

Public Consultation for the 5G Contest in Chile

I. Introduction

The process of implementation in Chile of fifth-generation mobile services technology (5G) has its origin in the pro-competition agenda promoted by the Government, through the Undersecretariat of Telecommunications, whose purpose is to make available to the public a high-capacity mobile network through a process based on competition, freedom of choice and the provision of a service with quality and full accessibility.

Worldwide, the Fifth Generation of mobile communications, known as 5G, (or IMT-2020 following ITU's denomination), is recognized as a fundamental pillar for smart industries, development of IoT (Internet of Things) and improved fixed and mobile broadband services.

Following these lines, the Undersecretariat of Telecommunications has decided to submit to a contest the following radio spectrum bands: 700 MHz; AWS; 3.5 GHz and 28 GHz, to start the process of adoption of 5G technology in our country. These bands are able to provide space for the challenges of the telecoms industry as well as to contribute to deepen the internet access market.

The bands of radioelectric spectrum to be included into this process will be –as of today¹– the following:

Table 1:

Denomination	Band	Available Bandwidth	Minimum Speed Requirement (*)
Low	700 MHz	20 MHz	8 Mbps download and 2 Mbps upload
Medium Low	AWS	30 MHz	12 Mbps download y 3 Mbps upload
Medium High	3,5 GHz	50 MHz	8 Mbps download y 2 Mbps upload, for each 10 MHz block
High	28 GHz	850 MHz	To be defined

(*) As a quality of service parameter.

In terms of interoperability, high, medium high, medium low and low bands complement each other, providing an adequate balance between data transmission capacity, extended coverage and other properties. For this reason, a new telecommunications operator, could require spectrum in the different bands, while a current telecommunication operator could only be interested in applying, eventually, only to some of them.

¹ New bands, or more spectrum within them, may be open to contest, as long as they are made available either by harmonized bands defined in the context of the ITU, in particular the World Radiocommunication Conference to be held in November 2019, or by equipment availability or proposals coming from equipment vendors.

II. General characteristics of the process

The process of awarding the aforementioned frequency bands, will be conducted according to the following characteristics:

- i. The process will encompass one or more nationwide licenses/concessions.
- ii. The contest will be initiated once the resolution that ends the non-adversarial proceeding entitled "Subtel Consultation on the maximum limit of radio spectrum", NC No. 448-2018, which is before the H. Competition Court, is firm and enforceable.
- iii. It is recognized that requirements of efficiency in the deployment of 5G, involve the need to open a portfolio of radio spectrum bands, with different signal propagation potentials. In this sense, the contest will follow a *combinatorial* type of model, by virtue of which each band will be subdivided into one or more blocks, companies being able to participate for any combination of them, as long as their offers fulfill the respective admissibility conditions. In this way, the best possible allocation is attainable, so that each proponent obtains combinations of blocks of their choice.

Similarly, the methodology for weighting scores of applications will take into account the impact of deployments proposed by applicants in productive sectors of the country through assignment of scores in previously defined industrial areas known as "industrial polygons".

- iv. At the moment of presenting their offers, proponents must attach the respective technical project (s), proponents may opt for one or more licenses, either Public Service for Data Transmission or Intermediate Telecommunications Service license. In other words, proponents are able to choose from end-customer and wholesale telecommunications service.

The technical project, elaborated in accordance with the rules of the corresponding contest and the relevant law, must identify technical characteristics such as the deployment of the related infrastructure, expected coverage, implementation deadlines according to stages, transmission speeds and other technical parameters and requirements defined in the contest rules.

- v. Any public or private juridical person, constituted in Chile and domiciled in the country that complies with the technical requirements established in the contest, may participate. Such juridical persons may present their offers individually or as a business consortium, as

it is currently the case of public service contests whose licenses were granted under the Telecommunications Development Fund (FDT)².

- vi. Eventual entry barriers are reduced, such as compulsory coverage on certain isolated geographical areas or others, which could imply comparative advantages for those operators that already have infrastructure deployed throughout Chile. In this regard, it is recognized that there are more efficient public policy instruments to address areas of lower commercial private interest, such as subsidies for rural areas, vulnerable sectors and distant regions.
- vii. In the same line of limiting eventual entry barriers to the process, a single guarantee bond will be required to ensure the correct execution of the technical project and the license, for a percentage value estimated as inferior to the investment cost of firms in this sector.
- viii. Licenses resulting from this process will be valid over a 30 year term, in accordance with provisions of the General Telecommunications Law.
- ix. Service parameters will be established to ensure that the technical project to be implemented corresponds effectively to the 5G technology standard.
- x. The evaluation of proposals declared admissible, will be developed in two phases:
 - a) First, a technical phase, subject to the evaluation method to be described in the contest rules and to be carried out simultaneously for each of the bands or band blocks in competition; and,
 - b) A second, economic phase, namely the bidding, subject to the eventual tie resulting from the technical evaluation described in the preceding point, which will determine the allocation of the respective blocks, based on the demand or economic offers put forward by proponents.
- xi. The technical project, referred in section iv) precedent, could include up to five consecutive stages, with a duration of one year each. However, proponents will increase the score by offering execution in fewer stages, as has occurred in previous spectrum contests.
- xii. Regarding coverages, the following elements will be considered:

² As an example, see: Resolución N°6 (19 Dec 2018); Subsecretaría de Telecomunicaciones, "Aprobación de Bases Específicas del Concurso Público Fibra Óptica Austral, Troncales Terrestres Aysén y Los Lagos, código: FDT-2018-02".

Table 2:

Frequency Band	Expected coverage to obtain maximum score in a given commune *	Communes under this criterion
700 MHz	200 km ² , or the commune's surface, if it is less than 200 km ² .	Those associated to regions of Valparaíso, Metropolitan, Maule, Bío Bío, Ñuble and Araucanía.
	100 km ² , or the commune's surface, if it is less than 100 km ² .	Remaining communes.
AWS	100 km ² , or the commune's surface, if it is less than 100 km ² .	All communes in the country.
3.5 GHz	In principle, 20 km ² , or the commune's surface, if it is less than 20 km ²	All communes in the country.
28 GHz	Criterion subject to definition.	Criterion subject to definition.

* The score of each commune will be obtained in proportion to its population.

- xiii. The technology to be required for the implementation of the technical project will be the one that complies with *3GPP's Release 15* or higher.

III. Situation of the 3,4-3,65 GHz frequency band

As explained previously, as of now, only 50 MHz are free to be assigned to mobile services in this frequency band. These are not previously assigned to any type of telecommunications service.

However, the objective of this Undersecretariat is to be able to incorporate all or part of the allocated spectrum in the 3.4 - 3.6 GHz sub-band of frequencies in future contests. If there is no reorganization in the aforementioned sub-band, there will be an inefficient use of the spectrum.

In fact:

- This band has been globally harmonized for the provision of IMT-2020 services, defined by the ITU at the World Radiocommunication Conference in 2015, and the developments for the deployment of the 5G technology begin with it.
- The ordering and definitive distribution of the 3.4 - 3.6 GHz sub-band, for purposes of granting licenses of public service for wireless local telephony, was established according to the technology used by the equipment available at the time, *Wireless local Loop* initially and *WiMax* later. As a result of which, licenses were granted using the FDD (*Frequency Division Multiplex*) protocol, assigning separate blocks for transmission and reception, with 25 MHz

bandwidth each. However, this is not in line with new technologies that use TDD (*Time Division Duplex*) protocol in the 3.5 GHz band and larger bandwidths.

- The preceding point shows the inefficiency in the use of the radio spectrum in terms of the use of FDD over TDD and the useful working bandwidth. It should be noted that bandwidths proposed for carriers by equipment vendors are multiples of 10 from 10 MHz to 100 MHz, in addition to a 15 MHz carrier. As a result, having 25 MHz to some extent would leave an "idle" block of 5 MHz when using 20 MHz carriers. Additionally, 20 MHz carriers in the FDD protocol would be isolated and as a result they would require more processing work to coordinate the emissions between segments.

Therefore, considering that the objective of this Undersecretariat is to promote an efficient use of the radioelectric spectrum, it is considered necessary to generate a reordering in the band that could lead to an advantage in the use of the spectrum, distributing channels with bandwidths appropriated to new technologies in addition to enabling, subject to the new spectrum limits, the entry of another operator by adding 50 MHz from the 3,6 - 3,65 GHz segment.

To achieve the above, it is necessary to engage current licensees/concessionaires of the 3.4 - 3.6 GHz band, in the public contest to grant concessions of public and / or intermediate services in the 3.4 - 3.65 GHz band, for the purpose of generating new licenses/concessions that make efficient use of it.

As a solution, this Undersecretariat proposes inviting current license/concession holders of the aforementioned sub-band to participate, establishing that there will be a recognition of the spectrum they have and that that spectrum be considered available to the contest. In this way, the spectrum available to the contest will be increased from 50 MHz to 250 MHz, and the assigned frequency blocks could be ordered in such a way that the spectrum is more efficiently used.

Finally, in relation to the recognition of spectrum, this may consider variables such as geographic coverage of such radio spectrum, service coverage relative to the population using services, the remaining time of the current license/concession, among others.

IV. Consultations

Besides incorporating a new technology, the Undersecretariat of Telecommunications must also encourage competition in the telecommunications market, promote efficiency in the use of a scarce resource such as the radio spectrum, and foster transparency and quality of services offered to the general public, without arbitrary discrimination.

Taking into account such aspects, in accordance with the principles enunciated in the introduction of this document, for the next contest to grant spectrum bands, a high number of participants is expected, to be able to choose the best technical projects, and to ensure a sustained quality. In

such context, feedback is needed, through this public consultation, regarding the following aspects:

a) Service Excellence:

Elaboration of a technical project, requires that technical offers are built according to parameters that account for service excellence. That will in turn, allow to evaluate and rank the different offers. The main characteristic corresponds to the computation of coverage in stages. In relation to coverage calculation and in general to the specific technical project for each band:

1. Comments are requested regarding coverages and speeds cited in tables 1 and 2, in relation to 700 MHz, AWS and 3.5 GHz bands.
2. Given that millimeter bands are associated to lower coverages, which criteria are considered adequate to evaluate coverage and speed for the 28 GHz band?
3. Comments on the definition of minimum download and upload speeds in each band as a requirement for coverage defined by the technical projects.

b) Cybersecurity:

The National Cybersecurity Policy has as a main objective, the design, implementation and deployment of measures that protect the safety and freedom of cyberspace users, reaffirming the national commitment to promote a free, open, democratic and secure cyberspace³. In this context, the following questions are posed:

4. Which aspects of cybersecurity are considered relevant to be included?
5. Which specific conditions are considered relevant for the protection of IoT?
6. Which points are considered important regarding data privacy protection, in relation to 5G technology?
7. In which sectors or activities are risks associated to information security considered a restraint for digital transformation?
8. In which manner should cybersecurity be implemented at the level of the radio interface and network infrastructure?

³ <https://www.ciberseguridad.gob.cl/objetivos/>