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Telecommunications and spectrum regulation in Brazil: a report for the APC

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From privatization to statization

For about 75 years up to the sixties, nearly all telecommunications services in the country were in private hands, distributed among hundreds of local operators. Telephony authorizations were issued and controlled by the state governments. In this process Companhia Telefônica Brasileira (CTB, a subsidiary of the Canadian company Brazilian Traction) emerged as a major operator of local and long-distance services in the majority of the larger Brazilian cities, covering about 80% of the telephone terminals in the country. CTB shared the market in these cities with Companhia Telefônica Nacional, CTN, an ITT[2] subsidiary. The remaining cities and towns were covered by small local operators in extremely precarious situations.

International communications were in the hands of foreign operators Western Telegraph, Radional, and Italcable. The federal government run only telegraphy (operated by the federal postal service) and some radio broadcast stations with national coverage.

Privatized telecommunications at the time provided poor services, and a process of statization[3] was initiated in 1962, when the government of the state of Rio Grande do Sul decided to take over the ITT subsidiary. This process culminated with the creation of Telebras by the federal government in July, 1972, during the military dictatorship.[4] The entire telephony and data transmission infrastructure in the country became part of Telebras (except for a few local operators and the state operator in Rio Grande do Sul), and Telebras subsidiaries were created for each of the other states of the federation.

Another subsidiary, Embratel, became the sole operator of interstate and international circuits. Until 1998 telecommunications remained the monopoly of Telebras, in an entirely verticalized structure which included regulatory power. Telebras and the Brazilian Post Office were under the authority of the Ministry of Communications (MiniCom), which also had regulatory power over the entire eletromagnetic spectrum.

The Brazilian Telecommunications Code (CBT, law 4117, of August 27th, 1962) classified telecommunications services in six categories according to their functions as follows: public service; restricted public service; limited service; broadcasting service; amateur radio service; and special service.[5] The Brazilian Constitution of 1988 defined telecommunications and broadcasting services simply as "public services", meaning in this case services offered by the State or, in the case of broadcasting, also licensed to private organizations.

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1 For further information on the history of telecommunications in Brazil, see Gaspar Vianna, *Privatização das Telecomunicações* (Rio de Janeiro: Notrya, 1993). Also, Antonio Hélio Guerra Vieira, *Histórico das Telecomunicações - Uma visão do Brasil*, tutorial, *http://www.teleco.com.br/tutoriais/tutorialeletronica/default.asp*

2 International Telephone and Telegraph. In Brazil it was also known by the acryonym IT&T. For a history of this company: *http://www.fundinguniverse.com/company-histories/International-Telephone-and-Telegraph-Corporation-Company-History.html*

3 "Statization" in this text means the taking over of private companies (owned by national or foreign interests) by the federal or a state government. This is different from "nationalization", which might imply either statization or the imposition by legislation that companies may remain private but cannot be controlled by foreign owners.

4 The military took over in the end of March, 1964, and the regime lasted for almost 21 years, ending with the nomination of a transitional government in the beginning of 1985.

5 Article 6 specifies services as follows: public service: any telecommunication system serving the general public; restricted public service: telecommunication service in ships, airplanes, land vehicles or for public use in localities where public telecommunication services are not available; limited service: services which are not open to public access, such as security, transportation management, certain services in rural areas; broadcasting service: radio and TV services open to the general public; amateur service: authorized radio amateur services; special service: such as time broadcast, standard frequency reference, radio positioning, meteorological services, scientic and experimental services, ambient music.

From statization to privatization

One of the features of the 1995-2002 government of Fernando Henrique Cardoso was a policy of accelerating the privatization of major industrial and services' state companies. In August, 1995, Constitutional Ammendment Number 8 opened the way for privatization through licensing of telecommunications. By that ammendment, services were separated into telecommunications and broadcasting, and an independent regulatory body for telecommunications was to be created.[6] A new General Telecommunications Law (known as LGT in Portuguese) established the general norms for the privatization process, and created an independent regulatory body, the National Telecommunications Agency (Anatel).

With the LGT, the older CBT remained valid only for the regulation of radio and television broadcasting. Decree 52795/63 (which regulates processes of issuing and renewal of authorizations) and Decree-Law 236/67 (which introduces stricter terms for licensing and establishes limits on the number of authorizations per organization) completed the overall regulatory framework still in force.

Deterioration of services, especially fixed line telephony, combined with the impossibility in practice of obtaining improvement in services through legal consumer action (there was a single services provider, which was also the regulator) favored pro-privatization arguments, given a huge unanswered demand where a fixed or mobile phone line could be obtained only in a parallel market. In a certain way it was a situation similar to when telecommunications were in the hands of foreign companies or small local entrepreneurs – but in a much larger scale (a huge centralized telecommunications operation) and in a period in which significant technological change started to take place worldwide.

Thus, some of the arguments which in 1962 led to statization of the system now served certain interests defending privatization. The real cause of the inability of Telebras to properly respond to public demand for services was that it suffered from chronic lack of resources due to government budgetary policies, which precluded proper development of the telecommunications network and keeping pace with technical advances.

Privatization of telecommunications initially involved dismembering the Telebras system into 12 companies – three fixed phone line operations, eight mobile phone operators and the long distance carrier, Embratel. Initially, all eight mobile operators used the "A" subranges of the 824-894 MHz band, operating in the AMPS analog standard.

The privatization process initiated in July, 1998, opened bidding for 10 "mirror" mobile companies operating in the "B" subranges of the 824-894 band, introducing the digital AMPS standard also known as TDMA. Three fixed line "mirror" companies and a long-distance "mirror" carrier were also authorized.

The table below summarizes the acquisitions in 1998.[7]

Company	Acquiring consortium	Value (US$ billions)
Embratel (nacional)	MCI	2.29

6 The ammendment altered Article 21 of the Brazilian Constitution. The altered paragraphs established the new attributions of the State as follows: (1) "XI – to explore, directly or through authorization, concession or permission, telecommunications services, as defined by law, which shall determine organization of services, creation of a regulatory body, and other institutional aspects" (paragraph XXII), and "to explore, directly or through authorization, concession or permission: a) broadcasting services of sounds and images" (paragraph XXIII).
7 The table does not include public companies which were independent from Telebras at the time: CRT (Rio Grande do Sul), Sercomtel (city of Londrina, Paraná), CETERP (city of Ribeirão Preto, São Paulo) and CTBC (cities in common border areas of Minas Gerais, São Paulo, Goiás and Mato Grosso do Sul). In June, 1998, Telefónica acquired 50.1% of CRT stock for US$1.02 billion.

Telesp (state of São Paulo)	Telefónica, Iberdrola, Banco Bilbao Vizcaya, RBS (Brazil), Portugal Telecom	5.00
Tele Centro Sul (states of Paraná, Santa Catarina, Mato Grosso do Sul, Mato Grosso, Goiás, Distrito Federal, Tocantins, Rondônia and Acre)	Telecom Italia, Banco Opportunity (Brasil)	1.80
Telemar (Rio de Janeiro, Minas Gerais, Espírito Santo, Bahia and other Northeastern states, Amazonas, Pará, Roraima and Amapá)	Andrade Gutierrez, La Fonte, Inepar, Brasil Veiculos, Macal (all Brazilian companies)	3.00
Telesp Celular (São Paulo)	Portugal Telecom	3.10
Tele Sudeste Celular (Rio de Janeiro, Espírito Santo)	Telefónica, Iberdrola, NTT Mobile, Itochu	1.20
Telemig Celular (Minas Gerais)	Telesystems International, Banco Opportunity	0.66
Tele Celular Sul (Paraná, Santa Catarina, Rio Grande do Sul)	Organizações Globo (Brazil), Banco Bradesco (Brazil), Telecom Italia	0.61
Tele Norte Celular (Amazonas, Pará, Roraima, Pará, Maranhão)	Telesystems International, Banco Opportunity	0.16
Tele Centro Oeste Celular (Acre, Distrito Federal, Goiás, Mato Grosso, Mato Grosso do Sul, Rondônia, Tocantins)	Splice do Brasil	0.38
Tele Leste Celular (Bahia, Sergipe)	Telefónica, Iberdrola	0.37
Tele Nordeste Celular (six Northeastern states: Alagoas, Ceará, Pernambuco, Paraíba, Piauí, Rio Grande do Norte)	Organizações Globo, Banco Bradesco, Telecom Italia	0.58
Total (US$ billions)		**19.15**

For comparison, the table below shows the total value of privatizations carried out in Brazil between 1990 and 1997, showing that privatization of telecoms in 1998 accounted for 43% of the value of all privatizations in that period.

Sector	**Value (US$ billions)**
Electricity	3.62
Railways	1.49
Fertilizers	0.49
Financial	0.24
Mining	6.86
Petrochemicals	3.70
Ports	0.25
Steel	8.19
Other	0.61
Total (US$ billions)	**25.45**

II – Entities responsible for spectrum management

Authority and oversight of spectrum management in Brazil is carried out by two federal entities: Anatel and MiniCom.

Anatel

Anatel was created by the General Telecommunications Law (LGT, Law 9472, July 16, 1997), modeled after the US Federal Communications Commission (FCC), with the following attributions:

- to approve, suspend and cancel authorizations;
- to regulate licensing and service providing processes;
- to oversee incumbents' operations;
- to manage the electromagnetic spectrum, including orbital equipment;
- to certify telecommunications products and equipment.

According to the LGT, Anatel is in charge of "implementing, within its mandate, the national telecommunications policy" (article 19, paragraph I). This responsibility is expressed in a set of attributions, including issuing of authorizations for telecommunications services offered in what are called public and private regimes, "to manage radiofrequency spectrum and the use of [satellite] orbits, issuing the respective norms" (paragraph VIII), and "to publish acts of authorization and extinction of the right of use of radio frequency and [satellite] orbit, overseeing and pllying sactions" (paragraph XIV).

The agency is based in the federal capital, Brasília. Its activities include publishing of norms, definition of tariffs, verification and certification of devices involved in transmission and reception. Decisions are taken by the Governance Board, assisted by an Advisory Board (constituted of representatives of other sectors of the federal government as well as civil society) and an Ombudsman's Office. Its organigram includes six superintendencies organized by type of services, as well as juridical and specialized advisory departments (Appendix I).

Spectrum management includes:

- establishment of norms, which involves establishing all conditions for use of this resource;
- definition of spectrum ranges for each type of service;
- planning of authorizations;
- carrying out allocation of ranges and authorization processes for each service;
- licensing of transceiver stations and receiving equipment.

The general list of communication services under Anatel's purview includes all manner of radio communications. Here is a partial list: meteorological services; inter-satellite communications; Earth-satellite communications; fixed communications and telephony; standard frequencies and time signals; mobile communications; aeronautical mobile communications; maritime mobile communications; space operations; space research; amateur radio; radioastronomy; radiodetermination, radiolocalization and radio broadcasting via satellite; radionavigation; broadcasting repeaters; multimedia communications etc. The actual list is precisely defined according to an extensive classification of services generally following International Telecommunication Union (ITU) norms and recommendations.

The agency is financially and administratively autonomous, and although it is organically related to MiniCom (considering that many procedures and decisions depend on a consensus or joint work among the two agencies) it is independent from it. Members of the Board, including

the Chair, are chosen by the president of Brazil after approval by the Senate – they have fixed mandates and stability (i.e, not affected by the national electoral processes). It started to operate in November, 1997.

Anatel is maintained by a percentage of income obtained from licensing and from a fiscalization fund called FISTEL – a tax on telecommunications services which generated about R$3 billion in 2009. Anatel takes a small percentage of these resources – its budget, approved by Congress on an yearly basis, was around R$400 million in 2009, which the agency considers insufficient to properly perform its duties. The remainder of those incomes is absorbed by the National Treasury.

Anatel was thus created with the general mission of helping to carry out a new economic and regulatory model for telecommunications in Brazil, starting with the definition and execution of the Telebras privatization process. After that privatization, the central role of Anatel was of regulating, licensing, and overseeing telecommunications services in the country, including spectrum management. From then on, incumbents became accountable to Anatel for quality of service and the fulfillment of targets specified in the authorization contracts.

Ministry of Communications (MiniCom)

MiniCom was created in 1967, during the military dictatorship, to centralize all executive tasks related to the sector. Separation of attributions is not always followed in a rigid manner, as, for example, channels originally intended for analog broadcasting might become available for telecommunications services, and both Anatel and MiniCom are involved in assigning channels for digital radio broadcasting and digital TV.

MiniCom is the main organism of the federal administration in charge of policies on radio and TV broadcasting (broadcasting, rebroadcasting and repeating of radio and TV emissions). Under its purview is the national post office monopoly, the state company EBC (Empresa Brasileira de Correios e Telégrafos). The ministry is organized under two main secretariats: electronic communication services; and telecommunications (Appendix II). More on broadcasting regulation will be presented later in this document.

III – Overview of main policies

Brazil currently lacks a unified national communications or telecommunications legislation. Actual policy is carried out through many fragmented directives derived from specific situations. Main pieces of legislation are CBT, LGT, and the so-called "Cable Law",[8] as well as associated legislation establishing federal funds for some specific purposes (like funding fiscalization, or promoting universalization of services). Some of them are briefly described below.

The Brazilian Telecommunications Model (LGT)

LGT established two modalities of services according to their relevance regarding basic social rights: regulated services ("public regime") and unregulated services ("private regime"). All incumbents of fixed telephony services (STFC) are under a public regime. They are required to universalize service provision according to the incumbent contract with Anatel, and guarantee quality of service; the agency establishes the basic pricing structure and values. Subscribers have to pay a monthly "basic tariff" which is currently R$40 (about US$24) – this tariff increased 3,846% in the period 1995-2009, while inflation in the same period increased by 184%,[9] a significant sign of the regulator's bias in favor of the telecommunications cartel. The public regime also determines that if for any reason a company fails to provide the services, the State will take over its operations, including the existing infrastructure.

All other telecommunications services are under a "private regime" which are basically regulated by the market. This is the case of all services which make intensive use of the spectrum, like mobile telephony and others. However, there are terms of service in the bidding contracts which vary according to the field of service and type of bidding – mainly, these are requirements defining quality and efficacy of service, and in some cases might include universalization goals.

Radio and TV broadcasting, however, are not under the LGT and operate under public concessions requiring compliance with specific guidelines. Cable TV is under a specific legislation which precedes LGT (and which, for instance, does not allow for foreign control of cable companies). Broadcasting is basically under Chapter V of the Brazilian Constitution (still requiring more detailed regulation). Decree 52795/1963 and 88066/1983, for example, determine the minimum amount of time a broadcaster ought to dedicate to news programming.

Public Telecommunications Policy (Decree 4733/2003)

In theory, public telecommunications policy is laid out in Decree 4733, which defines the following government objectives for the sector:

"I – to guarantee individual access of every citizen to at least one telecommunication service with tariff options;
"II – to guarantee access of every citizen to the Worldwide Computer Network (Internet);
"III – to cover [telecommunication] needs of the rural population;
"IV – to stimulate services' development in order to improve and expand access of the entire population to telecommunications, under reasonable and fair tariffs and prices;
"V – to promote development and carrying out of mechanisms to establish, adjust and revise

8 Decree 95744 was issued in 1988, regulated by MiniCom's Norm 250 (1989), and modified by Law 8977 (1995). The first 96 authorizations for cable TV networks were issued in 1990.
9 Data taken from a 2009 study by IDEC: *http://www.idec.org.br/telecom/pdf/IdecSSRC_relatorio_FINAL.pdf*

services' tariffs, through models which ensure a fair and coherent relation between the cost of service and the value to be charged to consumers, while assuring the financial-economic balance of the contract;
"VI – to guarantee adequate response to the needs of the citizens, related to telecommunications services with assurance of quality;
"VII – to organize telecommunications services with focus on social inclusion [article 4th]."

Directive for updating rulings in communications (MiniCom 11/2008)

This legal instrument, a formal letter from the minister of Communications to the chairperson of Anatel, is an indication of its weakness. The fact that it was issued just 24 hours after a request from the incumbents' association (Abrafix) makes it even more fragile.

The main reason of the document is to establish a reference for Anatel to end the PGO restriction which precluded an incumbent from operating in more than one of the authorization regions. In practice, this letter gave the agency powers to modify the PGO and issue a permission for the purchase of Brasil Telecom (which operated in the Southern, Midwestern and partly in the Northern regions) by Telemar/Oi (operating in Southeastern and Northeastern regions).

MiniCom's reason was the "reconfiguring of the competition standards in the telecommunications sector" provoked by "digital convergence", and justified it with the need for an "effort to obtain sinergies and economies of scale and goals which aims at expanding inbvestments in the integration of multisservices' networks". Finally, the letter requests a revision of the sector's regulations, which would become the Telecommunications Regulation General Update Plan (PGR)[10].

Digital Terrestrial Television Model (Decrees 4901/2003 and 5820/2006)

The introduction of digital audio and video broadcasting (digital radio and digital TV) are relevant to the discussion of spectrum management since they involve on the one hand the freeing up of large amounts of bandwidth currently used for analog transmission, and on the other hand introduce significant modifications in the spectrum ranges and use of bandwidth depending on adopted policies.

Digital TV was introduced in Brazil with the creation of the Brazilian System for Digital Television (SBTVD). Regulation did not establish this platform as a new service, and precluded use of features such as multi-programming and interactivity. Also, the current TV channel authorizations' holders received a frequency range with the same width as the one used for the current analog channels (6 MHz), instead of licensing the service. It is clear that with this bandwidth digital channels could be used far more effectively than the regulation currently determines. For this reason, Decree 5280 is being questioned in Brazil's highest court, the Supreme Federal Tribunal (STF).

Brazil has adopted for digital TV a modified version of the Japanese platform standard ISDB-T. The Brazilian digital broadcasting platform is known as ISDB-Tb or by its Portuguese initials SBTVD. This modified version has also been adopted by Argentina, Chile, Peru, Venezuela, and most recently Ecuador, Paraguay and Costa Rica. Other countries considering the adoption of SBTVD are Bolivia, Jamaica, Dominican Republic, Belize, Guatemala, Honduras, Nicaragua, Suriname, Mozambique, Tanzania, Malawi and South Africa.

10 Resolution 516/2008.

The SBTVD/ISDB-Tb standard uses the H.264 (MPEG-4 AVC) video compression standard, and an interactive middleware developed in Brazil called Ginga. The original Japanese platform uses H.262 (MPEG-2 Part 2) for video compression and the BML middleware. On April 29, 2009, the ITU has certified the Ginga-NCL module and its associated NCL/LUA programming language as the first international recommendation for interactive multimidia environments for digital TV and IPTV (Recommendation H.761).

Spectrum channels reserved by Anatel for digital TV are in the UHF range from 470 MHz to 806 MHz. Each channel allows for one full HD transmission (1080p) or an HD transmission (720p) and a standard definition transmission simultaneously (this is currently the arrangement being used by some of the main Brazilian broadcasters).

National Broadband Plan (Decree 7175)

After privatization, Telebras continued to operate at a minimum scale, serving basically as a source of public servants which were moved to Anatel[11] – this was its main function until, in May, 2010, president Lula signed Decree 7175 which instituted the National Broadband Plan (PNBL) and revived Telebras at its core. Article 4 defines the following mandate for Telebras:

- to implement the federal administration's communications network;
- to provide support to public policies regarding broadband connectivity to the Internet to universities, research centers, schools, hospitals, public service centers, community telecenters, and other public interest points;
- to provide communications infrastructure and network support to telecommunications services provided by private companies, states, Federal District, municipalities and non-profit organizations; and
- to provide Internet broadband connectivity services to final users only where these services are not adequately provided.

Article 7 defines the role of Anatel in the PNBL. The agency will "implement and execute the regulation of telecommunications and network infrastructure services related to Internet broadband connectivity" under the following directives:

- promotion of competition and free initiative;
- incentive to innovative businesses which develop the use of convergent services;
- adoption of fast-track procedures for conflict resolution;
- enforcement of infrastructure unbundling;
- management of public infrastructure and public assets, including electromagnetic spectrum, in order to reduce Internet broadband connection services' costs; and
- expansion of availabity of Internet broadband connectivity services in the implementation of telecommunications infrastructure.

The article also establishes that "in the execution of the directives in this article, Anatel will abide by policies established by the Ministry of Communications."

Telebras is taking over a large fiber backbone network which combines circuits on top of high-voltage transmission lines and networks operated by state companies such as Petrobras and the state company operating most transmission lines, Eletrobras (this includes fiber from a bankrupt private company, Eletronet).

Currently this network has a total length of 11,357 km covering Brasília (the federal capital)

11 Since Telebras had ceased to operate any telecommunications service and had no say on policy, moving its employees to Anatel did not represent a conflict of interest. It was actually a way to reduce public expenditure on personnel, as the cost of laying them off would be higher than simply rellocating them under Anatel's budget, and also a way not to lose an established expertise.

and 15 other state capitals, and by 2014 it will be extended to 30,803 km directly reaching 10 more state capitals. In 2010, the deployment plan will connect 100 municipalities around the fiber network, either directly or via high-speed point-to-point digital radio links. By 2014, the Telebras backbone should reach more than 80% of the 5,565 municipalities.

PNBL involves the use of certain spectrum ranges (above 6 GHz) to provide point-to-point links to points of presence in most municipalities using high-speed radios. But the Plan also contemplates a series of measures to stimulate entry of more operators in providing digital mobile services using 3G and 4G technologies.

Currently unused parts of the 1.9 GHz band are to be issued to new mobile operators to increase competition, with new rules regarding universalization – among them, the requirement that full 3G service be provided with full coverage in all municipalities of 100,000 inhabitants or more, even though mobile services are not under a public regulatory regime. Similar requirements will be imposed on operators seeking authorizations to operate in parts of the 3.5 GHz band.

PNBL also seeks to stimulate the deployment of long-range mobile in rural areas using the 450 MHz band. This service is considered relevant for universalization of broadband service in rural schools and households.

A large network of free broadband services via satellite, know as the GESAC Program, has been incorporated as part of the national broadband strategy. New service contracts signed in November 4th, 2010, between MiniCom and a private satellite operator will expand the number of ground stations in schools, community telecenters, security services and other public or community entities in areas not served by other broadband services by 1,460, to a total of 13,379 ground stations operating at speeds between 512 kb/s and 2 Mb/s.

IV- Attribution and destination of frequency ranges[12]

Attribution and destination of frequency ranges is regulated by the Radiofrequency Spectrum Use Regulation[13] in the "Frequency Ranges Assignment[14], Destination[15] and Distribution[16] Plan"[17] (PADDFFB) as well as the basic distribution and/or channeling plans for specific services and regions.

The Regulation establishes that the destination must guarantee the necessary space for adequate offering of services (article 18), but always preserving the "rational and economic" use of the spectrum. Anatel has the mandate to enforce effective use of the authorized frequency ranges. The Regulation gives Anatel powers to alter destination, attribution and distribution of these ranges. When this process requires spectrum rellocation of an operator, a deadline of between six months and eight years will be given for the conclusion of the process.

PADDFFB, according to article 9 of the Regulation, ought to abide by the following objectives:

- "rational and economic" utilization of radio frequencies;
- to avoid damaging interferences;
- to facilitate the creation of new services and applications; and
- to promote fair competition in the telecommunications sector.

According to article 47, each new authorization must be granted so that it responds to the needs of the applicant with a minimal possible use of the spectrum space.

The Regulation also establishes that attribution of frequency ranges also ought to take into account international treaties, agreements and acts subscribed by Brazil and ratified by the National Congress. According to article 7 of the Regulation, "every [electromagnetic] emission which could go beyond the Brazilian territory must be in accordance with norms pertaining to international treaties, agreements and acts subscribed by Brazil and ratified by the National Congress."

For some services, especially radio and TV broadcasting, frequency range distribution is carried out through the so-called basic plans. There are basic plans of distribution for: VHF and UHF TV transmission channels; VHF and UHF TV retransmission/repeating channels; digital TV channels (PBTVD); medium-wave (AM) radio channels; tropical-wave (AM) radio channels; short-wave (AM) channels; and frequency-modulation (FM) radio channels. There is also a reference plan for other radio communication services.

Approval of plans and frequency range attributions for services go through a procedure which

12 The full spectrum allocation details for 2009 are in a 177-page document, *Plano de Atribuição, Destinação e Distribuição de Faixas de Frequências no Brasil*, Anatel, Brasília:2009. Details are so extensive that it is nearly impossible to capture them meaningfully in a simple table or map.
13 Anatel Resolution 259 of 2001. Availabe at *http://www.anatel.gov.br/portal/documentos/biblioteca/resolucao/2001/anexo_res_259_2001.pdf*
14 "Attribution [of a frequency range]: insertion of a specific radio frequency range in the radio frequency ranges attribution table with the purpose of using it, under specific conditions, for one or more terrestrial or space radio communication services per ITU conventions, or for radio astronomy services" (Anatel Resolution 259 of 2001).
15 "Destination: insertion of one or more telecommunications services or systems – according to agency's classification – in the radio frequency ranges destination plan published by the agency, which pegs service exploitation to the use of specific radio frequency ranges, without contradicting the established attribution" (Anatel Resolution 259 of 2001).
16 "Distribution: insertion of a radio frequency, range or channel for a specific geographic area in a distribution plan published by the agency, without contradicting established attribution and destination" (Anatel Resolution 259 of 2001).
17 Available at *http://sistemas.anatel.gov.br/pdff/Default.asp?SISQSmodulo=1064&SISQSsistema=367*. Also availabe in PDF format: *http://www.anatel.gov.br/Portal/verificaDocumentos/documento.asp?numeroPublicacao=240203&assuntoPublicacao=Plano%20de%20Atribui%E7%E3o,%20Destina%E7%E3o%20e%20Distribui%E7%E3o%20de%20Faixas%20de%20Frequ%EAncias%20no%20Brasil%20-%20Edi%E7%E3o%202010&caminhoRel=Cidadao-Radiofreq%FC%EAncia-Atribui%E7%E3o,%20Destina%E7%E3o%20e%20Distribui%E7%E3o%20de%20Faixas&filtro=1&documentoPath=240203.PDF*

involves the following steps:

- formulation of a proposal by the technical superintendency;
- appreciation of the proposal by the Governance Board of Anatel;
- announcement of a Public Consultation with the proposal of the agency for the use of that specific range;
- analysis of comments received in the Public Consultation;
- examination of the legal aspects by the agency's Attorney Office;
- final approval by the Governance Board of Anatel.

V – Authorizations for use and exploration of frequency ranges

Anatel authorizations

The following are the steps in the authorization process:

- an application for the use of a radio frequency range or channel is submitted;
- a public bidding process is carried out;
- the range or channel is authorized or assigned;
- a license for the operation of the radio communication station is issued.

Carrying out a public bidding or an auction are normally mandatory in the distribution process. When there is more than one applicant for the same range or channel, Anatel must call a public bidding, publishing it in the Federal Official Daily. Applicants will have up to 30 days after publication to present proposals (which need to be accompanied by a technical project and an expert evaluation). If the number of qualified proposals goes beyond the technical capacity of the range in the bidding, the agency will carry out an auction to choose the winning application.

The following criteria will be considered in the bidding process: highest licensing price offering for the right of use of the frequency or channel; best coverage offering; best quality of use, taking into account the best possible use of the frequency range or channel, and priority of public interest services over restricted ones (article 46).

In the case of some services such as radio-taxi, the agency will only adopt the auction modality if there are more applications than available ranges. Otherwise the applicants are authorized after paying the minimum licensing price established by the agency.

However, the auction cannot take place if the authorization is for certain types of non-exclusive use. This is the case, for example, of several kinds of point-to-point services, which are usually granted without recourse to bidding or auction.

The agency is also in charge of services' inspection. This can be done through visits by agency inspectors or through monitoring systems. Inspections seek to evaluate adherence to the contract and norms pertaining to the specific service, as well as possible interferences with other operators or services.

Authorizations issued by Anatel can become extinct in several cases, such as:

- when contract clauses are violated;
- when Anatel decides on the basis of the public interest;
- when mandatory taxes are not paid;
- when the operation license has not yet been issued.

Extinction of an authorization before the end of the authorization period specified in contract does not result in indemnity rights to the licensee (Regulation article 62).

Authorizations by MiniCom

MiniCom is responsible for authorizations of services related to radio broadcast, including generation and retransmission of TV and radio signals. Procedures depend on the nature of the

granted license.

With Decree 2108 of 1996 public bidding for authorizations to operate radio and TV broadcasting services became mandatory. The authorization process follows the following path: (1) expression of interest; (2) evaluation on the availability of channels; (3) publication of an edict to receive proposals from interest parties in the geographical region; (4) carrying out of the bidding process to select the winner; (5) analysis of the broadcasting station's technical project; (6) approval of the authorization.

The first step is accepted but not mandatory. If a service provider wishes to operate broadcasting services in a geographical area, it must present an expression of interest to MiniCom, but the ministry can launch a bidding process to verify possible interest of prospective bidders independently of any expression of interest – but this is not usual. Anatel is responsible for the technical analysis regarding the broadcasting band involved. A bidder can also request the use of a range not yet included in the channel distribution plan if it can demonstrate with technical studies the feasibility of using that portion of the spectrum for the proposed service.

The edict includes specification of the modality of service, its coverage area, the license validity period, list of required documentation, applicable sanctions, evaluation items and deadline to receive proposals. Bidders are required to present documentation including the technical project, certificates of economic-financial qualification, compliance with fiscal obligations, proof of no debt with the federal government, proof that the organization's ownership composition respects the constitutional determination that no more than 30% of its capital is controlled by a foreign company[18], and a declaration that it does not exploit another identical service in the same geographical area or that it does not have a partner involved with another organization in this condition.

The bidding analysis takes into account financial, technical and content criteria. These take into account: amount of time dedicated to information, journalistic and educative programs; amount of time dedicated to news programs; amount of time dedicated to cultural, artistic and journalistic programs generated locally; deadline for beginning of operations. An edict could include additional evaluation criteria. Each one of the evaluation items receives a rank according to an evaluation methodology adopted by the ministry[19]. Once the bidding is concluded, the authorization project is evaluated by the Cabinet Office of the President and is submitted to the National Congress, where it is examined by several commissions[20].

The authorization project requires favorable votes of 2/5 of Congress (this vote is carried out in a joint session of the Chamber and Senate). Once approved it is published in the federal Official Daily and only then made official[21].

This procedure is not used in the case of retransmission or repetition services, as well as non-profit educative services and community radio. In the case of community radio, MiniCom

18 According to article 222 of the Federal Constitution: "Ownership of a journalistic and radio broadcasting and audio and imagens broadcasting company is only allowed for Brazilians native or naturalized for more than ten years, or legal entities constituted under Brazilian law and with headquarters in the country. Para one – In any case, at least seventy per cent of the total capital and voting capital of journalistic and radio broadcasting and audio and imagens broadcasting companies must belong, directly or indirectly, to Brazilians native or naturalized for more than ten years, who must manage acitivities and establish programming content".

19 A research by legislative consultant Cristiano Lopes Aguiar has revealed that the economic factor is highy decisive in the selection of a winner. Results show that 93.48% of biddings where there was competition with a minimum of two applicants were won by the one who presented the best pricing proposal. In 1.77% of the cases, winners presented proposals which receive the best technical and financial evaluations. Only 4,75% of the biddings were won by applicants with the best technical proposal.

20 Science, Technology, Communications and Informatics (CCTCI), and Constitution and Justice(CCJ), both of the Chamber of Deputies; Science, Technology, Communication, Innovation and Informatics (CCT) and Constitution and Justice (CCJ) of the Senate.

21 There are several critical views on this procedure. A good summary of these can be found in the publication "Concessões de Rádio e TV: onde a democracia ainda não chegou", at *http://www.intervozes.org.br/publicacoes/revistas-cartilhas-e-manuais/revista_concessoes_web.pdf*

publishes a announcement called "Announcement of Authorization" to receive proposals. Applicants must send a project with extensive documentation according to specific legislation (Law 9612 of 1998). Among the deciding criteria in case of more than one bidder is the number of expressions of support for the project by members of the community.

Authorizations can only be cancelled through a court order, according to the Federal Constitution (article 223). The Constitution added the National Congress as participant in the broadcasting authorization process, and also determined the duration of authorizations – 15 years for TV and 10 years for radio. It also defined a quorum of 2/5 of the 614 members (513 deputies and 91 senators) for non-renewal of an authorization, and established that only the Judiciary power could cancel an authorization.

Services which do not depend on authorizations

There are two basic types of services which do not require authorization by Anatel or MiniCom:

- services which use restricted radiation frequency ranges;
- communications services for exclusive use of the Armed Forces.

Income from authorizations of frequency ranges

Two basic sources of income sustain the regulatory services. One of them is the auctioning of frequency ranges and channels. Anatel does not publish the total amount obtained with this procedures, but the auctioning of 3G band ranges (1.9 MHz) generated R$5.3 billion of income. Regarding radio and TV broadcasting channels, minimum prices vary according to the region where the service will be offered. As examples, an auction in Brasilia was closed for R$4.5 million, while in the small town of Mateus Leme, in Minas Gerais, the closing price was R$131,000.

Another source of income is the charging of an authorization tax called Public Price for the Right of Use of Radio Frequency (PPDUR). It falls upon all radiocommunication services except the ones depending on authorizations. PPDUR is calculated taking into account the following factors:

- frequency range of the authorized band;
- geographic area where the range or channel will be used;
- portion of the frequency range used;
- time period of utilization of the range or channel;
- modality of service application (collective or restricted);
- population size in the municipality where the service will be deployed;
- types of use (exclusive, non exclusive)

Frequency ranges' destinations in the last 10 years

In the last ten years spectrum distribution presented two significant trends: (1) reservation of frequency ranges for mobile phone expansion, including mobile Internet access; (2) taking into account convergence of services. Currently the ranges reserved for broadband telecommunications services are in the following bands: 800 MHz; 900 MHz; 1.8 GHz; 1.9 GHz; 2.1 GHz; 3.5 GHz.

All of them are for multidestination, allowing for fixed and mobile voice and data. All are

intended to contemplate multiple services. The 1.8 GHz band was regulated in 2000 to serve the 2G mobile services.

In 2007 Anatel approved the distribution of the 1.9 GHz band for 3G services. When the auction was carried out, 1,963 of the 5,565 municipalities did not have mobile services. So the auction mechanism required operators to deploy services in a highly profitable area and in a lower development area simultaneously. Thus winning operators were required to cover the entire Brazilian territory with mobile services by 2010. High-speed Internet access should also reach at least 3,387 municipalities by 2015, according to the terms of the auction.

In 2007, Anatel's Board changed the regulations regarding the 3.5 GHz band, previously reserved for fixed wireless telephony and Internet access, so mobile phone operators could make use of this band to provide mobile broadband services. Auctions for this should be carried out by the end of 2010. Criteria used for frequency ranges' distribution for mobile services was crucial for the country to attain one mobile phone per inhabitant by October, 2010.

VII – The future of authorizations

In the next five years spectrum regulation will follow the directives and agenda established in the Telecommunications Regulation General Update Plan (PGR)[22]. The plan has the following set of objectives:

- universalization of broadband;
- reduction of barriers to access and use of telecommunications services by lower income groups;
- improvement of quality as perceived by users;
- expansion in the use of telecommunications networks and services to cover specific needs of consumers, especially through convergent services' offerings;
- creation of services packages at fair prices in rural areas;
- to assure adequate levels of competition in the exploitation of services;
- expansion of subscriber TV services for content distribution;
- development of national technologies and manufacturing.

Behind these objectives is a project of adaptating regulatory policy to a worldwide deregulation trend and of favoring large service provider groups, coupled with a few palliative measures to expand access like including universalization requirements for unattended areas.

Regarding spectrum management, this plan points to the definition of a convergent model for radiocommunication service exploitation. Anatel is starting to work with a dynamics of multidestination of frequency ranges. In this regard, anyone who acquires the right of use of portion of the spectrum will win a license allowing the simultaneous operation of fixed and mobile telephony, as well as fixed and mobile Internet access. This has an outright impact in the regulatory limits previously established to separate each telecommunication service.

Accompanying this new approach, Anatel's policy seeks to expand network capacity. According to the general manager of spectrum certification already mentioned, there will be an additional demand of 1,080 MHz towards 2020 to support data applications in fixed and mobile broadband. Currently, available ranges total 355 MHz. The 3.5 GHz, 2.5 GHz and 450 MHz bands will have an added range of 780 MHz until 2015. The remaining balance should be obtained in part from the current VHF bands which are expected to be freed with the switchover to digital TV (of particular interest is the 700 MHz band). Auctioning of these ranges is expected to happen between 2010 and 2011.

The 2.5 GHz band has originally been reserved for MMDS[23] operators. It is now being claimed by mobile operators who seek to expand their broadband services' offerings. Mobile phone operators plan to use the 2.5 GHz band to provide Wi-Max- or LTE-based broadband services. A public consultation by Anatel was initiated in 2009 to establish the viability of this band being shared among MMDS providers and mobile operators. As a result of this process, Anatel proposed that the 2.5 GHz band be divided into three subranges: two 70 MHz ranges for wireless broadband and one 50 MHz range for MMDS. As expected, MMDS operators went to Court to challenge this proposal, but Anatel is expected to go ahead with the bidding process as proposed. Pay-TV companies argue that allocating a portion of the 2.5 GHz band to mobile phone operators would hinder the capacity of MMDS operators to provide broadband services and therefore to become a competitive part of the multiple-play services market.

The 3.5 GHz band (also known as the "H" band) is also being considered by mobile operators,

22 Resolution 516/2008.

23 From Wikipedia: "Business Radio Service (BRS) formerly known as Multichannel Multipoint Distribution Service (MMDS), also known as Wireless Cable, is a wireless telecommunications technology, used for general-purpose broadband networking or, more commonly, as an alternative method of cable television programming reception. MMDS is used in The United States, Canada, Mexico, Dominican Republic, Iceland, Ireland, Russia, Slovenia, Brazil, Barbados, Australia, Nigeria, Pakistan, Panama, Sri Lanka, Thailand, Uruguay, India, Belarus, Lebanon and Cambodia." -- *http://en.wikipedia.org/wiki/Multichannel_Multipoint_Distribution_Service*

and is auctioning is being planned by Anatel for 2011. In this case, Anatel has reserved a 10 MHz range for exclusive use by digital inclusion programs such as non-profit community networks.

The destination of the 450 MHz band has already been established by MiniCom for the National Rural Telecommunications Program[24]. It will be used for voice and data communications in remote areas, usually not served by operators using other bands. Certain government services use this band (such as the Federal Police), which need to be relocated before auctioning starts.

Regarding VHF currently used by analog TV, which will be made available when the full switchover to digital TV is carried out by 2016, there is no definition yet, and the current holders of these channels plan to retain them for their own services. Take up of digital TV is slow, despite the fact that most main cities already have a few major channels operating the new service. One factor which slows down the adoption process is that Digital TV converters are still expensive for most people. However, the federal government considers that portions of these bands could be available for auctioning as early as 2015.[25]

The pledge of mobile operators regarding these bands is to use the following ranges for broadband services: 450-470 MHz; 700-960 MHz; 2500-2690 MHz, and 3400-3600MHz. In these cases, as well as in all upcoming spectrum auctioning and bidding processes, Anatel should adopt a new approach determined by the federal government, which emphasizes quality of service, universalization and innovation instead of gains from auction revenue. A recent study for Latin America an optimum social value (estimated value of a spectrum range allocated for socially extensive applications such as wireless services) for portions of the 700 MHz band still assigned to analog UHF television in Latin America – the study establishes an optimum range of 108 MHz corresponding to UHF channels 52 to 69 for reassignment to broadband wireless.[26]

Reuse of the analog TV spectrum range

By 2016 all currently used analog VHF and UHF TV channels will be returned to the State. This means a spectrum bandwidth of 48 MHz in the VHF range and of 168 MHz in the UHF range.

A subrange of the VHF channels will probably be allocated to digital audio broadcasting, replacing the current analog FM band, which will also be retaken by the State. In any case, spectrum will be freed in those ranges and there is a number of proposals to put them to use in digital communications.

A proposal being advanced by civil society groups is to take advantage of this freed spectrum space to put in practice an open spectrum policy, expanding on the opportunities for digital broadcasting by local educational, cultural and other community groups. This space can as well be used by the new digital data transmission technologies, such as WiMax and other wireless broadband systems.

Most probably this reuse will follow similar rules as the criteria established in September, 2010, by the FCC,[27] with focus on providing long-range wireless broadband to the last mile.

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24 Directive of the Ministry of Communications 431, of July 23rd, 2009. Available at *http://www.mc.gov.br/noticias-do-site/21328-ministerio-das-comunicacoes-cria-programa-nacional-de-telecomunicacoes-rurais*
25 *http://convergenciadigital.uol.com.br/cgi/cgilua.exe/sys/start.htm?infoid=22890&query=simple&search_by_authorname=all&search_by_field=tax&search_by_keywords=any&search_by_priority=all&search_by_section=&search_by_state=all&search_text_options=all&sid=8&text=700+mhz*
26 D.B.Avanzini, R.E. Muñoz, *El Valor Social de la Banda 700 MHz en América Latina*, DIRSI/IDRC: August, 2010.
27 For a short analysis on this: *http://insight-laboratoriodeideias.blogspot.com/2010/09/super-wi-fi-ganha-espaco-no-espectro.html*

Digital radio broadcasting

Brazil has not yet adopted a standard for digital audio broadcasting or "digital radio". Two standards are being tested: the American IBOC (In Band On Channel) and the European DRM (Digital Radio Mondiale). Digital radio brings the possibility of transmitting data with an audio program, as well as multiprogramming (like in digital TV). Digital radio channels would use the same spectrum bands currently used in analog radio broadcast. Analyses show that the DRM standard seems better for the Brazilian case, especially in the short-wave and medium-wave ranges. Studies are not yet conclusive regarding the use of DRM in the FM band.

The federal government currently favors adapting the European DRM, not the least becauseit is based on open standards, while IBOC is proprietary and requires royalty payments. The possible adoption of digital radio broadcasting might also free up frequency ranges. At the end of March, MiniCom issued Norm 290/2010 which created the Brazilian Digital Radio System (SBRD). Much less detailed than SBTVD, it does not define standards. However, it is expected that a Brazilian system derived from both standards should be developed. The ruling also determines that there should be a single standard for both AM and FM. Among the objectives are "promoting social inclusion, cultural diversity and the national idiom through access to digital technology for democratization of information" and "to enable technology transfer to the Brazilian industry of transmitters and receivers, ensuring, whenever appropriate, exemption from royalties."

The process in defining the standard had been criticized by several civil society organizations. Arpub, the association of public radios, recommends a public debate on the technology to be adopted, including a process of public consultations.

Community radio

Community radio in Brazil has a very restrictive legislation (law 9612/98), and the red tape to obtain an authorization might take years. Only one radio can operate in each locality (town, city, or borough in larger cities) with range restricted to a 1 km radius. If this range might be enough for urban boroughs and small towns, it represents an impossibility for areas in which populational groups are scattered, like the dozens of small communities along the Tapajós River in the Amazon (groups of 50-100 families), several kilometers apart from each other. Incidentally, thousands of municipalities have no radio station (community or otherwise) in operation, which does not ease the difficulty in obtaining community radio licenses for these areas.

Transition to digital radio will especially affect these radios, as they might not have the resources required for the migration. Even a low-power FM transmitter might cost several thousands of dollars, and there is the possible additional cost of royalties. The Brazilian Association of Community Radios (Abraço) defends the adoption of a single standard without royalties and the authorization of more than one channel per locality for community radios.

Brazil has about 250 million radio receivers in 86% of homes. At the end of 2009 there were 8,204 radio stations, of which 3,865 were community radios.

VII – Spectrum as an asset of the commons?

Throughout the fairly recent regulatory history of telecommunications and broadcasting in Brazil, the radio spectrum has been legally considered an asset of the commons under the oversight of the State, a resource which the federal government provides to interested parties as a temporary concession under specific regulatory norms. Until the privatization of telecommunications, only radio and TV broadcasting channels were licensed to the private sector.

In other words, the eletromagnetic spectrum in Brazil should, in theory and according to the Constitution, not a commodity which can be bought and sold, but which is licensed for temporary use through bidding processes and public consultations. However, these processes are frequently subject to questioning regarding transparency, and the assignment of auhtorizations according to certain political and economic interests.

Only in 1995 broadcasting authorizations began to be approved through a auctioning process – before that they were issued by indication of state governors or other powerful politicians. Usually the financial and political elites benefit from a skewed process in which channel bidding results favor these groups. Currently, nearly 90% of the spectrum range available for broadcasting has been taken over by commercial radio and TV, although the Brazilian Constitution calls for a far more reasonable balance among sectors (commercial, non-commercial and governmental). Only one radio broadcast channel is reserved for community radio in each locality, and only 2% of the FM spectrum range can be used by community radio. This restriction is not justified on technical grounds, but derived from dominant economic and political interests.

On the other hand, the bidding process substituted economic power for political leverage. Between 1997 and 2008 more than 93% of more than 1,000 authorizations were handed to the proposals paying the highest licensing prices. Less than 5% were given to the best technical proposals. [28]

Another hurdle against more democratic access to broadcasting channels is the authorizations' renewal process. Instead of opening up the channel for rebidding, renewal is in practice automatic, thus perpetuating a situation of very few powerful economic interests controlling most of broadcasting coverage in the country. Non-renewal must be approved by at least 2/5 of the Chamber of Deputies, a very rare situation. Also, if litigation precludes renewal, the station can remain in operation, as a provisional license is automatically issued on presentation of a renewal request until a decision is made (a process which usually lasts for many years).

Towards an open spectrum policy

According to the Wikipedia definition in the case of the United States:

> "Open spectrum (also known as free spectrum) is a movement to get the Federal Communications Commission to provide more unlicensed, radio frequency spectrum that is available for use by all. Proponents of the "commons model" of open spectrum advocate a future where all the spectrum is shared, and in which people use Internet protocols to communicate with each other, and smart devices, which would find the most effective energy level, frequency, and mechanism. Previous government-imposed limits on who can have stations and who can't would be removed, and everyone would

28 Cristiano Lopes Aguiar, research paper submitted to the 31st Brazilian Communication Sciences Congress (Intercom), September 2008. Technical criteria involve time to be dedicated for news, educational and cultural programs, besides details of the technologies involved. This evaluation is made by Ministry of Communications' technicians.

be given equal opportunity to use the airwaves for their own radio station, television station, or even broadcast their own website."[29]

Civil society advocates in Brazil believe that this concept can be applied in a number of cases, taking into account that oversight by the State and its regulatory mechanisms will always be a necessity. The advent of digital radio and TV technologies, as well as the advances in low-cost wireless data transmission, provide an expanding technical basis for new ways to use the spectrum in situations in which the analog equivalent would take up much larger amounts of bandwidth. It also seems consensus that spectrum allocation for certain applications (like digital radio and TV networks, long-range data communication infrastructures, telephony networks etc) will continue to follow a model of authorizations and licensing.

Even the spectrum ranges freed for open spectrum technologies would have to follow recommendations and norms regarding techniques such as power levels, bandwidth delimitations, modulation technologies and so on. This is the obvious case of the so-called unlicensed ranges used for Wi-Fi data communication in the 2.4 GHz band, in which in Brazil, for example, unlicensed transmission power is limited to 400 mW.

Efficacy in spectrum use

Criteria to regularly monitor optimum spectrum use had been in discussion by Anatel for several years. In 2008 a public consultation was carried out, and finally, on November 5th, 2010, the agency announced the Regulation for Evaluation of Efficient Use of the Spectrum. In general terms, this Regulation establishes efficacy criteria which ought to be followed by all entities which make use of the radio spectrum. Non-compliance might result in fines or even suspension of service according the Anatel's procedures for these cases. For the time being, radio and TV broadcasting are nor included in this new regulation.[30]

Under this new regulation, all telecommunications services (fixed and mobile), including wireless pay-TV, will be periodically evaluated. Satellite services and point-to-point services will be evaluated on a case-by-case basis at any time. Anatel has established two indicators to measure efficacy of spectrum use – one to verify spectrum use at any point in time, and another to evaluate the evolution in the efficacy of spectrum use on the basis of a time series.

Operators must provide information required to keep those indicators updated every three months.

29 *http://en.wikipedia.org/wiki/Open_spectrum*.
30 For summaries of this new regulation, visit *http://www.teletime.com.br/05/11/2010/anatel-divulga-pontos-do-novo-regulamento-de-uso-do-espectro/tt/203515/news.aspx*, and *http://www.teletime.com.br/04/11/2010/anatel-exclui-radiodifusao-e-aprova-regulamento-de-uso-eficiente-do-espectro/tt/203455/news.aspx*

VIII – Licensing for community networks

A summary of the spectrum currently allocated for licensed and unlicensed operation of wireless services is presented in the table below.

Band	Service	Anatel licensing
2.4 GHz	Wi-Fi (802.11b/g)	No [1]
2.5 GHz	MMDS, Wi-Max, LTE	Yes [2]
3.5 GHz	Wi-Max, LTE	Yes [3]
4.9 GHz	Government services	Yes [4]
5.4 GHz	Wi-Fi (802.11a) (point-to-multipoint / point-to-point)	No [1]
5.8 GHz	Wi-Fi (802.11a) (point-to-multipoint / point-to-point)	No [1]
1.9 GHz and 2.1 GHz	3G	Yes (mobile services)

Notes:
[1] Except for areas with population above 500,000 and transmit power above 400 mW.
[2] Currently used for MMDS and being disputed by mobile operators for broadband service.
[3] Still pending approval of rules by Anatel.
[4] Public security services.

Unlicensed bands are frequently used for extending home or community networks. Typically, a community telecenter might share its Internet link with the surrounding area using a Wi-Fi access point or even a network of access points interconnected in what is known as "mesh technology" (also known as "Wi-Mesh"). This network can use a combination of 2.4 GHz and 5 GHz radios. As long as this network operates without any financial gain derived from the service and no individual radio operates above 400 mW, it can operate without any authorization or licensing.

If the network, even if operated on a non-profit basis, charges for its services or operates any transmitter above 400 mW, the organization responsible for it needs to obtain a license from Anatel called SCM[31] (initials for "multimedia communication service"). Currently this license has a one-time price of R$9,000 (about US$5,300), and Anatel is considering a significant reduction to R$1,200 which might be approved in 2011.

Incidentally, SCM is required for any commercial operator of voIP (voice-over-IP) service, independently of the carrier medium. However, if voIP services are operated within an organization's own network, no licensing is required. Usually larger organizations create their own voIP service and contract the interface to the external telephone network with a licensed voIP backbone operator. The largest operator of voIP services to the final user is Vono, a subsidiary of GVT. Another company, Transit Telecom, operates backbone voIP services to service providers such as Skype and several other organizations. Both of these have points of presence in most of the larger cities of Brazil. As these services operate under an SCM license, they do not fall under the telephony regulatory framework.

However, SCM licensing is available only to formally registered for-profit companies. A few of

31 Resolutions 272, 328, and 295 are the relevant regulatory instruments issued by Anatel for SCM licensing.

the larger cities in Brazil have their own municipal data processing company which is qualified to obtain this license, but only about 300 of 5,565 municipalities have a population of more than 90,000 and of these only a handful need such organizational structures. Outsourcing of the municipal network to private companies is usually not a good option for most of them, especially if the partnership is expected to return a profit.

As a viable alternative in these cases, and responding to recommendations from organizations such as the Brazilian Internet Steering Committe (CGI.br) and the National Education and Research Network (RNP), Anatel has approved another form of licensing for municipal networks.

The SLP[32] (initials for Limited Private Service) license, approved in March, 2007, can be granted directly to the municipality for operation without charge of network services using unlicensed bands. These networks cannot reach beyond the municipal borders and must use only Anatel-certified communications equipment. Anatel became aware that many municipalites were deploying their local networks on an informal basis, and in several cases their operation would require an SCM license. SLP (which costs a one-time fee of only R$400) was the solution to formalize these networks and stimulate new initiatives by the municipalities.

32 For additional information, see Norm 13/97 of the MiniCom, and Anatel resolutions 365, 387 e 461.

IX – The 1st CONFECOM and spectrum governance[33]

Pluralist participation in eletromagnetic spectrum governance in Brazil is minimal and formally does not exist. Eventual public consultations are carried out exclusively at the discretion of the State regulators. In the case of radio and TV broadcasting this participation does not exist neither in the authorizations' decisions nor in the lengthy renewal processes. Broadcasters are never subject to a public scrutiny (which could, for instance, lead to non-renewal or cancellation of a license) regarding quality of service or inadequate use of the spectrum in the frequent cases of constitutional violations.

Only in 2007 the Chamber of Deputies (members of Congress are among the main holders of broadcasting licenses), through its Science & Technology, Communication and Informatics Commission (CCTCI), has created the posssibility of holding public audiences as a broadcasters' evaluation mechanism. However, not a single audience has ever been held.

Civil society organizations in Brazil consider the pluralist governance of the spectrum as a central issue in the struggle for communication rights. In 2007, several of these organizations and social movements carried out a National Campaign for Democracy and Transparency in Radio and TV Authorizations, which asked for immediate action against a number of irregularities such as: excess time dedicated to paid advertising; expired authorizations and the many channels held by senators and deputies; the end of automatic renewals; establishment of transparent and democratic criteria for renewal, according to the Brazilian Constitution; creation of a pluralist commission to monitor renewals; and the carrying out of a pluralist National Communication Conference (CONFECOM) to revamp public policies and build a new communications regulatory framework.

The 1st CONFECOM was then called in 2009 by MiniCom, and was held in December, 2009. Below is a summary of the main proposals presented by civil society organizations and social movements to the conference:

- to reorganize the eletromagnetic spectrum through spectrum ranges reserved for specific segments.
- to end the selling of broadcasting time to third parties.
- to ensure that radio and TV stations are no longer owned by politicians holding public office.
- to change the criteria for issuing new authorizations.
- to make effective social participation in the renewal processes.
- to create social control mechanisms on stations' activities.
- to demand significant improvement in the monitoring and enforcement capabilities of agencies such as the Ministry of Communications and Anatel
- to demand elimination of red tape in the authorizations for community radios.
- to increase the number of channels reserved for public and community stations.

Mos of these demands were accepted by the 1st CONFECOM. One of the milestones is the approval of the proposal that divides the broadcast spectrum in a proportion of 40% for the private sector, 40% for community and non-profits, and 20% for the State. This is to be incorporated in the new regulatory framework for broadcast authorizations also approved in the conference.

Regarding specific criteria for issuing authorizations, the following items were also approved:

- diversity in offerings, considering the whole of the system;
- complementariness among community, private and state systems;

33 This topic is based on information from several sources, and spectially from the paper produced by the Brazilian Observatory on Communication Rights, "Direito à Comunicação no Ar: A Gestão do Espectro Eletromagnético Brasileiro", 2010.

- preference to interest groups who do not yet own means of communication;
- strengthening of local cultural production;
- direct employment generation;
- increase in free time available to social organizations and independent producers.

The conference also approved as requisites for renewals:

- respect for diversity regarding women, black and indigenous people, sexual minorities;
- adherence to labor and social security laws;
- adherence to article 221 of the Consitution which establishes the objectives and principles of communication.

However, there was no consensus nor agreement among participants of the conference regarding the use of the spectrum in a digital environment. No agreement was achieved as well on the permission for multiprogramming in digital radio and digital TV. The main commercial broadcasters participating in the conference favored authorization for multiprogramming just for their own use. Some social sectors proposed a reduction in bandwidth instead of the approval of multiprogramming, opening up the way for additional channels to be issued to non-commercial programming.

X – Additional notes

Flexible regulation of the spectrum

In Brazil there are few initiatives for flexible regulation of the electromagnetic spectrum. As shown in IV.3, above, there are only two modalities of services not subject to regulation: the ones classified as "restricted radiation", such as personal communicators, and the Armed Forces' communications services.

Regarding exploration of "white spaces"[34], Anatel's current general manager for spectrum certification, Maximiliano Martinhão, estimates that this could become a practice, but it is too early for its adoption, since, according to him, "this is not yet a consolidated technology"[35].

Regarding frequency sharing, the main experience is in the use of the 3G frequency ranges. In those geographical areas which are not profitable but the service must be provided by contract, operators might share frequency ranges in order to provide services.

Preparation for WRC 2011

The telecommunications sector and the government are preparing for WRC 2011 through the Brazilian Telecommunications Commission (CBC) Number 2, which handles radio communications.

According to Anatel's Resolution 502 of 2008[36], which modified the structure of the commissions, CBC-2 is in charge of coordinating Brazilian participation in the Radiocommunication Advisory Group (RAG), in the ITU's Radiocommunication Sector Study Commissions (ITU-R), and in the Inter-American Telecommunications Commission (Citel) – this includes their advisory committees and Working Subgroup 1.

CBC-2 holds four meetings a year which are open to all telecommunications stakeholders. Anatel only explicitly invites business associations but does not preclude participation from other sectors. According to Maximiliano Martinhão, who is also chair of the commission, its members are already discussing the 25-item agenda to define the Brazilian positioning on each specific issue.

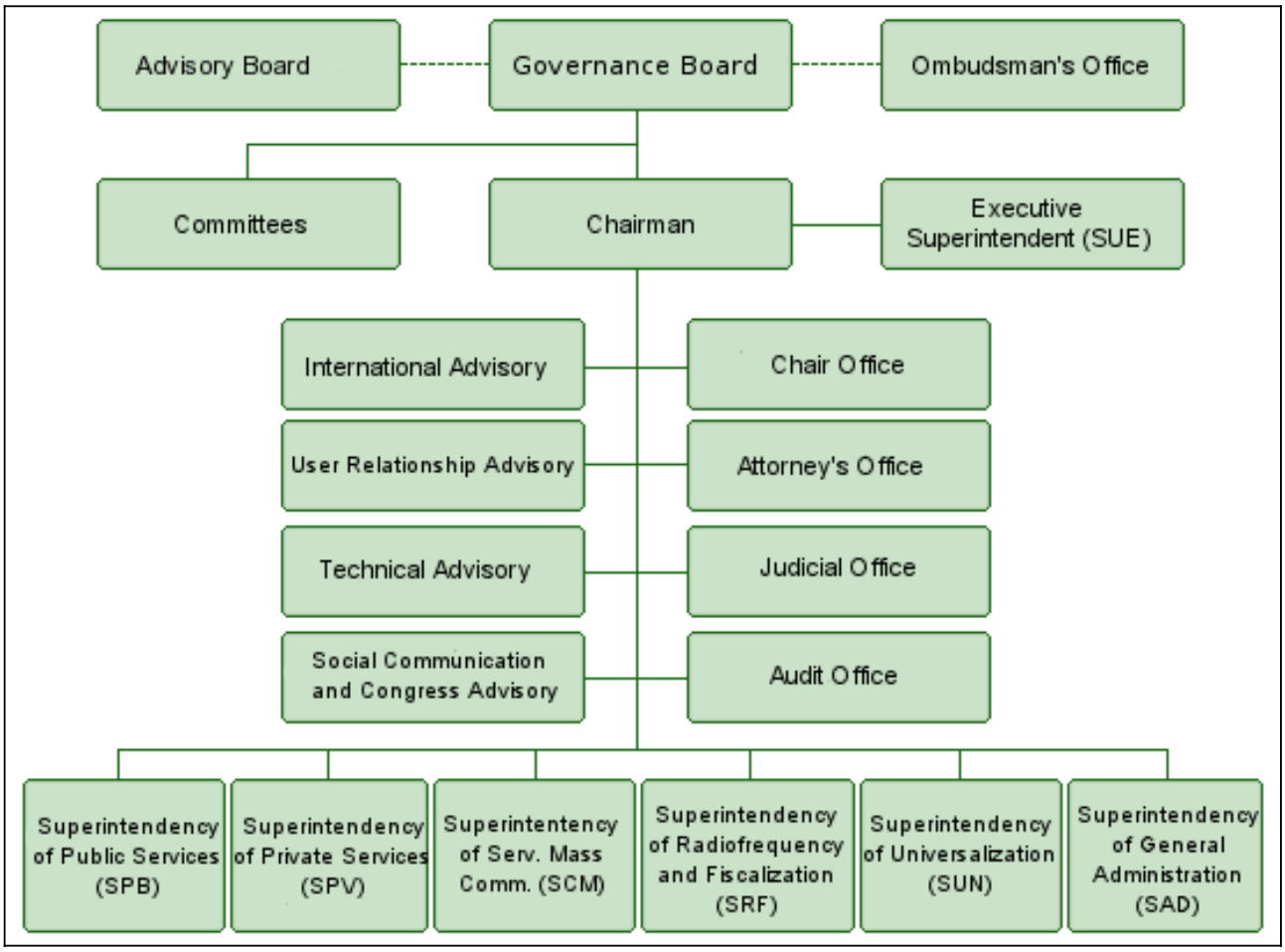
34 Frequency gaps between channels. In analog transmission, these are required to minimize mutual interference. Digital technologies permit the use of these gaps as well.

35 Interviewed by Jonas Valente.

36 Available at *http://www.anatel.gov.br/Portal/verificaDocumentos/documento.asp?numeroPublicacao=233756&assuntoPublicacao=null&caminhoRel=Cidadao-nomeItemCanal=Introdu%E7%E3o26codigoVisao=8-Introdu%E7%E3o26codigoVisao=8&filtro=1&documentoPath=212744.pdf*

Appendix I

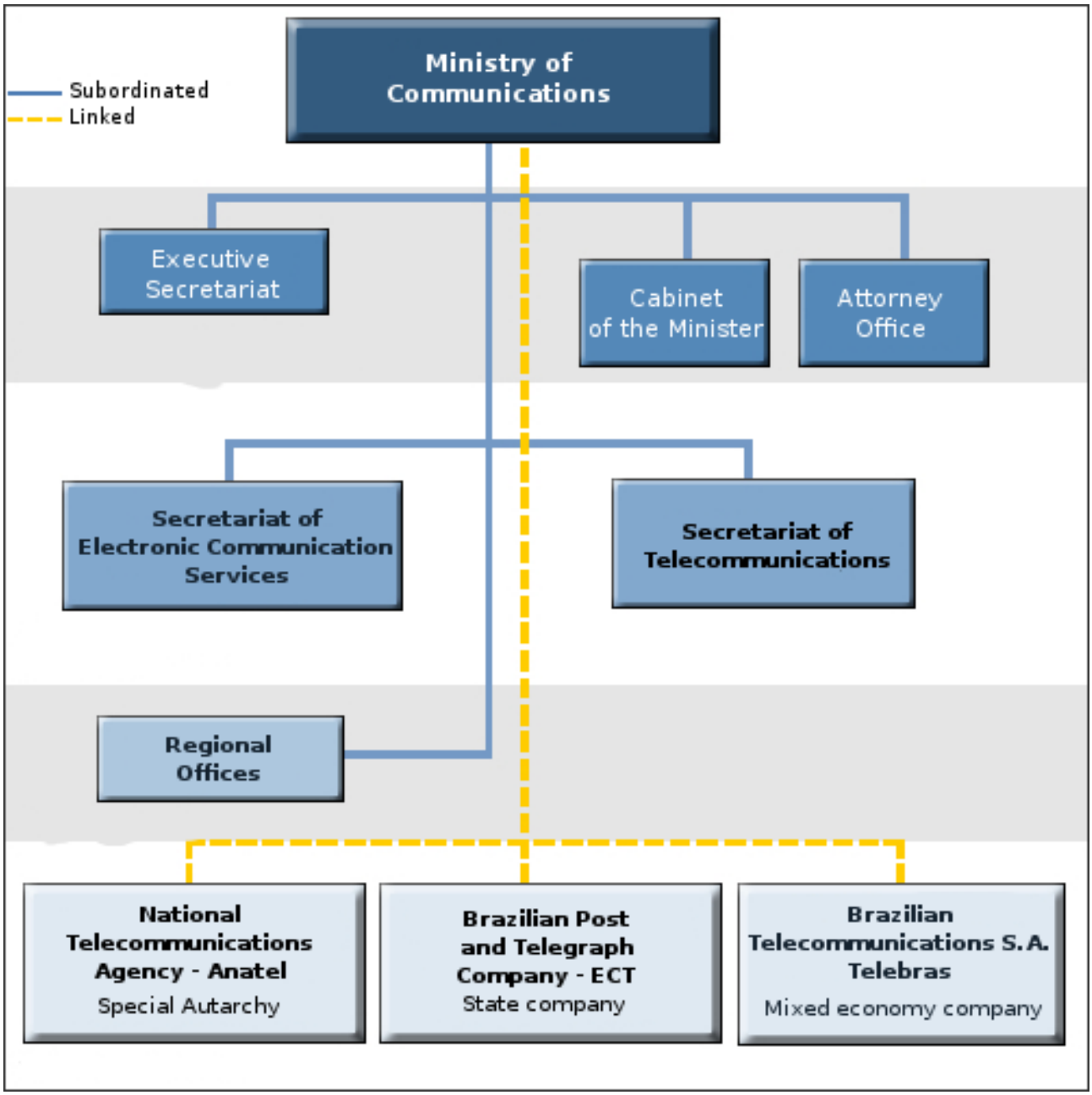
Organigram of Anatel



Source: *http://www.anatel.gov.br*, June 2010.

Appendix II

Organigram of the Ministry of Communications (MiniCom)



Source: *http://www.mc.gov.br*, June 2010.

Appendix III

Glossary of acronyms

Abraço	Brazilian Association of Community Radio Broadcasters
AMPS	Advanced Mobile Phone System
Anatel	National Telecommunications Agency
CBC-2	Brazilian Telecommunication Commission Number 2
CBT	Brazilian Telecommunications Code
CGI.br	Brazilian Internet Steering Committee
CTB	Brazilian Telephone Company
CTN	National Telephone Company
EBC	Brazilian Post and Telegraph Company
FCC	Federal Communications Commission
GESAC	E-Government Services for the Citizen
IDEC	Brazilian Institute for the Defence of the Consumer
IPTV	Digital Television via Internet
ISDB-T	Integrated Services Digital Broadcasting - Terrestrial
ISDB-Tb	Integrated Services Digital Broadcasting - Terrestrial, Brazilian version
IT&T	International Telephone and Telegraph
ITU	International Telecommunication Union
ITU-R	ITU Radiocommunication Sector Study Commissions
LGT	General Telecommunications Law
MiniCom	Ministry of Communications
PADDFFB	Frequency Ranges Assignment, Destination and Distribution Plan
PBTVD	Digital TV Channels Basic Distribution Plan
PGO	General Authorizations Plan
PGR	Telecommunications Regulation General Update Plan
PNBL	National Broadband Plan
RAG	Radiocommunication Advisory Group
SBTVD	Brazilian Digital Television System
SCM	Multimedia Communication Service
SLP	Limited Private Service
STF	Supreme Federal Tribunal
TDMA	Time Division Multiple Access
Telebras	Brazilian Telecommunications Company

Appendix V

Web links of interest

Anatel	*http://www.anatel.gov.br*
Brazilian Digital TV	*http://www.dtv.org.br*
Cabinet Office of the President	*http://www.casacivil.gov.br*
CTS/FGV	*http://direitorio.fgv.br/cts*
Intervozes	*http://www.intervozes.org.br*
MiniCom	*http://www.mc.gov.br*
National Forum for Democratization of Communication	*http://www.fndc.org.br*
Telebras	*http://www.telebras.com.br*