Spectrum Management: View from the Chilean Administration

Gobierno de Chile

Subsecretaría de Telecomunicaciones

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Subtel – CHILE

The Fourth School in Spectrum Management for Radio Astronomy

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Agenda

- About Chile
- Framework for Telecommunications
- Spectrum management
- Coordination - ALMA Radiotelescope

About Chile

CHILE

Chile is a democratic republic, divided into 15 administrative regions; presided over by Ms. Michelle Bachellet. It has a population of more than 15 million people, and a continental longitude of approximately 4.200 km and 8.000 km, if the Chilean Antarctic is considered.

Chile has plenty of natural resources, and is advanced in its multisectorial variety of products and services, such as mining, aquiculture, agriculture, communications, financial sector and retail, among others.

CHILE

Chilean business environment is based on a commitment to economic liberalization and free-market policies. It has focused on building sound macroeconomic bases and strong institutions, as well as promoting competition and international integration.

It is worth mentioning the country's modern telecommunications system, its internationally competitive banking sector, fine standard of public infrastructure, excellent quality of services and availability of qualified workers.

Framework for Telecommunications

Framework for Telecommunications

Institutional and Legal Framework for Telecommunications in Chile:

- The Undersecretariat of Telecommunications (SUBTEL)
  - was created in 1977, Decreto N°1762
  - as a technical body in charge of regulating and promoting the development of telecommunications
  - under the organizational structure of the Ministry of Transport and Telecommunications

Framework for Telecommunications

Functions of Subtel:

- Subtel is in charge of
  - Developing telecommunications policies;
  - Compliance with the laws, regulations, technical standards, as well as international treaties;
  - Spectrum management;
  - Issuance of technical standards on telecommunications and control compliance;
  - Representing the country as the Chilean Telecommunication Administration before the International Telecommunication Union (UIT);
  - Granting, modifying, denying, suspending or terminating concessions, permits, and licenses to provide telecommunication services in Chile;

Framework for Telecommunications

Legal framework includes the General Law on Telecommunications, technical rules and plans.

- GLT N° 18.168 came into force in 1982
  - in order to regulate the installation, operation and exploitation of telecommunications services
  - with special emphasis on the promotion of competition
  - GLT defines five service categories, which correspond to broadcasting telecommunication services, public telecommunication services, limited (private) telecommunication services, amateur radio services and intermediate telecommunication services
  - Compliance with the laws, regulations, technical standards, as well as international treaties;
  - Spectrum management;

Framework for Telecommunications

Other institutions in telecommunications regulation

- Besides GLT, Chile has a Competition Tribunal
  - main purpose is to protect and promote competition in all markets
  - it is responsible for determining if an operator is dominant or not and if the market presents conditions pertinent to grant freedom of prices or requires public intervention

- National Television Council, established by the Constitution
  - its purpose is to guarantee the correct operation of television services
  - not under the review or control of any other public entity
  - is the competent authority to grant the concessions for television broadcasting services and the permits for limited television services

Spectrum management

Regulating Spectrum

Legal hierarchy on regulating spectrum

- Spectrum Plan, Plan General de Uso del Espectro Radioeléctrico, Decreto Nº 127 year 2006 determines the way that the frequencies will be allocated by the Table of frequency allocation. (based on Article 5 of the ITU Radio Regulations, Region 2)

- Through Rules (Resolución Exenta), frequency bands are appointed for specific uses, in accordance with requirements of technological trends, spectrum planning criteria based on discussions in different forums (like CITEL), regional and national positions

Regulating Spectrum

Categories of services and allocations

- Services allocated on a Primary basis: can claim protection from harmful interferences from stations of a primary service or from stations of a secondary service

- Services allocated on a Secondary basis: can not claim protection from harmful interferences from stations of a primary service, but they have the right to claim protection from harmful interferences from stations of a secondary service.

Regulating Spectrum

Band	PLAN General: ALLOCATION	Choice/ Rules: APPOINTED
17,8 – 18,4 GHz	FIJO MÓVIL FIJO POR SATÉLITE (espacio-Tierra) (Tierra-espacio)	 Incluida en Canalización Fijo (hay enlaces TV estudio planta)
18,4 – 18,6 GHz	FIJO FIJO POR SATÉLITE (espacio-Tierra) MÓVIL	Canalización Fijo
18,6 – 18,8 GHz	EXPLORACIÓN DE LA TIERRA POR SATÉLITE (pasivo) FIJO FIJO POR SATÉLITE (espacio-Tierra) MÓVIL salvo móvil aeronáutico INVESTIGACIÓN ESPACIAL (pasivo)	Incluida en Canalización Fijo
18,8 – 19,3 GHz	FIJO POR SATÉLITE (espacio-Tierra) FIJO MÓVIL	Resolución Fijo por satélite Debe coordinarse con Fijo
19,3 – 19,7 GHz	FIJO FIJO POR SATÉLITE (espacio-Tierra) (Tierra-espacio) MÓVIL	Canalización Fijo
19,7 – 20,1 GHz	FIJO POR SATÉLITE (espacio-Tierra) MÓVIL POR SATÉLITE (espacio-Tierra)	Resolución Fijo por satélite
20,1 – 20,2 GHz	FIJO POR SATÉLITE (espacio-Tierra) MÓVIL POR SATÉLITE (espacio-Tierra)	Resolución Fijo por satélite

Regulating Spectrum

Band	PLAN General: ALLOCATION	Rules: APPOINTED
14,47 – 14,5 GHz	FIJO POR SATÉLITE (Tierra-espacio) Radioastronomía Móvil por satélite (Tierra-espacio)	Resolución Fijo por satélite

Coordination - ALMA Radiotelescope

Coordination

Subtel granted AUI and ESO, licence (Permiso de Servicio Limitado), to install and operate the radiotelescope at Llano de Chajnantor, Atacama.

- Granted in 2004.
- Renewed in 2013
  - Resolución Exenta N° 3075, august 2013 to AUI
  - Resolución Exenta N° 3076, august 2013 to ESO

- Asociated to characteristics of
  - Frequency asignment
  - Location
  - Type and number of antennas
  - Definition of protection zone and coordination zone

Coordination

- Reception frequency bands of ALMA antennas

Authorized Frequency Bands [GHz]	Band allocated to radioastronomy service on primary basis [GHz]	Band allocated to radioastronomy service on secondary basis [GHz]
35 - 52	42,4 - 43,5	
67 - 90	76-77,5 / 79 - 90	77,5 - 78
84 - 116	84 - 94 / 94,1 - 116	94 - 94,1
125 - 163	130-134 / 136-158,5	125-130 / 134-136
163 - 211	164 - 167 / 182-185 / 200-211	
211 - 275	211-231,5 / 241-275	
275 - 370	Not allocated	
285 - 500	Not allocated	
602 - 720	Not allocated	
787 - 950	Not allocated	

- The radiotelescope can operate on all the frequency bands authorized, nevertheless it is no possible to guarantee protection on the bands, or parte of them, not allocated to radioastronomy on primary basis.

Coordination

- Protection Zone:
  - Centered at lat. 23°01‘40“ South and long. 67°45‘17“ West, 30 km radius.
  - Subtel guarantees that will not authorize the instalation of radiocommunicaciones systems which operate in the reception bands of the radiotelescope.

Coordination

- Coordination Zone
  - Same center as the protection Zone, inside national territory.
  - Any authorization will be submited to a coordination process:
    - Subtel will inform ESO and AUI about applications that could afect the operation of the radiotelescope, asking for their technical oppinion.
    - In any case ESO and AUI will detect emissions affecting the radiotelescope operation, they will inform Subtel for their coordination.

"Good Practices" regarding adjusting antenna beams, power, filtering armonic emissions.

Coordination

Inside the coordination zone, the emissions from equipments authorized to licensees will be limited according to Rec. ITU-R RA 769-2 in the cases:

- For frequencies <31,3 GHz, maximum EIRP is defined for distances from 10Km to 100 Km.
- For frequencies >31,3 GHz, protection criteria established by Rec. ITU-R RA 769-2 (or any ITU Recomentatiod that will replace it) will be settled.

Coordination

Inclusion of the frequencies of ALMA Radio Observatory in the ITU Master International Frequency Register

Radio astronomy station antenna characteristics
ALMA Observatory

Code	Antenna type and dimensions	Effective area and angular coverage in azimuth and elevation
CHL1	Array of 64 parabolic reflectors, 12 -m diameter each with Cassegrain subreflector, arranged in a variable pseudo-random spiral pattern of maximum diameter 10 km	5100 square metres; all directions; the angle of elevation is between 5° and 90°
CHL2	Array of 64 parabolic reflectors, 12 -m diameter each with Cassegrain subreflector, arranged in a variable pseudo-random spiral pattern of maximum diameter 10 km	5100 square metres; all directions; the angle of elevation is between 5° and 90°

Gracias.

Gobierno de Chile

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