INVITED PRESENTATION

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Mss Nebes,
Frequency Regulation and Management

Introduced by Dr. André Deschamps

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Anne-Marie NEBES - ANFR
Agence Nationale des Fréquences – Maison Alfort - 94704

Abstract— *Radio frequencies spectrum is a scarce resource with special properties:*
- Part of public propriety, but its use on a national basis must take into account the uses of neighbour countries that must be protected against interferences.
- Scarce, but inexhaustible, unlike oil, for instance.
Explosion of technologies using electromagnetic waves, especially those relating to mobile applications leads to strong pressure on this resource, economic value of witch is increasing.
For these reasons, certain economists call in question again both the lawfulness of public actors in charge of the frequencies management and the methods of this management.

Because of its specificity, frequencies spectrum is a resource that must be regulated, on order to be used in a rational and optimised way.
Because of propagation properties, this regulation is carried out at two levels:
-International level, for radio frequencies does not consider boundaries.
-National level, because frequencies are used on national basis, by each sovereign state.
The present talk is centred on three main axes:
1: Specific constraints relating to frequencies spectrum use: Rights and duties of frequencies users such as those result from international and national rules.
2 International bodies involved in frequencies management: global level (ITU) and regional level (for ex: CEPT and E.U
3- An example of national organisation: the ANFR in France.

I. Rights and duties of frequency's users:

Frequencies spectrum is the public property of each sovereign state. For that, it is impossible to sell it: it is placed at users disposal, at national level, during period of time depending on technologies evolution and economic global development, type of players-operators and manufacturers- and type of equipments put on the market. This resource must be used, depending on national allocations, based on international sharing, under specified conditions and for limited periods

A. International regulatory provisions:

At global level, those provisions are defined in ITU frame. ITU is a specialized UN s' organisation, gathering 188 countries, and in charge of promoting efficient telecommunications development, by defining regulation, standardization of equipments and technical cooperation with less advanced countries.
Rights and duties of state Members, relating to frequencies uses, result from Union Constitution, and especially, from Radio Regulations, that is annexed to the Constitution. International treaty, ratified by national parliament, the R.R is invested with a stronger power than the national law. It contains provisions relating to:

- a) The conditions of utilisation of the frequencies bands included between 9KHz and 1000 GHz;
- b) The conditions of protection of frequencies utilisation

1) Conditions of radio frequencies bands utilisation

The regulatory rigidity of the RR

R.R .Article 5 now allocates the frequencies bands, until 275 GHz, between the different radio services; such as they are defined at its article 1, according to propagation characteristics and technologies evolutions.
Radio services include:
Fixed and mobile Services
Terrestrial and space Services
Active and passive Services.
The RR establish to categories of services: " Primary "service , witch benefits of priority, and "secondary " service.
Stations of "secondary" services shall not cause interference to stations of "primary" service to witch frequencies are already assigned or to witch frequencies may be assigned at a later date, and cannot claim protection against harmful interference from station of a " primary" service to witch frequencies are already assigned or to witch frequencies may be assigned at a later date.
Because it is scarce, the spectrum is very often shared between two, or more than two primary (or primary and secondary) services.
This sharing can be on "equal rights ", between primary services if they are expected to be compatibles a priory (ex: Fixed and fixed satellite service in frequencies bands above 1GHz.)
Otherwise, the RR shares the world into three Regions, corresponding to the main continents
R1: Europe and Africa
R2: North and South America
R3: Asia, Australia, and Oceania.
So, frequency bands, according to propagation conditions, type of radio services, but also economical stake, market size, are allocated on a worldwide basis (R1-R2-R3) or on Regional basis.
Mechanisms introducing flexibility:
The notion of radio service:
The idea of radio service is wider as the idea of radio system.
It allows consequently equipments evolution without question of uses rights, which is essential in order to guarantee the profitability of economic investments resulting of the network expansion.
The footnotes
Definition of additional (services allocated plus others) and alternative (services of footnote instead of) allocations.
During a radio conference, some countries can derogate to allocation provisions of the frequencies Table under the

condition that they register their name (and the name of the additional or alternative service in a footnote.
Such as the notion of service, the footnote is a way to introduce flexibility in the international allocation Table

2) Protection conditions of frequency:

The purpose of frequencies management is to operate at the same time the maximum of transmitters, without interference, taking onto account that:
- Frequencies bands are shared between services;
- Frequencies channels are re-used at a specified distance from the previous utilisations.

To be protected against interference, frequencies assignments shall benefit of "international recognition".
To get this recognition, frequencies assignments shall be, either:
- Registered in the Master International Frequency Register, up-dated by the ITU. The date of receipt of the frequencies assignments, under the condition that they are in accordance with RR provisions, provides to their "anteriority rights":

That means that other administrations shall take these previous assignments under consideration when making their own assignments in order to avoid harmful interferences.
- Or in accordance with assignments included in a Plan, if the Plan has been concluded in the ITU.

It is necessary to record frequencies assignments, for passive services too, in the Master file, on order to get protection against interference and to keep uses of rights, if the band is re-allocated.
Provision RR 11.12 stipulates that: "Any frequency to be used for reception by particular radio astronomy station may be notified if it is desired that such data be included in the Master Register."

B. National regulatory provisions:

At national level, the international sharing is completed and précised by the national regulation.
In France, the "Tableau national de repartition des bands de frequencies " annexed to a decree taken by the Prime Minister completes the international sharing.
This document, based on the international allocation Table to radio services, adds the national ministers and "Independent Authorities" witch, either use frequencies for their own needs – government utilisations- or give licences for commercial and private needs.
For these national users, called by the French law as "affectataires", frequencies can be used based on "exclusivity" if they are designated as single user, or based on sharing either with priority, or with not same rights.
It is possible to use frequencies not in accordance with the RR Article 5, but assignments in such cases cannot get international recognition, and shall not cause interference to assignments of other administrations used in accordance with the RR.
It is mandatory to register assignments in the national data file, called the "Fichier national des fréquences «, in order to get national protection against national interference and to be registered in the international Master register.

II. - INTERNATIONAL FREQUENCY MANAGEMENT ORGANISATIONS:

A. ITU: The worldwide organisation dealing with frequency management:

Issued from the European Conference dealing with the regulation of telegraph system in 1865, ITU is the oldest of the international inter-governmental organisations. For this reason, all other international organisations took ITU as model, United Nations too.
ITU is composed by two kinds of bodies: Regulatory and permanent bodies

1) Regulatory bodies:

Plenipotentiary conference, mainly in charge of:
- Electing the General Secretary, the Vice General Secretary, the Directors of the 3 Boards, the Members of the Committee, and the members of Administrative Council
- Determining the budget of the Union

- Modifying, as such as necessary, provisions contained in the ITU Constitution and Convention.

Administrative Council, in charge of:
-Representing the Plenipotentiary conference, it holds each year, to look at budget, and for execution of the Constitution, Convention, Regulations (R.R)and Conferences provisions .

RR Committee:
Composed by representatives of countries Members, it meets about two weeks per year and examines the Radio Bureau activities.

Radio Conferences, in charge of
Modifying the RR and ITU Plans provisions, in accordance with their agendas

Radio Assembly, in charge of:
Establish, through specialized Committees, Recommendations and Reports relating to technical and operating conditions of radio equipments.

2) Permanent Bodies

General Secretariat
Organized in Departments, ITU General Secretariat is under the general Secretary s' authority.
It deals with:
- Preparation and execution of the budget
- Secretariat works organisation and employees nomination
- Organisation of ITU conferences and publication of their Finals Acts
- Bring in legal advices for the Union of witch the general secretary is the legal representative

Radio Bureau
It deals with frequencies assignments registration for Terrestrial and space Services. It up-date the Master Register, in accordance with provisions contained in the RR and Finals Acts of ITU Regional Conferences.
This data base contains all assignments for all radio services which benefit of international recognition.

The Radio, Development, and Telecommunication standardization Sectors:
Under the Director s' authority, each Sector allows the participation of the I.T.U Members to the works of the Union.

Relating to radio Sector, the Sector organizes the meetings of radio Assembly, and its working parties.

B. An example of regional organization: CEPT and UE:

In order to reach the harmonization of frequencies bands utilization, relative extended market, European western countries have been working together since the sixty, building up an organization called the "Conference Européenne des Postes et Telecommunications " (CEPT). All groups of countries, in each continent, are also gathered in regional organizations (ex: CITEL, for America continent).CEPT gathers more than 40 countries from western and astern Europe, also includes Turkey and Russia. Trough the "Comité des communications électroniques" (ECC), a working Party (CPG) has been set up in order to reach compromises and write European common proposal (ECP) for the ITU conférences.

The European Union (EU) has regulatory power to harmonize frequencies bands and operating conditions inside the Union.
The "Directives" when adopted need the Members States to modify their national laws.

III. AN EXEMPLE OF NATIONAL FREQUENCY MANAGEMENT: FRENCH ANFR

The French present organization results from the Telecommunication Regulation Law from 1996.
This laws gave to a state agency the "Agence nationale des fréquences" (ANFR) the planning managing and the monitoring of radio frequencies , taking nevertheless under consideration the competences of the 11 ministries and Authorities users of frequencies- for their own needs, or to licence privates users-
The ANFR has Administrative Council, composed by representative members of frequencies users, and radio experts.
A general director directs it.

The ANFR is composed of:

A. Four technical Directions:

La direction de la planification du spectre et des affaires internationales (DPSAI:
It deals with :

- The making up of national position for international meetings
- Proposals of the national frequencies repartition, the TNRBF, which the prime minister shall approve.
- Manage the spectrum in a prospective way
- Manage a relocation found in order to facilitate the frequencies utilisation evolution.

La Direction du contrôle technique du spectre (DTCS)
Including seven technical services, spread on the territory, this Direction is equipped with 50 fixed monitoring stations and with 26 mobile monitoring stations.
It deals with:

-The interferences resolution
-The de detection of illegal uses
-The organization and coordination of monitoring of radio spectrum, for the benefit of all ministries and authorities users of frequency.
-The checking of radio equipments, in order to ensure that they are in accordance with technical standards.

La Direction des conventions avec les affectataires (DCA)
It deals with:
The conclusion of conventions in order to perform works relating to frequencies management for national users of frequencies.

La Direction de la gestion nationale des fréquences (DGNF)
It deals with:
The up-date of the frequency files required for frequencies coordination and registration
The up-date of the radio stations file.

B. Consultative Committees:

ANFR performs its tasks by working together with the « Affectataires », inside " consultative committees", set up by the Administrative Council
These committees are organized around three main kinds of competences:

a) Frequency planning:
« Commission de planification des fréquences » (CPF), dealing with the national allocation Table .
Around this main Committee, are gathered:
-"Commission d 'assignation des fréquences" (CAF), dealing with frequency registration.
-"Commission des coordinations aux frontiers"(CCF), dealing with international coordination.
-"Commission de contrôle du spectre,", dealing with national monitoring policy.

b) International aspects:
"Commission des conferences radioélectriques", (CCR) to which are gathered:
-"Commission des conferences des radiocommunications" (CCR), dealing with preparation of ITU conferences.
- « Commission de l' Assemblée des radiocommunications », dealing with preparation of ITU radio standardisation and operational conditions meetings.
-"Commission des affaires Européennes", dealing with questions relating to European policy concerning radio sector.

c) Synthesis and prospective aspects:
« Commission de synthèse et prospective »(CSPR), to which are gathered:
"Commission de compatibilité electromagnétique" (CCE)
« Commission des revues du spectre (CDRS)
« Commission du fonds de réaménagement du spectre » (CFRS)
« Commission de valorisation du spectre » (CVS).

Such a mechanism is very interesting, because it associates all frequency users – for governmental and commercial uses -to the decision process.
All users known the constraints relating to frequency uses, and can defend their position in order to reach the necessary compromises between opposite and, sometimes very political, interests.