

Appendix A Licence conditions

Area of use and technical conditions

1. The licence is national.
2. The licence shall be used for terrestrial systems capable of providing wireless broadband services.
3. Frequency Division Duplex (FDD) technology shall be used as duplex method for downlink and uplink transmission respectively.

Radio transmitters in the frequency spectrum 738–758 MHz, Supplemental Downlink (SDL), and 768–788 MHz, FDD, referred to as base stations and repeaters below, shall transmit in downlink.

Radio transmitters in the frequency spectrum 713–733 MHz, FDD, referred to as terminals below, shall transmit in uplink.¹

4. Within the assigned frequency blocks, the average radiated power (e.i.r.p.)² from base stations and repeaters must not exceed 64 dBm/5 MHz per antenna in directions where the effective antenna height³ is lower than 50 metres and must not exceed 67 dBm/5 MHz per antenna in directions where the effective antenna height is 50 metres or higher.
5. Average radiated power (e.i.r.p.) from base station transmitters and repeaters in the frequency band 470–733 MHz must not exceed the values given in the table.

Frequency spectrum	Block	Average radiated power (e.i.r.p.)	Bandwidth
470-694 MHz	SDL1-4, FDD1-4	-23 dBm per cell ⁴	8 MHz
694-703 MHz	SDL1-4, FDD1-4	-32 dBm per cell	1 MHz
703-733 MHz	SDL1-4, FDD1-4	-50 dBm per cell	5 MHz

6. Average radiated power (e.i.r.p.) from base station transmitters and repeaters outside the assigned frequency block, in the frequency band 733–788 MHz, must not exceed the values given in the table.

¹ Subdivision into frequency blocks and limitation of the number of licences, see section 2 of the general invitation

² e.i.r.p. stands for Equivalent Isotropically Radiated Power.

³ Effective antenna height is calculated as antenna height over average ground level, where average ground level states the average height above sea level in a direction 0 to 3 km from the antenna.

⁴ For an antenna site with more than one sector, “cell” refers to one of the sectors.

Frequency spectrum	Block	Average radiated power (e.i.r.p.)	Bandwidth
733-788 MHz	SDL1-4, FDD1-4	$0 < \Delta F < 5$: 22 dBm per antenna	5 MHz
		$5 < \Delta F < 10$: 18 dBm per antenna	
		$ \Delta F > 10$: 16 dBm per antenna	

$|\Delta F| = 0$ MHz corresponds to the upper and lower limits respectively for the assigned frequency block.

7. Average radiated power (e.i.r.p.) from base station transmitters and repeaters in the frequency bands 788–821 MHz and 832–862 MHz must not exceed the values given in the table.

Frequency spectrum	Block	Average radiated power (e.i.r.p.)	Bandwidth
788-791 MHz	SDL1-4, FDD1-2	14 dBm per antenna	3 MHz
	FDD3	16 dBm per antenna	3 MHz
	FDD3	4 dBm per antenna	200 kHz
	FDD4	21 dBm per antenna	3 MHz
	FDD4	11 dBm per antenna	200 kHz
791-796 MHz	SDL1-4, FDD1-2	16 dBm per antenna	5 MHz
	FDD3	17 dBm per antenna	
	FDD4	19 dBm per antenna	
796-801 MHz	SDL1-4, FDD1-3	16 dBm per antenna	5 MHz
	FDD4	17 dBm per antenna	
801-821 MHz	SDL1-4, FDD1-4	16 dBm per antenna	5 MHz
832-862 MHz	SDL1-4, FDD1-4	-49 dBm per cell	5 MHz

8. Terminals that are installed outside built up areas⁵ may transmit with a higher average power than 23 dBm⁶ on condition that they do not cause harmful interference to other radio usage. Neither may usage be in contravention of provisions in bilateral coordination agreements.
9. Average radiated power from terminals (expressed as e.i.r.p. or t.r.p.) in the frequency band 470–694 MHz must not exceed -42 dBm/8 MHz.

This condition applies regardless of bandwidth and radiated power within

⁵ Built up areas means areas that have more than 200 residents and where there is less than 200 metres between houses, according to the definition of a built up area used by the Central Bureau of Statistics.

⁶ This power limit is stated as e.i.r.p. for terminals that are designed to be fixed or installed and as t.r.p. for terminals that are designed to be mobile or nomadic. t.r.p. stands for *total radiated power*. e.i.r.p. and t.r.p. are equivalent for non-directional antennas. This value has tolerance of up to +2 dB so as to take into account operation under extreme environmental conditions and production spread.

own frequency block.

If the licence holder wishes to use an average radiated power higher than 23 dBm or a bandwidth greater than 10 MHz, the Swedish Post and Telecom Agency shall first be informed of how the condition of -42 dBm/8 MHz is ensured.

10. Average radiated power from terminals (expressed as e.i.r.p. or t.r.p.) in the frequency band 694–703 MHz must not exceed the values given in the table.

Frequency spectrum	Block	Average radiated power (e.i.r.p./t.r.p.)	Bandwidth
694-698 MHz	FDD1-4	-7 dBm	4 MHz
698-703 MHz	FDD1-4	2 dBm	5 MHz

11. The licence holder may, by agreement with other licence holders in 713–733 MHz, 738–758 MHz and 768–788 MHz, deviate from the technical conditions according to point 5 with regard to 713–733 MHz and according to point 6 with regard to 738–758 MHz and 768–788 MHz.
12. The licence holder is responsible for planning the network.

Shared use

13. The licence holder of this licence has priority in the frequency spectrum assigned.

The frequency spectrum shall be shared with others on condition that the licence holder of this licence is not put at risk of harmful interference.

The licence holder shall assist, as appropriate, in making available information about usage and current and planned deployment so as to facilitate sharing the frequency spectrum.

If there is a standardised regulation or sophisticated technology for sharing available, the Swedish Post and Telecom Agency may require that information shall be made available in automated format to the Swedish Post and Telecom Agency or its appointed third party.

Coordination

14. The licence holder shall coordinate with and obtain approval from the Swedish Armed Forces with all new installations and changes to existing installations in the municipalities of Ystad, Gotland and Karlskrona.⁷
15. The licence holder shall comply with applicable provisions at every point in time with regard to coordination agreements that Sweden has entered into with other countries.

Prohibition on causing interference and measures to rectify interference to television reception

16. The licence holder must not cause interference to the reception of terrestrial television in the 470–694 MHz frequency band for resident population⁸.

Television interference refers to:

- The signal level⁹ from the base station or by the licence holder installed repeater or terminal within the relevant frequency block (dBm/5 MHz) exceeds the signal level from the television transmitter for the effected TV channel (dBm/8 MHz) by more than 41 dB.
- or
- The signal level from the base station or by the licence installed repeater or terminal holder within the relevant frequency block (dBm/5 MHz) exceeds -6 dBm/5 MHz (overload).

Signal levels shall be measured¹⁰ with a reference antenna 10 metres above the ground – under appropriate conditions – at the affected household. The basis for the reference antenna is a directional antenna with 11 dBd antenna gain and a cable without losses. The reference antenna shall use the polarisation used for the television transmission. Properties for directional antenna discrimination shall be based on ITU-R recommendation BT.419. Measurements shall be made in the direction where the desired television signal is strongest.

The prohibition on causing *television interference* only applies if the measured field strength from the TV transmitter of the desired station exceeds $44 + 20 \log_{10}(f/500)$ dB μ V/m/8 MHz (f is the centre frequency of the TV channel in question) at a height of 10 metres above the ground.

17. The licence holder shall assist in:
 - immediately establishing a collaboration between licence holders in the 713–733 MHz, 738–758 MHz and 768–788 MHz bands, for the purpose of coordinating measures to remedy interference (according to the definition of *television interference* in point 16) to reception of

⁷ There are directions on how to initiate coordination under Information.

⁸ Resident population means that the household has people registered at this address in the population register.

⁹ Signal level = Level over 50 Ω (ohms) measured at the feed point of the reference antenna.

¹⁰ The measurement method is determined by the Swedish Post and Telecom Agency in collaboration with affected parties.

terrestrial television in the 470–694 MHz frequency band for the resident population,

- ensuring that the collaboration between licence holders immediately offers a joint contact point with good accessibility, at the least by telephone, to which television viewers whose reception is affected by the use of the 700 MHz band can contact,
- coordinate the contact point mentioned above with that established for television viewers whose reception is affected by the use of the 800 MHz band,
- keep a log of incoming calls,
- immediately identify which licence holder is causing television interference in the 470–694 MHz band and as quickly as possible and without charge undertake investigation and, where the cause of interference relates to the licence holder, without charge remedy confirmed *television interference* in an appropriate manner and
- if necessary, immediately shut down interfering base station transmitters or by the licence holder installed repeaters or terminals until the television interference has been remedied.

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Obligations for coverage and deployment (applies to the licence for 2×10 MHz which shall be assigned with obligations for coverage and deployment)

18. By means of deployment, the licence holder shall achieve coverage for mobile voice and data services of at least 10 Mbit/s for reception with hand held terminals that can be deducted by the value of the so-called *coverage obligation amount* according to the settlement model in points 30-33.

This deployment shall proceed as far as the coverage obligation amount permits in the priority areas, types 1 and 2, that may be found in Appendix B to this licence.

The coverage obligation amount is adjusted annually for inflation with effect from 31 January 2020.¹¹

19. At least SEK one hundred million (100,000,000) of the coverage obligation amount shall be used for deployment that achieves coverage within type 1 priority areas.

The amount is adjusted annually for inflation with effect from 31 January 2020.

The remainder of the coverage obligation amount may be used for deployment that achieves coverage in type 1 or type 2 priority areas.

At least 50 per cent of the coverage obligation amount may be used for deployment that achieves coverage in the counties, and according to the percentage distribution, in the table below.

County	Minimum percentage of coverage obligation amount
Jämtland	10.5 %
Dalarna	8.5 %
Västerbotten	8.0 %
Norrbotten	7.5 %
Västernorrland	7.0 %
Gävleborg	4.5 %
Värmland	4.0 %
Total	50 %

A county consists of the borders that applied on the decision date for this licence.

¹¹ The annual average of the consumer price index (1980=100) is used as a measure of inflation. The amount for adjustment with effect from 31 January 2022 is the coverage obligation amount that remains after settlement of approved costs. Settlement continues until the coverage obligation amount has been used up.

20. Coverage for voice services is deemed to exist if, with a hand-held terminal, it is possible to connect a call and the connection can be maintained with good quality and without interruption.
21. Coverage for data services is deemed to exist if, with a hand-held terminal, it is possible to receive data at a speed of at least 10 Mbit/s and to transmit data with a speed at least equivalent to what follows from point 23.

Capacity and performance¹² within the coverage area shall correspond to at least 2×10 MHz LTE with 2×2 MIMO.

22. Every mast that is established to comply with the obligations for coverage and deployment shall achieve coverage for voice and data services in at least 20 km² of priority area.

In these licence conditions, the term mast refers to the construction that carries the antennae (antenna carrier) and the construction that contains the radio equipment (technical space). The radio equipment, antennae and other equipment that is needed for the installation are also included in the term mast.

23. Coverage according to points 20-22 shall be based on the following assumptions:
 - The terminal's lowest permitted power and worst reception sensitivity according to 3GPP or other relevant standardisation organisation
 - Base station sensitivity to the equipment in use (inc. diversity gain, TMA¹³ etc.)
 - Terminal antenna amplification ≤-2 dBi (regardless of frequency band).
 - Margin of 8 dB for data services and 16 dB for voice services in relation to a terminal free of body contact.
 - Terminal height above ground 1.5 metres
 - Interference margin (load) in uplink 2 dB
 - Handover gain 2 dB for techniques where relevant
 - Lowest data speed in uplink 128 kbit/s, in normal conditions
 - Lowest data speed in downlink 10 Mbit/s, in normal conditions
 - Cell edge coverage probability ≥80%
24. The deployment shall be performed cost-effectively.

The cost-effectiveness condition means among other things that masts shall be placed without coverage overlaps.

Antenna configuration, e.g. the number of sectors and antennae directions, shall also be so that the priority area that can be covered by each mast is performed effectively.

¹² With regard to speed and latency.

¹³ Tower Mounted Amplifier

25. Every mast that is approved for financial settlement according to point 30 shall be in operation and comply with the licence conditions throughout the remaining licence period.
26. The obligations for coverage and deployment cannot be complied with through the use of masts put into operation before the decision date for this licence using the technologies GSM, UMTS or LTE in any of the frequency bands 800 MHz, 900 MHz, 1800 MHz, 2100 MHz or 2600 MHz.
27. The obligations for coverage and deployment cannot be complied with through the establishment of a mast closer than 1,000 m from masts according to point 26 unless there are special circumstances.
28. The obligations for coverage and deployment may be complied with using frequency bands that are harmonised within the European Union for wireless broadband services and awarded and have a performance¹⁴ and capacity that as a minimum corresponds to what can be achieved using 2×10 MHz LTE with 2×2 MIMO in the 700 MHz band.
29. If frequency bands according to point 28 are used, the obligation for coverage for voice services according to point 20 may also be complied with through for example the GSM, WCDMA or VoLTE technologies for voice telephony.

Settlement model

30. Only masts that comply with the coverage and deployment obligations may be settled from the coverage obligation amount.
31. The cost of each mast is settled using a standardised amount of SEK one million (1,000,000).

The standardised amount is adjusted annually for inflation with effect from 31 January 2020.¹⁵

32. In addition to the standardised amount, the licence holder may also settle actual costs for connection to the electricity grid for each mast, i.e. the connection charge (excluding VAT) invoiced by the electricity network operator.¹⁶

A maximum of SEK two million (2,000,000) per mast may be settled for electricity connection.

33. Costs above the standardised amount and actual costs for electricity may not be settled.

Timetable deployment

34. Coverage shall be provided according to the following s timetable:

¹⁴ Speed and latency

¹⁵ CPI (1980=100) is used as a measure of inflation

¹⁶ Applies to the electricity grid up to the connection point for the location of the mast.

- By 31 December 2021 at the latest, the licence holder shall have completed deployment that can be settled at an amount corresponding to 25 per cent of the coverage obligation amount.
- By 31 December 2022 at the latest, the licence holder shall have completed deployment that can be settled at an amount corresponding to 50 per cent of the coverage obligation amount.
- By 31 December 2023 at the latest, the licence holder shall have completed deployment that can be settled at an amount corresponding to 75 per cent of the coverage obligation amount.
- By 31 December 2024 at the latest, the licence holder shall have completed deployment that can be settled at an amount corresponding to 100 per cent of the coverage obligation amount.

Information

Application obligation

Public communication networks of the type that are normally provided against payment or publicly available electronic communication services may only be provided after application to the Swedish Post and Telecom Agency.

Information obligation

Those who perform activities according to the Act on electronic communication are obliged, upon request, to provide the Swedish Post and Telecom Agency with the information and documents that are needed to check compliance with the conditions set pursuant to the Act.

Changes in conditions

Licence conditions may be changed with regard to future changes in radio technology or changes in radio usage because of the international agreements that Sweden has signed or provisions adopted pursuant to the treaty on the function of the European Union.

Consultation with the Swedish Armed Forces

Consultation with the Swedish Armed Forces regarding the location of base station equipment in certain municipalities is initiated by filling in a placement form, which may be found on the website of the Swedish Armed Forces.¹⁷ Completed form are sent to the Swedish Armed Forces according to the instructions on the form. If there are any questions, contact the Swedish Armed Forces at fysplan@mil.se.

¹⁷ www.Forsvarsmakten.se klicka på Om myndigheten-> Riksstressen -> Remissblanketter -> Remiss för inplacering ->