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Broadcasters' Access to Broadcasting Frequencies

by Nicola Weißenborn

EDITORIAL

Frequencies are as indispensable for broadcasting as letters are for language. For a long time, broadcasting frequencies were a scarce commodity, a situation which digital compression techniques are now counteracting. This is why the obligation for frequency usage to be sanctioned by state authorities is increasingly coming under the microscope. This much we know.

What many people don't know, however, is how spectrum is actually managed in different countries. What rules do countries follow when distributing this finite resource which ignores national boundaries, and how do they allocate frequencies to users? What does the transition to more efficient digital technology actually mean for the legal framework governing frequency use? Does the emergence of new radio-based systems also bring with it new approaches to spectrum management?

This IRIS *plus* gives a brief, illustrated overview of this subject. It describes the main technical aspects of spectrum use, European and even global co-operation aimed at creating sensible spectrum regulation and different national legal models for actual frequency allocation. It also looks at the direction in which digitisation is pushing the spectrum debate.

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Broadcasters' Access to Broadcasting Frequencies

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1. Introduction

Like all means of communication, broadcasting is dependent on transmission systems, whether wireless or cable. Access to these transmission networks is therefore a fundamental requirement for broadcasters, whose right of access is widely acknowledged. Article 10.1 of the European Convention on Human Rights, for example, guarantees a general right of access to communication networks,[1] which is not limited to particular methods of communication or specific means of transmission and reception.[2] The Court of Justice of the European Communities (ECJ) has also recognised the right to access to communication networks, albeit on the basis of the free movement of services enshrined in Article 49 of the EC Treaty.[3] However, in neither case are these rights of access absolute. The European Court of Human Rights believes that media plurality serves a greater purpose,meaning that access to the individual components of the communication process must be properly defined. From the ECJ's point of view, basic access rights may be restricted on non-economic grounds rooted in the public interest. Balancing the individual's right to access with the need to protect the plurality of opinion, Decision No. 676/2002/EC of the European Parliament and of the Council of 7 March 2002 states that:

> "Radio spectrum policy in the Community should contribute to freedom of expression, including freedom of opinion and freedom to receive and disseminate information and ideas, irrespective of borders, as well as freedom and plurality of the media."

The actual need to regulate access to the individual components of the communication process is clear in view of the technical conditions required for broadcast transmissions to be possible in the first place. Both television and radio, whether for terrestrial, satellite or cable broadcasts, depend on the use of frequencies, a finite resource. Particularly in the field of traditional, radio-based transmission, broadcasting competes with a whole host of other applications that are also based on radio waves, e.g. mobile telephony, radio astronomy and navigation radio. However, the usable frequency spectrum is limited, not only by physical factors, but also because radio waves are subject to interference. If frequency use is not regulated, the consequences can be disastrous. Such a consequence was clearly illustrated in the USA in the 1920s, when a court ruled that the government did not have the power to regulate frequency access. Radio stations subsequently tried to outdo each other by increasing the power of their transmissions in order to ensure that their particular channels could be received, since the stronger a signal is in comparison with others, the less likely it is to suffer interference. This situation was not rectified until the adoption of the 1927 Radio Act, giving the Department of Commerce responsibility for spectrum management.[4] On the other hand, however, technical advances can alter or reduce the need for regulation by increasing the capacity of the available spectrum. Inevitably, therefore, spectrum management involves a series of legal questions, ranging from the provision of the universal service and restrictions on the use of this service to the prevention of interference and protection of services during the digital switchover.

In this context, the aim of this article is to show how broadcasters obtain their frequencies and who lays down the standards for this process: how is spectrum organised, divided up and ultimately distributed? Who decides on the allocation of transmission capacities and how? This article will also look at new approaches and trends in spectrum management.

2. Technical Requirements

In order to consider spectrum regulation in more detail, it makes sense to begin by discussing the main technical aspects and requirements.

a) Methods of Disseminating Broadcast Content

In contrast to the early days of broadcasting, broadcasters can now (at least in theory) choose from many different transmission methods.[5] Traditional broadcasting comprises wireless transmission based on terrestrial radio technology, since satellite transmission was introduced later. In terrestrial broadcasting, the broadcast signal (in the form of electromagnetic waves[6]) travels directly from the broadcaster to the receiver. In satellite broadcasting, the signal is beamed from the earth to a satellite,converted into the appropriate frequency, boosted and transmitted back to the relevant region. However, in almost every case, part of the signal's journey, from where it is recorded to the reception device, involves a physical wire connection (such as the distribution systems in residential buildings). In cable television, analogue or digital signals are carried via a broadband cable (coaxial cable) directly to the consumer's terminal. There are also hybrid systems in which programmes carried via satellite are fed into cable networks, for example to supply individual households.

b) Frequencies

All forms of broadcasting, whether terrestrial, satellite or cable, use certain frequencies. The term "frequency" is derived from physics and refers to the number of times a periodic event occurs within a given unit of time. In broadcasting, "frequency" refers to the number of electromagnetic wave oscillations per second. As well as the oscillation rate, which is measured in Hertz, where radio frequencies are concerned the energy content of the transmission is also important. The greater the strength of the signal (or power flux density), the further the radio wave can travel through space under otherwise equal conditions.

Since different frequencies vary greatly in terms of how they are transmitted, thus limiting their usability, their suitability for certain radio services is somewhat predetermined. Low-frequency waves (long waves), for example, in contrast to high-frequency waves (short waves) travel well through space and are therefore more suitable for services offered over a wide area. Lower frequencies, however, have fewer uses and their interference potential is very high.[7]

In order to use frequencies for data transmission, the information being carried must generally be encoded. This process is known as modulation. The information concerned (e.g. spoken language or pictures) is "modulated" to a carrier frequency through the short-term variation of the amplitude, sequence or phase of the frequency during transmission. The modulation technique used affects the transmission rate and therefore the efficiency of the system.[8]

aa) Characteristics of Digital Transmission

Analogue broadcasting is based on the continuous reproduction of information on electromagnetic waves such as information concerning acoustics (air pressure) or visual parameters (brightness). In digital broadcasting the fluctuations of these physical quantities are represented by a sequence of numbers. Digitisation therefore makes it possible to rationalise and accelerate the processing of information, thus providing for more efficient use of the available frequency spectrum. One reason for this is the multiple use of frequencies (known as multiplexing). Greater efficiency can also be achieved through data compression, which reduces the volume of transmitted data through selection (according to use). Data compression techniques currently used for audio and video signals include the MPEG-2 and MPEG-4 standards (Moving Picture Experts Group).[9] A high level of efficiency also results from advanced computer technology,making it easier to recognise and process signals – the more oscillations there are per unit of time (frequency), the more information can be carried and the more computer capacity is required.[10]

bb) Spectrum Allocation

In order to facilitate uninterrupted communication between broadcaster and receiver, individual transmission processes need to be separated. The situation is similar to that of group communication, which is only possible if people speak either at different times or in different places. In radio communication, it is usual for certain parts of the frequency spectrum, so-called frequency bands and channels, to be allocated to individual services. For analogue television, a bandwidth of 7 to 8 MHz per channel is required. As already mentioned, one benefit of digitisation is the multiple use of frequencies. Whereas with analogue broadcasting systems it is only possible to divide frequencies (FDMA – Frequency Division Multiple Access) or broadcasting areas (SDMA - Space Division Multiple Access), digital systems can also be defined using physical quantities other than the frequency itself and can thus be bundled (multiplexed). Such "channel access procedures" include TDMA (Time Division Multiple Access) and CDMA (Code Division Multiple Access). A frequency band used for analogue transmissions can only be switched over to a digital technique (such as DVB-T) if the operator of the analogue frequency stops using it.

The changes to the technical conditions outlined above bring with them new challenges in relation to the regulation of spectrum management, whether in terms of the digital switchover or in dealing with transfrontier aspects.

3. Spectrum Management

With regards to spectrum management, most countries follow the long-established principle of "command and control". This means that the frequency regulator determines in detail the type of use, i.e. the technology to be used and the services entitled to use the frequency. It decides who can use the frequency, for how long and under what conditions (such as obligations to develop networks). However, it appears to be an increasing trend for frequency allocation to be liberalised and left in the hands of market mechanisms. Initial examples of this include frequency auctions, particularly in the mobile sector but also in broadcasting.[11] An even more advanced development is secondary trading, whereby frequencies can be bought and sold, resulting not only in a change of licensee but also potentially in a change of use.

a) Status Quo

In principle, spectrum management is the responsibility of the state. However, since radio frequencies in particular are not always geographically limited, but can reach across national borders, international coordination is necessary. A multi-regional approach also has many economic advantages, since user devices can only be used worldwide if common frequency standards are adopted. Spectrum management therefore takes place at different levels, described in detail below. A particular focus will be given here to the management of broadcasting frequencies.

aa) ITU

A global agreement on the allocation and use of radio waves was achieved by the International Telecommunication Union (ITU), a United Nations organisation created in 1948 with its headquarters in Geneva.[12] Co-operation within the ITU is intended to eliminate interference between radio stations of different countries and to improve the use made of the radio frequency spectrum (see Art. 1.2 lit. b ITU Constitution[13]). The primary functions of the ITU are to allocate frequencies used for wireless transmission for different applications and purposes, to allot radio frequencies and to register frequency assignments (Art. 1.2 lit. a ITU Constitution). The ITU is responsible for both terrestrial and satellite frequencies and, in relation to the latter, for the associated orbital positions of the geostationary satellites (Art. 1.2 lit. a ITU Constitution). The ITU-R (Radiocommunication),[14] as one of the three pillars of the ITU,[15] is responsible for the radiocommunication sector. One of its tasks is to ensure "the rational, equitable, efficient and economical use of the radio-frequency spectrum by all radiocommunication services, including those used by the geostationary satellite or other satellite orbits" (Art. 12.1 (1) ITU Constitution).

The ITU regulations on spectrum management are enshrined in the Radio Regulations (RR). They divide spectrum planning and management into three decision categories:[16]

– Firstly, allocation decisions, through which the available frequencies and frequency bands are allocated to particular types of use, i.e. radiocommunication services;

– Secondly, allotment decisions, through which, on the basis of the allocation decisions, the corresponding capacities are distributed to certain national telecommunications authorities;

– Thirdly, assignment decisions, through which a frequency is allocated to a user. In other words, a radio station receives permission to use a certain frequency or frequency range under particular conditions.

Frequency allocations are contained in the Table of Frequency Allocations, which is binding on all ITU member states under international law as it forms part of the Radio Regulations (Art. 5 – see Art. 54.1 of the ITU Constitution). The whole frequency band regulated by the ITU (9 kHz to 400 GHz) is divided into smaller band segments and allocated to more than 40 different radiocommuni-

cation services.[17] Broadcasters can therefore only use a fraction of the available frequencies and frequency bands. Deviations from the ITU Table of Frequency Allocations are only permissible if they do not cause harmful interference to other radio stations authorised under ITU rules (Art. 4.4 RR). Decisions amending or adding to the Table of Frequency Allocations are taken by the World Radiocommunications Conferences organised by the ITU-R. These conferences usually take place every two or three years[18] (Art. 12.2 lit. a ITU Constitution). Regional radiocommunication conferences can also be held in order to deal with frequency planning issues in particular regions. The use of analogue television frequencies in Europe, for example, was regulated by the 1961 Stockholm Plan. However, at the latest regional conference (RRC-06 – Regional Radiocommunication Conference 2006), the second part of which was held in Geneva from 15 May to 16 June 2006,[19] a new frequency agreement (GE06 Agreement) was drafted and adopted, replacing the analogue broadcasting plan. The Agreement contains a plan for the switchover to digital broadcasting (T-DAB and DVB-T) using certain frequency bands. The deadline for the switch from analogue to digital broadcasting was set at mid-2015. The next WRC, in autumn 2007, will deal with issues connected to the regulation of new uses in the spectrum.

Frequency assignments are generally the responsibility of national telecommunications authorities. However, the ITU awards broadcasting rights to individual states or regions if the application cannot be limited to the territory of a state and therefore has the potential to cause harmful interference, for example satellite communication.[20]

bb) Europe

At European level, frequency regulation takes place through both the CEPT (European Conference of Postal and Telecommunications Administrations) and the relevant European Union bodies. Although the European Community's powers in relation to spectrum policy are limited, it is becoming increasingly influential in this area. This may be due to the fact that frequencies are a significant economic asset and, as such, a resource for numerous commercial activities.

CEPT

The CEPT, founded in 1959 and now with 47 member states, offers a forum for regulatory questions in the postal and telecommunications sectors. The Electronic Communications Committee (ECC)[21] is responsible for harmonising European frequency usage plans and finding ways of accommodating new radio applications in the spectrum. The ECC also develops and adopts common positions, for example in the run-up to ITU Conferences.[22] ECC measures relating to significant harmonisation matters take the form of decisions, binding on member states that have accepted them (Art. 10.2 in connection with Art. 12 of the Rules of Procedure[23]). However, there is no obligation on member states to do so. As well as decisions, the ECC draws up recommendations, which members are free to implement as they see fit (Art. 10.4 in connection with Art. 10.2 of the Rules of Procedure). These measures are drafted by working groups after consultation with interest groups, such as network operators, service providers and users.[24] In addition, reports are drawn up on the results of ECC studies or European Common Proposals (ECP). The ECC's work is supported by the European Radiocommunications Office (ERO).

CEPT agreements include, for example, the Special Arrangement Wiesbaden 1995[25] and the Chester 1997 Multilateral Coordination Agreement,[26] which developed further the ITU Stockholm Agreement of 1961 and created a basis for the introduction of digital terrestrial television (DVB-T) and radio (T-DAB). Member states of the CEPT also prompted the ITU to undertake a revision of the 1961 Stockholm Agreement. The "WG RRC-06", a CEPT working group, helped to develop common European positions within the framework of the RRC-06.[27]

The ECC is drawing up, in stages, a European Common Allocation Table (ECA),[28] which essentially corresponds to the ITU's Table of Frequency Allocations but contains more detailed regulations. The ECC is currently drafting proposals for a frequency allocation and usage plan for the whole range from 9 kHz to 275 GHz,[29] which should be implemented by 2008.

The CEPT usually co-operates with other organisations by allowing their representatives to join its working groups or arranging special meetings with them. Details of this co-operation are laid down in Memoranda or Letters of Understanding. The European Commission and the CEPT coordinate their activities in the fields of frequency planning and harmonisation on the basis of a Memorandum of Understanding. The CEPT also carries out mandates for the European Commission.

European Union

All EU member states are also members of the CEPT. The Council of the European Communities has discussed the relationship between the EU and the CEPT on many occasions. In its Resolution of 28 June 1990, it declared that strengthening European co-operation in the field of radio frequency coordination was a major goal. In its Resolution of 19 November 1992 on the implementation in the Community of the European Radiocommunications Committee Decisions, it called on member states to participate actively in the development of ERC (ECC since 2001) decisions aimed at supporting the provision of significant Europe-wide radio services.

The European Community has no specific competence in the field of spectrum policy. Measures are usually based on the provision of Art. 95 of the EC Treaty concerning the harmonisation of legislation. After taking initial measures relating to telecommunication services, aimed for example at harmonising frequency allocation in order to make frequencies available throughout the EC[30] and laying down rules of procedure for frequency allocation,[31] the European Commission published a Green Paper on the development and introduction of a Community framework for spectrum policy in 1998.[32] The political objectives mentioned in the Green Paper included, in particular, a desire to stimulate technological innovation and competition in radio-based services, mobile telephony and wireless local loops and to pursue Community aims relating to spectrum policy under conditions that are foreseeable and provide legal certainty.

The Green Paper was followed in 2002 by a series of legal instruments in the so-called telecommunications reform package, which created a new legal framework for electronic communication.[33] One particularly important measure was the Radio Spectrum Decision of the European Parliament and of the Council.[34] This Decision aimed to establish a policy and legal framework in order to ensure the coordination of policy approaches and, where appropriate, harmonise conditions with regard to the availability and efficient use of the radio spectrum (Art. 1 of the Decision). Under the Decision, a Radio Spectrum Committee (RSC) was created in order to help the Commission with the development and adoption of technical implementing measures and with a view to contributing to the formulation, preparation and implementation of Community radio spectrum policy (Art. 3 of the Decision).[35] Under

Art. 4 of the Decision, the Commission can issue mandates to the CEPT for the development of technical implementing measures. This particularly concerns the harmonisation of radio frequency allocation. The Commission can declare that the results of this work are binding on the member states and set a deadline for their implementation by the member states (Art. 4.3 of the Decision).

The principles for the management of radio frequencies for electronic communications services are laid down in Directive 2002/21/EC on a common regulatory framework for electronic communications networks and services (Framework Directive). Frequency allocation and assignment must be based on "objective, transparent, non-discriminatory and proportionate criteria" (Art. 9.1). As far as spectrum policy and broadcasting are concerned, the most important Directive of the reforms package is the Authorisation Directive. This Directive stipulates that the provision of electronic communication networks[36] or services may, in principle, only be subject to a general authorisation (Art. 3.2). However, individual rights of use of radio frequencies and numbers may be granted (Art. 3.2 in connection with Art. 5):

> "Without prejudice to specific criteria and procedures adopted by Member States to grant rights of use of radio frequencies to providers of radio or television broadcast content services with a view to pursuing general interest objectives in conformity with Community law, such rights of use shall be granted through open, transparent and non-discriminatory procedures." (Art. 5.2).

The Directive also permits competitive or comparative selection procedures for the granting of radio frequencies (Art. 5.4 in connection with Art. 7). Auctions are therefore an admissible means of granting broadcasting frequencies.[37]

cc) National Legal Frameworks

On the basis of the aforementioned international and European agreements, frequency allocation plans are drawn up and frequencies allocated at national level. This can happen in various ways, as illustrated below using three examples of countries with very different spectrum management systems. Under German law, there is a strict separation between telecommunications and media content. In France, even though telecommunications and the media are treated separately, the media regulators are specifically responsible for spectrum management. Finally, in the United Kingdom, telecommunications and media supervision are dealt with together. The combined management of content and media takes into account media convergence, in which content and the means of its transmission are growing closer and closer together. However, as shall be illustrated, national circumstances mean that this solution is not always easy to achieve.

Germany

The legal framework for broadcasting in Germany reflects the federal structure comprising a national government and the *Länder*. While telecommunications legislation and the management thereof are the exclusive responsibility of the Federal Government according to Art. 73 no. 7 and Art. 87f of the *Grundgesetz* (Basic Law – *GG*) respectively, the task of organising the broadcasting system is entrusted to the *Länder* under Articles 30 and 70ff. *GG*. Through its case-law, the Federal Constitutional Court has established the need for both sides to exercise mutual consideration, coordination and participation. The Federal Government, for example, must establish how frequencies should be allocated in consultation with the responsible *Land* authority (Art. 57.1.1 *Telekommunikationsgesetz* (Telecommunications Act – *TKG*)),[38] and must grant it the right to a hearing, although it does not require its formal consent.

The regulatory body responsible for telecommunications in Germany is the *Bundesnetzagentur für Elektrizität, Gas, Telekommunikation, Post und Eisenbahnen* (Federal Networks Agency for electricity, gas, telecommunications, post and railways – *BNetzA*), an independent federal authority linked to the Federal Ministry of Economy and Technology.[39] BNetzA has specific functions with regards to spectrum management and ensuring the efficient, interference-free use of frequencies, taking into account the interests of broadcasting (Art. 57.1 *TKG*).

Spectrum management in Germany is mainly regulated through the *TKG* (Arts. 52-65 *TKG*), explained in more detail through statutory orders and administrative provisions. According to the *TKG*, the allocation of frequencies on a national level follows a three-stage procedure:

Firstly, the Federal Government issues, through a statutory order, a **table of frequency allocations**, under which the consent of the *Bundesrat* is required for the allocation of broadcasting frequencies (Art. 53.1 *TKG*). This allocation of frequency bands for particular radio services is based on international provisions.

In the second stage, the regulatory body, with the participation of the public, draws up a **frequency usage plan**, which further divides the frequency bands and stipulates how they should be used (Art. 54 *TKG*). According to Art. 5.1 of the *Verordnung über das Verfahren zur Aufstellung des Frequenznutzungsplanes* (Order on the procedure for drawing up the frequency usage plan, *Frequenznutzungsplanaufstellungsverordnung – FreqNPAV*),[40] this process must be agreed by the highest federal and *Land* authorities concerned.

Finally, **frequencies are assigned** by the *BNetzA* (Art. 55 *TKG*) on the basis of the frequency usage plan. Permission is granted for the use of particular frequencies under established conditions. Official consent is granted in the form of an administrative act. Priority is given to the operator of a transmitting installation (this may even be a broadcaster) via which the channel is to be transmitted.[41]

Since the *Bundesländer* are responsible for determining the content of the frequencies and monitoring private broadcasters, broadcasters must comply with broadcasting law at *Land* level as well as with telecommunications legislation before they are finally assigned a frequency by the *BNetzA*. The "serving function" of telecommunications law vis-à-vis media law must be taken into account.

Firstly, the transmission capacities allocated to each *Land* are assigned to the so-called "consumers", i.e. the public service *Land* broadcasting authorities[42] and the *Land* media authorities. The *Land* media authorities[43] then decide which private broadcasters may use which frequencies for how long and to broadcast which channels.[44] The granting of permission to use a frequency depends on the broadcaster holding a private broadcasting licence, required under Art. 20 of the *Rundfunkstaatsvertrag* (Inter-State Broadcasting Agreement – *RStV*).[45] The procedure and selection criteria (particularly taking into account the need for diversity) for these licences are laid down in Art. 21 ff. of the *Rundfunkstaatsvertrag*[46] agreed between the *Länder* and the respective *Land* laws.

If there is a need for additional frequencies within the parts of the frequency spectrum allotted to broadcasting, the relevant *Land*

authorities – depending on the *Land* laws, these are either the state/senate chancelleries or the *Land* media authorities – inform the *BNetzA* in accordance with Art. 57.1.2 *TKG* of the need,[47] which must be taken into account during the frequency assignment process under Art. 55 *TKG*. Fulfilling the need for frequencies requires comprehensive coordination from the point of view of protection rights within broadcasting itself, across different radio-based services and internationally.

In the past, the application-based system has regularly been used for analogue broadcasting services. Specific forms of frequency allocation procedure (Art. 55.9 in connection with Art. 61 *TKG*) include tendering, which was used for T-DAB and DVB-T, and auctioning, recently used for the allocation of BWA frequencies (Broadband Wireless Access). Decisions on the use of procedures are taken by the Presidents' Chamber of the *BNetzA*.[48]

France

In France also, the first stage of spectrum management is the drawing up or updating of a national table of frequency allocations (*Tableau national de répartition des bandes de fréquences*)[49] on the basis of international agreements. This process is controlled by the national frequencies agency (*ANF – Agence nationale des fréquences*) or its frequency planning committee (*CPF – Commission de planification des fréquences*).[50] With the agreement of the regulatory bodies for audiovisual media (*CSA – Conseil supérieur de l'audiovisuel*) and the post and telecommunications sector (*ARCEP - Autorité de Régulation des Communications Electroniques et des Postes*[51]), the relevant version of the plan is issued by the Prime Minister (Art. 41 of the *Code des postes et des communications électroniques* – Post and Electronic Media Code) in the form of a decree (*Arrêté*). The *ANF* also represents the national interests within the ITU and CEPT. The *CSA* is also involved in coordination activities (Art. 9 of Freedom of Communication Act no. 86/1067 of 30 September 1986 – *Loi relative à la liberté de communication*, "*Loi Léotard*"[52]).

A fundamental task of the *CSA* is to ensure the freedom of the media in France. Allocating broadcasting frequencies and monitoring broadcast content are part of the remit of this national media regulatory body (Arts. 20, 21 of Act no. 86/1067). Through Act no. 2004/669 of 9 July 2004 on electronic communications and audiovisual communication services,[53] the powers of the CSA were extended to include the monitoring of content on electronic communication networks, now used for the transmission of television and radio channels (Internet, mobile telephones).[54] The *CSA's* role in spectrum management therefore covers all forms of audiovisual communication, regardless of the method of transmission or distribution. (Art. 23.3 in connection with Art. 2 of Act no. 86/1067).

Under Art. 22 of Act no. 86/1067, the *CSA* is responsible for allocating frequencies and monitoring their use. The allocation of analogue frequencies to public service television broadcasters (and *ARTE*) takes priority because and in view of the need to fulfil their public service remit (Art. 26.1 of Act no. 86/1067). If licences for analogue terrestrial channels are to be awarded to private (national, regional or local) television broadcasters, the *CSA* invites tenders for them and publishes a list of available frequencies (Arts. 30 ff. of Act no. 86/1067).[55] When granting licences, the *CSA* must take into account the different types of digital transmission, particularly the development of mobile reception (Arts. 30, 30-1 para. 1 of Act no. 86/1067).

The right of a certain service to use a particular frequency is granted following a public hearing of the candidates (Art. 30.1 of Act no. 86/1067) through the conclusion of an agreement (*convention*) between the *CSA*, acting on behalf of the state, and the service provider (Art. 28 of Act no. 86/1067). These agreements contain practical provisions on the obligations of the service provider (programme content, advertising, penalties for breach of contract, etc.). The obligations of public service broadcasters are laid down in a schedule of terms and conditions (*cahier des charges et des missions*) (Art. 48.1 of Act no. 86/1067).

The *ARCEP* is also involved in spectrum management (Art. 41 of the Post and Electronic Media Code). However, it does not monitor content, only infrastructure and competition issues. It therefore supervises the creation and use of cable networks, for example, as well as laying down technical regulations for the operation of networks and services.[56]

United Kingdom

A different system of media regulation operates in the United Kingdom, where spectrum management is the responsibility of Ofcom (Office of Communications), created under the Office of Communications Act 2002. The Communications Act 2003 gives extensive powers to Ofcom, making them the only regulatory body for the whole communications and broadcasting sector. With regard to spectrum management issues, Ofcom is supported by the Ofcom Spectrum Advisory Board (OSAB), which meets five or six times a year.

The national table of frequency allocations is drawn up by the National Frequency Planning Group, a sub-committee of the Cabinet Official Committee on UK Spectrum Strategy. It covers the whole frequency spectrum from 9 kHz to 275 GHz and designates the institutions responsible for frequency allocations in each particular sector (Ofcom, Ministry of Defence, etc.).

Through the adoption of the Wireless Telegraphy Act 2006 on 25 October 2006, all provisions relevant to spectrum management (Wireless Telegraphy Act 1949, 1967, 1998, Broadcasting Offences Act 1967, Section 6 of the Telecommunications Act 1984 and provisions of the Communications Act 2003) were consolidated in a single body of laws. According to Section 2 of the Wireless Telegraphy Act 2006, Ofcom must publish a plan (the United Kingdom Plan for Frequency Authorisation) setting out the frequencies that have been allocated and those that are available in the United Kingdom. In carrying out its radio spectrum functions, it must, under the terms of Section 3, have regard to the extent to which the electromagnetic spectrum is available for use, as well as the current and likely future demand for use of the spectrum. In carrying out these functions, it must promote the efficient management and use of the spectrum, particularly economic benefits, the development of innovative services and competition in the provision of electronic communications services. The responsible Minister (Secretary of State) may, in accordance with a prescribed procedure, give directions to Ofcom concerning its radio spectrum functions (Sections 5 and 6).

Official permission to use a frequency is generally granted in the form of a licence. Service providers need to meet certain conditions before applying for a licence. Just as the regulation of audiovisual content in the United Kingdom is shifting more and more towards self- and co-regulation, spectrum management is also increasingly being left in the hands of the free market. Frequencies can be bought and sold, while efforts are being made to liberalise the use of the spectrum. However, Ofcom also monitors these areas.

b) Recent Trends

Digital compression techniques and their effect on the scarcity of frequencies on the one hand, and a higher demand for radio-based systems resulting from an increasingly mobile communication society on the other, are creating new challenges for spectrum management. Debates over frequency policy are focusing specifically on both the need for and the limits of regulation and new approaches to this question have already been adopted in various regulations.

According to Art. 9.3 of the Framework Directive, member states may make provision for undertakings to transfer rights to use radio frequencies with other undertakings. This is meant to increase the flexibility and the technical and economic efficiency of the use of the available frequency spectrum. The basis for spectrum trading is found at national level in provisions such as Art. 42-3 of the French Post and Telecommunications Code and Art. 62 of the German *TKG*.[57] The most advanced measures, however, are found in the United Kingdom, where Section 168 of the Communications Act 2003 lays down the basic principles for spectrum trading. After Ofcom had laid down the procedure in a statutory instrument,[58] it launched licence trading for the initial licence classes, which included mobile radio and data networks, in December 2004. Under Ofcom's supervision, the "rights and obligations arising by virtue of a wireless telegraphy licence" may be transferred (para. 4 of the statutory instrument). According to the Implementation Plan published in 2005,[59] Ofcom intends to open up the market for more than 70% of the radio spectrum. In addition, however, licences with a cross-border nature or those whose use should be harmonised on the basis of international agreements will be subject to regulation.[60]

Such extensive control of the market appears to be fully in line with the internal market concept of the European Commission which, in its Communication of 14 September 2005 on a market-based approach to spectrum management in the European Union,[61] supported the introduction of market-based spectrum allocation, particularly for radio and television. Its proposal that spectrum management be adapted to the needs of the modern communication market, the key word being convergence, involves a "market-based model allowing more freedom to market players to decide how spectrum should be used, and lowering the barriers for access to spectrum rights by making possible the trading of the rights".[62] It is therefore not only a question of spectrum trading itself, but of spectrum liberalisation, i.e. the question of whether and to what extent spectrum buyers can change the type of use and thus the spectrum allocation after acquiring a particular frequency.

However, in the broadcasting sector in particular, there are concerns about the resulting lack of supervision.[63] This became clear recently in the responses, submitted before the deadline of 27 October 2006, to a public consultation on the policy options for the review of the regulatory framework that was established in 2002.[64] The consultation followed the publication of a Commission Communication on the Review of the EU Framework for electronic communications networks and services of 29 June 2006 (so-called Review 2006).[65] Developing further the position it set out in its 2005 Communication, the Commission proposed, *inter alia*, that certain frequency bands should be managed more efficiently through greater use of common Europe-wide regulations, possibly even within the framework of a European agency for spectrum management, and that frequencies should be increasingly allocated in accordance with market demand. These proposals were further supported by the EU Commissioner for Information Society and Media, Viviane Reding, in her speech at the ECTA (European Competitive Telecommunications Association) Conference on 16 November 2006.[66] Linked to this is the idea that frequencies should be allocated in accordance with the principles of technological and service neutrality. However, Germany in particular has expressed reservations about this and has argued that it must be possible to derogate from such principles, for example in order to ensure a diverse broadcasting landscape.

4. Concluding Remarks

Frequencies are allocated to broadcasters on the basis of numerous decisions, many of which are not (only) taken at national level. Firstly, this is inevitable because spectrum is a highly coveted, but finite resource. Secondly, it is a result of the cross-border nature of spectrum and on the need for common technical standards for converging markets. It is also clear that the spectrum available for broadcasting is not determined solely by decision-makers at national level, but that these decisions are limited in turn by international agreements. In spite of the complexity of the decision-making process, national spectrum management bodies are required to ensure the effective, interference-free use of frequencies by taking relevant and comprehensive decisions. Nevertheless, taking into account new communications technologies and applications, developing at a tremendous rate, is undoubtedly a slow process. There is therefore a tendency to replace the traditional administration-based approach to frequency allocation with market mechanisms. Decision-makers and the various parties concerned hope that this economic, as opposed to technological, approach will generate an increased level of flexibility vis-à-vis new technologies as well as an increased efficiency of use. However, the two aspects linked to this idea, spectrum trading and liberalisation, should be treated with caution where broadcasting is concerned.

Another related issue is the extent to which broadcasters, particularly public service broadcasters who are subject to special protection, should be granted a share in the spectrum that will become available as a result of the digital switchover. This question is particularly relevant, for example, if support is to be given to enable new services such as mobile television via mobile phones to break through.[67] In many cases, it will be necessary to weigh up the need to protect media pluralism with the opening up of competition. Even in the United Kingdom, where liberalisation plans are already at an advanced stage, Ofcom, as part of its Framework Review, has only been able to apply the principles of spectrum trading and liberalisation to a series of applications – including broadcasting – in a very limited way. For broadcasting in particular is ultimately regulated not only by the relevant national broadcasting legislation, but also by a host of international agreements. Instruments that at least amend spectrum management legislation therefore appear to be a minimum requirement for liberalisation to take place.

Finally, for technological reasons, there will always be a certain need for regulation. This applies, for example, in relation to the coordination of radio communications and wired networks, since they can interfere with one another, and in view of economic and ecological issues, such as support for new technologies, investment protection, and electromagnetic radiation.

1) Alexander Rossnagel/Werner Sosalla/Thomas Kleist, Der Zugang zur digitalen Satellitenverbreitung, Schriftenreihe der Landesmedienanstalten, vol. 28, 2004, p. 75.
2) ECHR, judgment of 22 May 1990, No. 17/1989/175/231 (Autronic AG vs. Switzerland); ECHR, judgment of 24 November 1993, No. 36/1992/381/455-459 (Lentia vs. Austria); ECHR, judgment of 21 September 2000, No. 32240/96 (Tele 1 Privatfernsehgesellschaft mbH vs. Austria).
3) ECJ, case C-17/00, Rec. 2001, I-9445 (de Coster); ECJ, case C-211/91, Rec. 1992, I-06757 (Commission vs. Belgium).
4) Martin Cave, Spectrum Management and Broadcasting: Current Issues, Communications & Strategies, No. 62/2nd quarter 2006, p. 21.
5) Re transmission methods, see Alexander Scheuer/Michael Knopp, Digital Television Glossary, supplement to IRIS Special 2004, Regulating Access to Digital Television, pp. 13 ff.
6) These are waves from combined electric and magnetic fields, which – without being connected to a medium – travel at the speed of light, whatever their frequency.
7) Beck'scher Kommentar zum Telekommunikationsgesetz, 3rd edition, 2006, § 52, para. 3 f.
8) Beck'scher Kommentar zum Telekommunikationsgesetz, 3rd edition, 2006, § 52, para. 5 ff.
9) A working group created in 1988 by the ISO/IEC (International Organization for Standardization/International Electrotechnical Commission), responsible for developing standards for digital audio and video data compression; concerning the technology, see Alexander Scheuer/Michael Knopp, op.cit., p.6.
10) Beck'scher Kommentar zum Telekommunikationsgesetz, op.cit., § 52, para. 11 ff.; Günter Herrmann/Matthias Lausen, Rundfunkrecht, 2nd edition, 2004, § 2 para. 49, 52.
11) For information on broadcasting frequency auctions, see the report of the Round Table Conference on the Auctioning of Frequencies for Broadcasting, Sari Galapo, Institute for Information Law, Amsterdam, 8 May 1999: http://www.obs.coe.int/online_publication/expert/00002539.pdf.en
12) Regarding the development of the ITU, see http://www.itu.int/aboutitu/overview/history.html
13) ITU Constitution of 22 December 1992, last amended in Marrakech in 2002.
14) For details of the ITU structure, see http://www.itu.int/aboutitu/structure/index.html
15) The sectors replaced the previous committees under ITU structural reforms agreed in 1992 and implemented in 1994. The other sectors are ITU-T (Telecom Standardization) and ITU-D (Telecom Development).
16) See Joachim Scherer, Frequenzverwaltung zwischen Bund und Ländern unter dem TKG, K&R 1999, appendix 2 to vol. 11, p. 3.
17) For example, amateur radio, mobile telephony, navigation radio, broadcasting or space research radio services.
18) The last WRC was held in Geneva from 9 June to 4 July 2003; the next one is also due to be held in Geneva, from 22 October to 16 November 2007.
19) The preparatory conference (CRR-04) was held in Geneva from 10 to 28 May 2004.
20) Christian Koenig/Andreas Neumann, Rechtliches und organisatorisches Umfeld der Satellitenkommunikation, MMR 3/2000, pp. 151, 153.
21) This replaced the ERC (European Radiocommunications Committee) and ECTRA (European Committee for Regulatory Telecommunications Affairs) in 2001.
22) For information on the ECC's activities, see http://www.ero.dk/ecc
23) Rules of Procedure for the ECC, 2005: http://www.ero.dk/ecc
24) See Joachim Scherer, Frequenzverwaltung zwischen Bund und Ländern unter dem TKG, op.cit., pp. 3f.
25) Last revised in Maastricht in 2002: http://www.ero.dk/Wi-e
26) http://www.ero.dk/132D67A4-8815-48CB-B482-903844887DE3?frames=no&
27) For information on the working group, see http://www.ero.dk/520338AC-2399-4359-A9D2-CBA53C64E98F.W5Doc?frames=no&
28) http://www.ero.dk/eca-change
29) It therefore covers all essential frequencies for the communications sector; those above 275 GHz can be used for infrared and optical radio communication devices, for example.
30) For example, Directive 87/372/EEC of 25 June 1987 on the frequency bands to be received for the coordinated introduction of public pan-European cellular digital land-based mobile communications in the Community; Council Directive 90/544/EEC on the frequency bands designated for the coordinated introduction of pan-European land-based public radio paging in the Community (since repealed by Directive 2005/82/EC of 14 December 2005); Directive 91/287/EEC of 3 June 1991 on the frequency band to be designated for the coordinated introduction of digital European cordless telecommunications (DECT) into the Community.
31) Directive 90/387/EEC of 28 June 1990 on the establishment of the internal market for telecommunications services through the implementation of open network provision.
32) Green Paper on Radio Spectrum Policy in the Context of European Community Policies such as Telecommunications, Broadcasting, Transport, and R&D (COM(98) 596 final).
33) See in general Nico van Eijk, New European Rules for the Communications Sector, IRIS plus 2003-2, or Joachim Scherer, Die Umgestaltung des europäischen und deutschen Telekommunikationsrechts durch das EU-Richtlinienpaket, K&R 2002, part I, pp. 273 ff., part II, pp. 329 ff., part III, pp. 385 ff.
34) Decision No. 676/2002/EC on a regulatory framework for radio spectrum policy ("Radio Spectrum Decision").
35) The Committee's work is supplemented by the Radio Spectrum Policy Group – established under Commission Decision No. 2002/622/EC of 26 July 2002 – which particularly supports and advises the Commission on issues linked to spectrum policy and the coordination of spectrum policy strategies.
36) According to Art. 2 lit. a of the Framework Directive, the term "electronic communications network" includes "networks used for radio and television broadcasting, and cable television networks, irrespective of the type of information conveyed".
37) Nico van Eijk, op.cit., p. 5.
38) Telecommunications Act of 22 June 2004 (Federal Law Gazette I p. 1190), last amended through Art. 273 of the Order of 31 October 2006 (Federal Law Gazette I p. 2407).
39) http://www.bundesnetzagentur.de
40) Order of 26 April 2001 (Federal Law Gazette I p. 827), last amended through Art. 464 of the Order of 31 October 2006 (Federal Law Gazette I p. 2407).
41) Alexander Rossnagel/Werner Sosalla/Thomas Kleist, op.cit., p. 99.
42) Also national public service broadcasters *Zweites Deutsches Fernsehen* and *Deutschlandradio*.
43) In exceptional cases, this may be another body, such as the Land government.
44) Beck'scher Kommentar zum Rundfunkrecht, 2003, § 50, para. 58.
45) In Saarland, the licence is based on a so-called "Zulassungsfiktion".
46) *Staatsvertrag über den Rundfunk im vereinten Deutschland* (Inter-State Agreement on broadcasting in the unified Germany), 31 August 1991 in the version of the 8th *Rundfunkänderungsstaatsvertrag* (Amendment to the Inter-State Broadcasting Agreement) of 8 to 15 October 2004.
47) Beck'scher Kommentar zum Telekommunikationsgesetz, op.cit., § 57, para. 3.
48) Formerly by the Regulierungsbehörde für Telekommunikation und Post (Regulatory body for telecommunications and post – RegTP).
49) http://www.anfr.fr/pages/tnrbf/tableau_derive_150105.html
50) For information on the organisational structure, see: http://www.anfr.fr/index.php?cat=presentation&page=org
51) Founded in 1996 as the Autorité de Régulation des Télécommunications (ART) and responsible only for telecommunications until 2005.
52) Official Gazette of 1 October 1986, last amended through Act no. 2006/961 of 1 August 2006, Official Gazette of 3 August 2006.
53) Official Gazette of 10 July 2004; see also: Amélie Blocman, FR – Law on Electronic Communications and Audiovisual Communication Services Promulgated, IRIS 2004-8: 8.
54) Pascal Kamina in Alexander Roßnagel/Thomas Kleist/Alexander Scheuer, Die Reform der Regulierung elektronischer Medien in Europa, pp. 227, 237.
55) Pascal Kamina, op.cit., p. 226.
56) Pascal Kamina, op.cit., pp. 222, 229.
57) In Germany, the BNetzA, after hearing the parties concerned and under certain conditions, can release frequency bands for trading and lay down the basic conditions and procedure for trading. However, it has not yet done so.
58) The Wireless Telegraphy (Spectrum Trading) Regulations 2004, available at: http://www.opsi.gov.uk/si/si2004/20043154.htm
59) Spectrum Framework Review: Implementation Plan: http://www.ofcom.org.uk/consult/condocs/sfrip/sfip/sfr-plan.pdf
60) Overview of the planned measures on spectrum trading and liberalisation: http://www.ofcom.org.uk/radiocomms/ifi/trading/libguide/
61) Communication from the Commission to the Council, the European Parliament and the European Economic and Social Committee and the Committee of the Regions – a market-based approach to spectrum management in the European Union (COM(2005) 400 final).
62) Commission Communication on spectrum management (COM(2005) 400 final), op.cit., section 1, p. 3.
63) Beck'scher Kommentar zum Telekommunikationsgesetz, op.cit. § 52, para. 59 ff.
64) For information on the consultation procedure, see: http://ec.europa.eu./information_society/policy/ecomm/tomorrow/index_en.htm
65) COM(2006) 334 final
66) http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/06/697&format=HTML&aged=0&language=EN&guiLanguage=en
67) This question was recently raised at the RRC-06, where frequencies were allocated for T-DAB and DVB-T.