communication, public safety, meteorology, science and others. Commercial users need authorisation, public legal act, issued by National Regulatory Authority.

Auctions and beauty contests

Right to use a spectrum could be described as a range of frequencies available to use in given locality for given time. In a case where there is low interest of users in a particular band, the rights of use are awarded according to the “first come – first served” principle. In this way the applications are processed continuously.

Some bands with favourable propagation parameters are attractive for users and selection procedure should be used to select the future band users. A spectrum auction is a selection procedure whereby a government uses an auction to sell the rights of use a specific frequency band. There are a number of different auction formats that could be used for assigning spectrum, depending on whether the auction takes place over single or multiple rounds, licences are sold simultaneously or sequentially, and whether bids for licences are submitted separately or linked. A spectrum auction will usually last several weeks from the opening bid to the final winning bid. Auctions have been carried out in a many European countries, particularly for bands suitable for mobile networks.

Under a beauty contest applicants set out their case for being awarded licences on the basis of the criteria set out in the invitation to bid. Criteria might include speed of deployment, project viability, spectrum efficiency and ability to stimulate competition. The criteria could be weighted.

Applicants are required to submit information in support of their application. This would include company details, description of services to be offered, roll out plans, business projections and costs, and a technical description of the network used to supply services.

Spectrum trading

Spectrum trading is transfer of rights to use radio frequencies, which needs to be approved by the competent national authority. The possibility of trading rights of use of spectrum is highlighted in the Radio Spectrum Policy Program of EU as a tool to promote innovation and investment through enhanced flexibility.

Spectrum sharing

Spectrum sharing can be defined as a common usage of the same spectrum resource by more than one user. Sharing can be made with respect to all three domains: frequency, time and place. An example is the operation of wireless microphones in the spaces between broadcasting channels.