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LICENSE TAXES

Each Administration should find a method of reliable getting of sufficient incomes for covering maintenance costs of efficient spectrum use management program. Sufficient financing of the spectrum management program is very important for:

- bringing into operation of new services using a spectrum;
- functioning of radio electronic means with acceptable level of interference;
- providing favourable possibilities for service providers and manufacturers of equipment;
- significant input into the economy.

On the contrary, insufficient financing of management can impede or even disturb an introduction of valuable radio services and has variety of negative consequences.

It is necessary to remember that regardless to the approach of financing, using of the spectrum as well as managing are connected with some costs, which are covered by the **population**.

For any resource, including the spectrum, reception from the given resource of greatly possible net profit for the society is a primary economic task. This is identifies as **efficient economic assignment of the resource**.

But it is impossible to reach an ideal efficient economic assigning of the spectral resource on national level, since the following reasons disturb to this:

- important governmental, scientific and other social requirements can't be satisfied properly;
- it is desirable to establish some limits to incorporate property rights on sites of spectrum of individual users in order to prevent the monopolistic prevail on the market;
- assignment of the concrete frequency bands to specific users on national or international level for providing economy of the manufactured equipment;
- international assignment of frequency bands for the world-wide users.

The second economic task related to the spectrum use management is pricing for spectrum use.

The spectrum price as a “rent” function (or profit which it gains) is determined by economists.

Rights or privileges relatively to radio frequency use have value for users who can sell wireless communication services or use wireless technologies in production other commodities and services.

It is possible to determine quantitatively by a price a rent collected for the resource, with which this resource is exposed on the open market.

Financing of spectrum use management can be fully budgetary, i.e. management costs are covered at the expense of taxes. In this case licenses to users are granted free of charge.

Then licensees (in the field of spectrum) have a free license, having the economic value, i.e. they get a rent determined for that license.

The given approach has two essential defects:

- it is unjust to those, who don't use radio/telecommunications;
- doesn't stimulate efficient spectrum use.

It is much expedient unless completely, at least partly, costs on spectrum use management be covered by users of spectral resource, in particular by means of approach called "license payments (fees)".

Efficiency of spectrum use depends on flexibility of spectrum use management techniques. Efficient technology should represent stimulus for the users for more efficient resource use. For example, it is possible to establish a complex system of fining for non-fulfillment of standard or regulation, but it's much better to establish stimulus for exceeding of standards.

Effective spectrum use policy should rely on the incentive factors which can contain the following components:

1. Establishment of nonzero value of a resource unit, it is the simplest component.
2. It is necessary a way of pricing.
3. Adaptability to changes in circumstances.
4. Adaptability to changes in technology.

We can discuss more detail the last two last components.

Adaptability to changes in circumstances can be envisaged by a possibility of transfer of rights on spectrum use. If administration wants to create an incentive in order users contrived to changes, for example, increase of a demand on services, so the administration should have a chance to buy and sell the rights on spectrum use in the open market. Initial recipient of the right on the spectrum can be the best on that moment. But after some time the initial user can have other, more preferable possibilities, or a new user can see some other ways for obtaining more high profits from these rights on the spectrum, than the initial user. Economically efficient spectrum use is facilitated by transfer of rights in such cases. If there isn't such

possibility, the initial user makes some adjustments in connection with changes in circumstances, but many possibilities to increase economic efficiency are lost inevitably.

Of course, transfer of rights should be limited by certain rules, otherwise administration, granting transferable licenses, can lose control, that is in some cases will result in serious consequences.

But than more administration restricts ways of using of a license, that more it takes itself a responsibility of correct determination of its use. This responsibility can be difficult, since a spectrum manager has always incomplete information.

Moreover, restrictions to a license do its harder for correction of mistakes when they inevitably appear.

Adaptability to changes in technology can be given by a right to change applied technical standards by an user. In frequency band assignment a selection of a standard is given to the user, but he should follow the standards requirements on out-of-band emissions and requirements on emissions beyond the service territory.

Important advantages of management with such technical flexibility is that user takes a decision on new technologies, but not administration of communications. Having used incentive policy, if it is economically efficient for approving the new systems, intended for these bands, users could approve a new project. If administration takes a responsibility to establish the technical standards on equipment, or on the width of one channel, specific set of anti-innovative incentives is created for users.

Thereby, a system of economically efficient spectrum management includes the three components:

1. Nonzero cost of using of the spectrum, determined either by a market (that is preferable for the developed market), or administrative method.

2. A right, given to users of the spectrum to transfer according to a price, established in the market, of all or a part of rights, given them on using of the spectrum.

3. A right, given to users of the spectrum for changing of technical standards of frequency bands used by them, for example, on a channel width in obligatory conformity to technical standards of out-of-band interference. In combining with the right of transfer of rights (licenses) the powerful incentives for economically efficient adaptability to changes in technology and demand are established.

Thereby for establishing the economically efficient spectrum management system (providing development of a market), it is necessary gradually change an essence of radio frequency license (permission), so a license to contain specific, legally protected rights, for example, such as:

1. **A right of emission** – consists of a right to emit a specific maximum level of energy in a specific frequency band at a specific period of time within a specific place. Moreover, a level of side radiation, emitted in adjacent or coordinated frequency bands, should be limited to a certain maximum level.

2. **A right of admittance** - allows the license owner to refuse the others in permission to emit energy within a specific period of time, place and frequency bands, assigned in his rights to emission.

3. **Usage** – owner of the right can use any equipment, corresponding to his rights to emission.

4. **Transferability** – rights can be transferred fully or partly at any time and according to one's own discretion.

This are often market methods of management, but previously than they must be introduced, market must be prepared, i.e., **must be a corresponding legal base, a base of specifications and standards must be perfected etc.**

License fees

License fees – fees for the right to use a spectral resource, assigned in a license (permission), that can be collected, for example, on the annual base.

They, at least, can be one of the source of profits of administration, occupied with spectrum use management.

Transparent structure of payment, for example, reimbursing direct expenses connected with the reception of a license, or payment for the share of used part of the spectrum can get a public support, since presented as equitable. Like auctions, license fees reflect spectrum value and if they are established on sufficiently high level, can force users of radio communication effectively use spectrum or choose between using of a spectrum and other possibilities, which can use these users.

A range of complexity of license fees is extended from a simple Table for one service, payment for frequency of each station for each service to a complex formula, including a number of parameters.

Majority of countries do not take a payment for using of the spectrum from governmental institutions, but many also do not take a payment for using of the spectrum from other services, having public interest, for example, from non-profitable (non commercial) organizations.

\but, for example, Austria, Canada and United Kingdom are referred to a number of countries, that take payments from governmental institutions.

Main types of payments are based on administrative expenses, connected with processing of applications for receiving a license, on profits got by license holders from using of the spectrum, and on formulas of incentive payments.

Administrative payments are based on direct expenditures on regulation spectrum use management, connected with processing of applications on receiving licenses and can include also indirect expenditures on spectrum use management, i.e. additional costs.

Separate license holders are usually grouped on categories of services, and payments can be collected proportionally to occupied bandwidth.

Payments of the base of profits are proportional to the incomes, which license owner gets from using of the spectrum.

In the formula of incentive payments insufficiency of the spectrum is taking into account. These payments usually reflect an amount of population or area, maintained by the radio station, bandwidth and in some cases – a set of other factors.

Payments, based on the possible costs of using of the spectrum and auctions are used too.

It is necessary to note that in some cases administrations can collect payments for the separate equipment or single frequencies, in other cases the single payment can be collected for the block of frequencies.

Experience of using the license fees

Australia. In addition to conducting auctions and introduction of the limited system of property rights, the Agency on spectrum use management (ASUM) has tried to improve the efficiency of the traditional system of licensing. For the support of the approach ASUM carried out a solid revision of license fees for using of the radio communication equipment. In 1995 after some consultation with telecommunication operators ASUM moved from the traditional method of collection payments for using of the spectrum, based on the kinds of services, to the payments system on the base of spectrum site dimensions, provided to the users. Thus, license fees are calculated more consequently and transparently in comparison with the previous several arbitrary approach, where the main attention has been drawn to the features of licensed radio communication services.

In new structure of license fees for the equipment each such payment usually consists of the three components:

- component of the issue or renovation, reflecting issue costs or license renovation;
- component of spectrum use management, reflecting a current cost of spectrum use management, including protection against interference (a fixed per cent from the spectral tax on the access (STA));
- spectral tax on the access, which is a revocable payment to the government for using a public resource and is based on the formula, which takes into account position of a spectrum site, geographical location, bandwidth and service area.

Calculation of STA reflect needs of the market, being based on the target strategy, as far as services, operated in more claiming spectrum fields or in more populated geographical dons, are associated with more high license fees, than that which are operated in less claiming fields of the spectrum and less populated geographical regions.

Besides, broadband services are associated with more high license fees, than services with more efficient using of the spectrum that stimulates users to search for technically more perfect equipment, which uses less frequency broadband or works at more available spectrum site.

ASUM also has entered some measures, that ensure the greater flexibility and certainty on the market of radio communication. Flexibility was reached by permission to license owners to transfer their own licenses on equipment to the third parties, but big certainty – by permission to license owners to acquire licenses up to five years.

Israel. Ministry of communication of Israel has established a system of payments in the way the payment per 1 MHz is reducing with increasing of a frequency, beginning above 960 MHz. This approach was accepted to encourage using less occupied frequency bands and stimulate spectrum users to use an advantage of re-using a high frequency, connected with big fading and smaller level of antenna side lobes at high frequencies.

USA. From 1987 the Federal Communications Commission (FCC) began to use application fees, which have been established for all licensed radio services and had purposes to cover direct administrative costs for processing the applications for licenses. Application fees varied from service to service. Moreover, they meant that these fees shouldn't cover expenses of FCC on activity, which doesn't connected directly with processing the applications for licenses, but connected with process of spectrum use management, such as ensuring fulfillment the national rules and conditions of Radio communication Regulation, as well as working out of a policy.

In 1993 the USA Congress decreed that FCC must collect regulation fees for compensation its activity in the field of working out of a policy and rules for providing its fulfillment, operation of informational services for users, as well as for operation in the international arena. Collected regulation fees, introduced in 1994, are entered in an account, intended for assignation of the FCC. Each year the USA Congress establishes a certain amount which must be collected during a fiscal year. Payments are collected on the annual basis and can be different for various services.
