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The Swedish Post and Telecom Authority's Spectrum Policy

PTS Strategies for Spectrum Management

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Preface

Radio spectrum is a limited natural resource with a very high value. Its value lies in the fact that radio spectrum is a necessary input for a wide range of services and applications. This includes wireless communication for work, utility and leisure, but also for security, crisis preparedness, national defence, research, and more.

In Sweden, the Swedish Post and Telecom Authority (PTS) is the responsible authority for spectrum management. This means that it is our responsibility to manage the common resource for the benefit of society as a whole.

The role of the spectrum management authority carries significant responsibility, not least in light of a changed security situation. In order to fulfill our responsibility in a way that creates the greatest possible value for Sweden, it is important that we work logically and thoughtfully with transparency in our spectrum management. This means that we always, at every occasion and in every situation, should strive to maximise the societal benefit of radio spectrum in Sweden over time.

This spectrum policy outlines a number of strategies that contribute to PTS working towards the authority's vision, that the societal benefit of radio spectrum in Sweden is maximised over time, as well as towards the goal to enable a diversity of radio uses.

PTS' spectrum policy replaces the authority's spectrum strategy from 2014[1].

Dan Sjöblom
Director-general, PTS

[1] PTS-ER-2014:16

Innehåll

Summary

Radio spectrum is a valuable and scarce common resource that benefits both individuals and organisations. The vision for PTS' spectrum management is that the societal benefit of radio spectrum in Sweden is maximised over time.

The societal benefit of radio spectrum is the benefit society at large enjoys from the use of the radio spectrum resource. Radio spectrum has many uses, including publicly available electronic communication services and radio use that is needed for defence, public order, security, fundamental research etc., as well as for broadcasts aimed at enabling freedom of expression and free formation of opinion. The weighted benefit of these and other uses of radio spectrum constitutes the societal benefit of radio spectrum.

Maximised societal benefit of radio spectrum over time is achieved when the use of the resource is such that the greatest possible overall benefit is created for society as a whole over time. The use of radio spectrum resource is then said to constitute efficient frequency use.

Lack of radio spectrum can be an obstacle to societal development. Technical and economic development and innovation benefit from access to spectrum.

Since it is not possible for PTS to know in advance which radio uses will be most demanded and utilised, the authority shall enable a diversity of radio uses, both known and unknown.

In order to achieve the goal of PTS spectrum management, to enable a diversity of radio uses, and ultimately the vision, a number of strategies have been identified for the authority's actions in four areas. These areas are international harmonisation and standardisation, spectrum planning, rights of use, license conditions and assignment methods as well as sharing and trading.

1. Introduction

The Swedish Post and Telecom Authority (PTS) is the government authority responsible for the areas of electronic communication and postal services in Sweden. PTS' vision is *Secure and accessible communication for Sweden*. Through cooperation, promotional efforts, regulation and supervision, PTS contributes to a safe digital transformation according to the authority’s mission statement. Important parts of the electronic communication on which society's digitalisation relies stem from wireless electronic communication networks, for which access to radio spectrum is necessary.

Radio spectrum is a valuable and scarce common resource that benefits both individuals and organisations. The vision for PTS' spectrum management is that the societal benefit of radio spectrum in Sweden is maximised over time.

The use of wireless communication and other radio uses is increasing, and thus, the need for radio spectrum is also increasing. Therefore, PTS needs to work in a manner that is sustainable in the long term and ensures that radio spectrum is sufficient for society's needs today and tomorrow.

The spectrum policy is a guiding document aimed at outlining PTS' strategies for radio spectrum planning and international spectrum harmonisation efforts, as well as in the assignment of frequencies. When examining individual cases of assignment of radio spectrum, PTS applies current regulations in the Electronic Communications Act (2022:482) and regulations issued with the support of the Act.

2. Legal Framework for Sweden's Spectrum Management

2.1 The European Electronic Communications Code

In December 2018, the new framework for electronic communications in the EU was adopted through *Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code* (the Code).

The Code emphasises the important social, cultural and economic value of radio spectrum and that member states should ensure the efficient management of the resource.

Efficient and effective use of spectrum and competition are recurring elements in the provisions of the Code. Harmonisation, licensing, license conditions, supervision and setting of fees all contribute to effective use.[2] Spectrum management shall be technology neutral. Furthermore, according to Article 45, member states shall facilitate the rapid development in the Union of new wireless communication technologies and applications and promote shared use of radio spectrum.

Member states shall, according to Article 4, cooperate with each other and the Commission through the Radio Spectrum Policy Group (RSPG) regarding strategic planning, coordination and harmonisation of the use of radio spectrum in the Union.

2.2 The Electronic Communications Act

The Electronic Communications Act (2022:482) (the Act), which came into force in June 2022, governs PTS' work in the field of electronic communications. The Act from 2022 replaced the Electronic Communications Act (2003:389) from 2003. Through the new law, and the accompanying Electronic Communications Regulation (2022:511) (the Regulation), the provisions of the Code are implemented in Swedish law.

[2] Directive (EU) 2018/1972, articles 30, 42, 45–47, 49.

The provisions of the Act on the right to use radio transmitters have a broader scope than the Code generally has. Licensing for use such as private communication radio, radio control and radar normally falls outside the scope of the Code; however, regulation of these uses is included in the Act. Member states' measures for safeguarding national security also fall outside the EU directive.

2.3 The Mission and Mandate of the Swedish Post and Telecom Authority

PTS manages radio spectrum on behalf of the Swedish Parliament (Riksdag) and the Government of Sweden.

In addition to the Act and the Electronic Communications Regulation (2022:511), PTS' mission is outlined in the Regulation with Instructions for the Swedish Post and Telecom Authority (2007:951). The Instruction states that PTS shall promote the expansion of broadband and mobile coverage, ensure that opportunities for radio communication and other uses of radio waves are utilised efficiently, promote effective competition, and establish and publish plans for frequency allocation.

Spectrum management should also be carried out in the context of mandatory provisions or recommendations on harmonisation in the field of electronic communications issued by the European Commission (the Commission), as well as international agreements and the work carried out within CEPT/ECC[3] and ITU[4], where PTS participates. PTS shall also participate in national standardisation and in international standardisation within organisations such as ETSI.

[3] CEPT – European Conference of Postal and Telecommunications Administrations, ECC – Electronic Communications Committee is an autonomous committee under CEPT that develops common policies and regulation in electronic communications for Europe.

[4] ITU - International Telecommunication Union is the UN's specialised body for information and communication technology.

3. Vision and Goal for PTS Spectrum Management

3.1 Vision for PTS Spectrum Management

The societal benefit of radio spectrum in Sweden is maximised over time

Since radio spectrum is a valuable and scarce common resource, it needs to be used where it provides the most benefit to society.

The societal benefit of radio spectrum is the benefit society at large enjoys from the use of the radio spectrum resource. Radio spectrum has many uses, including publicly available electronic communication services and radio use that is needed for defence, public order, security, fundamental research etc., as well as for broadcasts aimed at enabling freedom of expression and free formation of opinion. The weighted benefit of these and other uses of radio spectrum constitutes the societal benefit of radio spectrum.

Maximised societal benefit of radio spectrum over time is achieved when the use of the resource is such that the greatest possible overall benefit is created for society as a whole over time. The use of radio spectrum resource is then said to constitute efficient frequency use. A more complete term is socioeconomically efficient frequency use. The aspect of time is important because radio uses change over time, and new applications within these emerge as a result of technical development and innovation. Decisions made within spectrum management can have long-term consequences. It is therefore important to consider how these decisions affect societal benefit over time.

According to the Electronic Communications Act, PTS is required to assess what constitutes efficient use of frequencies in Sweden. This applies, for example, when granting licenses.[5] The radio use must constitute an efficient use of the frequencies for licenses to be granted. According to the legislative history of the Act, consideration can also be given to socio-economic aspects as well as the overall societal benefit of a certain radio use[6].

[5] Chapter 3, Sections 6, 9 and 12 of the Swedish Electronic Communications Act (2022:482).
[6] Government Bill 2021/22:136 pp. 134–135

It is important to consider the relationship between socio-economic efficiency and technical efficiency. Technically efficient frequency use relates to how much information can be transferred per unit of time, area and frequency for a radio use.

Often, technical efficiency is a prerequisite for, and leads to, socio-economic efficiency. Through well-balanced license conditions, PTS can create prerequisites for technically efficient frequency use. One example is when technical conditions are imposed on licenses for radio links, which allows multiple users of radio links to coexist and share a certain frequency range, thus increasing societal benefit. Without well-balanced license conditions, technical efficiency would likely decrease due to increased interference between users and uses. As a result of reduced technical efficiency, socio-economic efficiency would also decrease as the functionality of services could be negatively affected.

However, high technical efficiency is not always associated with high socio-economic efficiency. This may occur, for example, if a technically efficient radio use prevents or restricts other radio use with higher societal benefit.

The relationship between socio-economic efficiency and competition is also worth highlighting. Competition can lead to higher societal benefit by making services more affordable and of higher quality for consumers, by offering a greater variety, and by promoting investment and innovation.

Socio-economic analysis is an analysis of benefits and costs for society[7]. Within spectrum management, socio-economic analysis can provide a structured support to PTS in assessing what constitutes a socioeconomically efficient frequency use, e.g. to determine which radio uses should be enabled in a frequency range. Socio-economic analysis can be seen as an umbrella term and can include various types of analyses, such as cost-benefit analysis and cost-effectiveness analysis[8], technical analyses and "simpler" assessments, depending on the complexity of the issue. The common denominator among the different types of analyses is that they focus on societal benefits and costs. Many technical studies, such as of output power and interference levels, aim to enable use and thus provide a basis for socio-economic analysis. A competition analysis, for example, in the assignment of frequencies, is also an analysis with societal benefit as the overarching goal since competition is a means to achieve increased societal benefit. The scope and design of the analyses should be proportional to the importance of the measure being analysed.

[7] Society here refers to all consumers, companies and other actors within e.g. a country.

[8] The two methods can be described as opportunity cost analyses. In a cost-benefit analysis, the benefit of implementing a certain measure is compared with the cost of the same measure, and the alternative is not to implement the measure. In a cost-effectiveness analysis, different measures are compared with each other.

3.2 The Goal of PTS Spectrum Management

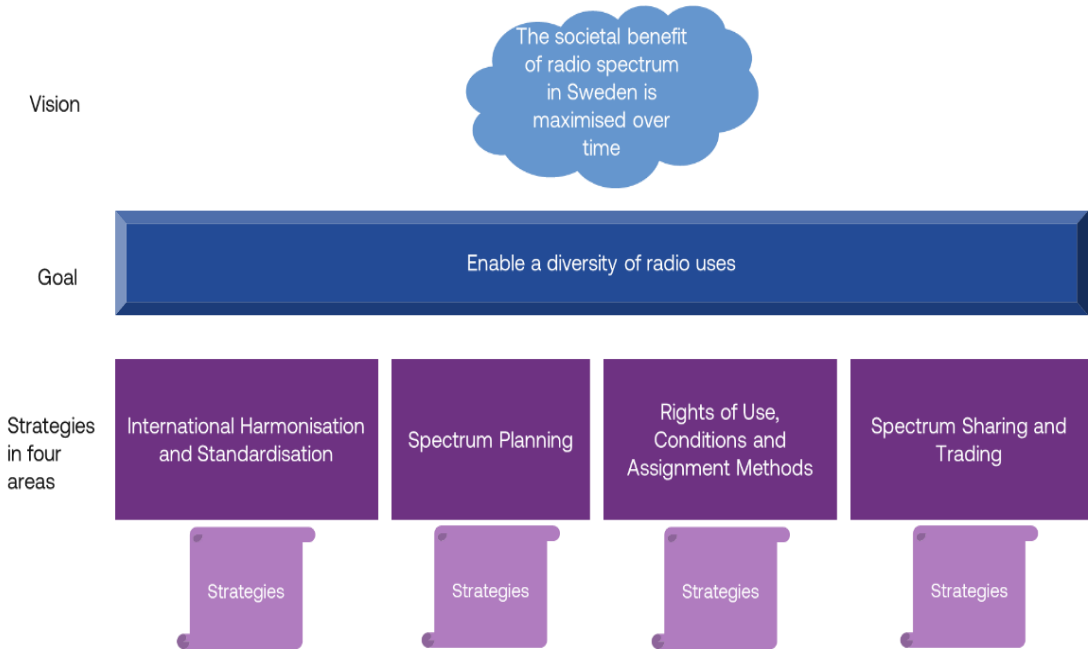
Enable a diversity of radio uses

Lack of radio spectrum can be an obstacle to societal development. Technical and economic development and innovation benefit from access to spectrum.

Since it is not possible for PTS to know in advance which radio uses that will be most demanded and utilised, the authority shall enable a diversity of radio uses, both known and unknown.

In order to achieve the goal of PTS spectrum management, to enable a diversity of radio uses, and ultimately the vision, a number of strategies have been identified for the authority's actions in four areas. These areas are international harmonisation and standardisation, spectrum planning, rights of use, license conditions and assignment methods as well as sharing and trading.

Figure 1 Vision, Goal and Strategies



4. Strategies for PTS Actions in four Areas

4.1 International Harmonisation and Standardisation

Strategies:

PTS shall act neutrally in relation to the interests of different stakeholders, focusing on the societal benefit of frequency use in Sweden.

PTS shall aim for international harmonisation involving as many countries as possible, while maximising Sweden's opportunities for efficient frequency use.

PTS shall promote that sharing possibilities between different uses of radio spectrum are always considered in the international harmonisation efforts.

PTS shall promote that only the conditions necessary to enable technically efficient frequency use constitute the harmonised technical conditions.

PTS shall strive to ensure that technical parameters for radio transmitters do not become unnecessarily permissive and that the characteristics of radio receivers are improved to make them less sensitive to interference.

PTS shall promote that mandatory harmonisation decisions at the EU level (e.g. directives and implementing decisions) are actively reviewed with a certain periodicity.

The background to and the need for harmonisation and standardisation stem from the costs that arise if different countries and regulatory authorities do not coordinate how radio spectrum is used. Lack of coordination would result in interference across national borders, which besides the direct negative effect, also hinders the development of satellite-based services and other radio-based services that regularly cross national borders, such as in shipping and aviation. Another consequence is that markets where radio frequencies are used, such as mobile broadband, would become smaller and more local. Overall, harmonisation and standardisation can lower transaction costs[9] and achieve economies of scale.

[9] Transaction costs are costs that an actor incurs, and costs that otherwise arise, for a transaction to take place at all, for example costs for gathering information and for enforcing and maintaining agreements.

In its international work, PTS shall act neutrally in relation to the interests of different stakeholders, focusing on the societal benefit of frequency use in Sweden.

PTS shall aim for international harmonisation involving as many countries as possible, while maximising Sweden's opportunities for efficient frequency use and minimising negative constraints.

In the international harmonisation efforts, PTS shall promote that sharing possibilities between different uses of radio spectrum are always considered. Sharing studies should be designed so that new uses are provided conditions that allow them to be introduced without causing harmful interference to existing use.

PTS shall promote that only the conditions necessary to enable technically efficient frequency use constitute the harmonised technical conditions in harmonisation decisions from CEPT/ECC and the Commission. Such harmonisation decisions shall further be based on the principle of technology and service neutrality, thereby enabling new and changed use over time.

Standardisation and harmonisation are also essential in specifying the characteristics of radio transmitters and receivers. The emitted power of a radio transmitter outside the frequency range that pertains to the actual transmission and a radio receiver's sensitivity to interference outside the frequency range where it is supposed to receive are both crucial for the possibility of spectrum sharing, especially between different radio uses. In the international harmonisation and standardisation efforts, PTS shall therefore strive to ensure that technical parameters for radio transmitters[10] do not become unnecessarily permissive outside the frequency range that pertains to the actual transmission and that the characteristics of radio receivers are improved to make them less sensitive to interference.

PTS shall promote that mandatory harmonisation decisions at the EU level (e.g. directives and implementing decisions) are actively reviewed with a certain periodicity, similar to what is possible for ECC decisions. This can facilitate the process of withdrawing harmonisation decisions that hinder efficient frequency use.

Whenever possible, PTS shall promote a more efficient way of working in international groups dealing with harmonisation and standardisation.

[10] In harmonisation decisions often expressed in the form of a so-called Block Edge Mask (BEM)

4.2 Spectrum Planning

Strategies:

PTS shall analyse the needs and demand for frequencies, to which extent various frequency bands are used, and monitor technological and societal developments.

PTS shall strive to ensure that all radio uses, in the long term, are placed in or moved to frequency ranges where the highest socioeconomic efficiency can be achieved.

PTS shall facilitate for applicants of licences to choose a suitable frequency band from a socioeconomically efficient perspective by providing information, guidance and a certain degree of governance in the application process.

PTS shall analyse the needs and demand for frequencies, to which extent various frequency bands are used, and monitor technological and societal developments. Socio-economic analysis and assessment of how demand and needs evolve in the future can be used to determine which radio uses that should be enabled in different frequency ranges.

PTS shall strive to ensure that all radio uses, in the long term, are placed in or moved to frequency ranges where the highest socioeconomic efficiency can be achieved, including technical suitability. In many cases, predicting future changes is difficult. Therefore, PTS needs to enable various new uses and innovations and not create unnecessary barriers to entry that hinder societal development. An existing use today that hinders another use tomorrow may not represent a socioeconomically efficient use. A long-term perspective is therefore necessary, for example when licences are issued and licence duration is determined in a frequency band that can be expected to have a different use in the future.

However, for some frequency bands the use in Sweden is to a large extent governed by international agreements, why the possibilities for alternative uses in Sweden are limited. This applies to frequency bands for e.g. shipping, aviation, meteorological satellite and radar services as well as navigation services. If PTS makes the assessment that a changed use in Sweden is desirable in such bands, the authority needs to carry the spectrum planning through international harmonisation efforts.

The authority regularly publishes a spectrum orientation plan[11] that presents the current use, planned changes to the use of frequency bands, and how the authority plans to assign radio spectrum in the coming years. Current use is also presented in the Swedish frequency plan[12], which PTS manages.

[11] PTS Inriktningsplan för spektrumhantering

[12] Post- och telestyrelsens allmänna råd om den svenska frekvensplanen

The same type of radio use often occurs in several various frequency bands. This applies, for example, to mobile use, satellite use and the use of fixed radio (radio links). Which frequency band is most suitable depends on the user's preferences regarding transmission capacity, quality, range of transmission, coverage and availability. PTS shall facilitate for applicants of licences to choose a suitable frequency band from a socioeconomically efficient perspective by providing information, guidance and a certain degree of governance in the application process. The application of the guidelines regarding link distances not to be undercut in various frequency bands for fixed radio, which the authority publishes, is an example of governance for applications for radio links.

4.3 Rights of Use, Conditions and Assignment Methods

Strategies:

When choosing between different rights of use, PTS can utilise socio-economic analysis.

PTS shall only impose conditions that ensure effective and efficient frequency use.

PTS shall let demand and willingness to pay govern the assignment of frequencies, with the exception of certain public goods.

4.3.1 Choice between different rights of use and conditions attached thereto

The use of radio transmitters requires a licence according to the Electronic Communications Act[13]. A licence shall refer to the right to use a certain radio transmitter (individual transmitter licence) or to use radio transmitters within a certain frequency range (block licence). PTS may also issue regulations on licence-exempt.[14, 15] Typically, such exemptions result from decisions by the Commission or recommendations from CEPT/ECC. However, PTS may decide to exempt other radio uses, not covered by such decisions or recommendations, if a socio-economic analysis shows that it is the most appropriate right of use.

Licence-exempt offers benefits such as the opportunity to develop and introduce new uses without time-consuming licencing processes, thereby lowering barriers to entry and promoting innovation. Licence-exempt is often suitable for lower

[13] Chapter 3, Section 1 of the Electronic Communications Act (2022:482).

[14] Frequency ranges with licence-exempt and the conditions that must be met appear in the Swedish Post and Telecommunications Authority's regulations on licence-exempt; *Post- och telestyrelsens föreskrifter om undantag från tillståndsplikt för användning av vissa radiosändare*.

[15] Chapter 3, Section 26 of the Electronic Communications Regulation (2022:511).

transmitter powers and when the need for protection is limited. Licence-exempt also creates favourable conditions for shared use. In cases where higher transmitter powers are needed and there is a greater need for protection against interference, licences are often more appropriate.

Licences for individual radio transmitters are suitable for radio use that is not intended for wide-area coverage, such as fixed radio (radio links), or when only a limited number of transmitters are needed. A licence for an individual radio transmitter grants the licence holder a right to at a geographical location and on a specific frequency transmit with a certain power on a certain antenna height, possibly limited to certain directions.

Block licences are suitable for networks intended for wide-area coverage, such as mobile networks. Such networks may consist of a large number of transmitters with geographically overlapping coverage areas, why the licence holder can be expected to perform a more efficient radio planning compared to PTS. A block licence grants the licence holder the right to use a certain frequency range within a geographically defined area (nationally, regionally or within another defined area) under certain conditions.

When choosing between different rights of use, including geographical boundaries of licences, PTS can utilise socio-economic analysis.

Rights of use may be attached with the types of conditions specified in the Act[16]. Only conditions ensuring an effective and efficient frequency use shall be imposed. The conditions that shall apply must therefore be assessed based on what is justified and proportionate considering the circumstances of the individual case.[17] As for technical requirements necessary for efficient frequency use, this means that rights of use should typically only be combined with the conditions required to enable coexistence between different radio users and radio uses within the same frequency band, as well as with radio uses in adjacent frequency bands. This creates flexibility over time, lowering barriers to entry and enabling innovation and competition. Conditions that restrict which electronic communication services or which technologies that may be used, i.e. limit technology and service neutrality, may only be introduced in cases specified in the Act[18].

When it comes to conditions regarding requirements that are of importance to Sweden's security, PTS has an obligation to consult with the Swedish Security Service and the Swedish Armed Forces in matters concerning the use of radio

[16] Chapter 3, Section 12 of the Electronic Communications Act (2022:482).
[17] Government Bill 2021/22:136 p. 143.
[18] Chapter 3, Section 15 of the Electronic Communications Act (2022:482).

transmitters.[19] This is to clarify whether the radio use could cause harm to Sweden's security and whether there is a need to attach licences with such conditions.

4.3.2 The assignment of frequencies shall be governed by the demand and willingness to pay

If the supply of frequencies is sufficient to meet the demand, i.e. if there is no scarcity in a frequency range, everyone's needs can be met, and PTS then grants access to frequencies through assignment of licences to those who apply first or through licence-exempt. Licences assigned on a "first come, first served" basis are usually licences for individual radio transmitters.

In cases where an application concerns a radio use that aligns with PTS' Spectrum Orientation Plan[20], a technical analysis may be conducted to ensure that the radio use does not cause harmful interference to radio use in already assigned licences. However, if the application concerns a radio use that deviates from the use and the overall conditions set by PTS in the Spectrum Orientation Plan, a socio-economic analysis, in addition to technical aspects, can contribute to PTS' assessment of the possibility of assigning licence, including appropriate licence period. According to preparatory works[21] of the Act, PTS should apply a positive approach when assessing the possibility of assigning licences.

If there is a scarcity of frequencies in a frequency range, PTS has the option to decide that the number of licences assigned within the range should be limited, if necessary to ensure efficient use of radio frequencies. This mainly applies to block licences. Licences shall then instead be assigned either through an auction, where the highest bidder wins the licence (willingness to pay), or through a comparative selection procedure (often called a beauty contest) or through a combination of these procedures.[22] In a beauty contest, selection is based on the applicant's commitments to, for example, provide coverage and deployment. Such commitments are often associated with a cost and therefore indirectly express willingness to pay.

Both of the above assignment procedures aim to achieve an allocation of frequencies that enables socioeconomically efficient frequency use by subjecting the assignment to competition. However, there are significant differences. The auction uses an objective measure - willingness to pay - while beauty contests involve a degree of subjectivity in the assessments that must be made. Auctions are currently

[19] Chapter 3, Section 13 of the Electronic Communications Regulation (2022:511).
[20] PTS Inriktningsplan för spektrumhantering
[21] Government Bill 2002/03:110 p. 134.
[22] Chapter 3, Sections 9 and 11 of the Electronic Communications Act (2022:482).

a widely used and well-accepted method for assigning spectrum in scarcity situations, so also in Sweden.

Both auctions and beauty contests should be based on open, objective, transparent, non-discriminatory, and proportionate criteria and designed to promote competition[23]. If a forward-looking analysis of competition shows that it is necessary to maintain or achieve competition in the markets where the frequencies are used as input goods, competition-promoting measures may be applied, such as spectrum caps[24]. Other important aspects in the design of an auction include the size of the frequency blocks and their reserve prices to ensure that frequencies are not sold at undervalued prices.

In addition to promoting competition, an auction or beauty contest may aim to promote coverage and deployment[25]. In such cases, PTS may take into account, for example, political goals for broadband deployment or other societal needs. Any conditions regarding coverage and deployment should be non-discriminatory, proportionate, and transparent, and PTS considers how the design affects competition in an auction and in the market where spectrum is an input good.

Even in cases where there is no scarcity of frequencies, PTS can use annual fees for the right to use frequencies to create some incentive for socioeconomically efficient frequency use by allowing demand and willingness to pay to play a more guiding role.

4.3.3 Exemptions for certain public goods

Certain societal functions are considered public goods[26]. These could be underproduced if the assignment of frequencies were solely governed by demand and willingness to pay. As a result, such public goods often need to be organised and funded collectively by the state, either entirely or partially.

The assignment of frequencies for the radio use of collective goods is not governed by willingness to pay, nor is it solely governed by demand. Below is a description of how the assignment of frequencies for certain collective goods' radio use is conducted.

[23] Government Bill 2021/22:136 p. 140, Chapter 3, Section 11 of the Electronic Communications Act (2022:482), Directive (EU) 2018/1972, article 48.

[24] Government Bill 2021/22:136 pp. 140 and 418, Directive (EU) 2018/1972, article 52.

[25] Chapter 3, Section 11 of the Electronic Communications Act (2022:482).

[26] Collective goods differ from private goods in that it is more difficult to charge for a public good, which means that a market for, and production of, the good may not arise at all. An example is defence – an individual benefits from the defence, and cannot be easily excluded from enjoying this benefit, even if the individual is not involved in financing.

When assigning frequencies for the Swedish Police Authority, the Swedish Security Service, the Swedish Armed Forces, and the National Defence Radio Establishment,[27] PTS makes decisions on frequency assignment after consulting with these authorities.[28] This is done following a balance between the needs of these stakeholders and the frequency needs of other stakeholders[29]. In this balance, a socio-economic analysis may be included, demonstrating how needs can be met as efficiently as possible.

For radio use necessary for activities aimed at maintaining public order, security, or health, according to the Electronic Communications Act, neither an auction nor a beauty contest may be used when assigning frequencies, even if scarcity exists within a frequency range[30]. This provision in the Electronic Communications Act is most practically significant in the assignment of licenses for the so-called RAKEL system, used by the police and emergency services.

Similarly, in decisions regarding licences for public broadcasting, as defined in the constitution[31], i.e. terrestrial radio and television broadcasts, neither an auction nor a beauty contest may be used[32, 33]. Instead, the selection of who will be assigned the broadcast licences in the terrestrial network is made by the government or an authority appointed by the government[34]. However, PTS makes decisions on licenses for radio transmitters that enable these broadcasts to reach the public.

For reception-only radio use, such as radio astronomy, earth exploration, and similar satellite services, a licence is not required. However, such use may need protection from interference caused by other radio use. A socio-economic analysis can determine what constitutes reasonable protection considering the respective societal benefits of the relevant uses. Such an analysis may result in the justification of measures such as introducing exclusion zones within block licences or implementing other conditions in connection with decisions on licenses, to ensure adequate protection for reception-only radio use.

[27] This also applies to the Swedish Armed Forces' Materiel Agency for activities that the agency carries out on behalf of the Swedish Armed Forces or FRA.
[28] Chapter 3, Section 3 of the Electronic Communications Act (2022:482).
[29] Government Bill 1992/93:200 p. 321.
[30] Chapter 3, Section 10 of the Electronic Communications Act (2022:482).
[31] The Fundamental Law on Freedom of Expression (1991:1469).
[32] Which frequency range is granted for radio and television broadcasts in the terrestrial network is decided by the government.
[33] Chapter 3, Section 10 of the Electronic Communications Act (2022:482), with reference to Chapter 1, Section 2 of the Fundamental Law on Freedom of Expression (1991:1469).
[34] When this document was drawn up, the Media Authority was the government-appointed authority.

4.4 Spectrum Sharing and Trading

Strategies:

PTS shall always consider the possibility of spectrum sharing when granting licences, both in the near term and in the future.

Trading of licences, through transfer or leasing, is a way to achieve more efficient frequency usage.

PTS shall always consider the possibility of spectrum sharing when granting licences, both in the near term and in the future, even though the conditions for sharing may vary from case to case. A licence may either contain technical conditions that enable sharing with other users or uses, or alternatively inform the licence holder that the frequency range is shared. With appropriate licence conditions, spectrum sharing often leads to efficient frequency use and prevents scarcity situations, as several uses can access the same frequency band.

A licence condition requiring spectrum sharing is particularly relevant for block licences because otherwise, a licence holder would be granted exclusive access to a certain frequency range. The conditions should enable sharing through licences granted on a shared basis and without priority.

Spectrum trading with licences, through transfer or leasing, is another way to achieve more efficient frequency use[35]. Spectrum trading can reduce transaction costs and enable a change in usage while promoting competition through lower barriers of entry. Technology- and service-neutral licences are almost a prerequisite for spectrum trading.

A licence or part of a licence may be transferred, with PTS' consent, if certain prerequisites are met, such as ensuring that the transfer does not adversely affect competition[36]. The prerequisites for leasing are largely the same as those for transfer[37]. For licence holders, leasing provides a potential revenue stream by allowing someone else access to unused frequency space.

Spectrum sharing, transfer, and leasing regulations aim to achieve socioeconomically efficient frequency use by enabling the use of assigned frequencies in cases where the licence holder does not use them. This helps counteract spectrum scarcity while promoting competition through lower barriers of entry.

[35] Chapter 3, Sections 25–28 of the Electronic Communications Act (2022:482).
[36] Chapter 3, Section 25, paragraph 1, point 2 of the Electronic Communications Act (2022:482).
[37] Chapter 3, Section 28 of the Electronic Communications Act (2022:482).

4.5 The strategies in summary

Figure 2 The strategies in summary