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# **Open invitation to apply for a licence to use radio transmitters in the 800 MHz band**

Consultation

A decorative graphic consisting of several overlapping, white, curved lines that sweep across the lower right portion of the blue background, resembling stylized radio waves or a signal path.

Open invitation for the 800 MHz assignment, consultation version

**Open invitation to apply for a licence to use radio transmitters in the 800 MHz band**

Consultation

**File reference**

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## 1 Introduction

With this open invitation, the Swedish Post and Telecom Agency (PTS) invites all interested parties to apply for licences to use radio transmitters in the 790-862 MHz frequency band (the 800 MHz band).

Those wishing to participate in the assignment must submit a written application and a bank guarantee to PTS.

This invitation is made in accordance with Chapter 3, Section 8 of the Electronic Communications Act (LEK – 2003:389) and PTS Code of Statutes – PTSFS 2008:1 on spectrum auctions and PTS Code of Statutes – PTSFS 2010:xx concerning a combined selection procedure for licences to use radio transmitters in the 816-821/857-862 MHz frequency block (FDD6 in the 800 MHz band).

### 1.1 Reading instructions and general information

The frequency band is divided into six frequency blocks: FDD1–FDD6. The licences for five of the frequency blocks (FDD1–FDD5) shall be assigned through a tender procedure, where the price the applicant is willing to pay for the licence is decisive (auction). The licence for one frequency block (FDD6) shall be subject to a condition on coverage and rollout and shall therefore be assigned through a combination of a comparative selection procedure ('beauty contest') and an auction.

The combined selection procedure for FDD6 will constitute one part of the total selection procedure for all frequency blocks (FDD1-FDD6). Thus the terms 'auction' and 'auction procedure' will be used in this open invitation as a common term for the total selection procedure; i.e. the auction for FDD1–FDD5 *and* the combined selection procedure for FDD6.

In those places in this open invitation where 'auction' means an auction under Chapter 3, Section 8 of LEK<sup>1</sup>, this will be explicitly stated through a reference to the Act.

PTS urges all parties interested in participating in the auction to read through all parts of this document and the Regulations in question very carefully. The Regulations contained in PTS Code of Statutes – PTSFS 2008:1 apply to the auction according to LEK that shall be held to assign the FDD1-FDD5

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<sup>1</sup> In Chapter 3, Section 8, paragraph 3 of LEK, an 'auction' is defined as a tender procedure where the price that the applicant is willing to pay for the licence is decisive.

licences and the Regulations contained in PTS Code of Statutes – PTSFS 2010:xx apply to the combined selection procedure that shall be conducted to assign the FDD6 licence.

It is important that those applying for a licence to use radio transmitters and to participate in the auction are aware of all of the preconditions and provisions so that there is no risk of the applicant losing the opportunity to obtain the frequency blocks that the applicant wishes to have. PTS may reject an application from an applicant or bar a bidder from participating in the auction for, among other things, the following reasons:

- if the application or bank guarantee is submitted to PTS too late,
- if the application is incomplete,
- if the application contains incorrect information,
- if the content of the bank guarantee is different to that stated in **Appendix 3**, or
- if two or more bidders collude during the auction procedure.

When formulating their application and bank guarantee and when participating in the auction, an applicant shall comply with the applicable provisions of the PTS Regulations and of this open invitation. If this is not done, there is a risk that the winning bidder may have a licence assigned to it at the auction revoked.

PTS estimates that the auction will take approximately two to ten working days to conclude, but that interested parties should be prepared for it to take longer.

PTS strongly recommends that applicants participate in the trial auction that the Agency will arrange prior to the auction.

Please note the following important dates:

- XX 2011  
Application and bank guarantee shall have been submitted to PTS
- XX 2011  
Planned date of trial auction
- XX 2011  
Planned date of start of auction

Information about the auction will be published on the PTS website under [www.pts.se/800MHz-bandet](http://www.pts.se/800MHz-bandet). It is also possible to subscribe for the news published on the website's news pages; in this case radio news [*nyheter - radio*].

## 1.2 Form for selection procedure

PTS has made the assessment that the frequency space available in the 800 MHz frequency band is not sufficient to grant licences to all interested parties. This assessment has, among other things, been based on the interest survey conducted by PTS in October 2009.<sup>2</sup> When demand for spectrum is greater than supply, the number of licences shall be limited and licences considered following an open invitation to apply. This consideration may take place after a 'beauty contest', an auction according to LEK or a combination of these procedures.

PTS's policy<sup>3</sup> is to assign licences in the first instance through an auction according to LEK. The Agency considers that an auction according to LEK would be the most effective way of assigning FDD1-FDD5 licences in this case. An auction according to LEK also increases the probability of efficient spectrum use, as licences will be assigned to the stakeholders that value them the most.

The FDD6 licence shall be subject to a condition on coverage and rollout and the licence shall be assigned according to a combination of a comparative selection procedure and an auction according to LEK in accordance with the Regulations contained in PTS Code of Statutes – PTSFS 2010:xx. The combinatory selection procedure means that bidders compete for the licence through a binding offer of coverage. If there are several bidders that have promised coverage up to and including a ceiling amount, they may continue to compete through binding monetary offers; see Section 2.9.

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<sup>2</sup> See responses compiled from the interest survey for the 800 MHz band, file ref. 09-9529

<sup>3</sup> PTS-VR-2006:2

## 2 Licences and licence conditions

### 2.1 Licences

This assignment refers to national licences to use radio transmitters in the 800 MHz band (790–862 MHz). PTS has divided the frequency band up into six frequency blocks for FDD use (Frequency Division Duplex)<sup>4</sup>, each encompassing 2×5 MHz; see Table 1 below. Each frequency block constitutes one licence.

Frequency block	Downlink band (MHz)	Uplink band (MHz)
FDD1	791–796	832–837
FDD2	796–801	837–842
FDD3	801–806	842–847
FDD4	806–811	847–852
FDD5	811–816	852–857
FDD6	816–821	857–862

Table 1: Frequency blocks

The winning bidder for the frequency block in the auction will gain access to these frequencies as soon as the auction has closed and PTS has decided on licences.

#### 2.1.1 Technology and service-neutral licences

These licences shall – with certain restrictions – be technology and service-neutral. This means that the licence holder chooses the technology and area of application within the framework of the licence conditions itself. The licence holder may also change technology and application during the term of the licence, though also within the framework of the licence conditions. However, the licences shall be subject to a requirement to use the Frequency Division Duplex (FDD) method; see Section 2.2. One of the licences shall also be subject to a condition on coverage and rollout, which means that the licence holder shall provide an identified target group with access to data communications services with a particular bit rate; see Section 2.9.

<sup>4</sup> 'FDD' means that the base station-to-terminal communication (downlink) and terminal-to-base station communication (uplink) takes place in separate frequency channels.

### 2.1.2 Term of licence

The licences and licence conditions shall apply up to and including 31 December 2035.

### 2.1.3 Annual charge

The licence holders shall pay an annual charge to PTS from and including the licences being granted. PTS shall determine the amount of the charge in Regulations, currently PTS Code of Statutes – PTSFS 2009:2 on charges. According to these Regulations, the charge for 2×5 MHz in the 800 MHz band amounts to SEK 570,000 in 2010.

### 2.1.4 Assignment and lease of licences

According to Chapter 3, Sections 23 to 24 of LEK, licence holders have the opportunity to assign or lease a licence or part of a licence to use radio transmitters following the consent of PTS.

## 2.2 Frequency blocks

The total band plan comprises 2×30 MHz in six frequency blocks, each of 2×5 MHz (FDD1–FDD6) and a midgap of 11 MHz. A reverse duplex direction applies to the frequency arrangement.<sup>5</sup> The downlink band starts at 791 MHz, which means that there is a frequency separation of 1 MHz to the 470–790 MHz frequency space. This frequency arrangement is illustrated in Figure 1.

790–791	FDD1 791–796	FDD2 796–801	FDD3 801–806	FDD4 806–811	FDD5 811–816	FDD6 816–821	821 – 832	FDD1 832–837	FDD2 837–842	FDD3 842–847	FDD4 847–852	FDD5 852–857	FDD6 857–862
Unassigned	Downlink						Midgap	Uplink					
1 MHz	30 MHz (6 blocks of 5 MHz)						11 MHz	30 MHz (6 blocks of 5 MHz)					

Figure 1: Frequency arrangement in the 800 MHz band (frequencies specified in MHz)

The frequency space directly under 790 MHz is currently used for terrestrial television in the first instance, but also for among other things wireless microphones. The frequency space above 862 MHz is currently used for low power devices.<sup>6</sup>

<sup>5</sup> 'Reverse duplex direction' means that the uplink (the connection from terminal to base station) is located in the upper part of the band in contrast to what is usual when planning FDD spectrum.

<sup>6</sup> See PTS's current provisions on exemptions from licence obligations for certain radio transmitters at [www.pts.se](http://www.pts.se)

## 2.3 Technical conditions

### 2.3.1 Spectrum masks and power levels

PTS has formulated the technical conditions for the 800 MHz band in accordance with the European Commission's decision of 6 May 2010.<sup>7</sup> This decision is based on the concept of a spectrum mask (Block Edge Mask – BEM); that is, the licence holder is free to choose its technology, but must limit the radiation from its radio use in relation to other licence holders in adjacent frequencies so that harmful interference does not arise.

In order to achieve appropriate protection in technical respects for terrestrial television reception in the 470–790 MHz frequency space, further conditions on maximum power transmitted shall be laid down. Channel 60 areas (i.e. those geographical areas where the 782–790 MHz frequency space is used or has been planned for terrestrial television<sup>8</sup>) are particularly sensitive to interference from changed radio use in the 800 MHz band. This is why the technical conditions in these areas are stricter than they are in other areas and may, for example, mean that an additional filter will need to be installed at the base stations. Special conditions for maximum power transmitted and polarisation in Channel 60 areas shall be laid down for FDD1 and FDD2.

The licences shall be subject to the technical conditions stated in **items 1–12 of Appendix 1**.

### 2.3.2 Exemptions from licence obligations

#### 2.3.2.1. Low power devices in the midgap in the 800 MHz band

PTS intends to permit the use of low power devices in the midgap in the 800 MHz band (i.e. the 821–832 MHz frequency space) by exempting this use from the licence obligation. The proposed exemption from the licence obligation can be found on the PTS website.<sup>9</sup> PTS is also investigating the possibility of extending this exemption in the future in accordance with the ECC decision of 30 October 2009.<sup>10</sup>

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<sup>7</sup> Commission Decision of 6 May 2010 on harmonised technical conditions of use in the 790-862 MHz frequency band for terrestrial systems capable of providing electronic communications services in the European Union, 2010/267/ EU

<sup>8</sup> Channel 60 areas are shown in Appendix 4.

<sup>9</sup> [www.pts.se](http://www.pts.se)

<sup>10</sup> ECC Decision of 30 October 2009 on harmonised conditions for Mobile/Fixed Communications Networks (MFCN) operating in the band 790-862 MHz, ECC/DEC/(09)03, Annex 3

2.3.2.2. Ultra Wide Band (UWB)

Radio transmitters using UWB technology in the 0–1600 MHz frequency band may broadcast without a licence using an average maximum power density of 90 dBm/MHz EIRP and a peak power density of -50 dBm/50 MHz EIRP.

## **2.4 Prohibition against causing interference and undertaking to work together and remedy interference to television reception**

### **2.4.1 Prohibition against causing interference to television reception**

According to LEK, terrestrial television reception in the 470–790 MHz frequency band may not be prevented. For this reason, licences to use radio transmitters in the 800 MHz band shall be subject to a requirement that the licence holders must not cause interference to television reception in the 470–790 MHz frequency band (television interference); see **item 13 of Appendix 1**.

A definition of what constitutes ‘television interference’ can be found in the licence conditions. In order to determine whether a household (permanent resident population<sup>11</sup>) is vulnerable to television interference, signal levels shall be measured using a reference antenna, ten metres above the ground in case it affects the household.

### **2.4.2 Undertaking to work together and remedy television interference**

The FDD1-FDD6 licences shall also be subject to a condition corresponding to the licence holder’s undertaking; see **item 14 in Appendix 1**. This undertaking means a requirement for licence holders to establish and maintain cooperation with other licence holders in the 800 MHz band to take appropriate measures to remedy television interference that may arise when using the 800 MHz band.

The undertaking to work together and remedy television interference represents a precondition for being allowed to participate in the auction. The undertaking shall be submitted in the application and will constitute a licence condition pursuant to Chapter 3, Section 11, item 11 of LEK.

Costs associated with cooperation, investigations and measures to remedy television interference shall be borne by the licence holders. Licence holders in the 800 MHz band may agree between themselves on a reasonable and fair

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<sup>11</sup> ‘Permanent resident’ means that there are people in the household who are registered at the address in the population register.

division of costs for cooperation and investigations. Investigations shall be free for television viewers, regardless of whether the source of the interference lies with a licence holder or is of another kind. The licence holder that has caused the television interference shall pay for the measures taken to remedy this interference.

#### 2.4.2.1. Establishing and maintaining cooperation

The undertaking involves a requirement to establish and maintain cooperation with other licence holders in the 800 MHz band. This cooperation shall help television interference to be dealt with rapidly and efficiently.

The licence holders may determine the form of cooperation themselves, but it is important that the measures guarantee a good service. The form of cooperation must be established so that it facilitates rapid processing; i.e. the source of the interference shall be identified promptly and the interference investigated and remedied as soon as possible thereafter.

#### 2.4.2.2. Common point of contact and good accessibility

Accessibility is key if television interference is to be remedied quickly, which is why a common point of contact is necessary for television viewers who experience a problem with their television reception. Television viewers shall be able to make a report by phone and be able to talk to someone in person via the common point of contact. It should not cost television viewers anything to make a report.

The licence holders shall determine the form of cooperation themselves. Examples of the usual forms for consumer contacts include help desks and complementary web tools.

#### 2.4.2.3. Identifying, investigating and remedying television interference

The undertaking also entails a requirement to promptly identify the licence holder that has caused the television interference and to investigate and remedy the television interference shown as soon as possible thereafter.

When the television interference has been identified, the equipment that is causing the interference must be disconnected and should remain disconnected until the television interference has been remedied.

There are several examples of how the licence holders can remedy television interference. Filters on the television receivers may be one way and another way may be to adapt and adjust the base stations by, for example, redeploing and redirecting antennae.

The licence holders must keep a register of the reports so that this undertaking can be followed up effectively. PTS shall be able to gain access to the register following a request to do so.

#### 2.4.2.4. Limitations in the undertaking

The obligation to remedy interference to television receivers encompasses the permanent resident population. The limitation corresponds to the transmission obligation contained in the broadcaster's licence to broadcast television.

This undertaking only covers interference according to the licence condition's definition of interference (television interference).

#### 2.4.3 Supervision of the undertaking

PTS is both the licence and supervisory authority. The licence holders are thus responsible for satisfying PTS that the undertaking has been complied with.

### 2.5 Coordination with the National Defence Radio Establishment

In order to prevent interference to sensitive installations, the National Defence Radio Establishment (FRA) needs to be able to influence the location of new base stations, radiated power in various directions and the nature of antennae and the rest of the radio installations. The risk of interference from a base station close to an FRA installation can be kept to a minimum; e.g. by directing the radiated power in another direction.

FDD1-FDD6 licences shall be subject to a condition for the licence holder to coordinate with and obtain the consent of FRA when locating base station equipment in the proximity of FRA installations within the Municipalities of Ekerö, Gotland, Karlskrona, Kungsbacka, Simrishamn, Vellinge and Ystad; see **item 15 of Appendix 1**.

After concluding the auction procedure, PTS may provide information about how it may implement coordination with FRA. Such a routine has been drawn up for existing licences in 1800 MHz band.

### 2.6 Voluntary coordination between licence holders

PTS encourages voluntary coordination between the licence holders involved regarding technical requirements in the licence conditions.

It is possible for licence holders in the 800 MHz band to deviate from certain technical requirements in the licence conditions provided that the licence holders affected by the deviations agree; see **item 12 in Appendix 1**.

## **2.7 Coordination with other countries**

The FDD1-FDD6 licences shall be subject to a condition for the licence holder to comply with the agreements that Sweden has concluded with other States; see **item 16 in Appendix 1**.

The 800 MHz band is used internationally, among other things, for terrestrial television, fixed communications and radio navigation above the ground.

Use of radio transmitters generally means that the transmitters must not cause interference to radio use in other countries. The preconditions for radio use can be found in the Radio Regulations<sup>12</sup> issued by the International Telecommunication Union (ITU). Other preconditions, such as more generous conditions, may be concluded between countries through bilateral coordination agreements. These agreements normally indicate the levels of field strengths that may be generated and tolerated and when detailed coordination must be arranged. The work of PTS involves drawing up bilateral coordination agreements for the 800 MHz band with Denmark, Finland, Norway and Russia. The coordination agreements that Sweden concludes will be posted on the PTS website.<sup>13</sup>

All radio use in the 800 MHz band must comply with the international and bilateral agreements that Sweden concludes with other countries. Rollout may have to be adapted in order to satisfy the requirement for coordination. The applicants are therefore encouraged to carefully consider the protection requirements contained in the various agreements and the effects that may arise owing to the use of radio services in other countries.

### **2.7.1 Television broadcasting in other countries**

There is an international agreement for planning terrestrial television (ITU-R Geneva 2006 Agreement, GE06) that among other things regulates the 800 MHz band. This agreement also regulates the coexistence between mobile services and broadcasting in this band. For mobile services, it is specified that base stations must not be allowed to generate a field strength exceeding

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<sup>12</sup> See <http://www.itu.int/publ/R-REG-RR/en>

<sup>13</sup> See <http://www.pts.se/sv/Bransch/Radio/Koordineringsavtal/Mobiltelefoni/>. Other coordination agreements used for mobile services, such as for the 2.6 GHz and 3.6–3.8 GHz bands, are also available on this website.

25 dBuV/m<sup>14</sup> at the border of another country without the approval of the country affected.

The preconditions for coexistence between mobile services and television broadcasting will be discussed at the forthcoming World Radiocommunication Conference in 2012 (WRC-12). The outcome of WRC-12 may affect the field strength levels that may be accepted without coordination at the border of another country.

GE06 also contains frequency plans<sup>15</sup> describing the rights of different countries to use television broadcasting service transmitters. These frequency plans include information about transmitter locations, height of antennae, power transmitted and allotments, which represent a form of space for future television broadcasts. The agreement also makes it possible to put into use new transmitters, generating a field strength of up to a certain level (coordination trigger<sup>16</sup>), without special coordination. All of Sweden's neighbouring countries have rights through GE06 that may be used for terrestrial television, without having to seek consent from other countries.<sup>17</sup> Applicants should therefore take into consideration that this use in other countries may result in an increased level of interference depending on, for instance, frequency and the location and height of the receiver.

Among Sweden's neighbouring countries, Denmark, Finland, Norway and Germany have decided to use the 800 MHz band for electronic communications services other than terrestrial television in the long run. PTS is actively working to establish bilateral agreements with these countries.

### **2.7.2 Radio navigation in other countries**

Use of the 800 MHz band in Sweden is also limited by the need to protect radio navigation above the ground that is used in other countries<sup>18</sup> in the 800 MHz band. It is primarily the Russian use that is relevant on the part of Sweden. The existing coordination situation means that the aggregate field

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<sup>14</sup> In accordance with GE06, 25 dBuV/m applies with a wave propagation model ITU-R Recommendation P.1546 and ten metres above the ground, 1% time probability and 50% location probability

<sup>15</sup> <http://www.itu.int/ITU-R/terrestrial/broadcast/plans/ge06/index.html>

<sup>16</sup> In accordance with GE06, 25 dBuV/m applies with a wave propagation model ITU-R Recommendation P.1546 and ten metres above the ground, 1% time probability and 50% location probability

<sup>17</sup> An extract from neighbouring countries' assignments in GE06 has been published on the PTS website under the link: [www.pts.se/800MHz-bandet/](http://www.pts.se/800MHz-bandet/)

<sup>18</sup> In accordance with ITU RR 5.312, the 645-862 MHz frequency band is allocated for radio navigation above the ground in Armenia, Azerbaijan, Bulgaria, Georgia, Kazakhstan, Kyrgyzstan, Moldavia, Mongolia, Poland, Romania, Russia, Slovakia, Tadzhikistan, the Czech Republic, Turkmenistan, Ukraine, Hungary, Uzbekistan and Belarus.

strength from the licence holder's radio transmitters must not exceed the protection levels stipulated in Recommendation ITU-R M.1830 for Russian assignments notified to ITU.<sup>19</sup>

The work of PTS involves drawing up a bilateral agreement with Russia concerning the division between mobile use and radio navigation above the ground.

The preconditions for the division between mobile services and radio navigation above the ground will be discussed at WRC-12. The outcome of WRC-12 may affect the preconditions for coexistence, e.g. the field strength levels that Russia shall accept from other countries' radio use without special coordination. If there is no bilateral agreement between Sweden and Russia at the time of WRC-12, the rules laid down at WRC-12 shall apply.

## **2.8 Dynamic spectrum access**

In order to achieve high spectrum efficiency, PTS reserves the right to allow dynamic spectrum access in the frequency band. This means that a radio user may possibly be permitted to use another licence holder's part of the frequency band, provided that this use does not give rise to detectable interference for the licence holders; see **item 17 of Appendix 1**.

## **2.9 Requirement for coverage and rollout for FDD6**

One of the targets set by the Government in its 'Broadband Strategy for Sweden'<sup>20</sup> is that 'all households and businesses should have good opportunities to use electronic public services and other services via broadband'. In order to contribute to achieving this objective and to minimise the number of homes and places of business that do not have access to broadband in Sweden, the FDD6 licence is subject to a condition on coverage and rollout (coverage requirement); see **items 18–21 in Appendix 1**.

### **2.9.1 Coverage requirement**

The coverage requirement means that the licence holder shall cover those permanent homes and fixed places of business that lack broadband and which have been identified by PTS. This coverage requires new wireless infrastructure in the 800 MHz band, with certain limitations (see Section 2.9.4), but the costs that the licence holder incurs will be limited in accordance with that described below.

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<sup>19</sup> An extract of the use notified to ITU has been published on the PTS website under the link <http://www.pts.se/800MHz-bandet>

<sup>20</sup> Report from the Ministry of Enterprise, Energy and Communications N2009/8317/ITP

2.9.1.1. Combined selection procedure and cost limitation

The FDD6 licence shall be assigned through a combined selection procedure; i.e. a combination of a comparative selection procedure (beauty contest) and an auction according to LEK.

The bidders compete for the FDD6 licence through a binding offer for coverage, which constitutes a comparative selection procedure. The lowest bid (minimum bid) that can be made is SEK 150m. Bidders can make bids up to and including SEK 300m (the 'ceiling amount') in coverage. PTS considers that this amount is sufficient to establish coverage through the rollout of infrastructure.

If several bidders have offered coverage up to and including the ceiling amount (SEK 300m), they may continue to compete for the licence through binding monetary offers that are paid as an auction proceeds (amounts over SEK 300m). This latter part of the combined selection procedure constitutes an auction according to LEK.

The coverage requirement is limited to a rollout cost corresponding to the licence holder's bid in coverage together with an annual adjustment for inflation<sup>21</sup>; see **item 18 in Appendix 1**. The licence holder shall not pay the bid amount, but shall use it to provide coverage. The coverage bid may never amount to more than the ceiling amount of SEK 300m. The amount of the coverage bid excludes value added tax.

2.9.1.2. Identification

PTS shall identify those who are to receive coverage. The point of departure for this identification is permanent homes and fixed places of business that do not have access to data communications services with a particular bit rate. Identification, which will take place annually from and including 2011, is based on information obtained by the Agency and processed to, among other things, ascertain whether the households and the businesses wish to have coverage.

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<sup>21</sup> The part of the licence holder's bid in coverage that remains each year, after deducting the licence holder's annual rollout costs, shall be adjusted upwards with inflation. This adjustment shall be made from and including 31 January 2013 and the annual average figure for the Consumer Price Index (CPI) shall be used as a measure of inflation. The index for 2010 has been set at 299.66 (1980=100). The following example illustrates how the inflation adjustment is considered to function. It is based on the assumption that the licence holder has pledged SEK 300m to cover permanent homes and fixed places of business. The licence holder uses SEK 200m in the first year (2012) to provide coverage, and SEK 100m is left for rollout in future. Assume that the annual average CPI figure is 300 and 306 for 2011 and 2012 respectively. CPI then increased by two per cent on an annual basis. The amount that remains (SEK 100m) shall therefore be adjusted upwards by two per cent on 31 January 2013 and the *inflation adjustment would thus become SEK 2m*. In total, SEK 102m is thus left for the licence holder to use for coverage. This adjustment shall take place every year until the promised funds for coverage have been used up.

The households and businesses that, on request, state that they wish to have coverage are included in a list of identified homes and places of business that PTS will then send to the licence holder; see Section 2.9.3.

In the Broadband Survey for 2009, around 2,800 permanent homes and fixed places of business lacked the basic prerequisites for broadband.<sup>22</sup>

PTS wishes to emphasise that the identification will not cover homes and businesses that have had access to data communication services with a bit rate of 1 Mbps (or a higher applicable level for functional access to the Internet) via the licence holder since 1 October 2009, but who have lost their access during the term of the licence. Such homes and places of business are not included in the target group for the coverage requirement in order to prevent licence holders from using the money promised for coverage to pay for the transition to new technology in their networks.

#### 2.9.1.3. Regulations for the combined selection procedure

PTS's Regulations PTS Code of Statutes – PTSFS 2010:xx concerning a combined selection procedure for licences to use radio transmitters in the 816–821/857–862 MHz frequency band (FDD6 in the 800 MHz band) shall apply to the combined selection procedure.

#### 2.9.2 Definition of coverage

'Coverage' is defined as

- that the rollout that takes place is appropriate and cost-effective in accordance with PTS's guidelines, and
- that end users gain access to data communications services in at least one room in the permanent home or at the fixed place of business so that they can receive services with a bit rate of 1 Mbps, or a higher applicable data rate for functional access to the Internet.<sup>23</sup>

The licence holder shall satisfy both of these criteria for each one of the homes and places of business identified in order to satisfy the coverage requirement.

##### 2.9.2.1. Appropriate and cost-effective rollout

As stated above, the cost of rolling out infrastructure is restricted. To check that the licence holder uses the money promised for coverage in the intended

<sup>22</sup> PTS-ER-2010:5. For maps and coordinates of the areas where there is no broadband coverage, see [www.pts.se](http://www.pts.se)

<sup>23</sup> The term 'functional access to the Internet' is used within the rules and regulations for universal services; see Chapter 5, Sections 1 and 2 of LEK.

way, the rollout shall be appropriate and cost-effective. This requirement means that the costs that the licence holder incurs for such rollout will be deducted from the cash that the licence holder promised within the framework of PTS's supervision of the coverage requirement. The rollout of infrastructure shall continue for as long as the money promised for coverage is still available; see Section 2.9.3.

By 'cost effective and appropriate rollout', PTS means a rollout at justified and reasonable costs aimed to cover the homes and places of business identified by PTS during the term of the licence. These costs shall establish coverage for identified homes and places of business, but not other kinds of coverage. The assessment of what is appropriate and cost-effective shall be conducted on the basis of the licence holder's own preconditions.

PTS has produced guidelines for the costs that the Agency considers may be included for an appropriate and cost-effective rollout; see **Appendix 1**. These guidelines only cover costs that arise when rolling out new infrastructure, principally the cost of establishing and installing such infrastructure. The cost of maintaining the newly established coverage (e.g. the cost of operating and servicing the network) is not covered.

#### 2.9.2.2. Data communications services with a particular bit rate

The coverage requirement means that the licence holder shall provide data communication services with a bit rate of 1 Mbps or a higher data rate stipulated by the Government for functional access to the Internet. The aim of the data rate for functional access to the Internet is to enable the use of a basic range of electronic communications services in society. The current data rate is 20 kbps<sup>24</sup>, but according to the Government there are reasons supporting an increase to 1 Mbps.<sup>25</sup> The bit rate in the coverage requirement may thus be increased during the term of the licence, in pace with the Government increasing the data rate for functional access to the Internet. If the bit rate for the coverage requirement is increased, PTS will then identify the homes and places of business that lack access to the new level. The licence holder may consequently use the money promised for coverage to cover an address with the new bit rate even if the address had already been covered with a lower rate.

The licence holder shall provide end users with access to data communications services indoors, in at least one room in the permanent home or at the fixed place of business. Supplying such services in areas principally used as wet or storage rooms does not constitute coverage.

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<sup>24</sup> See Section 29 a of the Electronic Communications Ordinance (2003:396)

<sup>25</sup> Government Bill 2009/10:193 p. 85 ff.

End users must be able to use data communications services by obtaining a subscription for the service and a radio receiver for indoor use that the licence holder has recommended to end users.

If the licence holder chooses to provide end users with coverage by installing equipment in the permanent home or at the place of business (e.g. a directional antenna and cables), the licence holder shall be responsible for such equipment. This means, for instance, that it is the licence holder that will pay for any maintenance and servicing costs for the equipment. The power supply for the equipment on the other hand shall be provided and paid for by the end user. In the event that the licence holder chooses to install equipment, PTS recommends the following installations to facilitate supervision of the coverage requirement:

- Erection of an outdoor antenna, from which radio signals are directed into the home or premises via a radio frequency cable.
- Erection of an outdoor antenna, which is connected to radio equipment that converts the signal into a publicly available interface for data communications, e.g. Ethernet or WLAN locally. The licence holder shall provide the service to the home or place of business via this interface.

### **2.9.3 Timeframes for coverage and list of target groups**

Coverage shall be provided within the following frameworks until the rollout cost amounts to the amount promised for coverage (no more than SEK 300m together with an annual adjustment for inflation):

- the licence holder shall cover at least 25 per cent of the permanent homes and fixed places of business on the list no later than 31 December 2012. PTS shall send this list to the licence holder no later than by 31 December 2011,
- the licence holder shall cover at least 75 per cent of the permanent homes and fixed places of business on the list no later than 31 December 2013. PTS shall send this list to the licence holder no later than by January 2013, and
- from and including 2014 and beyond, the licence holder shall cover all of the permanent homes and fixed places of business on the list no later than by 31 December of each year. PTS shall send this list to the licence holder no later than by January of the same year.

In the first two years (2012 and 2013) the licence holder may choose which homes and places of business on PTS's list for 2012 and 2013 shall receive coverage, as long as 25 and 75 per cent of them are covered in the respective year.

In 2014 and beyond, all homes and places of business identified for a particular year shall receive coverage during the year until the cost of covering them amounts to the money that the licence holder promised for coverage.

Identification shall start in 2011 and the first list of homes and places of business to be covered shall be sent to the licence holder in the autumn of 2011.

In the autumns of 2012 and 2013, the licence holder shall receive a preliminary list of the homes and places of business that are to be covered in 2013 and 2014 respectively. This is due to the fact that PTS will ask the licence holder no later than on 1 December of each year to report on the homes and places of business that it has covered during the current year; see Section 2.9.5. Those who received coverage in 2012 and 2013 shall be removed from the preliminary list and PTS will send out a final list in January 2013 and 2014 confirming the homes and places of business that are to have coverage by the end of 2013 and 2014 respectively.

*Example 1: The final list for 2013 comprised 1,250 homes and places of business.*

The licence holder receives a preliminary list for 2013 in the autumn of 2012 comprising 1,500 homes and places of business (1,000 from the 2012 list and 500 additional homes and places of business for 2013). On 1 December 2012, the licence holder shall provide PTS with a report listing the 250 homes and places of business that it covered from the 2012 list (25 per cent of 1,000). Those who did not receive coverage in 2012 (750) shall be included in the final list for 2013 together with additional homes and places of business (500). This final list thus comprises 1,250 (750+500) homes and places of business. The list is sent to the licence holder in January 2013 and covers 75 per cent of 1,250 homes and places of business in 2013.

#### **2.9.4 Rollout in other frequency bands or using other technology**

The coverage requirement shall be satisfied by rolling out wireless infrastructure in the 800 MHz band. However, such rollout will be particularly costly for some of the permanent homes and fixed places of business encompassed by the coverage requirement. This results from the fact that these homes and places of business are located in places where the terrain

makes coverage difficult and that are a long way from other homes and places of business encompassed by the coverage requirement. A small number of cases also lack even basic infrastructure (e.g. roads and access to electricity), for which reason these homes and places of business are extremely costly to cover.

In these cases, the licence holder may be able to use other frequency bands and other technologies if this is clearly less costly than a rollout in the 800 MHz band; see **item 21 in Appendix 1**.

#### **2.9.5 Supervision of the coverage requirement**

PTS is both the licence and supervisory authority. The licence holder is thus responsible for satisfying PTS that the undertaking has been complied with.

PTS will ask the licence holder no later than 1 December of each year to report on the permanent homes and fixed places of business that have received and are expected to receive data communications services with a particular bit rate during the current year. In conjunction with this, an electronic map in the format instructed by PTS shall be requested. This map ought to show the coverage established for the respective area, the infrastructure (e.g. roads, cables, masts) built and the homes and places of business covered.

PTS will ask the licence holder to report no later than 31 January of each year on its costs for covering each of the homes and places of business that received coverage in the previous year.

PTS may also, if required, request more detailed information to determine whether the coverage requirement has been satisfied, e.g. to assess whether the rollout has been appropriate and cost-effective.

#### **2.10 Differences between frequency blocks**

There are several circumstances that mean that the preconditions for using the various frequency blocks differ. This may entail that a bidder values blocks differently.

These circumstances are mainly the following:

- The technical conditions laid down differ between licences for frequency blocks; see Section 2.3.
- PTS intends to permit radio use of low power devices in the midgap (821–832 MHz); see Section 2.3.2.

- The expected impact of terrestrial television reception in the 470–790MHz frequency band differs between frequency blocks; see Sections 2.3 and 2.4.
- The existing and potential use of the 470–790 MHz frequency band for terrestrial television and other radio services by neighbouring countries differs between frequency blocks; see Section 2.5.
- A coverage requirement shall be laid down for the FDD6 licence; see Section 2.9.

## 3 Application and bank guarantee

### 3.1 The application

Applications shall be made on the standard application form provided by PTS; see **Appendix 2**. The application shall contain the following:

- Information about the applicant:
  - name or operating name,
  - personal identity (ID) number or corporate/organisation ID number (or the equivalent for a foreign applicant),
  - postal address, and
  - the contact person authorised to represent the applicant during the auction, including his or her telephone number and e-mail address.
  
- An assurance that:
  - the applicant is not insolvent,
  - bids placed in the auction come from the applicant,
  - the applicant has not had a licence revoked by PTS in the last four years prior to the application deadline for the auction under Chapter 7, Section 6, items 2 and 4 of LEK, and
  - that the applicant satisfies/will satisfy the applicable provisions of the PTS Regulations and this open invitation at the time of application and during the auction.
  
- An undertaking to work together and remedy television interference; see Section 2.4.
  
- Information about parties closely related to the applicant shall be attached to the application; see Section 4.2.

#### 3.1.1 Signature, etc.

The application shall be signed by an authorised signatory and an original copy submitted. An extract from the Trade and Industry Register, or corresponding for foreign applicants, shall also be attached to the application, indicating among other things which person(s) are authorised to sign in the operating name of the undertaking.

If a person who has signed the application is not an authorised signatory according to an extract from the Trade and Industry Register (or the corresponding equivalent for foreign applicants), a power of attorney for such authorisation should be submitted to PTS together with the application.

#### 3.1.1.1. Specific information for foreign applicants

If the extract from the Trade and Industry Register or corresponding is not in Swedish or English, a Swedish or English translation of the extract shall be attached to the application. If the extract does not clearly indicate that the person who signed the application (or power of attorney) is an authorised signatory for the applicant, a short description of authorised signatory powers shall be attached to the application, with references to relevant legislation.

#### 3.1.2 Available contact person

PTS will address all correspondence for the assignment matter to the contact person stated in the application. This, for example, means that PTS will only send information for logging into the action system to the contact person. Consequently, it is important that this contact person is available and can receive such information from the receipt of the application until such date on which the auction has closed.

### 3.2 Bank guarantee

Those applying to be allowed to be bidders in the auction must submit a bank guarantee to PTS before the end of the application period. If the bank guarantee is submitted to PTS too late, the applicant may not participate in the auction. Applicants must submit the bank guarantee under sealed cover (envelope), preferably within the same cover as the application.

The bank guarantee shall be given in Swedish kronor and shall include the content shown in **Appendix 3**. The bank guarantee shall also be issued by a credit institution (e.g. a bank) or a financial institution in an EU Member State, Iceland, Liechtenstein, Norway or Switzerland.

#### 3.2.1 Amount of the bank guarantee

The amount that the bank guarantee shall comprise is calculated on the basis of the number of frequency blocks that the applicant wants to be able to bid for in the first bidding round (a bidder's right to bid during the auction may never exceed the amount to which the bidder's bank guarantee corresponds).

The amount of the bank guarantee shall equate to at least SEK 25m for each frequency block that the bidder wants to be able to bid for in the auction. The applicant shall personally calculate the size of the bank guarantee. With regard

to the spectrum cap set for the auction (see Section 4.1), the bank guarantee may be issued for either at least SEK 25m or at least SEK 50m. Note that applicants do not need to state in their application how many frequency blocks the applicant is interested in bidding for at the auction. The size of the bank guarantee does not constitute a limitation for how high a bid the bidder can make at the auction.

### **3.2.2 Return and use of the bank guarantee**

PTS will return bank guarantees as soon as possible to those applicants that are not allowed to participate in the auction.

Bank guarantees will be returned to bidders that did not win the bidding for any of the frequency blocks as soon as possible after the auction has been closed. Bank guarantees will be sent to the postal address stated by the applicants.

Bank guarantees from winning bidders will be returned after the auction proceeds and processing charge have been paid to PTS; see Section 7. If a winning bidder does not pay PTS on time, the Agency will utilise the bidder's bank guarantee. The bank guarantee will be utilised in the first instance to pay the processing charge and in the second instance some of the auction proceeds.

### **3.3 Submitting the application and bank guarantee**

Those wishing to participate as bidders in the auction must submit an application and a bank guarantee to PTS.<sup>26</sup> The application and bank guarantee must satisfy the requirements of the PTS Regulations and this open invitation. The application and bank guarantee must be submitted to PTS no later than [DDMM] 2011.

Applications and bank guarantees that have been submitted too late will not be considered by PTS. It is the responsibility of the applicant to ensure that the application and bank guarantee is submitted to PTS on time. The application and bank guarantee shall be submitted to PTS under sealed cover (envelope) marked '*Ansökan 800 MHz-tilldelning*' [Application for the 800 MHz assignment].

If the application and bank guarantee are sent by post, the address is:

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<sup>26</sup> The assignment is governed by two regulations, both stating that an application and a bank guarantee must be submitted. Note, however, that each applicant only needs to submit *an application and a bank guarantee*, regardless of which frequency block(s) the applicant intends to bid for.

Swedish Post and Telecom Agency 'Ansökan 800 MHz-tilldelning' Box 5398 SE-103 49 Stockholm, Sweden
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The application and bank guarantee may be delivered to PTS in person or by courier at Valhallavägen 117, Stockholm, Monday to Friday, 08.00–17.00. Book a time in advance (contact Sally Ibrahim, +46 (0)8-678 55 00) if the application and bank guarantee are to be delivered in person or by courier.

PTS will open the applications and bank guarantees submitted on [DDMM] 2011. After the application has been opened, PTS will notify the stated contact person that the application has been received. Applicants that have submitted an application are not obliged to place bids in the auction. In other words, it is possible to refrain from placing bids in the auction even if PTS has approved the application to be allowed to become a bidder in the auction.

## 4 Spectrum cap and provision on closely related parties

### 4.1 Spectrum cap

A spectrum cap of 2×10 MHz has been set for the assignment of the 800 MHz band. An applicant therefore cannot be assigned any more than two licences of 2×5 MHz through the auction.

### 4.2 Provision on closely related parties

If two or more applicants are closely related undertakings, only one of them may participate in the auction. A definition of a ‘closely related party’ is as follows:

1. all undertakings that form part of the same group under Chapter 1, Section 4 of the Annual Accounts Act (1995:1554)<sup>27</sup> are deemed to be closely related,
2. if an undertaking or a group holds at least half of the votes for all shares in another undertaking, such undertaking (and any of its subsidiaries) are considered to be closely related to the owning undertaking and respectively to all undertakings in the owing group.

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<sup>27</sup> Chapter 1, Section 4 of the Annual Accounts Act is worded as follows:

An undertaking is a ‘parent company’ and a legal entity is a ‘subsidiary’ if the undertaking

1. holds more than half of the votes for all shares in the legal entity,
2. owns shares in the legal entity and, owing to a contract with other part-owners of this legal entity, has control of more than half of the votes for all shares,
3. owns shares in the legal entity and is entitled to appoint or dismiss more than half of the members of its board or corresponding governing body, or
4. owns shares in the legal entity and is entitled to solely exercise a decisive influence over the legal entity owing to a contract with the legal entity or owing to a provision of its Articles of Association, partnership agreement or rules comparable thereto.

Furthermore, a legal entity is a subsidiary to the parent company, if another subsidiary of the parent company or the parent company together with several other subsidiaries or several other subsidiaries together

1. hold more than half of the votes for all shares in the legal entity,
2. own shares in the legal entity and, owing to a contract with other part-owners of this legal entity, have control of more than half of the votes for all shares, or
3. own shares in the legal entity and are entitled to appoint or dismiss more than half of the members of its board or corresponding governing body.

If a subsidiary owns shares in a legal entity and, owing to a contract with the legal entity or, owing to a provision in its Articles of Association, partnership agreement or rules comparable thereto, is entitled to solely exercise a decisive influence over the legal entity, this is also a subsidiary to the parent company.

A parent company and a subsidiary jointly constitute a ‘group’.

In this Act, a ‘group company’ means an undertaking in the same group.

This means, for example, that jointly owned network undertakings in the mobile telephony market are considered to be closely related to their owners. It should be noted that two operators that own a joint network undertaking 50/50 are not deemed to be closely related to each other.

In conjunction with the application, applicants shall submit details of undertakings that are closely related to the applicant in accordance with the above definition. If two or more applicants are closely related to each other, they shall, at the request of PTS, state which of the undertakings shall participate in the auction. If this request is not complied with, none of the closely related undertakings may participate in the auction.

If it becomes known to PTS during the auction that a bidder has submitted incorrect information about circumstances related to closely related parties, PTS may decide to bar this party from participating in the auction.

## **5 Prohibition against collusion**

Collusion between bidders during the auction may negatively affect the outcome of the procedure. For this reason, bidders must not coordinate bidding or collude in the auction procedure in any other way. Discussions about the auction between two bidders may be interpreted as collusion.

If it becomes known to PTS during the auction that two or more bidders are colluding, PTS may bar these parties from participating in the auction.

## 6 Auction procedure

An auction according to LEK is an administrative selection process for assigning licences. The auction procedure will be held via an electronic auction system over the Internet, with several bidding rounds until such time as higher bids are no longer being placed and PTS closes the auction. The format of the auction is a Simultaneous Multi Round Auction (SMRA) with a right to move bids.

The FDD6 licence will be assigned through a combination of a comparative selection procedure (beauty contest) and an auction according to LEK; see Section 2.9. However, bidding for FDD6 will take place within the same auction system and in the same way as bidding for the other blocks; the only difference is that a bid up to and including the ceiling amount is a commitment in coverage and the amount of the coverage bid shall not be paid as an auction proceeds. Bidders can move bids between FDD6 and the other blocks throughout the entire auction.

### *How can one participate in the auction?*

The auction is an extensive process. Bidders must monitor and be active throughout the entire auction, though only during office hours.

During the first bidding round all bidders must be logged into the auction system and place bids. The number of points that the bidder bids for in the first round determines the number of points that the bidder has as binding bids in the auction. When the next round starts, the bidder must be logged in again in order to monitor the course of events and submit bids or decide to leave a bid unchanged (for example if their bid is a highest standing bid). And so it continues: bidders place bids in round after round. It is important to be active during each round to retain one's bidding rights.

After each bidding round, the bidders gain access to information about, for example, highest standing bids. Analysing this information may determine which bids to place in the next bidding round and whether to move a bid. Bidding levels (that is, the amount by which bidders may raise their bids) shall be set by PTS.

The auction will continue until all bidding has ceased. Because bidders are entitled to move bids and pass, bidding may suddenly resume for a frequency block that has stood still for several bidding rounds. In other words, a frequency block where it appeared that the winner was known may receive another higher bid. In the same way, a bidder, without doing anything, may find that they have a highest standing bid because someone else has moved a bid. Consequently, bidders must monitor all bidding rounds until the auction has closed.

PTS will make an announcement via the auction system when the next bidding round is to begin and end. The duration of the various bidding rounds may be changed during the auction so that the auction is not exceedingly long. Thus, the tempo may increase as the auction proceeds. For example, a bidding round may last for several hours at the start of the auction, but reduce to 10 to 20 minutes toward the end of the auction.

### **6.1 Frequency blocks and points**

The auction comprises six frequency blocks (six FDD blocks, each of 2×5 MHz) and each frequency block is an object in the auction.

Each frequency block has been allocated a value expressed as points: FDD frequency blocks have been assigned one point each, thus 2x5 MHz (i.e. 10 MHz) corresponds to one point. PTS has introduced the ‘points’ concept to determine the activity and bidding rights of bidders at the auction; see Section 6.6.

The spectrum cap set by PTS means that a bidder is allowed to bid for no more than 2×10 MHz (i.e. 20 MHz) or two points in a respective bidding round. The auction system will not permit a bidder to place bids encompassing more than two points.

### **6.2 Definitions**

*Bid (FDD1-FDD5):* a binding offer to pay an amount for a licence included in the auction.

*Bid (FDD6):* a binding offer for coverage up to and including the ceiling amount; see Section 2.9. The ceiling amount is SEK 300m. Bids that exceed the ceiling amount constitute a binding offer to, in addition to coverage, pay for the licence the amount exceeding the ceiling amount.

*Bidder:* a party that has submitted an application to participate in the auction and that satisfies the requirements contained in PTS’s decision to limit the number of licences.

*Bidding round:* a round in the auction when it is possible to bid for the frequency block.

*Bidding rights:* the right of a bidder to place a bid in the auction. The bidding rights are indicated as a number of points.

*Highest standing bid:* a bid that after each bidding round has been determined to be a highest standing bid for the respective frequency block at the time.

*Winning bid:* the highest standing bid for a particular frequency block after the auction has closed, which means that the bidder has won the bidding for the frequency block.

### **6.3 Login details and Internet connections**

Details of how to log into the auction system will be sent to the contact person stated in the application. Bidders need the login details for identification purposes and to log into the Internet auction system. PTS will also send the contact person the web address for the auction website, an auction system manual and a telephone number for support in good time prior to the auction.

Bidders are responsible for their own participation, e.g. that their computers, Internet connection and other equipment are in working order and that appropriate staff are participating and that they do not lose their login details.

English will be the language used in the interface for bidders in the auction system.

### **6.4 Time of the auction**

The auction is planned to start at 10.00 a.m. on X 2011. The start time will not be brought forward. If the start time needs to be postponed, PTS will provide information about this on the PTS website ([www.pts.se/800MHz-bandet](http://www.pts.se/800MHz-bandet)) and inform contact persons about the change.

PTS considers that the auction will take approximately two to ten working days, but would like to emphasise that it may take longer.

It is planned to hold a trial auction on X 2011, approximately one week before the start of the auction. PTS recommends that all bidders participate in the trial auction not only to ensure that their equipment is in working order but also to understand the format of the auction.

### **6.5 Bidding**

The auction will start with a minimum bid for each frequency block. These are shown in Table 2 below. 'Minimum bid' means the lowest bid that can be

made in the first bidding round. Minimum bids should not be interpreted as PTS's valuation of the licences.

Frequency block	Minimum bid (SEK)
FDD1	150,000,000
FDD2	150,000,000
FDD3	150,000,000
FDD4	150,000,000
FDD5	150,000,000
FDD6	150,000,000

Table 2: Minimum bids for frequency blocks

During the first bidding round, a bidder may only place bids for frequency blocks whose aggregate number of points corresponds to the bank guarantee. The amount of the bank guarantee must be at least SEK 25m for each point (that the applicant wishes to be able to bid for).

*Example 2:*

Bidder A has submitted a bank guarantee that corresponds to one point. This means that the bidder can bid for no more than 2×5 MHz in the first round.

The opportunities of bidders to place bids (bidding rights) in subsequent bidding rounds are described in Section 6.6 below.

A bidder may never bid for more than two points in a bidding round.

The auction will be carried out in bidding rounds, where the start and end times are determined by PTS. It is possible to bid for all frequency blocks in each bidding round, and each bidder may place new, higher bids, provided the bidder has sufficient bidding rights. This means that the bidder states a bid for the frequency blocks that it wishes to bid for and then registers its decision. The length of the bidding rounds may vary during the auction depending on activity at the auction. The aim is for the auction to end within a reasonable period of time.

Bids must be submitted to PTS within the period of time and in the manner stipulated by PTS during the auction procedure. Bidders are responsible for ensuring this. After the end of a bidding round, it will no longer be possible to place bids. In other words, it may be risky to wait until the end of a bidding round to register bids, as the bidder may, for example, experience technical problems.

When the bidding round is over, all registered bids will be ranked in order of size. If two or more bidders have placed identical bids, these bids will be

ranked immediately after the end of the bidding round by drawing lots, which takes place in the auction system.

The bidder whose bid for a frequency block is ranked the highest will have the highest standing bid for that frequency block.

Any bids placed are binding for the bidder. However, any bids placed previously may be cancelled if:

- the bidder replaces the bid with a higher bid for the same frequency block, *or*
- the bidder replaces the bid with a bid for a different frequency block by moving the bid; see Section 6.8.

Bids that are not the highest standing bid are also binding (unless they have been cancelled). They may become a highest standing bid if the highest standing bid for the frequency block has been cancelled by a bid being moved.

The number of points that the bidder bids for in the first round determines the number of points that the bidder has as binding bids in the auction. The number of points that the bidder has as binding bids will consequently remain constant during the auction. However, a bidder is not compelled to place new bids in each bidding round corresponding to the number of points that the bidder has as binding bids (however, there is then a risk that the bidder may reduce their bidding rights; see Section 6.6). A bidder may never have a binding bid for a frequency block encompassing more than two points in total (2×10 MHz, i.e. 20 MHz).

Before each bidding round, PTS will determine one or more permitted bidding levels, higher than the highest standing bid for the respective frequency block. Fixed bidding levels reduce the risk of errors during bidding and also aim to end the auction within a reasonable period of time. However, the size of the raised bids may vary during the auction and between different frequency blocks.

## **6.6 Bidding rights and activity requirements**

A bidder's bidding rights, which are expressed as a number of points, determine the bidder's right to place bids in different bidding rounds in the auction. In the first bidding round, the bidding rights of the bidder are determined by the size of the bank guarantee. As a rule, a bidder must remain active during the auction in order to retain its bidding rights.

The activity requirement means that a bidder may not bid for more frequencies during the course of the auction than those that the bidder bid for in previous bidding rounds. For example, if a bidder wants to win 2×10 MHz in total (i.e.

20 MHz), this bidder must have already bid for at least  $2 \times 10$  MHz in the first bidding round.

The aim of the activity requirement is to ensure that the auction is closed within a reasonable period of time.

The bidder's **activity** is calculated in points at the end of each bidding round as follows:

- a) points in a frequency block for a highest standing bid held at the beginning of the bidding round, *plus*
- b) points in a frequency block for bids placed during the bidding round, *less*
- c) points in a frequency block for a highest standing bid cancelled during the bidding round.

The sum of a), b) to c) comprises the bidder's activity in the newly concluded bidding round.

Regardless of whether a bidder is placing its first bid in a frequency block or is increasing or moving a bid, this bid constitutes a bid placed and thus falls under item b) above.

The bidder's **bidding rights** are calculated in points at the end of each bidding round as follows:

- a) the activity during the bidding round, *plus*
- b) points received by reactivating a bid

The sum of a) and b) comprise the bidder's bidding rights for the next bidding round. However, in the first bidding round, the bidder's bidding rights are determined by the size of the bank guarantee.

The following examples illustrate some of the auction rules. The examples are not designed to give a true picture of how the auction will run (for instance, bidders do not always act rationally in the examples). Instead, the intention is to provide a simple step-by-step illustration of the auction. Many of the calculations illustrated in the examples will be made automatically by the auction system.

*Example 3:*

Bidder A has submitted a bank guarantee corresponding to two points.  
Bidder B has submitted a bank guarantee corresponding to one point.

In the first bidding round, A places a bid for FDD3 and FDD 4, which is the maximum permitted according to the spectrum cap rule. B places a bid for FDD3.

As there are two bids for FDD3, the auction system ranks the bids at the end of the bidding round (by drawing lots if they are equal in size). B's bid for FDD3 is ranked highest (highest standing bid for FDD3) and A's bid for FDD4 is ranked highest (highest standing bid for FDD4). All of the bids placed are binding, even those bids that are not a highest standing bid (A's bid for FDD3).

A's activity in the first bidding round is 2 and B's activity in the first bidding round is 1. A's bidding rights in the second bidding round are 2 and B's bidding rights in the second bidding round are 1.

In the second bidding round, A moves its bid from FDD4 to FDD2. This is so that A can place a bid for FDD2; in order to do this A must cancel a bid, either for FDD3 or FDD4. In this case, A chooses to cancel its bid for FDD4. A's activity in the second bidding round is 1 (one point for a highest standing bid at the start of the bidding round plus one point for making a bid during the current bidding round less one point for cancelling a highest standing bid). B does not increase its bid for FDD3, where B has a highest standing bid.

B's activity in the second bidding round is 1 (one point for a highest current bid at the start of the bidding round plus zero bids placed in the bidding round less zero cancelled highest current bids).

A's bidding rights in the third bidding round are 1. However, A still has a binding bid for a frequency block corresponding to two points. B's bidding rights in bidding round three are 1.

A bidder's bid is reactivated if it becomes a highest standing bid as a result of the person with the previous highest standing bid moving their bid. If a bid is reactivated, the bidder's bidding rights are raised by one point. If the bidder did not have any bidding rights before the bid was reactivated and only one bid was reactivated, the bidder's bidding rights are raised by two points, provided

the bidder's bank guarantee equates to two points and that it placed a bid for two frequency blocks in first bidding round. This is so that the bidder whose bid is reactivated will be able to obtain at least  $2 \times 10$  MHz.

*Example 4:*

Continuation of Example 3: in the third bidding round, B moves its bid from FDD3 to FDD4. B's activity is 1 (one point for a highest standing bid at the start of the bidding round plus one bid placed for FDD4 less one cancelled highest standing bid for FDD3).

A does nothing in the third round. A's activity is 1 (one highest standing bid for FDD2 plus zero bids placed less zero cancelled highest standing bids).

As B has moved its bid from FDD3, A's previously placed bid for FDD3 will now become a highest standing bid.

A's bidding rights in the fourth bidding round are 2. A's activity in the previous bidding round was actually 1, but A has acquired a reactivated bid by B moving its highest standing bid for FDD6. B's bidding rights are 1.

PTS would like to emphasise the importance of the activity requirement. Bidders must remain active so that the right to place new bids is not be reduced. With two exceptions (reactivation of bids and passing), a bidder must thus have a highest standing bid or place new bids during each bidding round in order to retain its bidding rights for future bidding rounds. If bidding rights reduce, a bidder cannot take action to increase its bidding rights itself after the first bidding round; this depends instead on the actions of other bidders.

## **6.7 Exercising bidding rights**

The activity in a bidding round (calculated as points) may correspond to no more than the bidding rights.

In each bidding round, a bidder may use its bidding rights to remain active by:

- raising previously placed bids (a highest standing bid can also be raised)
- leaving a highest standing bid unchanged
- moving a bid that was placed previously (a highest standing bid can also be moved)

Bidding rights are not required to allow a bid that is not a highest standing bid to remain unchanged.

## 6.8 Moving bids

‘Moving a bid’ basically means that a bidder places a new bid for a different frequency block where the bidder did not have a bid, while cancelling an existing bid for a frequency block. A bidder can move one or two bids, provided it has sufficient bidding rights. The bid must be placed higher than the highest standing bid for the frequency block to which the bid is moved. A new bid does not have to be at the same or a higher level than the bid in the frequency block from which the bidder is moving. Bidders can move bids between FDD6 and the other blocks throughout the auction.

If the move means that a bidder moves back to a frequency block where it previously placed a bid (which was cancelled), the new bid must also be placed higher than this bidder's previous bid for the frequency block.

A precondition for bidders being able to move bids is that they must have bidding rights.

### *Example 5:*

Bidder X places a bid for the FDD1 and FDD2 frequency blocks in the first bidding round. This means that X's activity is two points and that its bidding rights in the following bidding round are thus two points.

In the first bidding round, bids were placed for all frequency blocks. Identical bids were ranked after the bidding round by drawing lots. This means that X's bid for FDD2 was ranked as a highest standing bid. X thus has one highest standing bid at the start of the second bidding round.

In the second bidding round, X moves its bid from FDD2 to FDD6. This means that X's bid for FDD2 is cancelled. X does nothing with the bid for FDD1. X's activity in round two is consequently 1 (one highest standing bid at the start of the bidding round plus one bid placed less one cancelled highest standing bid). X's bidding rights in the third round are thus one point.

Other bidders also placed several bids for all frequency blocks in the second bidding round. X's bid for FDD6 was ranked as a highest standing bid. X thus has one highest standing bid at the start of the third bidding round. One of X's bids is not a highest standing bid (FDD1).

X may choose to leave the highest standing bid (FDD6) unchanged, or raise or move it. Regardless of which of these three alternative X chooses, one of X's activity points will be used in the third bidding round by this bid. This means that X cannot raise or move the second bid (FDD1) in the third bidding

round, as X's activity in the bidding round may not exceed its bidding rights (one point).

When a highest current bid is cancelled in connection with a bid being moved, the following takes place:

- If one or more new bids are placed in the same round for the frequency block in question, the highest bid becomes a highest standing bid.
- If no new bids are placed in the same round for the frequency block in question, the bid that is ranked the second highest becomes the new highest standing bid. If a bid is reactivated in this way, the bidder's bidding rights are raised by one point. If the bidder did not have any bidding rights before the bid was reactivated and only one bid was reactivated, the bidder's bidding rights are raised by two points (provided the bidder's bank guarantee equates to two points and that the bidder placed a bid for two frequency blocks in first bidding round).
- If there are no binding bids left in the frequency block, PTS shall decide on the lowest bid allowed for this frequency block in the next round.

## 6.9 Passing

At the start of the auction, all bidders will be given the right to pass during a bidding round on no more than three occasions (the entire bidding round and not individual frequency blocks) without a reduction in bidding rights. This means the right to pass three times is the same for all participants, regardless of the extent of the bidder's bidding rights. PTS recommends that bidders save their right to pass for such situations where the bidder encounters circumstances that are difficult to control, such as technical faults experienced by the bidder.

It is not possible to pass during the first bidding round.

Passing may only be used if a bidder has not registered a decision during a bidding round and *if any rights of the bidder would otherwise be reduced*. The auction system will then automatically use one of the bidder's rights to pass in order to protect its bidding rights (if any opportunities to pass remain).

If the bidder registers a bid for one or more frequency blocks in a bidding round, the bidder has not passed.

If the bidder has a highest standing bid corresponding to the same number of points as the bidding rights, the auction system will not pass automatically, as the bidding rights of the bidder will not be reduced.

A bidder that does not want the auction system to automatically pass in a bidding round may choose to register a decision without raising/moving any of its existing bids. This consequently means that the bidder does not use one of its opportunities to pass and that its bidding rights may thus be reduced.

#### **6.10 Barring from participation**

If it emerges during the auction that a bidder has submitted incorrect information in its application or has otherwise not complied with the rules contained in the Regulations, PTS may bar such party from participating in the auction.

#### **6.11 Unforeseen events**

If unforeseen events have a major impact on the auction, PTS may temporarily or completely discontinue a certain bidding round or the auction. Under such circumstances, PTS is entitled to, when appropriate

- resume the auction or bidding round at the phase when bidding was interrupted, *or*
- declare that the auction, a bidding round or several bidding rounds are invalid and recommence the auction from the start or from a particular bidding round.

If an unforeseen event occurs, PTS intends to resume the auction with as little disruption or as few delays as possible. Examples of events that PTS may deem to be 'unforeseen' include technical interruptions that have a negative impact on PTS or the bidders, a bidder being barred from participating during the auction or major functional Internet disruptions. However, it is not possible for PTS to provide an exhaustive list in advance of what are deemed to be unforeseen events.

If the auction comes up against technical interruptions, PTS will first inform bidders via the PTS website ([www.pts.se](http://www.pts.se)).

#### **6.12 Information during the auction**

Before each bidding round, PTS will publish information in the auction system concerning:

- the start and end times for the next bidding round,
- bidding levels permitted in the next bidding round.

After each bidding round, anonymous information will be published about:

- the highest standing bid for each frequency block,
- aggregate activity in the auction.

Information from each bidding round will also be made available as historic data in the auction system.

All bidders will also be able to monitor the following information about their own bidding:

- total number of binding bids,
- the frequency blocks where the bidder has a highest standing bid and the size of this bid,
- the frequency blocks where the bidder has a binding bid that is not the highest standing bid, the size of this bid and how this bid has been ranked,
- the activity in the previous round and bidding rights in the next round,
- how many opportunities to pass are left.

### **6.13 Closure of the auction**

The auction may not close until a bidding round in the auction has been concluded without any bidding having taken place or anyone having passed the bidding round. In other words, this means that the entire auction closes at the same time. The right to move bids between different frequency blocks means that the auction for an individual frequency block may not be closed until the bidding for all frequency blocks has ceased.

PTS will inform the bidders about when the auction has closed via the auction system.

When the auction is closed, the winner of the bidding round will be the bidder that placed the highest bid or was ranked highest when lots were drawn for each frequency block.

A bid ceases to be binding after closure of the auction if the bid is not a winning bid.

## 7 Payment and assignment of licences

When the auction has closed, PTS will publish the names of the bidders that have won the bidding for the FDD1-FDD6 licences and the winning bids. Bids that have not won shall cease to be binding after closure of the auction. PTS will assign licences to those bidders that have won the bidding for frequency blocks as soon as possible.

Invoices for the auction proceeds and processing charge will be sent to the winning bidders after the auction. These invoices must be paid within 30 days of the date of invoice.

If the winning bid for the FDD6 licence is no more than SEK 300m, only a processing charge shall be paid. If the winning bid exceeds the ceiling amount, the winning bidder shall pay an auction proceeds and the processing charge. The auction proceeds constitutes the amount that exceeds SEK 300m.

The processing charge corresponds to external costs incurred by PTS that are directly linked to the auction procedure. PTS had costs in conjunction with the 800 MHz auction for, among other things, consultants, software and translation work. However, the processing charge will not exceed SEK X/MHz. The processing charge will be split between the winning bidders in accordance with the amount of spectrum assigned (the number of MHz). The final processing charge shall be laid down in a decision on assignment.

Bank guarantees will be returned to winning bidders after the auction proceeds and processing charge has been paid to PTS. Bank guarantees for bidders that have not won the bidding for any of the frequency blocks shall be returned after closure of the auction.

If the invoice is not paid to PTS on time, the Agency will utilise the bidder's bank guarantee. The bank guarantee will be utilised in the first instance to pay the processing charge and in the second instance to pay for some of the auction proceeds.

If PTS becomes aware after the auction has closed that a bidder has submitted incorrect information or has otherwise not complied with the rules contained in the PTS Regulations, this will not change the outcome of the auction for other bidders. This consequently means that the bidder with the second highest bid will not win the licence if the winner's licence is subsequently

revoked. The payment obligation remains the same for other bidders that have won licences.

Licences that have not been assigned at the auction or have been revoked will be assigned through a new procedure.

## **8 Risk of a licence being revoked**

In accordance with the rules contained in Chapter 7 of LEK, PTS may revoke a licence assigned through the auction. However, if a licence is revoked, there is still an obligation to pay the auction proceeds (i.e. the winning bid(s)) and the processing charge.

PTS may revoke a licence if a winning bidder has submitted incorrect information about, for example, its situation in terms of closely related parties, or if the bidder has not complied with the rules contained in the PTS Regulations and the open invitation by, for example, breaching the prohibition on collusion or if the bidder has not paid the processing charge or auction proceeds on time.

## 9 Questions and information

Information about the assignment of licences in the 800 MHz band has been published on the PTS website: [www.pts.se/800MHz-bandet](http://www.pts.se/800MHz-bandet).

It is also possible to subscribe for news published on the website's news pages; in this case radio news [*Nyheter – Radio*]. Subscribers will automatically receive an e-mail as soon as news is posted. Subscribe by going to <http://www.pts.se/prenumerera> and putting a cross against the options 'Radio' and 'Pressmeddelanden' [Press Releases].

Questions about the procedure may be sent by e-mail to the following address: [800-bandet@pts.se](mailto:800-bandet@pts.se). These questions and PTS's responses will be published on the PTS website.

## 10 Appendices

- Appendix 1 Proposed licence conditions
- Appendix 2 Standard application form
- Appendix 3 Template for bank guarantee
- Appendix 4 Channel 60 areas

## Appendix 1 – Proposed licence conditions

### Technical conditions

1. The Frequency Division Duplex (FDD) method shall be used. The downlink band (791–821 MHz) shall be used for transmissions from a base station and repeater in the downlink direction. The uplink band (832–862 MHz) shall be used for transmission from a terminal and repeater in the uplink direction.
2. Radiated power from a base station transmitter and repeater in the downlink direction must not exceed 64 dBm/5 MHz EIRP<sup>28</sup> if the effective antenna height<sup>29</sup> is less than 50 m, or 67 dBm/5 MHz EIRP if the effective antenna height is 50 m or above.
3. The following radiated power in Channel 60 areas<sup>30</sup> applies to the FDD1 and FDD2 frequency blocks.

Radiated power from a base station transmitter and repeater in the downlink direction must not exceed 56 dBm/5 MHz EIRP. However, if vertical polarization is used, the radiated power from a base station transmitter and repeater in the downlink direction may amount to 64 dBm/5 MHz e.i.r.p if the effective antenna height is lower than 50 m, or 67 dBm/5 MHz EIRP if the effective antenna height is 50 m or above.

4. In the 790-791 MHz frequency band, radiated power from a base station transmitter and repeater in the downlink direction must not exceed 17.4 dBm/1 MHz EIRP.<sup>31</sup>
5. In the 791-821 MHz frequency band, radiated power from a base station transmitter and repeater in the downlink direction outside those frequency blocks for which the licence holder has a licence must not exceed the values stated in the table in a 0-10 MHz frequency space.

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<sup>28</sup> EIRP stands for Equivalent Isotropically Radiated Power.

<sup>29</sup> Effective antenna height is calculated as the antenna height over the average level of the ground, where the average level of the ground indicates the average altitude in a direction 3 to 15 km from the antenna.

<sup>30</sup> Channel 60 areas are the geographical areas where the 782–790 MHz frequency space is being used or has been planned for terrestrial television. The Channel 60 areas are listed in Appendix 4.

<sup>31</sup> The levels for radiated power apply per antenna for between one and four antennae. This means that a system with several antennae (e.g. a MIMO system) may generate aggregate radiated power that exceeds the limit per antenna.

Frequency difference to block limit ( $ \Delta F $ ) i MHz	Maximum radiated power (EIRP) <sup>31</sup>
$0 <  \Delta F  < 5$	+22 dBm/5MHz
$5 <  \Delta F  < 10$	+18 dBm/5MHz

$|\Delta F| = 0$  corresponds to the upper and lower limits for the frequency block assigned for transmissions from a base station or repeater

6. In the 791-821 MHz frequency band, radiated power from a base station transmitter and repeater in the downlink direction outside the frequency blocks for which the licence holder has a licence must not exceed 11 dBm/1 MHz EIRP in a frequency space of more than 10 MHz.<sup>31</sup>
7. In the 821-832 MHz frequency band, radiated power from a base station transmitter and repeater in the downlink direction must not exceed 15 dBm/1 MHz EIRP.<sup>31</sup>
8. In the 832-862 frequency band, radiated power from a base station transmitter and repeater in the downlink direction must not exceed -49.5 dBm/5 MHz EIRP
9. In the 470-782 MHz together with the 782-790 MHz frequency bands, radiated power from a base station transmitter and repeater in the downlink direction in Channel 60 areas must not exceed the values stated in the table.

The base station's radiated power (P) (EIRP) in its own block	Maximum radiated power (EIRP) in the 470–782 MHz frequency band and 782–790 MHz in Channel 60 areas
$P \geq 59$ dBm/10MHz	0 dBm/8 MHz
$36 \leq P < 59$ dBm/10 MHz	(P-59) dBm/8 MHz
$P < 36$ dBm/10 MHz	-23 dBm/8 MHz

10. In the 782-790 MHz frequency band, radiated power from a base station transmitter and repeater in the downlink direction must not exceed 22 dBm/8 MHz EIRP in geographical areas other than Channel 60 areas.
11. The average power for FDD terminals used in the 832-862 MHz frequency band must not exceed 23 dBm.<sup>32</sup>

A higher average power than that mentioned above may be used for installations of a fixed erected directional antenna outside urban areas.<sup>33</sup> Use, for which the licence holder is responsible, presumes that no interference is caused to other radio use and that applicable obligations in relation to other countries have been satisfied.
12. The licence holder may deviate from the technical conditions contained in clauses 5, 6 and 8 above provided that other the licence holders affected approve such deviations.

Figures 1 to 2 illustrate the conditions stated for 790-862 MHz in the event that a licence holder has been assigned FDD1 and FDD2, and FDD6, respectively. Conditions for radiated power outside the licence holder's own frequency block in the 790-832 MHz frequency band apply to each antenna for between one and four antennae, while conditions for radiated power within the licence holder's own frequency block and also in the uplink band apply to aggregate radiated power from a base station.

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<sup>32</sup> This power limit is specified as EIRP for terminal stations designed to be fixed or installed and as TRP for terminal stations designed to be mobile or nomadic. EIRP and TRP are equivalent for isotropic antennae. It is recognised that this value is subject to a tolerance of up to +2 dB, to take account of operation under extreme environmental conditions and production spread.

<sup>33</sup> An 'urban area' means an area with more than 200 inhabitants and where there is less than 200 metres between houses in accordance with the definition of 'urban area' used by Statistics Sweden.

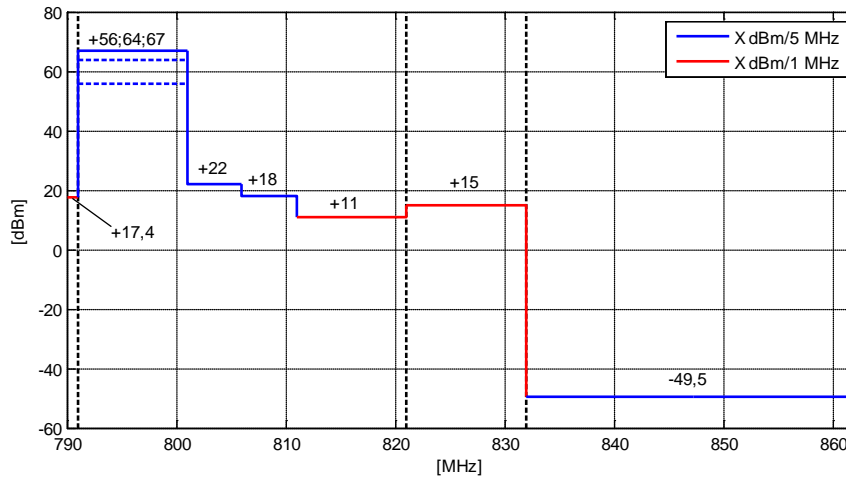


Figure 1: Illustration of conditions for maximum permitted radiated power (EIRP) in 790-862 MHz from a base station transmitter and repeater for licence holders with FDD1 and FDD2 licences

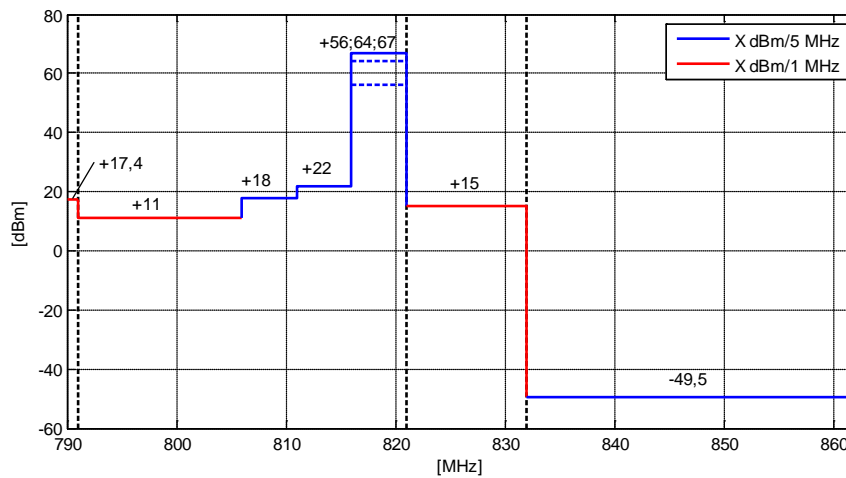


Figure 2: Illustration of conditions for maximum permitted radiated power (EIRP) in 790-862 MHz from a base station transmitter and repeater for a licence holder with an FDD6 licence

Illustrations of the conditions stated for 470-791 MHz are shown in Figures 3 and 4. The conditions for radiated power outside the licence holder's own frequency block in the 470-790 MHz frequency band apply to aggregate

radiated power from a base station. Level A in the figures is maximum radiated power (EIRP) in the 470-782 MHz frequency band, and 782-790 MHz in Channel 60 areas according to the licence condition in item 9 above.

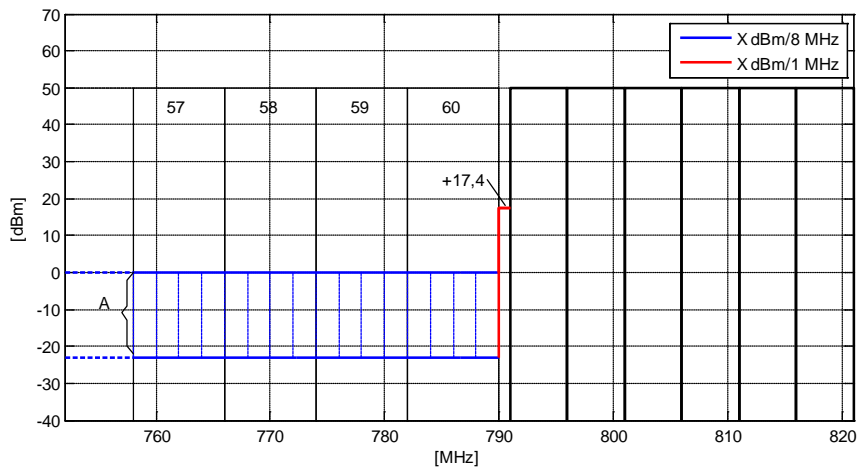


Figure 3: Illustration of conditions for maximum permitted radiated power (EIRP) in 470-791 MHz from a base station transmitter and repeater in Channel 60 areas

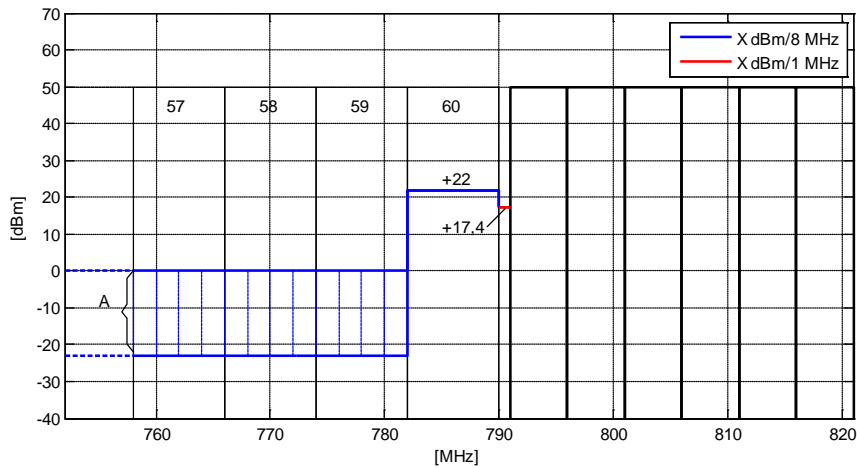


Figure 4: Illustration of conditions for maximum permitted radiated power (EIRP) in 470-791 MHz from a base station transmitter and repeater in geographical areas other than Channel 60 areas

### **Prohibition against causing interference and measures to remedy interference to television receivers**

13. The licence holder must not cause television interference to terrestrial television reception in the 470-790 MHz frequency band for the permanent resident population.<sup>34</sup>

*Television interference* means that:

- The signal level<sup>35</sup> from the base station within the block in question ( $dBm/5 MHz$ ) exceeds the signal level from television broadcasting service transmitters within the television channels affected ( $dBm/8 MHz$ ) by more than the signal level difference ( $dB$ ) given in Table 1.
- When measuring the signal level from the base station within the block in question ( $dBm/5 MHz$ ), it exceeds the levels given in Table 2 where the respective television channel is used.

The signal levels shall be measured<sup>36</sup> using a reference antenna<sup>37</sup> ten metres above the ground at the household affected. The measurement shall be made in the direction where the required television signal is strongest.

The prohibition against causing television disruption only applies if the field strength from the television broadcasting service transmitter's signal within the television channels affected exceeds  $44 + 20 \log_{10}(f/500)$   $dBuV/m/8 MHz$  ( $f$  is a centre frequency [MHz] in the respective television channel).

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<sup>34</sup> 'Permanent resident' means that there are people in the household who are registered at the address in the population register.

<sup>35</sup> Signal level = Voltage above 50 ohm measured at the reference antenna's feed point

<sup>36</sup> The method of measurement will be determined by PTS in collaboration with the interested parties affected.

<sup>37</sup> The starting point for the reference antenna is a directional antenna with an antenna gain of 12 dBd and a lossless cable. The reference antenna shall use the polarization used for television broadcasts. Properties for directivity discrimination shall be based on ITU-R Recommendation BT.419.

	<b>FDD1</b>	<b>FDD2</b>	<b>FDD3</b>	<b>FDD4</b>	<b>FDD5</b>	<b>FDD6</b>
Television Channel/Block	791-796 MHz	796-801 MHz	801-806 MHz	806-811 MHz	811-816 MHz	816-821 MHz
<b>60</b> 782-790 MHz	30	30	37	37	37	37
<b>59</b> 774-782 MHz	37	37	37	37	47	47
<b>58</b> 766-774 MHz	37	37	47	47	47	47
<b>21-57</b> 470-766 MHz	47	47	47	47	47	47

Table 1: Signal level difference (dB) for each block and for each television channel

	<b>FDD1</b>	<b>FDD2</b>	<b>FDD3</b>	<b>FDD4</b>	<b>FDD5</b>	<b>FDD6</b>
Television Channel/Block	791-796 MHz	796-801 MHz	801-806 MHz	806-811 MHz	811-816 MHz	816-821 MHz
<b>60</b> 782-790 MHz	-5	-5	0	0	5	5
<b>59</b> 774-782 MHz	0	0	5	5	5	5
<b>58</b> 766-774 MHz	5	5	5	5	5	5
<b>21-57</b> 470-766 MHz	5	5	5	5	5	5

Table 2: Upper limit for signal level (dBm/5 MHz) for each block and for each television channel

14. The licence holder shall help to:

- immediately establish cooperation between the licence holders in the 800 MHz band, with a view to coordinating measures to remedy interference (according to the definition of television interference contained in item 13) for terrestrial television reception for the permanent resident population in the 470–790 MHz frequency band,
- ensure that cooperation between the licence holders immediately offers a common point of contact with good accessibility, at least via telephone, for the television viewers,
- keep a register of reports received,
- promptly identify the licence holder causing television interference in the 470–790 MHz frequency band, and
- as soon as possible thereafter, arrange an investigation at no charge and, in the event that the source of the interference is attributable to a licence holder, remedy the television interference shown in an appropriate way and at no charge, and
- immediately disconnect the radio transmitters causing the interference until the television interference has been remedied.

### **Coordination**

15. The licence holder shall coordinate with and obtain the consent of the National Defence Radio Establishment when locating base station equipment, in conjunction with rolling out the communication network in the proximity of National Defence Radio Establishment installations within the Municipalities of Ekerö, Gotland, Karlskrona, Kungsbacka, Simrishamn, Vellinge and Ystad.
16. The licence holder shall comply with the applicable provisions of coordination agreements applicable from time to time that Sweden has concluded with other States.
17. The licence holder has priority regarding the assigned frequencies, but there may be cases where radio equipment with dynamic spectrum access is used by another party.

### **Requirement on coverage and rollout (only applies to FDD6)**

18. The licence holder shall cover all permanent homes and fixed places of business that do not have data communications services with a particular bit rate identified by PTS, though no more than a rollout cost of [X] Swedish kronor (excluding value added tax) plus an annual adjustment for inflation.<sup>38</sup>

19. 'Coverage' means:

- (i) a cost-effective and appropriate rollout in accordance with the provisions of PTS's guidelines for cost-effective and appropriate rollout, and
- (ii) that an end user gains access to data communications services in at least one room in the permanent home or at the fixed place of business so that the end user can receive services with a bit rate of 1 Mbps, or a higher applicable data rate for functional access to the Internet where the home or place of business has been identified.

'A bit rate of 1 Mbps' in item (ii) above means:

- that the bit rate amounts to at least 1 Mbps at some point in time in a day,
- that the average rate amounts to at least 750 kbps in a day, and
- that the average rate for four consecutive hours when the speed is at its lowest amounts to at least 500 kbps.

20. Coverage shall be provided within the following timeframes until the rollout cost amounts to the amount stated in item 18:

- (i) the licence holder shall cover at least twenty-five (25) per cent of the permanent homes and fixed places of business on the list no later than 31 December 2012. PTS shall send this list to the licence holder no later than 31 December 2011;

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<sup>38</sup> The part of the licence holder's bid in coverage that remains each year, after deducting the licence holder's annual rollout costs, shall be adjusted upwards with inflation. The adjustment shall be made from and including 31 January 2013 and the annual average figure for the Consumer Price Index (CPI) shall be used as a measure of inflation.

- (ii) the licence holder shall cover at least seventy-five (75) per cent of the permanent homes and fixed places of business on the list no later than 31 December 2013. PTS shall send this list to the licence holder no later than by January 2013, and;
- (iii) from and including 2014 and beyond, the licence holder shall cover all of the permanent homes and fixed places of business on the list no later than by 31 December of each year. PTS shall send this list to the licence holder no later than by January of the same year.

21. For the 250 homes and places of business that are most costly to cover through rollout, the licence holder may take into account coverage provided by using infrastructure in its own 450 MHz, 900 MHz, 1800 MHz, 2.1 GHz, 2.6 GHz or 3.4-3.8 GHz frequency bands or by using infrastructure based on a different technology to radio, if such rollout is clearly less costly than a rollout in the 800 MHz band. For the 20 most expensive homes and places of business, the licence holder may also take into account coverage provided by using satellite solutions if such rollout is clearly less costly.

#### **PTS guidelines for cost-effective and appropriate rollout**

By 'cost effective and appropriate rollout' PTS means a rollout at justified and reasonable costs aimed to cover (in accordance with PTS's definition of coverage, item 19 (ii) ) only those permanent homes and fixed places of business identified by PTS during the term of the licence. This only means additional costs.<sup>39</sup> The cost of covering a permanent home or fixed place of business may only be counted once during the rollout (except in those cases where PTS re-identifies homes or places of business on account of the level for functional access to the Internet having been raised).

A cost-effective and appropriate rollout covers the following costs:

- **Cost of infrastructure for the transmitter location**  
Cost of infrastructure in radio equipment and other facilities required to provide coverage according to the condition on coverage and rollout. This includes the cost of
  - roads up to the site where the radio base station is to be installed if none exists and this is required,

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<sup>39</sup> Separable costs

- the radio base station,
  - the building or the space where the radio base station is located; climate control required for the equipment to function as intended,
  - the support systems required for the installation to function generally, e.g. power, masts for attaching radio antennae, foundations for the building and masts, radio antennae, cables, radio waveguides, etc. required to satisfy the technical specifications that apply to radio coverage within these areas,
  - installation and commissioning, and
  - work directly linked to the construction of infrastructure at the transmitter location, e.g. excavation.
- **Cost of infrastructure at the end user**

Cost of equipment at the end user required to provide coverage in accordance with the condition on coverage and rollout. This includes the cost of

    - directional antennae and cables,
    - work directly linked to the installation of infrastructure at the end user, e.g. for erection, laying cables, installation of end user equipment.
- **Cost of infrastructure from a transmitter location to nodes in an existing network**

Cost of infrastructure between infrastructure at the transmitter site, which is required to provide coverage according to the condition on coverage and rollout, and nodes in the licence holder's other electronic communications networks, for contact and communication between these parts of the electronic communications networks. This includes the cost of

    - solutions with radio link equipment or other transmission equipment,
    - additional masts with associated installations or other investments in equipment and services that are necessary,
    - installation and commissioning, and
    - work directly linked to the construction of infrastructure from the transmitter location to nodes in existing networks.
- Other infrastructure costs in the part of the communications network constructed purely to satisfy the coverage requirement, and required so that the licence holder can satisfy the coverage requirement.

**A cost-effective and appropriate rollout does not include the following costs:**

- Ongoing costs for, among other things, the operation, maintenance and repair of infrastructure or reinvestments.
- The cost of measures made after commissioning the network to, e.g. increase its functionality and/or increase capacity in the network ('upgrades') (except in those cases where PTS re-identifies homes or places of business on account of the level for functional access to the Internet having been raised).
- The cost of covering (coverage as defined in the licence conditions) homes or places of business that previously had access to data communications services with a bit rate of 1 Mbps (or a higher applicable data rate for functional access to the Internet) , but which was lost owing to the licence holder having changed or removed the technology previously used.
- Organisational and administrative costs, such as, for example, the cost of cell planning and site surveys.
- Joint costs.<sup>40</sup>

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<sup>40</sup> Common costs

### Information

A party running operations under the Electronic Communications Act is liable to, on request, provide PTS with the information and documents required to supervise the conditions issued pursuant to the Act. In the course of supervising the requirement on coverage and rollout in the FDD6 licence, PTS will request information and documentation from the licence holder annually concerning:

- (i) the permanent homes and fixed places of business that have received coverage during the year in question, which shall be delivered to PTS no later than by 1 December of the same year, and
- (ii) the licence holder's costs for covering each of the permanent homes and the fixed places of business that have received coverage during the year in question, which shall be delivered to PTS no later than by 31 January of the following year.

The licence conditions may be changed considering future changes to radio technology or changes in radio use on account of international agreements to which Sweden has acceded or provisions adopted pursuant to the Treaty on the Functioning of the European Union.

It follows from Chapter 6, Section 12 of the Swedish Post and Telecom Agency Regulations (PTS Code of Statutes – PTSFS 2007:4) concerning exemptions from licence obligations for certain radio transmitters, amended by, among others, PTS Code of Statutes – PTSFS 2009:4, that exemptions from the licence obligation apply to radio transmitters that use UWB (Ultra Wideband) technology. In the 0 – 1600 MHz frequency space, this type of radio transmitter may emit a maximum average power density of EIRP -90 dBm/MHz and a peak power density of -50 dBm/50 MHz EIRP. If this type of radio transmitter reaches a large market, it may consequently be projected that the level of interference in the 800 MHz frequency band will increase.

**Appendix 2 – Application to participate in the auction<sup>41</sup> for a permit to use radio transmitters in the 800 MHz band**

Applicant's name or operating name: \_\_\_\_\_

Applicant's personal or corporate/organisation ID number (or corresponding for foreign applicants):

\_\_\_\_\_

Postal address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Contact person (who is authorised to represent the applicant in the auction):

\_\_\_\_\_

Postal address for the contact person (if the address is different to that specified above):

\_\_\_\_\_

\_\_\_\_\_

Telephone number (contact person): \_\_\_\_\_

Fax number (contact person): \_\_\_\_\_

e-mail address (contact person): \_\_\_\_\_

\_\_\_\_\_

<sup>41</sup> In this application, the term 'auction' means the entire selection procedure; i.e. an auction according to LEK for FDD1–FDD5 and the combined selection procedure for FDD6.

**The undersigned applicant confirms on their honour and conscience**

- that the applicant is not insolvent,
- that bids placed in the auction come from the applicant,
- that the applicant has not had a licence revoked by PTS in the last four years prior to the application deadline for the auction under Chapter 7, Section 6, items 2 or 4 of the Electronic Communications Act (2003:389), and
- that the applicant satisfies/will satisfy the applicable provisions of the PTS Regulations and this open invitation at the time of application and during the auction.

**In the event that the undersigned becomes a holder of a licence to use radio transmitters in the 800 MHz band, the undersigned applicant will take the following measures:**

- help to immediately establish cooperation between the licence holders in the 800 MHz band, with a view to coordinating measures to remedy interference (according to the definition of television interference contained in the open invitation, **Appendix 1**) for terrestrial television reception for the permanent resident population in the 470–790 MHz frequency band,
- ensure that the cooperation between the licence holders immediately offers a common point of contact with good accessibility, at least via telephone, for the television viewers,
- keep a register of reports received,
- promptly help to identify the licence holder causing television interference in the 470-790 MHz frequency band, and
- as soon as possible thereafter, arrange an investigation at no charge and, in the event that the source of the interference is attributable to the undersigned, remedy the television interference shown in an appropriate way, and
- immediately disconnect the radio transmitters causing the interference until the television interference has been remedied.

**Signature of authorised signatory:**

\_\_\_\_\_ of \_\_\_\_\_ / \_\_\_\_\_ 2011

**Print name:**

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**This application shall be submitted to PTS no later than [DDMM] 2011.**

Postal address: Swedish Post and Telecom Agency, 'Ansökan 800 MHz-auktion', Box 5398, SE-102 49 Stockholm, Sweden

Make an appointment with Sally Ibrahim (+46 (0)8-678 55 00) if the application and bank guarantee is to be delivered by hand or by courier. Visiting address: Valhallavägen 117, Stockholm, Sweden.

Note that the application must **be signed by an authorised signatory**. If the person who signed the application is not an authorised signatory according to an extract from the Trade and Industry Register (or corresponding for foreign applicants), an original power of attorney showing this person's authorisation shall be attached to the application.

**The following documents shall be attached to the application:**

- Extract from the Trade and Industry Register.
- For foreign applicants, an extract from the Trade and Industry Register or corresponding – in Swedish or English – confirming the information regarding operating name, corporate/organisation ID number and names of the authorised signatories.
- a power of attorney for authorisation if the person who has signed the application is not an authorised signatory according to an extract from the Trade and Industry Register or the corresponding for foreign applicants.
- Details of parties closely related to the applicants; see the definition of 'closely related parties' contained in the open invitation.
- A bank guarantee corresponding to at least the number of points that the applicant wishes to be able to bid for in the first bidding round (a template for a bank guarantee can be found in the open invitation (**Appendix 3**) and also separately in an electronic format on the PTS website).

### **Appendix 3 – Template for bank guarantee**

*For applicants to be allowed to participate in the auction, the bank guarantee must include the following:*

## **ON DEMAND GUARANTEE**

### **The Applicant**

[Name]  
[Address]  
[Post code]  
[Identification/registration number]  
[Country]

At the request of

### **Beneficiary**

Swedish Post and Telecom Agency (PTS)  
Box 5398  
SE-102 49 STOCKHOLM  
SWEDEN

We, the undersigned

### **Bank**

[Name]  
[Address]  
[Post code]  
[Identification/registration number]  
[Country]

## *GUARANTEE*

in favour of the Applicant's following

### **Obligations**

All administrative charges and/or auction fees resulting from the auction of licenses in the 800 MHz band in Sweden

### **Up to and including an amount of**

[XXXX] Swedish kronor (SEK).

### **On Demand Guarantee**

The Bank shall irrevocably and on demand from PTS pay to PTS the requested sum up to and including the above amount. The demand shall be made in writing. The written demand shall be signed by the Director General of PTS. The Bank shall not be entitled to any other examination or documentation of the claim. The undertaking of the Bank is independent and unconditional in relation to PTS.

### **Payment and interest**

The Bank shall effect payment of the amount required within eight (8) days of receipt of a demand. After this time, if the required sum has not been paid, the Bank shall pay default interest pursuant to Section 6 of the Interest Act (SFS 1975:635) until payment is effected.

### **Law and jurisdiction**

This Guarantee shall be subject to Swedish law and the jurisdiction of Swedish courts.

The agreed venue for any litigation with respect to this Guarantee shall be Stockholms tingsrätt (Stockholm City Court).

### **Validity**

This Guarantee shall remain valid until

DD MM 2011

### **Enforcement clause**

The Bank agrees that a judicial decision made by Swedish courts shall be directly enforceable in relation to the Bank.

Date: \_\_\_\_\_

Bank: \_\_\_\_\_

Signature of person(s) entitled to sign for the bank:

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Full name(s) and title(s):

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Telephone number(s):

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Open invitation for the 800 MHz assignment, consultation version

#### **Appendix 4 – Channel 60 areas**

See separate document on PTS web site, [www.pts.se/800MHz-bandet](http://www.pts.se/800MHz-bandet).