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Federal Communications Commission ComCom
Federal Office of Communications OFCOM

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Invitation to tender for frequency blocks for the nationwide provision of mobile telecommunications services in Switzerland

July 2018 edition

This document is an unofficial translation.
The official Dossier for public invitation to tender is available in German, French and Italian only.

Contents

1 Introduction

ComCom has instructed OFCOM to hold a public tender procedure for mobile radio frequencies. The tender procedure takes place with particular reference to the newly available frequency ranges for public mobile radio. In addition, the frequency block in the 2.6 GHz band which was not sold in the 2012 auction is being put out to tender again.

The continued and strongly increasing demand for mobile broadband services requires additional frequencies and a licensing configuration which is as flexible as possible. It is planned to put out to tender a bandwidth of 475 MHz in total. By means of this award of these frequency blocks, the intention is to provide market players with a long-term planning perspective.

The allocation of these frequencies is taking place by auction for reasons of transparency and non-discrimination. The auction is designed so that both the number of licences to be awarded and their corresponding spectrum is not prescribed by ComCom, but determined within the framework of the procedure. In this way, market players will have the possibility of purchasing a frequency configuration which corresponds to their business models. This procedure is intended to both enable any new operators to acquire mobile radio frequencies and to give existing operators the possibility of equipping themselves with frequencies suitable for their future demands.

Since the operators, licensees, candidates, etc. are mainly legal entities, these designations of persons are used below in the feminine or masculine form.

1.1 General

The Federal Communications Commission (ComCom) has decided to put out to tender all available frequency blocks in the 700 MHz (the second digital dividend), 1400 MHz and 3500-3800 MHz (hereinafter 3.6 GHz) frequency bands and the remaining frequencies in the 2600 MHz band. In total a bandwidth of 475 MHz will be awarded. In detail, this is composed of the following:

- 2 x 30 MHz (FDD[1]) in the 700 MHz band
- 1 x 15 MHz (SDL[2]) in the 700 MHz band
- 1 x 90 MHz (SDL[2]) in the 1400 MHz band
- 2 x 5 MHz (FDD[1]) in the 2600 MHz band
- 1 x 300 MHz (TDD[3]) in the 3.6 GHz band

The allocation of frequencies is exclusively for national use. All frequency blocks are to be awarded simultaneously in a single procedure.

1.2 The licensing authority

The licensing authority is ComCom (Art. 24a para. 1 TCA[4]).

1.3 Procedural sequence

The procedure for awarding licences is based in particular on the provisions of Art. 22 ff. TCA in accordance with Art. 20, 21, 23 and 24 of the Ordinance concerning Frequency Management and Radiocommunication Licences (OFMRL)[5]. The procedure for awarding the frequency blocks will take

[1] FDD: Frequency Division Duplex

[2] SDL: Supplemental Downlink in relation to the 800 MHz FDD blocks

[3] TDD: Time Division Duplex

[4] Telecommunications Act of 30 April 1997 (TCA; CC 784.10)

[5] Ordinance of 9 March 2007 concerning Frequency Management and Radiocommunication Licences (OFMRL; CC 784.102.1)

the form of an auction within the meaning of Art. 23 OFMRL. OFCOM is responsible for the preparation of the tender procedure and for the examination of all applications in accordance with the instructions of the Federal Communications Commission and shall submit these decision proposals[6]. Once authorisation has been obtained, the auction will take place in two phases, in the event that there is excess demand:

- In the first phase (the so-called clock phase), the extent of the frequencies to be awarded to the individual auction participants in each category will be determined by means of a simple "clock auction" (CA) conducted over several rounds. This will involve the auction participants specifying the amounts of spectrum they are requesting in each band at the respective prices defined for a given round, and the round prices will be increased until there is no longer excess demand in any category. The conclusion of the clock phase determines the auction price for all frequency blocks that have been won, which are at this point still abstract.
- In a second phase (the assignment phase) the successful bidders have the opportunity of acquiring their preferred specific frequency position.

In order to limit acquisition of the amount of spectrum by individual bidders, spectrum caps are applied. These are defined in the auction rules document (Annex II, para. 1.3). A more detailed description of the design of the auction is provided in Section 6 of the present document.

The auction rules mentioned in Section 6 are still subject to adjustments. The definitive auction rules will be communicated to participants after the disclosure of the admission decisions.

If conditions change substantially between publication of the invitation to tender in the Federal Gazette and the award of licence (e.g. changes in the market structure), the licensing authority may, taking into account the conditions stated in the tender documents, amend the minimum bids, or amend, suspend or cancel the procedure (Art. 24 OFMRL).

For the licence award, the licensing authority may appoint independent experts with regard to the preparation and implementation of the procedure and to the evaluation of bids (Art. 21 para. 2 OFMRL). In the present case the British company DotEcon was appointed.

Figure 1 below shows the procedural sequence schematically.

[6] Art. 1 para. 2 of the Federal Communications Commission Ordinance concerning the Federal Telecommunications Act of 17 November 1997 (CC 784.101.112)

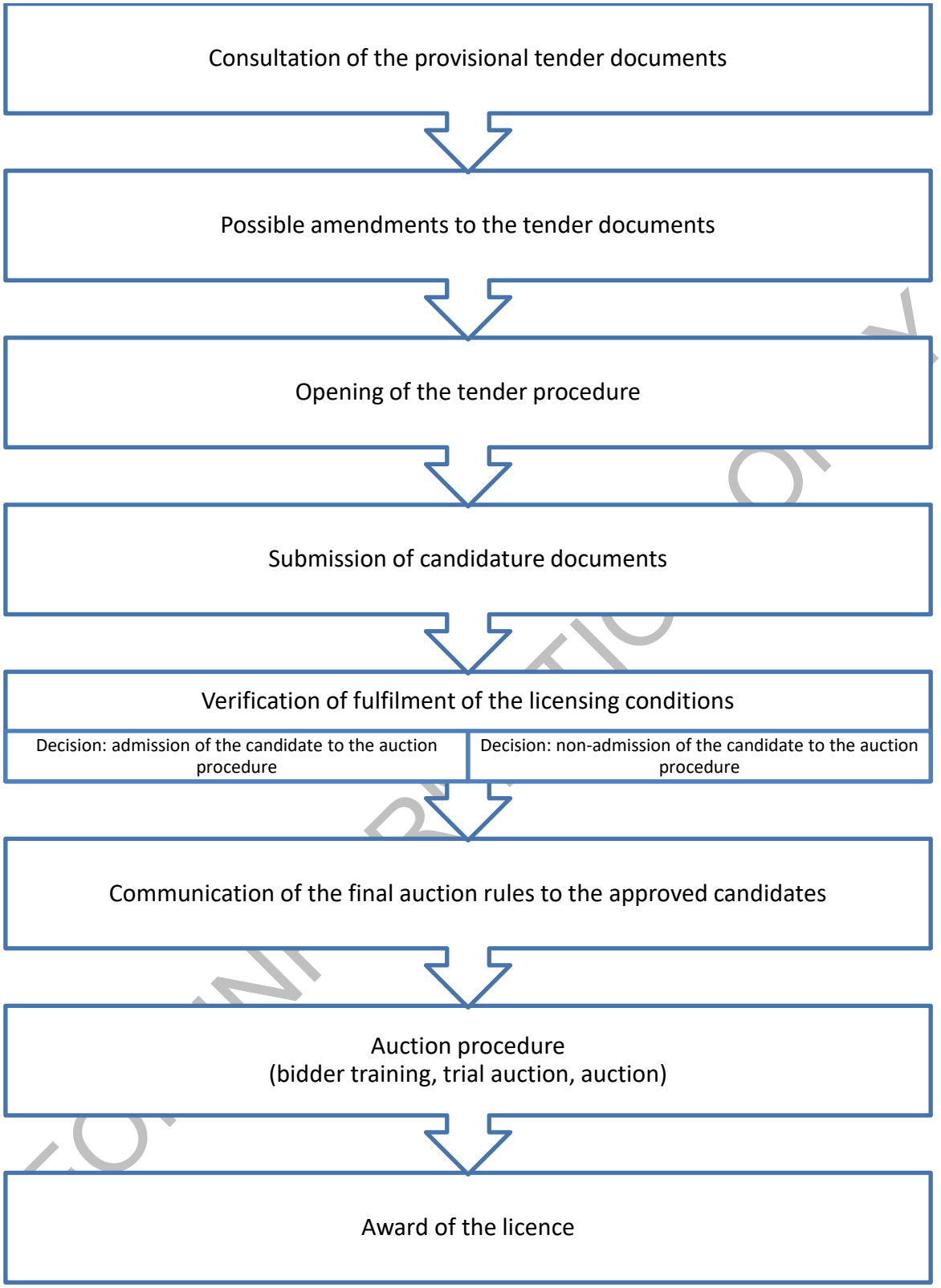

Figure 1: Schematic procedural sequence

2 Frequencies

2.1 The frequency situation

A total bandwidth of 475 MHz from the following frequency bands is available in the present award procedure:

Frequency band	Arrangement	Maximum usable bandwidth	Availability
700 MHz	703–733 MHz / 758–788 MHz: • 2 x 30 MHz FDD 738-753 MHz • 1 x 15 MHz downlink only SDL	60 MHz FDD 15 MHz SDL	Date: country-wide from 2018, subject to restrictions in border regions. Restrictions possible within the SDL range[7]
1400 MHz	Downlink only SDL • 1427–1452 MHz, 1 x 25 MHz • 1452–1492 MHz, 1 x 40 MHz • 1492–1517 MHz, 1 x 25 MHz	90 MHz SDL	Date: country-wide from 2019 with restrictions[8] [9] • 1 x 40 MHz (core band) • 1 x 25 MHz and 1 x 25 MHz (outer bands)
2600 MHz	2565–2570 MHz / 2685–2690 MHz: • 2 x 5 MHz FDD	10 MHz FDD	Date: already available country-wide
3500-3600 MHz 3600-3800 MHz	3500-3600 MHz • 1 x 100 MHz TDD 3600-3800 MHz • 1 x 200 MHz TDD	300 MHz TDD	Date: country-wide from 2019 • 1 x 100 MHz TDD • 3600-3800 MHz coordination with satellite earth stations mandatory (Valais, Geneva and Lake Constance regions, among others) • Specific restrictions due to applications of the Swiss Confederation

[7] ECC Report 239

[8] ECC Report 269. Furthermore, the outer bands must be fixed in the National Frequency Allocation Plan. Use inside the country and especially in regions near the border may be restricted by existing radio relay links.

[9] The CEPT compatibility and sharing studies regarding the L band have not yet been concluded and will continue until mid-2018. The use of the upper L band range will be associated with technical conditions, in order to ensure protection of Mobile Earth Stations (MES) above 1518 MHz.

Table 1: Bandwidths

2.2 Frequency blocks to be allocated

Category	Frequency band	Spectrum endowment	Number of blocks
A	700 MHz FDD	2 x 5 MHz	6
B	700 MHz SDL	1 x 5 MHz	3
C1	1400 MHz SDL	1 x 5 MHz	5
C2	1400 MHz SDL	1 x 5 MHz	8
C3	1400 MHz SDL	1 x 5 MHz	5
D	2600 MHz FDD	2 x 5 MHz	1
E	3.6 GHz TDD	1 x 20 MHz	15

Table 2: Frequency blocks to be allocated

A detailed listing of the frequency blocks to be allocated and the designation and description can be found in Annex I.

2.3 Conditions of use of frequency bands

These sections describe the regulations for use and conditions, as well as restrictions on uses in the frequency blocks to be allocated in the 700 MHz, 1400 MHz, 2600 MHz and 3.6 GHz frequency bands or parts thereof.

Restrictions may apply in respect of allocations under previous law which do not lapse until after the definitive allocation to mobile radio or allocations which continue to exist as a result of the co-existent allocation in the same range of frequencies. Furthermore, conditions are essential for specific frequency bands in order not to interfere with services on adjacent frequencies or conversely not to suffer interference from these services.

The allocation of frequencies is exclusively for national use. The conditions of use listed below apply. The listed decisions, the implementation thereof in Switzerland, recommendations, reports of the CEPT, ECC and ERC can be accessed at https://www.erodocdb.dk.

2.3.1 700 MHz

In each case the latest updated versions implemented by Switzerland of the provisions of the CEPT decisions and accepted recommendations apply, among others:

- ECC/DEC/(15)01: Harmonised technical conditions for mobile/fixed communications networks (MFCN) in the band 694-790 MHz including a paired frequency arrangement. (Frequency Division Duplex 2x30 MHz) and an optional unpaired frequency arrangement (Supplemental Downlink), approved 6 March 2015.
- CEPT Report 053: Report A from CEPT to the European Commission in response to the Mandate “To develop harmonised technical conditions for the 694–790 MHz ('700 MHz') frequency band in the EU for the provision of wireless broadband and other uses in support of EU spectrum policy objectives”, approved on 28 November 2014 by the ECC.
- CEPT Report 060: Report B from CEPT to the European Commission in response to the Mandate “To develop harmonised technical conditions for the 694–790 MHz ('700 MHz') frequency band in the EU for the provision of wireless broadband and other uses in support of EU spectrum policy objectives”, approved on 1 March 2016 by the ECC.
- CEPT Report 029: Report from CEPT to the European Commission in response to the Mandate on "Technical considerations regarding harmonisation options for the digital dividend in the European Union”.
  “Guideline on cross border coordination issues between mobile services in one country and

broadcasting services in another country" (Adoption of methodology). Final Report on 26 June 2009.

The block edge masks (BEM) are defined in ECC/DEC(15)01 (Annex II).

Applications within the SDL range must be used subject to possible technical restrictions, in order to protect the contiguous non-public radio service (PPDR).

2.3.1.1 Conditions of use at the national borders

2.3.1.1.1 Maximum interference field strengths in border areas

In principle and in the absence of bilateral or multilateral agreements, or if no other points are made in this section, the conditions of use in *ECC RECOMMENDATION (15)01*, Annexes 1, 4 and 5[10] apply.

- ECC/REC/(15)01: Cross-border coordination for mobile/fixed communications networks (MFCN) in the frequency bands: 694-790 MHz, 1452-1492 MHz, 3400-3600 MHz and 3600-3800 MHz.

2.3.1.1.2 Multilateral agreements for the border areas with Germany, France, Austria and Liechtenstein

The mean field strength generated by a base station at a height of 3 metres above ground and in a reference bandwidth of 5 MHz shall not exceed the following values at the border and in neighbouring countries:

In the event that FDD is in operation and preferential codes are used:

- 59 dBμV/m at the border.
- 41 dBμV/m on a coordination line 6 km beyond the border in the neighbouring country.
- In the international relationship with Liechtenstein, a value of 53 dBμV/m applies on a coordination line 1 km beyond the border in the neighbouring country in addition to the above values.

In the event that FDD is in operation and no preferential codes are used:

- 41 dB V/m at the border.

For LTE use, coordination (e.g. of the PCI code groups and other radio parameters) is recommended in accordance with *ECC RECOMMENDATION (15) 01*, Annexes 4 and 5.

Note: this section applies only to the FDD range (703-733 / 758-788 MHz). The SDL range is currently regulated only by ECC/REC/(15)01.

2.3.1.1.3 Coordination with broadcasting abroad

By the end of 2018, all Swiss radio allocations DTV/DVB-T) in this range will be taken out of operation.

Italy continues to operate DTV in the 700 MHz range, but has committed to decommission channels 50-53 (702 - 734 MHz) from mid-2020. The remaining allocations (channels 54+) are to be

[10] www.cept.org → ECC → Deliverables or http://www.ecodocdb.dk/

decommissioned by mid-2022 in accordance with EU Decision 2017/899[11]. Consequently, at the border with Italy, in particular in the south of Ticino, interference with base station receivers within range of Italian broadcasters' stations which use channels 50-53 can be expected even beyond mid-2020. Adverse effects in the downlink range are also possible but not to the same extent as in the uplink range, because of the lower above-ground height of the antennas in the case of the terminal.

Comparable interference situations with other neighbouring countries are not currently identifiable. In France the range is shared between broadcast operators and mobile radio operators, but according to the current state of knowledge not at the national border with Switzerland.

If no other bi- or multilateral agreements or if no other points are listed in this section, the methods of CEPT Report 029 on protection from DTV are to be applied in the event that broadcasting from adjacent countries extends or radiates to the Swiss border.

Consequently, all MFCN stations which exceed field strengths of 25 dBμV/m/8 MHz at a height of 10 m above ground within the coverage area of coordinated DTV allotments and/or allocations of the neighbouring country are to be coordinated.

2.3.1.2 Basis of calculation for interference field strength

The respective latest valid version of the HCM tool (Harmonised Calculation Method) of the "AGREEMENT between the administrations of (17 countries) on coordination of frequencies between 29.7 MHz and 39.5 GHz for the fixed radio service and for the mobile land radio service" (HCM Agreement) of December 2017 is used.[12] The "time probability" parameter for all calculations is 10%.

2.3.1.3 Operator agreements, planning agreements

See Section 2.3.5

2.3.2 1400 MHz

In each case the latest updated versions implemented by Switzerland of the provisions of the CEPT decisions and accepted recommendations apply, among others:

- ECC/DEC/(13)03: The harmonised use of the frequency band 1452-1492 MHz for Mobile/Fixed Communications Networks Supplemental Downlink (MFCN SDL), approved 8 November 2013, amended 2 March 2018.
- ECC/DEC/(17)06: The harmonised use of the frequency bands 1427-1452 MHz and 1492-1518 MHz for Mobile/Fixed Communications Networks Supplemental Downlink (MFCN SDL) (in particular for the protection of Mobile Earth Stations in the range above 1518 MHz).
- ECC Report 202: Out-of-band emission limits for Mobile/Fixed Communication Networks (MFCN) Supplemental Downlink (SDL) operating in the 1452-1492 MHz band, September 2013.
- ECC Report 227: Compatibility Studies for Mobile/Fixed Communication Networks (MFCN) Supplemental Downlink (SDL) operating in the 1452-1492 MHz band, approved January 2015.
- ECC Report 263: Adjacent band compatibility studies between IMT operating in the frequency band 1492-1518 MHz and the MSS operating in the frequency band 1518-1525 MHz approved 3 March 2017.

[11] DECISION (EU) 2017/899 OF THE EUROPEAN PARLIAMENT AND COUNCIL of 17 May 2017 on the use of the 470-790 MHz frequency band in the Union

[12] http://www.hcm-agreement.info/http/deutsch/verwaltung/index_hcm_programs.htm

- ECC Report 269: Least restrictive technical conditions for Mobile/Fixed Communications Networks in 1427-1518 MHz, approved 17 November 2017, corrected 2 March 2018.
- CEPT Report 054 Report from CEPT to the European Commission in response to the Mandate "To develop harmonised technical conditions in the 1452-1492 MHz frequency band for wireless broadband electronic communications services in the EU", approved on 28 November 2014 by the ECC.
- CEPT Report 065 Report from CEPT to the European Commission in response to the Mandate "To develop harmonised technical conditions in additional frequency bands in the 1.5 GHz range for their use for terrestrial wireless broadband electronic communications services in the Union" approved on 17 November 2017 by the ECC, corrected 2 March 2018

The block edge masks (BEM) and the maximum EIRP are defined in ECC/DEC/(13)03 (Annex 2) and ECC/DEC/(17)06 (Annex 2).

At CEPT level the authoritative reports and decisions are being revised or rewritten in consideration of the fact that this band is expected to be used for the 5th generation of mobile radio. Thus, for example, in the outer bands in particular the existing allocations under previous law or compatibility with satellite systems will be an issue.

It should be noted that the outer bands are now specified as E-UTRA frequency bands. However, it cannot be indicated when these bands will be implemented in the equipment.

2.3.2.1 Restrictions in Switzerland

Until the end of 2019 the 1438 – 1441 MHz frequency range will be used in Swiss airspace for aeronautical telemetry. Consequently, transmission must not take place in the C1 03 frequency block throughout Switzerland until the end of 2019.

2.3.2.2 Coordination with directional radio in France and Germany

Throughout the 1400 MHz frequency band, France continues to operate radio relay links which may be subject to interference by emissions from Switzerland. In addition to the conditions of use at the national borders (2.3.2.4), there is a co-ordination obligation for base stations in the reception area of these radio relay link stations in France.

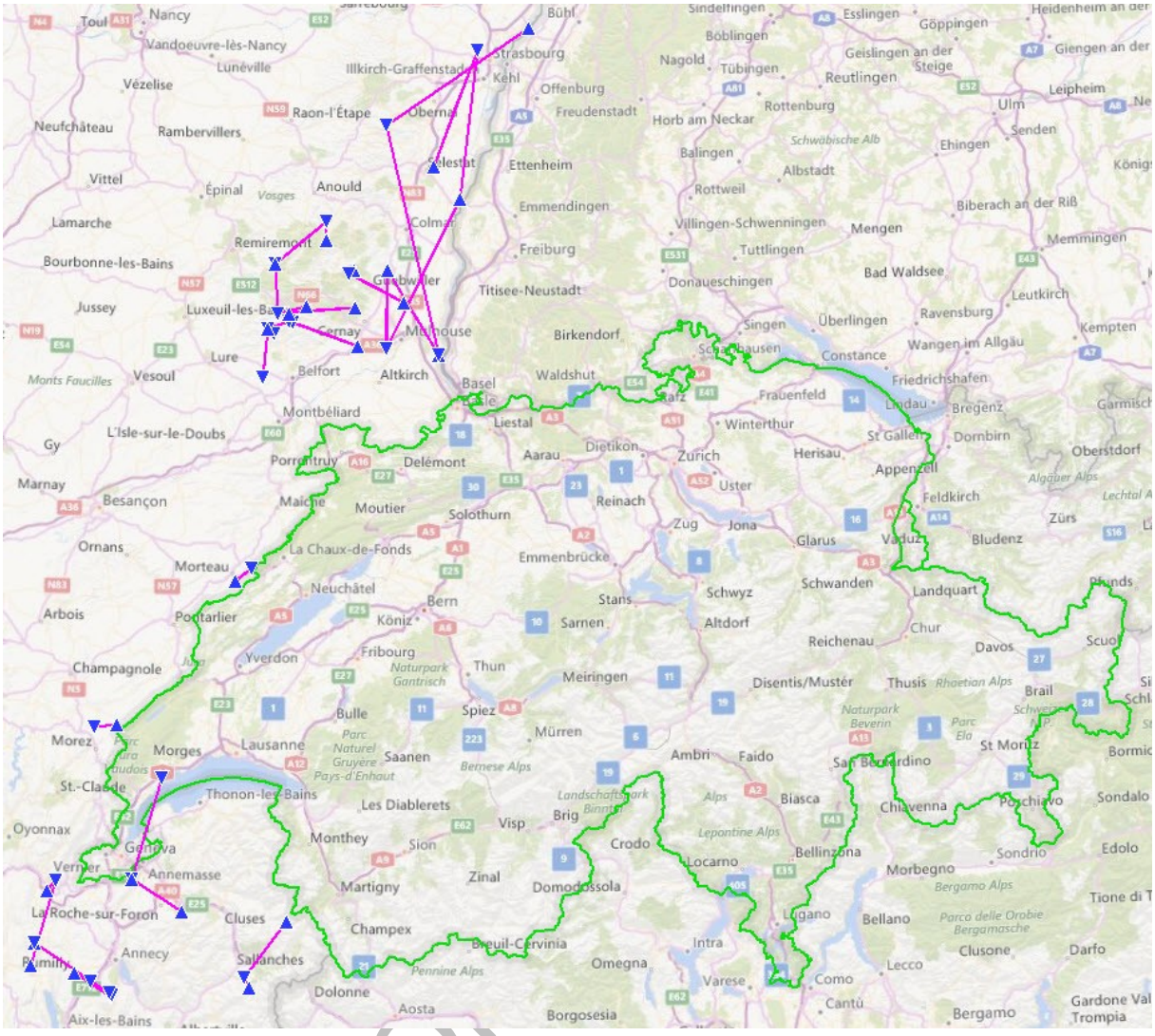

Figure 2: Directional radio link in France which must be protected

The following radio relay reception stations in France are affected:

Station	Coordinates EW	Coordinates NS	Reception frequency [MHz]	Bandwidth [kHz]	Antenna direction [deg]
19066	542031	75186	1427.3750	250	332.2
23764	577212	300175	1427.8625	75	265.3
19068	554392	96852	1428.3750	250	216.5
20849	602950	347058	1428.3750	250	21.2
20838	519694	100393	1428.9125	75	302.8
23532	604773	284596	1429.6250	250	347
22214	587904	312778	1429.7500	500	181
22211	611634	336224	1430.7500	500	7
22970	471088	90112	1430.7500	500	123

23531	634686	392831	1431.1250	250	234
22212	611634	336224	1432.2500	500	206
22215	587904	312778	1433.2500	500	149
22466	498463	162293	1436.5000	2000	261.8
22973	537571	209904	1438.5000	2000	52.3
19894	512996	144339	1445.8750	250	195.3
20993	593244	301895	1453.0000	1000	297.4
23795	475061	107233	1453.0000	1000	40.1
18742	484322	80179	1457.0000	1000	120.1
18743	484322	80179	1457.0000	1000	123.3
18744	484322	80179	1457.0000	1000	120
18727	555199	298202	1485.0000	1000	269
18728	560956	300601	1485.0000	1000	255.1
19005	548312	293192	1485.0000	1000	186.3
20998	576825	312657	1485.0000	1000	229.6
23798	469615	82700	1485.0000	1000	15.4
19008	567627	322648	1487.0000	1000	358.9
18718	550594	314488	1489.0000	1000	49.2
18726	550594	314488	1489.0000	1000	176.2
18720	548312	293192	1491.0000	1000	131.1
18732	548312	293192	1491.0000	1000	70.1
18745	578101	287507	1491.0000	1000	289.6

Table 3: Radio relay receivers in France which must be protected (possible changes).

Mobile radio base stations which are located in the reception area of these directional antennas and which use the frequencies of the radio relay receivers must be coordinated with OFCOM.

According to its own information, France will reallocate the entire 1400 MHz range for mobile radio and migrate the above-mentioned radio relay applications to other frequency bands. At present it is not possible to specify a point in time when this migration will be concluded.

In Germany the core band of the frequency band is already allocated to two licensees for MFCN. The outer bands will continue to be occupied by mobile directional relay applications which can also extend to the national border, without an indication of an end date. These lead to a restriction of usability of the outer bands at the border with Germany. The emissions from the base stations which use

frequencies from the outer bands (cat. C1 and C3) must therefore not exceed an aggregated field strength of [24] [13] dBuV/m/5MHz at the border with Germany at a height of ten metres above ground.

2.3.2.3 Protection of Mobile Earth Stations

The protection of Mobile Earth Stations (MES) in the range above 1518 MHz is regulated in ECC/DEC Decision (17)06 among others. Switzerland will implement this decision[14].

Standards in relation to out-of-band emissions (OOB) and upper limits of maximum radiated transmitting powers (inband power limit) of base stations in the upper band 1492 - 1517 MHz are defined in this decision. The restrictions imposed in the licence will provisionally be defined on this basis. Apart from general restrictions concerning the outer band, more stringent protective measures will be necessary over the entire upper outer band especially in the areas around major airports.

The definition of the stated default values for protection of MES has not yet been concluded at CEPT level. ECC Decision ECC/DEC (17)06 for the protection of MES will be finalised at a later date. However, it can be assumed that more stringent standards will be applied in areas around airports[15].

The measured field strength value will be used to assess cases of interference.

2.3.2.4 Conditions of use at the national borders

2.3.2.4.1 Maximum interference field strengths in border areas

In principle and in the absence of any bilateral or multilateral agreements, or unless otherwise specified in the licence in relation to this frequency range, at the national borders the conditions of use defined in ECC RECOMMENDATION (15)01 apply.[16]

- ECC/REC/(15)01: Cross-border coordination for mobile/fixed communications networks (MFCN) in the frequency bands: 694-790 MHz, 1452-1492 MHz, 3400-3600 MHz and 3600-3800 MHz

2.3.2.4.2 Multilateral agreements in border areas with Germany, France, Austria and Liechtenstein

The mean field strength generated by a base station at a height of 3 m above ground and in a reference bandwidth of 5 MHz shall not exceed the following values at the border and in neighbouring countries:

If preferential codes (PCI) and SDL are used:

- 65 dB V/m at the border
- 47 dB V/m on a coordination line 6 km beyond the border in the neighbouring country

[13] This value is provisional (1 March 2018)

[14] General OFCOM Statement on managing ECC/DEC/(17)06 and on MSS + GMDSS protection above 1518 MHz: ECC/DEC/(17)06 will be implemented in Switzerland / Other studies on protection of MSS are in progress (considering h) / Results October 2018 / WP 5D studies from June 2018 onwards / uppermost block (C3 05) will be restricted in any case (58 dBm in band e.i.r.p.) (Tender Annex1) / Reports related: ECC Report 263, ECC Report 269, CEPT Report 65 / Restrictions in the areas around major airports will concern the entire upper outer band.

[15] The airports which are affected have not yet been defined.

[16] www.cept.org → ECC → Deliverables or http://www.ecodocdb.dk/

- In the international relationship with Liechtenstein, a value of 59 dBμV/m applies on a coordination line 1 km beyond the border in the neighbouring country in addition to the above values

If no preferential codes (PCI) are used and SDL is used:

- 47 dB V/m at the border

For LTE use, it is recommended that coordination (e.g. of the PCI code groups and other radio parameters) in accordance with ECC RECOMMENDATION (15) 01, Annexes 4 and 5 be implemented.

Note: This section applies only to the core band (1452-1492 MHz). It is intended to extend ECC RECOMMENDATION (15)01 to the outer bands. A corresponding mandate has been approved.

2.3.2.4.3 Border region with Italy

The parameters and specifications of ECC RECOMMENDATION (15)01 are applied.

Note: This section applies only to the core band (1452-1492 MHz). It is intended to extend ECC RECOMMENDATION (15)01 to the outer bands.

2.3.2.4.4 Basis of calculation for interference field strength

The respective latest valid version of the HCM tool (Harmonised Calculation Method) of the "AGREEMENT between the administrations of (17 countries) on coordination of frequencies between 29.7 MHz and 39.5 GHz for the fixed radio service and for the mobile land radio service" (HCM Agreement) of December 2017 is used[17]. The time probability for all calculations is 10%.

2.3.2.4.5 Operator agreements, planning agreements

See Section 2.3.5

2.3.3 2600 MHz

In each case the latest updated versions implemented by Switzerland of the provisions of the CEPT decisions and accepted recommendations apply:

- ECC/DEC/(05)05: Harmonised utilisation of spectrum for Mobile/Fixed Communications Networks (MFCN) operating within the band 2500-2690 MHz, approved 18 March 2005, amended 3 July 2015 (for IMT-2000/UMTS systems).
- ECC Report 045: Sharing and adjacent band compatibility between UMTS/IMT-2000 in the band 2500-2690 MHz and other services, February 2004.
- ECC Report 119: Coexistence between mobile systems in the 2.6 GHz frequency band at the FDD/TDD boundary, June 2008.
- CEPT Report 019: Report from CEPT to the EC in response to the Mandate “To develop least restrictive technical conditions for frequency bands addressed in the context of WAPECS”, approved December 2007, editorial revisions in March 2008 and October 2008.

The block edge masks for use of the 2500-2690 MHz band are defined in CEPT Report 019, Annex IV. A distinction is made between two types of conditions of use:

[17] http://www.hcm-agreement.info/http/englisch/verwaltung/index_europakarte.htm

- Unrestricted blocks: maximum EIRP = 61dBm/5MHz[18]
- Restricted blocks: maximum EIRP = 25dBm/5MHz[19]

The following applies to the use of the 2620-2690 MHz FDD downlink band:

- The conditions for unrestricted blocks apply to all frequency blocks if TDD is not operated contiguously to the used frequency block[20].

2.3.3.1 Restrictions on use (from existing mobile radio licences)

In Switzerland, radar installations are in operation which use frequencies above the downlink frequency band (above 2690 MHz).

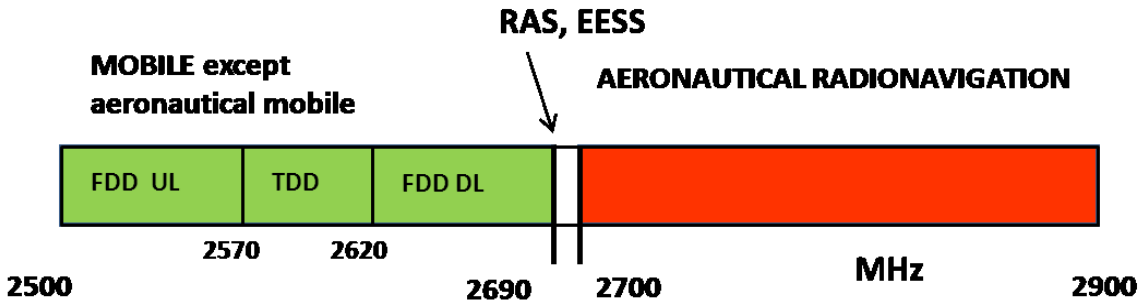

Figure 3: Excerpt from ECC Report 174[21]

These radar installations use pulsed signals and generate field strengths which may cause local interfere with mobile radio, to a greater or lesser extent, depending on the assigned partial frequency range.

In view of the low frequency spacing, IMT terminals of radar equipment with carrier frequencies below 2730 MHz may suffer interference (be blocked) within a radius of a few kilometres, depending on the transmission power of the radar and the composition of the terrain between the radar antenna and the terminal device. The reason for this is the reception filter in the duplexer of the IMT terminal, which does not yet develop any significant attenuation for these radar signals. IMT base stations may also suffer interference by radar systems.

In the converse case the situation looks the same: radar equipment may be subject to interference due to nearby base stations. The following restrictions on use are therefore imposed for IMT base stations:

- The maximum power aggregated by IMT base stations of secondary emissions in the 2700-2900 MHz frequency range, measured at the radar antenna, must not exceed -150 dBW/m²/ MHz[22].

[18] CEPT Report 19, Annex IV, Table A 4.2

[19] CEPT Report 19, Annex IV, Table A 4.4

[20] Subject to special protection measures for aeronautical radio navigation, cf. section 2.3.3.1

[21] www.cept.org → ECC → Deliverables or http://www.ecodocdb.dk/

[22] This corresponds to -4 dBuV/m/MHz

- If an IMT base station is located less than 2 km from a radar station, this must be coordinated. The licensee shall report affected base stations to OFCOM, which shall carry out a coordination and which may impose restrictions or changes to transmission parameters of LTE transmitters. OFCOM shall provide the licensee with a list of the locations of the affected radar installations.

Note:

The above reciprocal interference may occur even if all the systems involved meet the minimum technical requirements.[23]

2.3.3.2 Conditions of use at the national borders

2.3.3.2.1 Maximum interference field strengths in border areas

In principle and in the absence of bilateral or multilateral agreements, or if no other points are made in this Section, the conditions of use in *ECC RECOMMENDATION (11) 05*, Annex 1, 2 and 5[24] apply.

2.3.3.2.2 Multilateral agreement for the border areas with Germany, France, Austria and Liechtenstein

The mean field strength generated by a base station at a height of 3 m above ground and in a reference bandwidth of 5 MHz shall not exceed the following values towards and in neighbouring countries:

If only FDD is in operation or if only synchronized TDD is in operation, or if synchronised TDD is in operation together with FDD only in the 2750 - 2690 MHz range (or 2620 - 2690 MHz with France):

- 65 dB V/m at the border.
- 49 dBV/m on a coordination line 6 km beyond the border in the neighbouring country.

In all other cases where FDD and TDD are operated jointly, the following applies to TDD:

- 21 dBV/mμ at the border with Austria and Liechtenstein.
- 30 dBμV/m at the border with Germany and France (not synchronised).

For LTE use, coordination of the PCI code groups and other radio parameters is recommended in accordance with ECC RECOMMENDATION (11)05*,* Annex 5 and 6.

2.3.3.2.3 Border region with Italy

The parameters and specifications of ECC RECOMMENDATION (15)01, Annexes 1, 5 and 6 are applied.

2.3.3.2.4 Basis of calculation for the interference field strength

The latest version of the HCM tool (Harmonised Calculation Method) of the "AGREEMENT between the administrations of (17 countries) on coordination of frequencies between 29.7 MHz and 39.5 GHz

[23] The minimum requirements for radar equipment are defined, among other things, in the latest versions of the following recommendations: RECOMMENDATION ITU-R M.1464-1; RECOMMENDATION ITU-R SM.1541-4; RECOMMENDATION ITU-R SM.329-12.

[24] www.cept.org → ECC → Deliverables or http://www.ecodocdb.dk/

for the fixed radio service and for the mobile land radio service" (HCM Agreement) is used.[25] The time probability for all calculations is 10%.

2.3.3.2.5 Operator agreements, planning agreements

See Section 2.3.5.

2.3.4 3.6 GHz

In each case the latest updated versions implemented by Switzerland of the provisions of the CEPT decisions and accepted recommendations apply, among others:

- ECC/DEC/(11)06: Harmonised frequency arrangements for mobile/fixed communications networks (MFCN) operating in the bands 3400-3600 MHz and 3600-3800 MHz, approved 9 December 2011, amended 14 March 2014.
- ECC Report 254: Operational guidelines for spectrum sharing to support the implementation of the current ECC framework in the 3600-3800 MHz range, approved 18 November 2016 (including protection of FSS).
- ECC Report 203: Least Restrictive Technical Conditions suitable for Mobile/Fixed Communication Networks (MFCN), including IMT, in the frequency bands 3400-3600 MHz and 3600-3800 MHz, approved 8 November 2013, corrected 14 March 2014 (among other things BEM).
- Draft ECC Report 281: Analysis of the suitability of the regulatory technical conditions for 5G MFCN operation in the 3400-3800 MHz frequency band.
- CEPT Report 049: Report from CEPT to the European Commission in response to the Mandate “Technical conditions regarding spectrum harmonisation for terrestrial wireless systems in the 3400-3800 MHz frequency band” , approved on 8 November 2013 by the ECC, corrected on 14 March 2014 by the ECC.
- Draft CEPT Report 67: Report from CEPT to the Europe an Commission in response to the Mandate “To develop harmonised technical conditions for spectrum use in support of the introduction of next-generation (5G) terrestrial wireless systems in the Union” Review of the harmonised technical conditions applicable to the 3.4-3.8 GHz ('3.6 GHz') frequency band.

Currently, ECC decisions and various reports and analyses concerning the 3400 - 3800 MHz band are being revised or rewritten at CEPT level[26]. This also concerns guidelines and rules on the synchronisation of TDD networks. It is not possible at present to state how network synchronisation is to be regulated technically and administratively between the licensees in Switzerland and with the network operators in neighbouring countries.

2.3.4.1 Protection of applications of the Swiss Confederation

In this band, specific restrictions on frequency usage apply due to applications of the Swiss Confederation, which for military secrecy reasons are only notified to companies participating in the auction after they have been admitted to the auction.

2.3.4.2 Protection of Satellite Earth Stations

Satellite earth stations (SES) are operated in Geneva, canton Valais and Immenstaad (D), Leuk (VS) and Vernier (GE). The downlink from satellites to the earth stations operates in the 3600 - 3800 MHz

[25] http://www.hcm-agreement.info/http/englisch/verwaltung/index_europakarte.htm

[26] ECC PT1: www.cept.org → Groups → ECC PT1 → (SWG-C)

frequency range. In this arrangement, the receivers of the SES would therefore be subject to interference from emissions from mobile radio base stations and from mobile terminals, from the latter also because transmissions are made using the TDD method. In view of the generally higher radiated transmitting powers, base stations have a larger interference ranges. Conversely, the interference range of mobile terminals is smaller, but their location cannot be exactly determined. However, mobile terminals can be kept away from the satellite earth stations by reducing coverage accordingly.

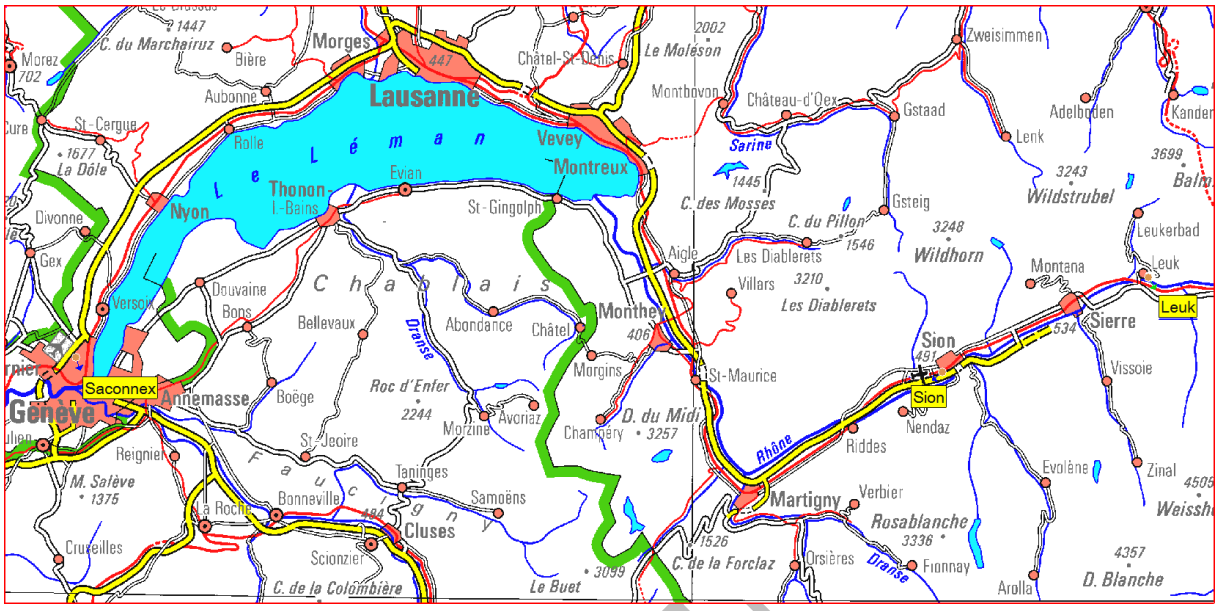

Figure 4: 3600 - 4200 MHz satellite earth stations in Switzerland requiring protection.

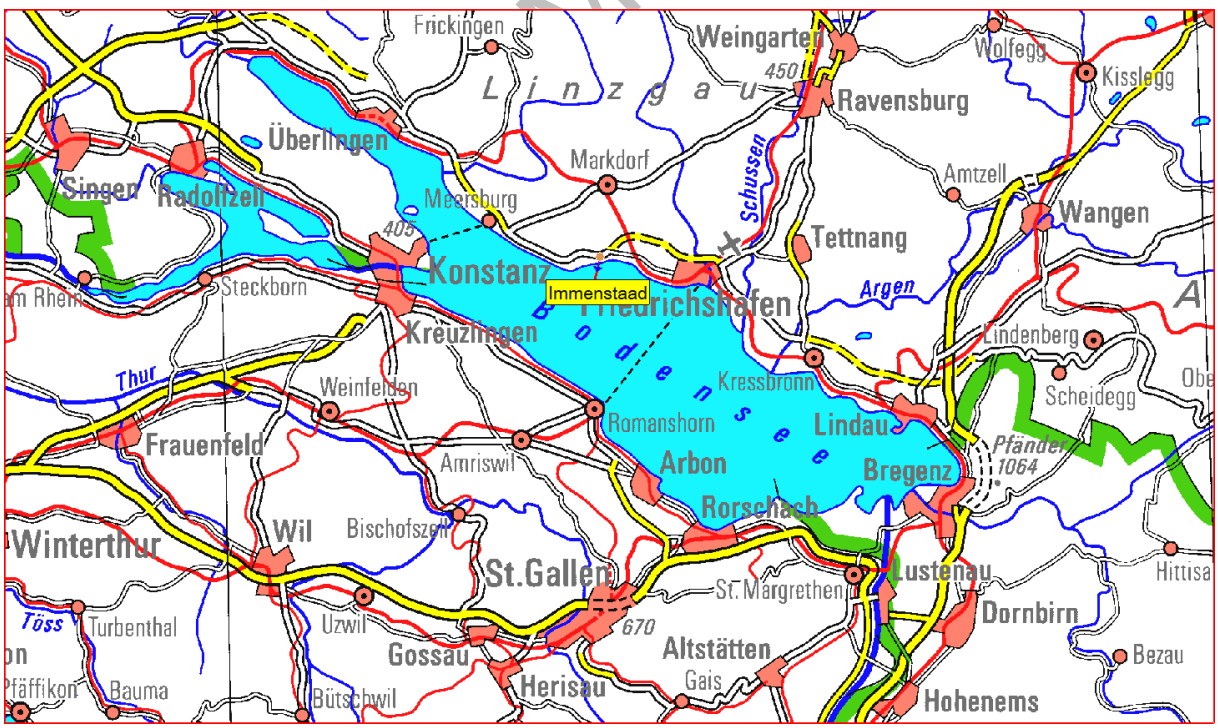

Figure 5: 3800 - 4200 MHz satellite earth station in neighbouring country requiring protection

Use of the 3400-3800 MHz frequency range is co-primarily possible for "Fixed", "Mobile" and "Fixed Satellite Services" in accordance with the National Frequency Allocation Plan. Therefore the SES

have "grandfather" rights protection. In Switzerland, however, no new stations are being commissioned in this frequency range.

The protection of SES consists of two components:

Protection from co-channel interference: Direct emissions into the reception frequency range of an SES constitutes the worst interference scenario. In this case the weak signal from the satellites must be protected from external signals on the same frequency with an adequate margin.

Protection from blocking: The sensitive receivers and/or preamplifiers of the SES operate over the entire 3600-4200 MHz frequency range. These are affected by emissions from the entire 3400-3800 MHz range and are overloaded or blocked if the incident power is too high. Consequently, all mobile radio transmitters which transmit in the 3500 - 3800 MHz range must not exceed specific power levels/field strengths at the locations of the SES. These restrictions for protection from blocking are less strict than those relating to protection from co-channel interference.

Protection zone and reduction of the allocated bandwidth in Valais:
To protect the Leuk satellite earth station transmissions in the 3640-3800 MHz frequency range must not take place in the following polygon.

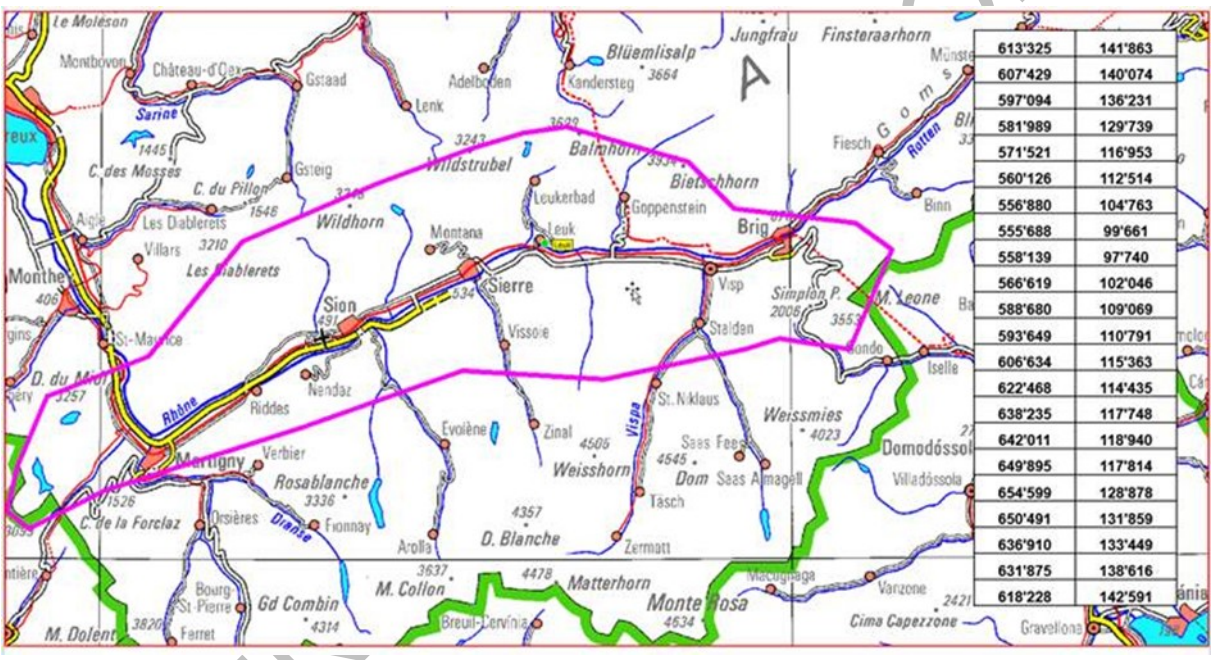

Figure 6: Protection zone in Valais for the 3640 - 3800 MHz frequency range

In the remaining 3500 - 3640 MHz frequency range only the restrictions for protection of the SES from blocking apply (P1, see table below).

Within the protection zone, the usable bandwidth is reduced by a factor of 7/15 for every licensee; this corresponds to the ratio of the 140 MHz bandwidth which is still usable to the entire allocation range of 300 MHz in the 3600 MHz frequency band.

For the reduction, the following principles will be applied:

- The position of the assignment within the reduced range will be arranged in such a way that greatest possible contiguous bandwidth results. ComCom determines the position of the reduced blocks.
- Rounding up or down to 5 MHz is applied.

- If several possibilities result in the case of rounding up or down to 5 MHz, rounding up or down will take place in favour of the licensees with the smallest assigned bandwidths in the 3600 MHz range.

Maximum permitted power levels at the Satellite Earth Stations:
To protect the receivers of satellite earth stations in the 3600-4200 MHz frequency range from interference, mobile radio base stations within range of these earth stations are restricted in the use of transmitters as follows: Mobile radio transmitters in the reception range of the earth stations may not exceed the power levels **P1** indicated in the following table for protection from blocking/overloading and **P2** for protection from co-channel interference.

SES	**Coordinates [CH1903]**	**Height above sea level [m]**	**P1 [dBm / 20 MHz]**	**P2 [dBm / 1 MHz]**
Leuk	616,010 / 129,660	935	**- 83** for transmitters below 900 MASL **- 123** for transmitters above 900 MASL	For all transmitters[27] which use the 3640-3800 MHz frequency range **- 140** for transmitters below 900 MASL **- 180** for transmitters above 900 MASL
Sion	593,353 / 119,226	485	**- 73** for transmitters below 500 MASL - **113** for transmitters above 500 MASL	No protection for receivers in the range 3500 - 3800 MHz
Saconnex	498,780 / 120,825	460	**- 66** for transmitters below 460 MASL - **113** for transmitters above 460 MASL	No protection for receivers in the 3500 - 3800 MHz range
Immenstaad (D)	746,106 / 281 864	410	**- 68** for all transmitters [28]	No protection for receivers within the 3500 - 3800 MHz range

Table 4: Maximum irradiation values for the individual satellite earth stations

P1: Maximum aggregated power from a block at SES at ten metres above ground for all mobile radio transmitters[29].

[27] This concerns transmitters which are outside the protection zone.

[28] This value can essentially be met by complying with the conditions of use at the national border; aggregation of multiple transmitters must be taken into consideration.

[29] P1: For protection from blocking a maximum permitted total power (aggregated) of -60 dBm is assumed in accordance with ECC Report 254, Annex 6. The values in the table are calculated by incorporating the reference bandwidth and antenna diagrams of the SES plus their elevation above sea level

P2: Maximum aggregated power at SES at ten metres above ground for mobile radio transmitters which fall within the reception frequency range of the SES. The reception frequencies are specified in Annex I[30].

P2 has priority over P1.

The conversion of P1 and P2 to a field strength must be undertaken at 0 dB - antenna at 50 ohms.[31]

The measured field strength value of the interference signal is used to assess cases of interference.

Frequency utilisation at the boundary of the polygon, internal co-ordination case:

At the boundary of the polygon, a domestic coordination case applies because the national one applies to the reduced assignment, which does not necessarily overlap. This concerns in particular the licensees which have been assigned frequencies in the upper range of the frequency band. In this case, the conditions of use for the national border from **Fehler! Verweisquelle konnte nicht gefunden werden.** are applied and thus the field strength is restricted at the boundary of the zone and at a distance of 6 km from it.

2.3.4.3 Conditions of use at the national borders

2.3.4.3.1 Principle

In principle and in the absence of bilateral or multilateral agreements, or if no other points are made in relation to this frequency range, at the national borders, the conditions of use defined in ECC RECOMMENDATION (15)01 apply.[32]

- ECC/REC/(15)01: Cross-border coordination for mobile/fixed communications networks (MFCN) in the frequency bands: 694-790 MHz, 1452-1492 MHz, 3400-3600 MHz and 3600-3800 MHz

2.3.4.3.2 Multilateral agreements for the border areas with Germany, France, Austria and Liechtenstein

The mean field strength generated by a base station at a height of 3 m above ground and in a reference bandwidth of 5 MHz shall not exceed the following values at the border and in neighbouring countries:

For TDD systems:

FDD is in operation in the neighbouring country:

- 32 dB V/m at the border.

TDD is in operation in the neighbouring country and the networks are **unsynchronised**:

- 32 dB V/m at the border.

[30] P2: For protection from co-channel interference, a maximum permitted power of -190 dBm/Hz at the antenna connection is assumed, in accordance with ECC Report 100. The values in the table are calculated by incorporating the reference bandwidth and antenna diagrams of the SES plus their elevation above sea level.

[31] Example: -83 dBm corresponds to 65.3 dBμV/m (3600 MHz

[32] www.cept.org → ECC → Deliverables or http://www.ecodocdb.dk/

TDD is in operation in the neighbouring country and the networks are **synchronised**:

- 67 dB V/m at the border.
- 49 dB V/m on a coordination line 6 km beyond the border in the neighbouring country.

For LTE use, coordination (e.g. of the PCI code groups and other radio parameters) is recommended in accordance with *ECC RECOMMENDATION (15) 01,* Annexes 4 and 5.

2.3.4.3.3 Basis of calculation for the interference field strength

The respective latest valid version of the HCM tool (Harmonised Calculation Method) of the "AGREEMENT between the administrations of (17 countries) on coordination of frequencies between 29.7 MHz and 39.5 GHz for the fixed radio service and for the mobile land radio service" (HCM Agreement) of December 2017 is used.[33] The time probability for all calculations is 10%.

2.3.4.3.4 Operator agreements, planning agreements

See Section 2.3.5.

2.3.5 Operator agreements

In the border areas, agreements with foreign operators may be made in the common frequency sections or (U)ARFCN for more efficient use of the frequency spectrum and reduction of administrative work. These may include, for example:

- Apportionment of preferential frequencies
- Apportionment of preferential codes
- Definition and specification of harmonised centre frequencies or carrier frequencies (e.g. for LTE or UMTS)
- Synchronization of networks.

The operator agreements:

- may not be concluded at the expense of third parties and
- Require the prior consent of all affected administrations.

Procedure for operator agreements

- With the request for approval, each operator concerned sends the outcome of the agreement in the form of a draft contract to their own spectrum management authority.
- Each spectrum management authority checks the submitted draft contract and sends its comments or consent in writing to the other foreign spectrum management authorities concerned.

[33] http://www.hcm-agreement.eu/

- The spectrum administrations which are approached in turn respond to comments or consents received.

- The spectrum management authorities inform their operators of the decision (consent, modification, rejection) on the basis of the comments of the spectrum management authorities. The administrations concerned are notified with a copy.

3 Licences

3.1 Basis of the licence

By virtue of the licence to be awarded, a licensee is granted the usage rights to the mobile radio frequencies that it purchased at the auction. The allocated frequencies are to be used to provide mobile communications services in Switzerland by means of "MFCN" cellular IMT networks[34]. The licensee is free, within the framework of the harmonised standard ETSI EN 301 908, to choose the technology (technology neutrality).

The rights and obligations of the licensee are in accordance with the provisions of the licence and its annexes, as well as to the statutory provisions applicable to the licence.

3.2 Legal basis

The following legal provisions in particular apply to the present licence to be awarded:

- Telecommunications Act of 30 April 1997 (TCA; CC 784.10).
- Ordinance of 9 March 2007 on Frequency Management and Radiocommunication Licences (OFMRL; CC 784.102.1).
- Ordinance of 7 December 2007 concerning Fees in the Telecommunications Sector (OCTS; CC 784.106).
- DETEC Ordinance of 7 December 2007 concerning Administrative Fees in the Telecommunications Sector (DETEC Telecommunications Fees Ordinance; CC 784. 106.12).

In exercising the conceded rights to use of the frequency spectrum, the licensee must respect the other implementing provisions of the TCA, in particular the provisions of the Ordinance of 9 March 2007 on Telecommunications Services (OTS; CC 784.101.1) as well as the Ordinance of 25 November 2015 on Telecommunications Installations (OTI; CC 784.101.2).

Other relevant provisions outside telecommunications legislation are listed under Section 1.2 in the specimen licence (Annex V).

3.3 Amendment of the legal basis

The conditions of the present licences to be awarded are subject to any changes in the legal basis applicable to it (cf. Section above and Section 1.2 of the specimen licence). In particular, the administration fees according to Section 3.9.2 shall be fixed in accordance with the applicable legal basis and may be subject to change during the course of the term of the licence. Reservations also remain with regard to future regulations on network access for third parties. Reservations also remain with regard to future legal obligations[35] to provide telecommunications services at cost-based prices in

[34] Mobile/Fixed Communications Networks within the meaning of the CEPT-ECC

[35] On the basis of a revision of the Telecommunications Act of 30 April 1997 (TCA; CC 784.10) or another legal basis (such as, for example, the revision of the Federal Act of 4 October 2002 on Civil Protection and Defence (Civil Protection and Defence Act, CPDA; CC 520.1) or of the Federal Act of 17 June 2016 on the National Economic Supply (National Economic Supply Act, NESA; CC 531).

favour of the official emergency and rescue services (BORS), if no commercial products are available on the telecoms market which meet the requirements[36] formulated by the Federal Commission for Telematics in relation to emergency and rescue (KomTM BORS). For any legal issues and interpretations, the respective applicable revisions of the law and regulations shall prevail in each case.

3.4 Term of the licences

The licences will be awarded on conclusion of the auction. The rights of use for the respective frequencies commence at the earliest from the time of availability listed in Section 2. The term of the frequency rights is given in the following table:

Category	Frequency band	Term of the licences
A	700 MHz FDD	31.12.2033
B	700 MHz SDL	31.12.2033
C1-C3	1400 MHz SDL	31.12.2033
D	2600 MHz FDD	31.12.2028
E	3.6 GHz TDD	31.12.2033

Table 5: Term of the licences

3.5 Utilisation obligations

A licensee is obliged to utilise the frequencies assigned to it by licence within the framework of the present award procedure in the sense of Art. 1 TCA and hence to provide commercial telecommunications services. Until the following minimum population coverage has been achieved, this must take place via its own transmission and reception units:

1. If the licensed usage rights include frequencies in the ranges 703 to 733 MHz and 758 to 788 MHz (hereinafter 700 MHz FDD frequencies), the licensee is obliged to cover at least 50% of the population of Switzerland with mobile radio services via its own infrastructure by 31 December 2024 at the latest.
2. If the licensed usage rights do not include any 700 MHz FDD frequencies as per para. 1, the licensee is obliged to cover at least 25% of the population of Switzerland with mobile radio services via its own infrastructure by 31 December 2024 at the latest.

The utilisation rights awarded with the licence may be revoked without compensation if the required coverage is not provided in due time, or if the general usage obligation is not fulfilled.

In general, the utilisation and coverage obligations may be changed only if the licensee proves that it is not able to meet them for reasons beyond its control. The licensee must prove conclusively that it has made every reasonable attempt to meet its obligations.

[36] This concerns: area coverage, ensuring availability in the event of overloading of the commercial networks and hardening of the network infrastructures plus additional functionalities for BORS incident management. (cf. in this connection the newsletter of the Federal Commission for Telematics in relation to Emergency and Rescue “NEWS No. 2, December 2017, KomTm BORS”, pages 3 and 4, which can be consulted at: https://www.babs.admin.ch/content/babs-internet/de/aufgabenbabs/kommsysteme/_jcr_content/contentPar/tabs/items/dokumente/tabPar/downloadlist/downloadItems/120_1513342319873.download/NEWS-Letter-KomTmBORS_Nr-02_de.pdf [Only available in German]

3.6 Construction and operation of the radio network

3.6.1 Base station data to be provided to OFCOM

Every 14 days, the operating data for all base stations must be sent to OFCOM. The licensees therefore submit their base station data by periodically uploading it to the database. The format of the data to be uploaded, as well as the detailed procedures, are to be discussed beforehand with OFCOM.

3.6.2 Radio interference and special precautions

If individual base stations operated within the framework of the awarded licence cause radio interference, the licensee is obliged to modify the parameters of the corresponding base station at OFCOM's request or to cease its operation.

3.6.3 Measurement stations of the Confederation

Within the framework of the technical supervision of the frequency spectrum in accordance with Art. 26 para 1 TCA, OFCOM and the Confederation operate several radio monitoring and reception stations. To prevent interference affecting these, base stations which are to be constructed closer than one kilometre (1 km) to such a measurement or reception station must be notified to OFCOM with all technical radio parameters, for coordination purposes. If it turns out that a planned base station could interfere with a measurement or reception station, it cannot be put into operation. OFCOM provides the licensee with a list of the locations of the individual measurement and reception stations.

3.7 Spatial planning, protection of nature and the countryside; joint-use of equipment

In the case of installations outside building zones, Art. 24 Spatial Planning Act and the relevant case law shall be taken into consideration.

The licensee shall make all reasonable efforts during the construction and operation of the transmitter sites to enable the shared use of these sites for other location-based purposes outside the building zone. If it depends on a site outside the construction zone, it is additionally obliged to use existing sites belonging to other licensees or other existing buildings or facilities, provided they have sufficient capacity.

The licensee shall inform the Cantons in advance of their network planning. When it does so, it shall provide information on the proposed new sites and any sites already approved, under construction or in service. In the case of structures outside the building zone, the licensee shall provide the information necessary to assess the location constraints according to Art. 24 of the Spatial Planning Act. The licensee is obliged to cooperate when developing coordination processes in order to minimise the impact on the area and landscape and at the same time to comply with the Ordinance on Protection from Non-Ionising Radiation (OPNIR) and to comply with the developed processes. The site data for the assessment of joint-use must be disclosed.[37]

OFCOM reserves the right to publish a list of sites in operation.

3.8 Immission protection

In exercising their rights of use of the frequency spectrum, the licensee must comply with the provisions of the ONIR. Using a quality assurance system (QAS) the licensee must ensure compliance

[37] Ordinance of 23 December 1999 concerning Protection from Non-Ionising Radiation (OPNIR; CC 814.710)

with the approved values in accordance with the circular of the Federal Office for the Environment (FOEN) dated 16 January 2006 concerning "Quality assurance to comply with the limits of the ONIR for base stations for mobile radio and wireless local loops" and shall document this compliance.[38]

3.9 Licence and administration fees

3.9.1 Licence fees for radio communication licences

The licence fees for utilisation of the allocated radio spectrum for the term of the licence are included in the auction price. The licence fee corresponds to the auction price less the administration fee for the call for tenders and the granting of the radiocommunications licence (Art. 39 para. 4 TCA).

Payment of the auction price must be made via a bank based in Switzerland and approved in accordance with the Federal Act on Banks and Savings Banks (CC 952.0).

3.9.2 Administration fees for the administration and technical supervision of the frequency spectrum

According to Art. 40 TCA and in conjunction with Art. 9 of the DETEC Ordinance concerning Administrative Fees in the Telecommunications Sector[39], the licensee is obliged to pay annual administration fees for the administration and technical supervision of the frequency spectrum. The fee is determined on the basis of the technical network specification (Annex III of the licence).

OFCOM collects the administrative fees yearly in advance.

3.9.3 Payment period of the award price

In accordance with Art. 23 para. 2 OFMRL, the award price for the purchased frequency utilisation packages must be paid in a one-off payment after award of the licence. It becomes due for payment on the entrance into validity in law of the licence. The payment period is 30 days. The payment must be made via a bank based in Switzerland and approved in accordance with the Federal Act on Banks and Savings Banks (CC 952.0).

Reimbursement of the auction price in the event of restriction, suspension, revocation or withdrawal of the licences and in the event of early abandonment of the licence is not possible (Art. 23 para. 2 OFMRL).

3.9.4 Calling-in of the bank guarantee

If the auction price is not paid within the allowed period of 30 days, the licensing authority shall demand payment of the bank guarantee in the full amount without notice. Any difference between the amount paid by means of the bank guarantee and the auction price remains due.

3.10 Transfer of the licence

In accordance with Art. 24d para. 1 TCA, the licence may be transferred in part or in whole to a third party only with the consent of the licensing authority. The consent provision also applies to the economic transfer of the licence (Art. 24d TCA). An economic transfer of the licence occurs when a

[38] https://www.bafu.admin.ch/dam/bafu/de/dokumente/elektrosmog/fachinfo-daten/qualitaetssicherungzureinhaltungdergrenzwertedernisvbeibasisstat.pdf.download.pdf/qualitaetssicherungzureinhaltungdergrenzwertedernisvbeibasisstat.pdf [Only available in German]

[39] DETEC Ordinance of 7 December 2007 concerning Administrative Fees in the Telecommunications Sector (DETEC Telecommunications Fees Ordinance, CC 784.106.12)

company has obtained control of the licensee in accordance with the law on cartels (Art. 24d para. 1 and 2 TCA).

All changes in the ownership structure of the licensee or other shareholders must be notified if as a result the possibility of influencing the business activity of the licensee changes.

3.11 Amendment and revocation of the licence

3.11.1 Power of intervention of the licensing authority

The licensing authority may amend or revoke the licence due to changes in actual or legal conditions if the amendment or revocation is necessary to guarantee important public interest (Art. 24e para. 1 TCA). In this case, the licensee shall be appropriately compensated if the transferred rights are revoked or substantially reduced (Art. 24e para. 2 TCA).

3.11.2 Amendment of the licence upon request

The licensing authority may, upon request from the licensee, amend the licence provided that no overriding private or public interests are affected by the licence amendment and that the licence conditions continue to be fulfilled in accordance with Art. 23 TCA. There is no legal claim on licence amendment.

3.12 Relinquishment of the licence

The licensee may relinquish its licence at any time. Relinquishment does not affect the obligation to pay the auction price. Outstanding amounts remain due. There is no claim to reimbursement for amounts already paid.

3.13 Specimen licence

For information, a specimen licence is appended to this document (Annex V). The definitive wording of the licences to be awarded on conclusion of this tender process may deviate from this.

4 Terms and conditions for participation in the tender procedure

4.1 Public consultation of the provisional tender documents

Prior to the opening of the public invitation to tender, potential interested parties were given an opportunity to comment on the provisional tender documents by means of a public consultation.

4.2 Opening of the procedure, submission of candidatures and deadlines

The call for tenders was launched on 06.07.2018 and published in the Federal Gazette (FF) on 10.07.2018. The deadline for submission of candidature documents is 05.10.2018.

The candidature documents must be delivered in person or by courier subject to prior notification, by

05.10.2018, 16:00 to the

Federal Office of Communications

Telecom Services and Post

Mobile radio frequencies tender

Zukunftstrasse 44

CH – 2501 Biel/Bienne

For this purpose, Mr Michel Donzé, Project Manager must be contacted in advance by telephone: +41 58 460 54 63.

The information on the frequency requirement and the bank guarantee (cf. Section 5) must be delivered separately in a sealed envelope with the name of the candidate.

OFCOM will issue confirmation of receipt to the candidate.

4.3 Questions/answers

From the opening of the tender procedure, participating parties will have an opportunity to submit questions.

The parties making submissions may address their questions concerning the auction procedure, the auction rules and the structure and content of the candidature documents by 27.07.2018 electronically to the following email address (in Microsoft Word format).

tp-nd@bakom.admin.ch.

OFCOM will generate an anonymised list of all questions received with corresponding answers and will distribute them by email to all parties who have registered with OFCOM. The list of questions and answers will also be published in anonymised form on the OFCOM website.

The anonymity of those posing the questions is guaranteed.

4.4 Modification, postponement and cancellation of the tender procedure

If, between publication of the invitation to tender in the Federal Gazette and the award of the licence, substantial conditions change (e.g. changes to the structure of the market), then the licensing authority may adjust the minimum bids or adapt, postpone or cancel the procedure (Art. 24 OFMRL). There is no entitlement to compensation.

4.5 Admission to the procedure

4.5.1 General conditions

In order to be able to participate in the auction, all candidates must demonstrate in advance that they meet the legal conditions for granting the licence (Art. 23 TCA) and the specific obligations cited in these tender documents. To this end, candidates shall submit a candidature dossier in accordance with the conditions listed in Section 5.

Any company may put itself forward as a candidate for the frequency blocks being put out to tender either on its own or as part of a consortium.

The restrictions relating to the effect on competition (cf. Section 5.5.3) shall apply.

4.6 Submissions

4.6.1 Form and content of submissions

Candidates shall render a single submission. In terms of structure and content, the submission shall be formulated in accordance with the information required in Section 5 and in accordance with the classification scheme in that chapter (title and numbering).

The submission consists of the candidature and its annexes (candidature documents). The candidature documents must be submitted in an official language of Switzerland or in English to the address given in Section 4.2, with an accompanying letter. With the exception of the frequency allocation application, the bank guarantee and the accompanying letter, all documents must be submitted in six copies. The candidature may not exceed 40 A4 pages (excluding annexes). The accompanying letter, the candidature and the “frequency allocation application” annex must bear the signature(s) of the person(s) authorized by the candidate.

By their signature, the candidates confirm that they are in agreement with all the conditions contained in the tender documents.

An electronic version (pdf format) of the candidature documents must also be delivered to OFCOM.

The submitted candidature is a binding commitment with the licensing authority and cannot be withdrawn.

4.6.2 Bank guarantee and frequency requirement

The frequency allocation application and the bank guarantee are to be submitted in a sealed envelope to OFCOM at the address indicated in paragraph 4.2. Each bidder may submit only one envelope containing a single frequency allocation application and a bank guarantee to OFCOM.

4.6.3 Trade secrets

The candidate must also submit an additional version of its candidature in duplicate, in which it has covered or deleted any elements relating to trade secrets. It must, however, also provide a brief summary of the essential elements of the covered or deleted information.

4.6.4 Incomplete submissions, additional clarifications

If the submission is incomplete or provides inadequate information, or if additional clarifications are required in the course of evaluation, OFCOM will fix a period of seven days for the required information to be submitted. The information and documents submitted must also meet the above requirements relating to structure, language and number of copies to be submitted.

If the deadline expires without the additional information or clarifications being submitted, the submission will not be considered.

4.7 Costs

All the expenses incurred by the candidate in connection with the candidature (the costs of preparing and submitting the candidature documents, of any additional clarifications and of further preparation relating to the auction) within the framework of the invitation to tender are to be borne in full by the candidate. Reimbursement on the part of the licensing authority is excluded.

4.8 Decision on admission to the auction procedure

After evaluating the submissions, the licensing authority will inform the candidates by written decision as to whether they will be eligible to participate in the auction.

The decisions on admission or non-admission to the auction procedure will be drawn up in one of the official languages of Switzerland.

With the authorisation to take part in the auction, the candidate becomes a bidder.

4.9 Administration fees

Administration fees are levied for the decision on admission in accordance with Art. 2 of the DETEC Ordinance concerning Administrative Fees in the Telecommunications Sector. These are calculated on the basis of the time expended. The hourly rate is CHF 210.

4.10 Publication

ComCom and OFCOM reserve the right to publish the names and addresses of candidates, their auction bids (in particular the quantity of frequency blocks applied for per round, per category and per bidder, any possible exit bids, assignments bids, etc.), the definite data for the award of the licence and the result of the auction. They are free to determine the time of any publication of the auction bids.

5 Candidature documents

The candidature documents must include the following information and be formulated in accordance with the following classification scheme (title and numbering).

5.1 Information on the party making the submission

5.1.1 General information

The candidate shall provide in the candidature its name and address and submit a copy of its statutes. It shall also provide details (name and percentage) of the proportional ownership of its company.

It shall attach an organisation chart of the company plus the names and addresses of the responsible contact persons (for administrative or technical questions). Foreign candidates must also provide a correspondence address in Switzerland to which all correspondence, particularly communications, summonses and decisions relating to the licensing procedure, may be addressed with legal force.

The following are also to be attached: a certified extract from the commercial register (or an equivalent document, in a form recognised in Switzerland, of the country in which the company is based) plus any company reports for the last three years.

5.1.2 Activity in the telecommunications market

The candidate must indicate whether it is registered in Switzerland as a telecommunications service provider, is active abroad in the telecommunications sector or is associated with or linked in any way

with a telecommunications service provider. Links with companies which are in turn associated with other telecommunications service providers must also be disclosed.[40]

5.1.3 Power of attorney

The candidate must indicate at least one representative with power of attorney or an authorised signatory. The power of attorney and the authority to sign shall be recorded in a notarial deed or a certified extract from the commercial register.

5.2 Frequency requirement and market assessment

The candidate shall present its assessment and planning relating to the future development and introduction of new mobile radio technologies and services. In addition it indicates its estimate of the general progress of the Swiss mobile radio market and explains how it wishes to use any newly acquired frequencies.

In this context, the candidate shall specify its frequency requirement in the application form provided (cf. Annex III). Each candidate must submit the completed frequency allocation application in order to be able to participate in the auction (cf. Section 0).

The frequency allocation application lists all categories of frequency blocks, the number of blocks in a category and the corresponding minimum bids and the eligibility points for each frequency block.

The candidate must specify in this application the number of frequency blocks per category which it is prepared to purchase for the respective minimum bids. The spectrum limits as described in Section 6 must be complied with.

The duly completed and signed form constitutes a binding bid. The candidate undertakes unconditionally and irrevocably to purchase the specified blocks at the minimum prices, if the clock phase of the auction does not take place (cf. Section 6.1.2 and auction rules).

However, if the clock phase of the auction does take place, the eligibility point which is available to the candidate in the first bidding round will be derived from the blocks applied for in the form (cf. Section 6.2 and auction rules).

This information must be provided in accordance with the form described in Annex III.

5.3 Wireless broadband communication for emergency and rescue services (BORS)

The party making the submission must state whether it is currently providing specific commercial communications services[41] in favour of BORS or if it intends to do so in the future.

[40] Telecommunications service providers must register with the Federal Office of Communications, which is responsible for supervision of telecommunications service providers (Art. 4 para. 1 TCA)

[41] Cf. footnote 36

5.4 Bank guarantee

Candidates must submit a bank guarantee that is valid until 30.09.2019 (cf. Section 0). The licensing authority may request an extension of the bank guarantee. The amount guaranteed by the bank corresponds to the value of the frequencies the candidate applied for valued at minimum bid.

The licensing authority may then require increases in the bank guarantee during the auction. The amount and the deadline for submission of the additional guarantees will be communicated in good time. The bidding process will be suspended until the expiry of this period.

A candidate which cannot provide the required bank guarantees will be excluded from the procedure.

The format of the bank guarantee is governed by the provisions in Annex IV.

5.5 Licensing conditions

5.5.1 Technical capabilities and technical planning (Art. 23 para. 1 letter a TCA; Art. 16 para. 2 OFMRL)

The candidate shall indicate the extent to which it, its partners or its agents possess the necessary technical capabilities. It shall designate a responsible technical person.

5.5.2 Compliance with applicable law

A candidate must guarantee that it complies with the applicable law, specifically the TCA, the corresponding implementing provisions and the licensing requirements. In this regard, it must:

1. state the organisational measures by means of which it will ensure compliance with the provisions relating to privacy and data protection in accordance with Art. 46 TCA as well as telecommunications law, specifically with regard to telecommunications secrecy in accordance with Art. 43 TCA.
2. specify whether it , related companies or persons involved in its company have been or are affected by one of the following measures within the five years preceding the submission of the bid, at home or abroad:
    - revocation of licences or authorisations in the telecommunications sector awarded by the state,
    - imposition of restrictions due to disregard of obligations under licences awarded by the state or authorisations in the telecommunications sector.
    - prosecution for a breach of the applicable national or international telecommunications law, the rules on cartels and other restraints on competition, the rules on unfair competition, employment law or for a breach of data protection provisions, a pending procedure relating to any of the above-mentioned cases.

5.5.3 Effects on competition

The award of a radio communication licence must not significantly impede effective competition, except where reasons of economic efficiency justify an exception (Art. 23 para. 4 TCA).

Only those candidates who have sufficient economic independence from other candidates may participate in the auction. One or more undertakings under unified economic management cannot submit multiple independent candidatures.

The candidate shall indicate

- other companies in Switzerland and abroad active in the telecommunications sector with which it constitutes an economic or legal entity;

- other companies in the telecommunications sector in Switzerland and abroad which it is obliged to assist owing to current circumstances.

The candidate shall name

- the shareholders or members whose share of the company capital is more than ten percent;
- the groups of shareholders or members who, for various - especially legal - reasons may jointly exercise significant influence on the decisions of the candidate (e.g. a shareholder pact).

The applicant shall disclose

- other telecommunications companies in Switzerland and abroad in which it has a financial interest;
- other companies in Switzerland and abroad with which it cooperates within the framework of technology partnerships, purchasing or marketing partnerships or other types of cooperation.

Sufficient economic independence between the candidates must be ensured throughout the award process. A merger of two or more candidates, and any process such as the acquisition of shares or the conclusion of a contract, which, directly or indirectly, gives a candidate control over a candidate previously independent of it or over parts of such, must be reported to the licensing authority and may lead to the disqualification of one or all participating candidates from the award procedure or to special licence conditions.

In the event of doubt about the possible impact of the award of a licence on competition, the licensing authority shall consult the Competition Commission. If the participation of a candidate might adversely affect effective competition, the candidate may be excluded from participation.

5.6 Provisions of building, planning and environmental law

5.6.1 Spatial planning and protection of the environment

The party making a submission must list the measures it wishes to take to ensure compliance with the requirements of spatial planning[42] and the protection of the environment[43], the landscape and nature[44].

5.6.2 Ordinance on Protection from Non-Ionising Radiation OPNIR

The party making a submission must present the planned measures to ensure compliance with the provisions of the Ordinance on Protection from Non-Ionising Radiation.[45]

[42] Guidelines on the problem of mobile radio installations and spatial planning, Federal Office for Spatial Development, December 2004 (https://www.bakom.admin.ch/bakom/de/home/frequenzen-antennen/antennenkoordination.html)

[43] CC 814.01

[44] Mobile radio antennas: Consideration of the requirements for the protection of nature and the landscape (Berücksichtigung der Erfordernisse des Natur- und Landschaftsschutzes), Factsheet of 30 October 1998, Federal Office of the Environment, Forests and Landscape (https://www.bakom.admin.ch/bakom/de/home/frequenzen-antennen/antennenkoordination.html)

[45] Ordinance concerning Protection from Non-Ionising Radiation of 23 December 1999 (Status 1 September 2009) (OPNIR; CC 814.710)

5.7 Licence conditions

With regard to the conditions of use cited under Section 3.5 the candidate shall provide a map with planned geographical coverage using the frequencies to be allocated (including planned timescales to achieve this coverage).

6 Auction

This chapter provides a summary overview of the auction. The auction rules mentioned in Annex II are still subject to adjustments. The definitive auction rules will be communicated to the participants in detail after the authorisation decision has been issued.

6.1 Auction structure

6.1.1 General

The auction will be conducted over the public internet using an electronic auction system. Further details about the necessary hard- and software will be provided to each qualified bidder in due course. OFCOM intends to conduct a bidder seminar and a mock auction for approved candidates before the auction starts so that there is an opportunity to become acquainted with the electronic auction system.

The auction for categories A to E uses a “clock auction” (CA) format, which comprises two phases:

- The first phase is the “clock phase". This phase determines how many abstract frequency blocks successful bidders acquire in each category, subject to spectrum caps[46]. The conclusion of the clock phase determines the auction price for all frequency blocks won, which at this point are still abstract (see Section 6.3.2).
- The second phase is the so-called assignment phase. In this phase the assignment of specific frequency blocks in categories A, B, C1, C2, C3 and E to each successful bidder takes place. In other words, the specific position of the abstract frequency blocks auctioned in the clock phase is determined. This takes place via a sealed bidding process with additional prices to be paid for the assignment of specific frequencies being determined through a second-price rule. This means that the bidders submit sealed bids for the assignment options applicable to them.

The total price for frequencies acquired in the auction is the sum of the prices at which frequency blocks are awarded after the clock phase, and the additional prices from the assignment phase.

6.1.2 Implementation of the first auction phase

After examination of the frequency allocation applications, the first auction stage (clock phase) is required if, for one or more of the categories A to E, the total number of frequency blocks desired by all bidders in their application form exceeds the number of blocks available in this category, i.e. if there is excess demand in at least one of the categories A to E.

The frequency allocation application is a binding offer to acquire the specified number of blocks at the minimum price: if sufficient frequencies are available in all the bands put out to tender (i.e. if the clock phase of the auction does not take place), the candidate must accept unconditionally and irrevocably, the usage rights to the frequency blocks it has applied for at the minimum price. If there is excess demand, the bidders’ eligibility (i.e. the extent to which bids may be submitted in the auction) is determined on the basis of the information in the frequency allocation application (cf. auction rules in Annex II).

[46] However, this does not apply to category D, since in this case bids are made on a specific block.

ComCom will communicate, within the framework of the authorisation decision, whether the clock phase is necessary according to the rules.

6.2 Minimum bid and eligibility points

For each frequency block there is a minimum bid and eligibility points. The eligibility points of the blocks applied for in the frequency allocation application, summed over all lots and lot categories, determine the maximum number of abstract frequency blocks on which a bidder can bid in the clock phase (eligibility). The eligibility points and the minimum bids for categories A to E are summarised in the following table.

Category	Frequency configuration	Number of blocks	Minimum bid (CHF) per frequency block	Eligibility points per block
A: 700 MHz FDD	2x5MHz	6	16.8 million	2
B: 700 MHz SDL	1x5 MHz	3	4.2 million	1
C1: 1400 MHz SDL	1x5 MHz	5	4.2 million	1
C2: 1400 MHz SDL	1x5 MHz	8	4.2 million	1
C3: 1400 MHz SDL	1x5 MHz	5	4.2 million	1
D: 2.6 GHz FDD	2x5MHz	1	5.8 million	1
E: 3.6 GHz TDD	1x20 MHz	15	1.68 million	2

Table 6**:** Minimum bid and eligibility points

6.3 Overview of the clock phase

The clock phase, if it is necessary, consists of a series of clock rounds. All bids submitted in the clock phase are package bids. That means that a bid can win only as a whole and a bidder cannot win a subset of the frequency blocks requested in its bid.

The maximum amount of spectrum that a bidder may acquire is limited on the one hand by the eligibility resulting from the bidder's application (Section 6.2), and on the other hand by the spectrum caps set by ComCom (Annex II).

6.3.1 Clock rounds

In the first clock rounds, the initial price for each of the categories A to E will be set equal to the minimum price for that category. Each bidder can submit one bid stating the number of lots in each category on which it wishes to bid at the given prices, subject to the activity rule described below and to the overall spectrum caps. When round is closed, demand is aggregated across all bidders. If demand exceeds supply in any category, another clock round is scheduled. In subsequent clock rounds, the auctioneer will increase the price for lots in a particular category if demand for lots in that category exceeded supply in the previous round.

If the bidder reduces its demand in one or more categories, it then has the option of submitting one or more exit bids. These give the bidder the possibility of specifying the prices at which it would request more blocks than in the current clock bid.

The clock rounds end after a round in which there has been no excess demand for lots in any of the categories.

Bidders are subject to an activity rule which is intended to provide an incentive to consistent bidding. The activity of a bidder in a round, defined as the sum of all eligibility points for all frequency blocks included in the clock bid, cannot be higher than its eligibility for this round. A bidder's initial eligibility for the clock phase results from the sum of the individual eligibility points for all frequency blocks applied for in its frequency allocation application. In any subsequent primary round, a bidder’s eligibility is equal to its activity in the previous primary round. This implies that a bidder’s eligibility may remain constant or decrease throughout the primary rounds; it cannot increase.

6.3.2 Determination of the winners and the prices

The clock phase ends after a round in which the aggregated demand from all bidders does not exceed the available supply in any lot category. The price to be paid by successful bidders corresponds to the respective round price of the last clock round or the lowest price in an accepted exit bid, if on the basis of the demand in the last clock round there would be excess supply(pay-as-bid, see auction rules in Annex II).

6.4 Overview of the assignment phase

The clock phase determines how many abstract frequency blocks successful bidders receive in each of the categories and the price they have to pay for these blocks. Except in category D, no specific frequencies have been assigned to the bidders. The purpose of the assignment phase is to determine how the available frequency blocks in categories A, B, C1, C2, C3 and E will be split between the winners from the clock phase and what additional price successful bidders have to pay for the receiving their preferred specific frequency assignments.

The winners in categories A, B, C1, C2, C3 and E will be able to submit their bids for their desired assignment options via the electronic auction system. They will receive a list of the frequency assignment options available for them and can then submit an assignment bid for each option on their bid form.

Winners of spectrum who have no preferences regarding the various assignment options do not have to submit assignment bids. The specific frequency configuration is determined by establishing the combination of valid assignment bids with the highest total value, where exactly one bid per bidder (which may be a bid with a bid amount of zero, expressing no preference) is considered, and bidders who have won multiple blocks in a frequency band are allocated contiguous frequency blocks within this band.

For each category in which an assignment is needed, determination of the successful bids is carried out separately (though assignment bids for all categories are submitted at the same time). The procedure consists of a single bidding round. Additional prices are determined using a second-price rule. Winners pay the lowest prices that they (together) would have had to bid in order to be successful with their respective bids. The calculation of supplementary prices is explained in detail in the auction rules in Annex II.

7 Violations of the law and consequences thereof

7.1 Collusion

From publication of the definitive tender documents onwards, it is forbidden for parties interested in participation to establish contact with other parties interested in participation directly or indirectly via intermediaries or to exchange information with the aim of influencing the outcome of the auction. Public notification of presumed or actual bidding strategies or concrete bids or other statements likely to influence the participation or bidding behaviour of third parties is also forbidden.

Candidates who act in collusion as defined in the paragraph above may not be allowed to take part in the auction or may be excluded from the bidding procedure, depending on the stage of the procedure. A licence which has already been awarded will be revoked without compensation. The provisions of Section 7.3 below shall apply *mutatis mutandis*.

7.2 Non-participation in the auction

Any candidate who has submitted an application in accordance with Section 4.6 and fulfilled the conditions for admission to the auction procedure and who does not participate in the auction remains liable to a proportion of the administration fees for the invitation to tender and award of the licences. Further liability claims in accordance with Section 2.1.2 of the auction rules (Annex II) are reserved. Furthermore, the non-participating candidate may be subject to an administrative penalty in accordance with Art. 60 TCA.

7.3 Infringement of the auction rules

In the event that a bidder infringes the auction rules and if the infringement is likely to influence the outcome of the bidding procedure to the detriment of the other bidders, the offending bidder may be excluded from the bidding procedure. If there is a risk of delay, the exclusion may take place without a previous hearing of the offending bidder. Apart from the exclusion, an administrative penalty as defined in Art. 60 TCA may also be imposed on it.

An exclusion may be decreed up to the time of award of the licence. If the infringement comes to the attention of the licensing authority only after the award of the licence, the licence will be revoked without compensation within the framework of a surveillance procedure. In principle, the legal effectiveness of the other licences awarded on the basis of the auction will not be affected by such a revocation.

An exclusion may be dispensed with if the infringement has no effects on the outcome of the bidding procedure. In this case the imposition of an administrative penalty as defined in Art. 60 TCA is reserved.

7.4 Other infringements

A bidder may be excluded at any time from the bidding procedure if it is found that it has obtained its authorization to take part in the auction through false information or if for other reasons it does not fulfil or no longer fulfils the authorization requirements defined in the present document.

The provisions of Section 7.2 above shall be applied *mutatis mutandis*.

7.5 Consequences of an exclusion

If a bidder is excluded from the bidding procedure because of an infringement of the auction rules, the bidding rounds affected by the infringement will be cancelled and the bidding procedure will be repeated.

8 Annexes

Annex I: Designation and description of frequency blocks

Annex II: Auction rules

Annex III: Frequency allocation application

Annex IV: Specimen template for the bank guarantee

Annex V: Specimen licence