

Amateur Radio Service in Brazil

General informations for foreigner amateur radio operators during FIFA World Cup 2014

Introduction



Maracanã stadium, Rio de Janeiro (Photo: Markhillary, CC 2.0)

Brazil will hold very important sport event in 2014: the FIFA World Cup. It's expected several hundreds of visitors and the Brazilian Telecommunications Agency (Anatel, *Agência Nacional de Telecomunicações*) gave temporarily special conditions (Act 4296) for the foreigner amateur radio operator who wish to transmit inside the country (1). This article is devoted to these operators for previously better understand the organization of Amateur Service in Brazil and enjoy the radio during the World Cup, providing very good contacts.

Brazil

Brazil is the world's fifth largest country, both by geographical area (8,5 millions of km²) and by population (around 200 millions). Brazil is the largest Portuguese speaking country, and the only one in America.

According the 2008 National Household Survey, 83,7% of the population defined as urban, heavily concentrated in the Southeast and Northeast. Brazil has 21 urban agglomerations with more than 1 million habitants. The country is divided into 26 states plus a Federal District, where is located the capital, the full planned city of Brasilia founded in 1960, a modernist architecture heritage. (2)

Brazil has 4 time zones (UTC-2 to -5). The country occupies 47% of the South American area. All countries in South America have boundaries with Brazil, except Chile and Ecuador.

Brazil has a coastline of 7.491 km, a home to a variety of wildlife and extensive natural resources in a variety of protected habitats. The country hosts five major climatic subtypes: equatorial, tropical, semiarid, highland tropical, temperate, and subtropical, producing environments ranging from equatorial rainforests in the north and semiarid almost deserts in the northeast, to temperate coniferous forests in the south and tropical savannas in central Brazil, as well different microclimates.

The economy is the 2nd of the America and 7th of the world, moving a GPD (PPP) of 2,5 trillion of dollars. The GPD per capita is \$12,528, the 79th position, the Gini index is 51,9 and HDI is 0,730 (85th position). (3)

Historical background

Radio has a great history in Brazil. It backs to 1899, when Priest Roberto Landell de Moura made one of the first voice communications of the world, linking distant neighborhoods in the city of Sao Paulo. Some of his equipments were patented both in Brazil (1901) and USA (1904), but they did not obtained the properly attention for commercial or military applications of the new technology.

In 2012, celebrating the 150 years of his birthday, Moura was recognized by Pres. Dilma Vana Rousseff among the honored Brazilians in the Pantheon of Fatherland and Freedom in Brasília.



Photos of Priest Landell de Moura (left photo) and Edgard Roquette-Pinto (right center) with Marshal Cândido Rondon (left center) at Brazilian National Museum (right photo). Cândido Rondon was army engineer and known as “Patron of Telecommunications in Brazil” due an epic work in the end of 19th century: erect over 6.000 km of first telegraph lines across in vast west forest region, respecting and integrated to the local indigenous people. (Photo: Museu Nacional)

The professor and anthropologist Edgard Roquette-Pinto is also a key reference to the radio pioneers in Brazil. In 1922 he created one of the first broadcasting stations of the country, *Radio Sociedade do Brasil* located at Rio de Janeiro, strictly devoted to educational and cultural affairs. Roquette-Pinto was also amateur radio operator in 1930's (SB1AG) and member of LABRE (as many other broadcasting pioneers).

LABRE, the Brazilian national amateur radio association (*Liga de Amadores Brasileiros de Rádio Emissão*), is the oldest telecommunication civil association in Brazil. Founded in 1931 in São Paulo, the association gained truly united status of national association in 1934, when all other regional leagues were unified around LABRE. Today LABRE is located in Brasília and have several state-local headquarters in a confederative shape. LABRE is a member IARU, the International Amateur Radio Union. (4)

Today Brazil has around 33.000 amateur radio operators. The majority is concentrated in Sao Paulo (PY2) with almost 10.000 hams (5). The country has an official national amateur radio emergency network called RENER, integrated with federal government. LABRE also is an active member of study groups and internal committees at Anatel, Inmetro and ABNT (technical governmental regulatory bodies) with the recent work of his ad-hoc group devoted to Spectrum Defense and Management (GDE).

Legal framework

The Constitution of the Federative Republic of Brazil ratified in 1988 oriented to the creation of a regulatory body to technically organize the telecommunications in Brazil, while Minicom (The Communications Ministry) promoted the wide political view of the communications field. In 1989 Brazil ratifies their General Telecommunications Law (*Lei Geral de Telecommunications – LGT*) and created Anatel. The LGT covered all general aspects of the concessions, rulemaking process, etc, while specific resolutions were development along the years for the specific aspects of the services. Strictly talking about Amateur Radio, Brazil has two laws:



Congressman Ulisses Guimarães (left photo by EBC) is holding the Brazilian Constitution in 1988. The Parliament created the General Telecommunications Law one year after (right photo by Senado Federal).

- **Resolution 449** – Amateur Service (Serviço de Radioamador):

<http://legislacao.anatel.gov.br/resolucoes/21-2006/93-resolucao-449>

- **Resolution 452** – Conditions for RF use by Amateur Service (Condições de Uso de RF pelo Serviço de Radioamador): <http://legislacao.anatel.gov.br/resolucoes/21-2006/341-resolucao-452>

The first one is devoted to general items, including licensing conditions, callsign, etc. The second is based on spectrum occupation, including band plans.

General aspects of Amateur Service in Brazil

Brazil has three kinds of classes: A, B and C. They differ by the type of exams to being Amateur Radio operator on respective class, the callsigns, access to the spectrum and power output. Check Tables 1, 2 and 3 for details.

Class	Laws	Ethic	Radio Electricity	Morse code
A	70%	70%	70%	87 of 125 words (TX and RX)
B	70%	70%	50%	87 of 125 words (RX)
C	70%	70%	Not applied	Not applied

Table 1 – Conditions of admissibility to Amateur Service in Brazil

Class	Power
A	1 kW, except 30 m with 200 W
B	1 kW; except 28000 - 28500 kHz and 29300 - 29510 kHz, limited to 100 W
C	100 W

Table2: Power output permitted for Amateur Service in Brazil

Band plan

Attention: the full lengths of the 160 m, 80 m and 30 m in Brazil are shorter than ITU Region 2 allocations. New ITU bands like 2200 m (135,7 kHz) and 630 m (472 kHz), as well 4 m (70 MHz) or 60 m (5,3 MHz) are still not recognized for Amateur Service in Brazil. LABRE through GDE made meetings this semester with Anatel, calling the government to consider the full length of some of these bands as provided on latest Radio Regulations of ITU for Region 2. For 60 m the league also drawn a new experimental activity and is following Anatel toward WRC-15 in a possible positive allocation to the service.

LABRE also made contributions on Band Plans of IARU Region 2 during the Cancún Conference last year. Since the Anatel Resolution 452 came back to 2006, the modifications promoted in Mexico aren't still applied to Brazil.

The Anatel Resolution 452 full detail the band plans effective in Brazil from 1,8 MHz to 1,3 GHz. Above this all modes are permitted. Amateur Radio is primarily service in all MF, HF and VHF bands, except 30 m. On UHF, SHF and EHF, the service is allocated on secondary basis. Check Table 3 for general bands as permitted for each class in Brazil. For the detailed Band Plan officially used in Brazil, check Annex 2 of this article or [Resolution 452, Anexo B](#).

Band	Class C	Class B	Class A
2200 m	Not allocated		
630 m	Not allocated		
160 m	1800 kHz to 1850 kHz		
80 m	3500 kHz to 3800 kHz		
60 m	Not allocated		
40 m	7000 kHz to 7040 kHz	7000 kHz to 7300 kHz	
30 m	Not applied		10138 kHz to 10150 kHz
20 m	Not applied		14000 kHz to 14350 kHz
17 m	Not applied		18068 kHz to 18168 kHz
15 m	21000 kHz to 21150 kHz	21000 kHz to 21300 kHz	21000 kHz to 21450 kHz
12 m	24890 kHz to 24990 kHz		
10 m	28000 kHz to 29700 kHz (29300 - 29510 only sats)		28000 kHz to 29700 kHz
6 m	50 MHz to 54 MHz		
4 m	Not allocated		
2 m	144 MHz to 148 MHz		
1,3 m	220 MHz to 225 MHz		
70 cm	430 MHz to 440 MHz		
33 cm	902 MHz to 907,5 MHz and 915 MHz to 928 MHz		
23 cm	1240 MHz to 1300 MHz		
13 cm	2300 MHz to 2450 MHz		
9 cm	3300 MHz to 3600 MHz		
5 cm	5650 MHz to 5925 MHz		
3 cm	10 GHz to 10,50 GHz (specific permission needed)		
1,2 cm	24 GHz to 24,25 GHz (specific permission needed)		
6 mm	47 GHz to 47,2 GHz (specific permission needed)		
4 mm	76 GHz to 81 GHz (specific permission needed)		
2,5 mm	Allocated but not destined		
2 mm	134 GHz to 141 GHz (specific permission needed)		
1 mm	241 GHz to 250 GHz (specific permission needed)		

Table 3 – Amateur bands as specified in Brazil per class.

Callsigns

Brazil has two families of identification letters received by ITU: PP to PY and ZV to ZZ. The callsign are distributed among the 27 States (including Federal District) plus Oceanic Islands and Antarctica.

The continental part of the country has 9 divisions (following the traditional Army geographical division).

Each state has a unique prefix for class A and B. It's formed by respective ITU letter combination plus the number of the region. For example, Parana and Santa Catarina form the Region 5. The prefix PP5 was designed for amateur operators class A and B located in Santa Catarina and PY5 for class A and B located in Paraná.

For class C, only "PU" letter plus the number of the region form the prefix in all Brazil. The first letter of the suffix has divided into the states of the specific region, for make the geographical distinction. For example: For Region 5, the amateur operator class C has the callsigns PU5MAA to YZZ for Parana and PU5AAA to LZZ for Santa Catarina.

Oceanic Islands and Antarctica counts as region 0 (zero). For all callsigns the first letter of the suffix define the area: "R" for the Athol of Rocas, "F" for the Archipelago of Fernando de Noronha, "T" for Trindade Island, "M" for Martin Vaz Island, "S" for St. Peter and St. Paul Rocks, "A" for Brazilian bases at Antarctica.

Foreigners can obtain a Brazilian permanent callsign after make the exams. They have the letter "Z" in the beginning of the suffix (for example, PY2ZAA). Brazil is also a member of the Organization of American States (OEA), so able to work with IARP, the International Amateur Radio Permission.

For the temporarily special conditions for foreigner amateur radio operator related to FIFA World Cup 2014, the callsign will be formed by the prefix related to the Brazilian state where you are operating, plus the callsign used on his/her homeland. For example: PY2/W1ABC, for a North American (W1ABC) operating at São Paulo (PY2).

The ZV to ZZ family is used in Brazil as special callsigns in Brazil. For the class C, the special calls sign must have three letters on suffix, started with letter W.

Check Annex 1 for basic callsign framework used in Brazil, including the combination to be used by foreigners during World Cup 2014. Check also [Resolution 449](#), *Anexo I, Tabela 1*, for complete information.

Equipments

In Brazil is not allowed the use of transmitters without homologation did by Anatel (except the home made equipments). Most of the transceivers with FCC-ID were recognized in the country. Check for pages 05, 06 and 16 to 33 of the document linked below to identify if the model of your transceiver is already homologated in Brazil. LABRE is also working with Anatel for CE mark recognition by the government and so extend the range of the models homologated for non-commercial users.

Article *Uma contribuição sobre o tema "Homologações de Equipamentos" para o Serviço de Radioamador* by Geraldo Travaglia Filho, PY2OY: <http://www.radioamadores.org/biblio/outros/Homolog-PY2OY.pdf>

In case of intentional RFI

Anatel teams will be stayed at the stadiums and in the International Broadcast Centre (IBC) for fast response to any RFI originated inside and the vicinity of the stadiums. Informations (including telephone local numbers) at: <http://tinyurl.com/anatel-rfi-en> . Anatel also made a special website for major sportive events occurring in Brazil. Check at: <http://tinyurl.com/anatel-events-en>

IARU Monitoring System in Brazil opens interactive home page for receives information in English at: <http://tinyurl.com/labre-iaru-ms>

Visit LABRE at São Paulo



LABRE at São Paulo (photo above) will open the doors for all visitors during the World Cup. There you can view the Brazilian national QSL Cards Bureau, as well the station PY2AA and found new radio friends. LABRE/SP is located at Rua Dr. Miguel Vieira Ferreira, 345-A, Tatuapé, São Paulo, Brazil. (Near “Vila Carrão” subway station). Before visit, check first the schedule. The telephone numbers are 11-2093-9888, 11-2294-1047. FAX: 11-2225-2828. Website: <http://www.labre-sp.org.br>. E-mail: labresp@labre-sp.org.br

End Notes

- 1 - For description of Act 4296 as well informations about activities related to the World Cup check: <http://www.radioamadores.org/biblio/outros/LABRE-Activities-WorldCup2014.pdf>
- 2 – São Paulo is the largest conglomerate with around 20 millions (11 millions only in the city, the largest in southern hemisphere), followed by Rio de Janeiro, Belo Horizonte, Salvador, Porto Alegre, Brasília, Recife, Fortaleza, Curitiba, Campinas, Goiânia and Belém (for those with more than 2 millions). See (3) for found the sources.
- 3 - Informations and redactions about Brazil chapter were adapted from Wikipedia: <http://en.wikipedia.org/wiki/Brazil> . The statistic source of information about Brazil is IBGE, the Brazilian Institute of Geography and Statistics: <http://www.ibge.gov.br/english/>
- 4 – Most of the memory of Priest Landell de Moura is a result of amateur radio devoted research, also recovery by journalists and scholars. Some informations can be obtained at: <http://www.mlm.landelldemoura.qsl.br/ingles.html> . For Roquette-Pinto biography (in Portuguese), check: <http://www.radioamador.com/ilustres/sb1ag.htm> (in Portuguese). For LABRE history, check: http://labre.org.br/wa_files/fundacao_da_LABRE.pdf (in Portuguese)
- 5 – Statistics can be found at: <http://www.ptt-radio.qsl.br/QuantosBR10.htm>



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Annex 1

Basic callsign framework according Resolution 449

STATES	CLASS A and B	CLASS C	FOREIGNER UNDER ACT 4296
ACRE	PT 8 AA to ZZ PT 8 AAA to YZZ	PU 8 JAA to LZZ	PT8/"your home call"
ALAGOAS	PP 7 AA to ZZ PP 7 AAA to YZZ	PU 7 AAA to DZZ	PP7/"your home call"
AMAPÁ	PQ 8 AA to ZZ PQ 8 AAA to YZZ	PU 8 GAA to IZZ	PQ8/"your home call"
AMAZONAS	PP 8 AA to ZZ PP 8 AAA to YZZ	PU 8 AAA to CZZ	PP8/"your home call"
BAHIA	PY 6 AA to ZZ PY 6 AAA to YZZ	PU 6 JAA to YZZ	PY6/"your home call"
CEARÁ	PT 7 AA to ZZ PT 7 AAA to YZZ	PU 7 MAA to PZZ	PYT7/"your home call"
DISTRITO FEDERAL	PT 2 AA to ZZ PT 2 AAA to YZZ	PU 2 AAA to EZZ	PT2/"your home call"
ESPÍRITO SANTO	PP 1 AA to ZZ PP 1 AAA to YZZ	PU 1 AAA to IZZ	PP1/"your home call"
GOIÁS	PP 2 AA to ZZ PP 2 AAA to YZZ	PU 2 FAA to HZZ	PP2/"your home call"
MARANHÃO	PR 8 AA to ZZ PR 8 AAA to YZZ	PU 8 MAA to OZZ	PR8/"your home call"
MATO GROSSO	PY 9 AA to ZZ PY 9 AAA to YZZ	PU 9 OAA to YZZ	PY9/"your home call"
MATO GROSSO DO SUL	PT 9 AA to ZZ PT 9 AAA to YZZ	PU 9 AAA to NZZ	PT9/"your home call"
MINAS GERAIS	PY 4 AA to ZZ PY 4 AAA to YZZ	PU 4 AAA to YZZ	PY4/"your home call"
PARAÍBA	PR 7 AA to ZZ PR 7 AAA to YZZ	PU 7 EAA to HZZ	PR7/"your home call"
PARANÁ	PY 5 AA to ZZ PY 5 AAA to YZZ	PU 5 MAA to YZZ	PY5/"your home call"
PARÁ	PY 8 AA to ZZ PY 8 AAA to YZZ	PU 8 WAA to YZZ	PY8/"your home call"
PERNAMBUCO	PY 7 AA to ZZ PY 7 AAA to YZZ	PU 7 RAA to YZZ	PY7/"your home call"
PIAUI	PS 8 AA to ZZ PS 8 AAA to YZZ	PU 8 PAA to SZZ	PS8/"your home call"
RIO DE JANEIRO	PY 1 AA to ZZ PY 1 AAA to YZZ	PU 1 JAA to YZZ	PY1/"your home call"
RIO GRANDE DO NORTE	PS 7 AA to ZZ PS 7 AAA to YZZ	PU 7 IAA to LZZ	PS7/"your home call"
RIO GRANDE DO SUL	PY 3 AA to ZZ PY 3 AAA to YZZ	PU 3 AAA to YZZ	PY3/"your home call"
RONDÔNIA	PW 8 AA to ZZ PW 8 AAA to YZZ	PU 8 DAA to FZZ	PW8/"your home call"
RORAIMA	PV 8 AA to ZZ PV 8 AAA to YZZ	PU 8 TAA to VZZ	PV8/"your home call"
SANTA CATARINA	PP 5 AA to ZZ PP 5 AAA to YZZ	PU 5 AAA to LZZ	PP5/"your home call"

SÃO PAULO	PY 2 AA to ZZ PY 2 AAA to YZZ	PU 2 KAA to YZZ	PY2/"your home call"
SERGIPE	PP 6 AA to ZZ PP 6 AAA to YZZ	PU 6 AAA to IZZ	PP6/"your home call"
TOCANTINS	PQ 2 AA to ZZ PQ 2 AAA to YZZ	PU 2 IAA to JZZ	PQ2/"your home call"
REGION ZERO	CLASS A and B	CLASS C	FOREIGNER UNDER ACT 4296
FERNANDO DE NORONHA	PY 0 FA to FZ e PY 0 FAA to FZZ	PU 0 FAA to FZZ	PY0F/"your home call"
MARTIN VAZ	PY 0 MA to MZ e PY 0 MAA to MZZ	PU 0 MAA to MZZ	PY0M/"your home call"
ATHOL OF ROCAS	PY 0 RA to RZ e PY 0 RAA to RZZ	PU 0 RAA to RZZ	PY0R/"your home call"
ST. PETER AND ST. PAUL ROCKS	PY 0 SA to SZ e PY 0 SAA to SZZ	PU 0 SAA to SZZ	PY0S/"your home call"
TRINDADE	PY 0 TA to TZ e PY 0 TAA to TZZ	PU 0 TAA to TZZ	PY0T/"your home call"
ANTARCTICA	PY 0 AA to AZ e PY 0 AAA to AZZ	PU 0 AAA to AZZ	PY0A/"your home call"

More informations on Resolution 449:

<http://legislacao.anatel.gov.br/resolucoes/21-2006/93-resolucao-449>

Annex 2

Band Plan according Resolution 452

160 meters

Range (kHz)	Uses	Obs.
1.800 a 1.850	CW	
1.800 a 1.810	CW	
1.809 a 1.810	CW	Beacons
1.810 a 1.820	Experimental and modes not cited on this band	Since it does not disturb adjacent segments
1.810 a 1.850	Phone AM and Phone SSB	

80 meters

Range (kHz)	Uses	Obs.
3.500 a 3.800	CW	
3.500 a 3.525	CW	
3.520 a 3.525	CW	Beacons
3.525 a 3.580	Experimental and modes not cited on this band	Since it does not disturb adjacent segments
3.580 a 3.620	Teletype SSB, Phone AM and Phone SSB	Priority to Teletype
3.620 a 3.625	Data SSB	
3.625 a 3.780	Phone AM and Phone SSB	
3.780 a 3.800	Phone SSB	Exclusive for DX

40 meters

Range (kHz)	Uses	Obs.
7.000 a 7.300	CW	
7.000 a 7.035	CW	
7.035	CW	Beacons
7.035 a 7.040	Data SSB and Teletype SSB	
7.040 a 7.050	Phone SSB	Exclusive for DX
7.050 a 7.120	Phone AM and Phone SSB	Priority to SSB Phone
7.120 a 7.140	Experimental and modes not cited on this band, Phone AM and Phone SSB	Priority to experimental modes (since they do not disturb adjacent segments)
7.150 a 7.200	Phone AM and Phone SSB	Priority to AM Phone
7.200 a 7.300	Phone AM	

30 meters

Range (kHz)	Uses	Obs.
10.138 a 10.150	CW, Teletype SSB, Data SSB and experimental modes	Maximum bandwidth of 3,0 kHz

20 meters

Range (kHz)	Uses	Obs.
14.000 a 14.350	CW	
14.000 a 14.060	CW	
14.060 a 14.095	Teletype SSB	
14.095 a 14.100	Data SSB	
14.100	CW	Beacons
14.100 a 14.115	Data SSB	
14.115 a 14.350	Phone SSB, Phone AM, experimental and modes not cited on this band	Priority to Phone SSB. Other modes since they do not disturb adjacent segments
14.286	Phone AM	AM calling frequency

17 meters

Range (kHz)	Uses	Obs.
18.068 a 18.168	CW	
18.068 a 18.100	CW	
18.105 a 18.110	Data SSB and Teletype SSB	
18.110	CW	Beacons
18.110 a 18.168	Phone SSB, Experimental and modes not cited on this band.	Priority to Phone SSB. Other modes since they do not disturb adjacent segments

15 meters

Range (kHz)	Uses	Obs.
21.000 a 21.450	CW	
21.000 a 21.070	CW	
21.070 a 21.125	Teletype SSB	
21.090 a 21.125	Data SSB	
21.125 a 21.149	CW	
21.149 a 21.150	CW	Beacons
21.150 a 21.450	Phone SSB and Phone AM. Experimental and modes not cited on this band	Priority to Phone SSB. Other modes since they do not disturb adjacent segments
21.335 a 21.345	SSTV	Priority

12 meters

Range (kHz)	Uses	Obs.
24.890 a 24.990	CW	
24.890 a 24.920	CW	
24.920 a 24.930	Data SSB and Teletype SSB	Other modes since they do not disturb adjacent segments
24.930	CW	Beacons
24.930 a 24.990	Phone SSB, experimental and modes not cited on this band	Priority Phone SSB. Other modes since they do not disturb adjacent segments

10 meters

Range (kHz)	Uses	Obs.
28.000 a 29.700	CW	
28.000 a 28.070	CW	
28.070 a 28.200	Teletype SSB	
28.120 a 28.200	Data SSB	
28.200 a 28.300	CW	Beacons
28.300 a 28.675	Phone SSB	
28.675 a 28.685	SSTV SSB	
28.685 a 28.700	Phone SSB	
28.700 a 29.300	Experimental and modes not cited on this band, Phone SSB	Priority to experimental modes, since they do not disturb adjacent segments. Other modes since they do not disturb adjacent segments
29.300 a 29.510	Modes applied to satellites communications	Satellite communications
29.510 a 29.700	FM/PM	Simplex and repeaters

6 meters

Range (kHz)	Uses	Obs.
50,00 a 50,10	CW	CW contacts and beacons
50,10 a 50,30	Phone SSB and CW	50,110 calling frequency
50,30 a 50,60	All modes	Since does not disturb adjacent segments
50,60 a 50,80	All modes except Phone	Since does not disturb adjacent segments
50,80 a 51,00	All modes	Radio control allowed
51,00 a 51,12	Phone SSB e CW	DX Pacific window
51,12 a 51,48	Phone FM/PM	Repeater input (output + 500 kHz)
51,50 a 51,60	Phone FM/PM	Simplex
51,62 a 51,98	Phone FM/PM	Repeater output (input - 500 kHz)
52,00 a 54,00	All modes	Since they do not disturb adjacent segments

2 meters

Range (kHz)	Uses	Obs.
144,000 a 144,050	CW	Priority to EME CW. Terrestrial CW authorized since does not disturb the priority for this segment
144,050 a 144,100	CW	144,090 MHz CW calling frequency
144,100 a 144,200	Phone SSB, CW and Teletype SSB	EME and weak signals in SSB. Occasional CW contacts. Teletype SSB since it does not disturb adjacent segments
144,200 a 144,275	Phone SSB and CW	144.200 calling frequency Phone SSB
144,275 a 144,300	CW	Beacons
144,300 a 144,500	Modes applied to satellites communications, CW, Phone SSB and Phone FM	Priority to satellites communications. Other CW, Phone SSB and Phone FM contacts since they do not disturb priority and adjacent segments.
144,500 a 144,600	Phone FM/PM	Weak signals simplex

144,600 a 144,900	Phone FM/PM	Repeater inputs. Output + 600 kHz.
144,900 a 145,100	Data FM/PM	Packet Radio exclusive
145,100 a 145,200	Phone FM/PM	Weak signals simplex
145,200 a 145,500	Phone FM/PM	Repeaters output. Input – 600 kHz.
145,500 a 145,565	All modes	Except Packet Radio. Experimental modes are priority since do not disturb adjacent segments. Other modes since they do not disturb priority mode and adjacent segments.
145,565 a 145,575	Data FM/PM	Exclusive APRS
145,575 a 145,800	All modes	Except Packet Radio. Experimental modes are priority since they do not disturb adjacent segments. Other modes since they do not disturb priority mode and adjacent segments.
145,800 a 146,000	Modes applied to satellites communications, CW, Phone SSB and Phone FM	Satellites communications
146,000 a 146,390	Phone FM/PM	Repeaters input, Output + 600 kHz.
146,390 a 146,600	Phone FM/PM	Simplex
146,600 a 146,990	Phone FM/PM	Repeaters output, Input – 600 kHz
146,990 a 147,400	Phone FM/PM	Repeaters output, Input + 600 kHz.
147,400 a 147,590	Phone FM/PM	Simplex
147,590 a 148,000	Phone FM/PM	Repeaters input, Output - 600 kHz.

1,3 meter

Range (kHz)	Uses	Obs.
220,000 a 221,990	Data FM/PM	
222,000 a 222,050	CW	EME in CW
222,050 a 222,060	CW	Beacons
222,060 a 222,100	CW	222,100 calling frequency CW and Phone SSB
222,100 a 222,150	Phone SSB and CW	Weak signals
222,150 a 222,250	Phone SSB and CW	
222,250 a 223,380	Phone FM/PM	Repeaters input. Output + 1.600 kHz
223,400 a 223,520	Phone FM/PM	Simplex
223,520 a 223,640	Data FM/PM	
223,640 a 223,700	Phone FM/PM and Data FM/PM	Links and control signals. Except Packet Radio.
223,710 a 223,850	All modes	Since it does not disturb adjacent segments
223,850 a 224,980	Phone FM/PM	Repeaters output. Input – 1.600 kHz

70 centimeters

Range (kHz)	Uses	Obs.
430,00 a 431,00	All modes	Except Packet Radio. Experimental modes are priority since they do not disturb adjacent segments. Other modes since they do not disturb priority mode and adjacent segments.
431,00a 432,00	Data FM/PM	
432,00 a 432,07	CW	EME
432,07 a 432,10	CW	Weak signals
432,1	Phone SSB and CW	Calling frequency
432,10 a 432,30	Phone SSB and CW	Weak signals
432,30 a 432,40	CW	Beacons
432,40 a 433,00	Phone SSB and CW	
433,00 a 433,50	Phone FM/PM	Simplex
433,50 a 433,60	Data FM/PM	Packet/APRS

433,60 a 434,00	Phone FM/PM	Simplex
434,00 a 435,00	Phone FM/PM	Repeaters input. Output + 5 MHz
435,00 a 438,00	Modes applied to satellites communications	Satellite communications
438,00 a 439,00	All modes	Except Packet Radio. Experimental modes are priority since they do not disturb adjacent segments. Other modes since they do not disturb priority mode and adjacent segments.
439,00 a 440,00	Phone FM/PM	Repeaters output. Input – 5 MHz

33 centimeters

Range (kHz)	Uses	Obs.
902,00 a 902,10	CW	EME
902,1	Phone SSB and CW	Calling frequency
902,10 a 902,20	Phone SSB	
902,20 a 903,00	Fonia FM/PM	Simplex
903,00 a 903,10	Phone SSB and CW	
903,10 a 903,50	Data FM/PM	
903,50 a 906,00	All modes	Since it does not disturb adjacent segments
906,00 a 907,50	Phone FM/PM	Repeaters input
915,00 a 918,00	Data FM/PM	
918,00 a 921,00	Phone FM/PM	Repeaters output
921,00 a 927,00	FSTV (all)	ATV (Channel 2)
927,00 a 928,00	Phone FM/PM	FM simplex and links

23 centimeters

Range (kHz)	Uses	Obs.
1.240-1.260	All modes	
1.260-1.270	Modes applied to satellites communications	Satellites uplink (ref. WARC '79)
1.270-1.276	Phone FM/PM	Repeaters input, output between 1282 and 1288
1.271-1.283		Test pair
1.276-1.282	All modes	FSTV-AM priority; video carrier 1.277,25 MHz; audio carrier 1281,75 MHz. Other modes since they do not disturb priority mode and adjacent segments.
1.282-1.288	Phone FM/PM	Repeaters output, input between 1270 and 1276
1.288-1.294	FSTV (all)	Wideband experimental, simplex ATV
1.294-1.295	Phone FM/PM	
1294,5	Phone FM/PM	National calling frequency
1.295 a 1.297	Phone SSB and CW	Weak signals
1.295-1.295,80	SSTV (all), Fax-simile (all) and experimental	SSTV, FAX, ACSSB, experimental
1.295,80-1.296,05	Phone SSB and CW	EME only
1.296,07-1.296,08	CW	Beacons
1.296,10	Phone SSB and CW	Calling frequency
1.296,40-1.296,80	Phone SSB and CW	
1.296,80-1.297	Experimental modes	Experimental beacons (exclusive)
1.297-1.300	Data FM	Digital communications

More informations on resolution 452:

<http://legislacao.anatel.gov.br/resolucoes/21-2006/341-resolucao-452>