



**Departamento
de Controle do Espaço Aéreo**
Department of Airspace Control



Aviation Risk Mitigation Measures due to the Implementation of 5G Frequencies in Brazil





National Telecommunication Agency



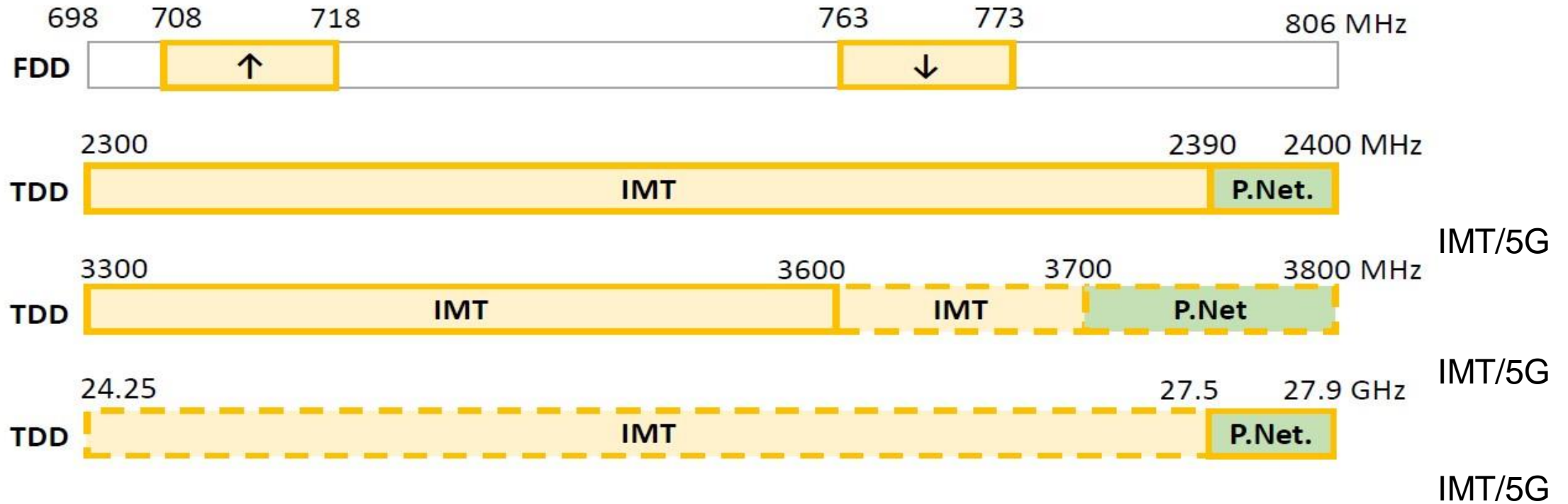
5G Auction in Brazil and the 3.5 GHz band



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Spectrum Blocks

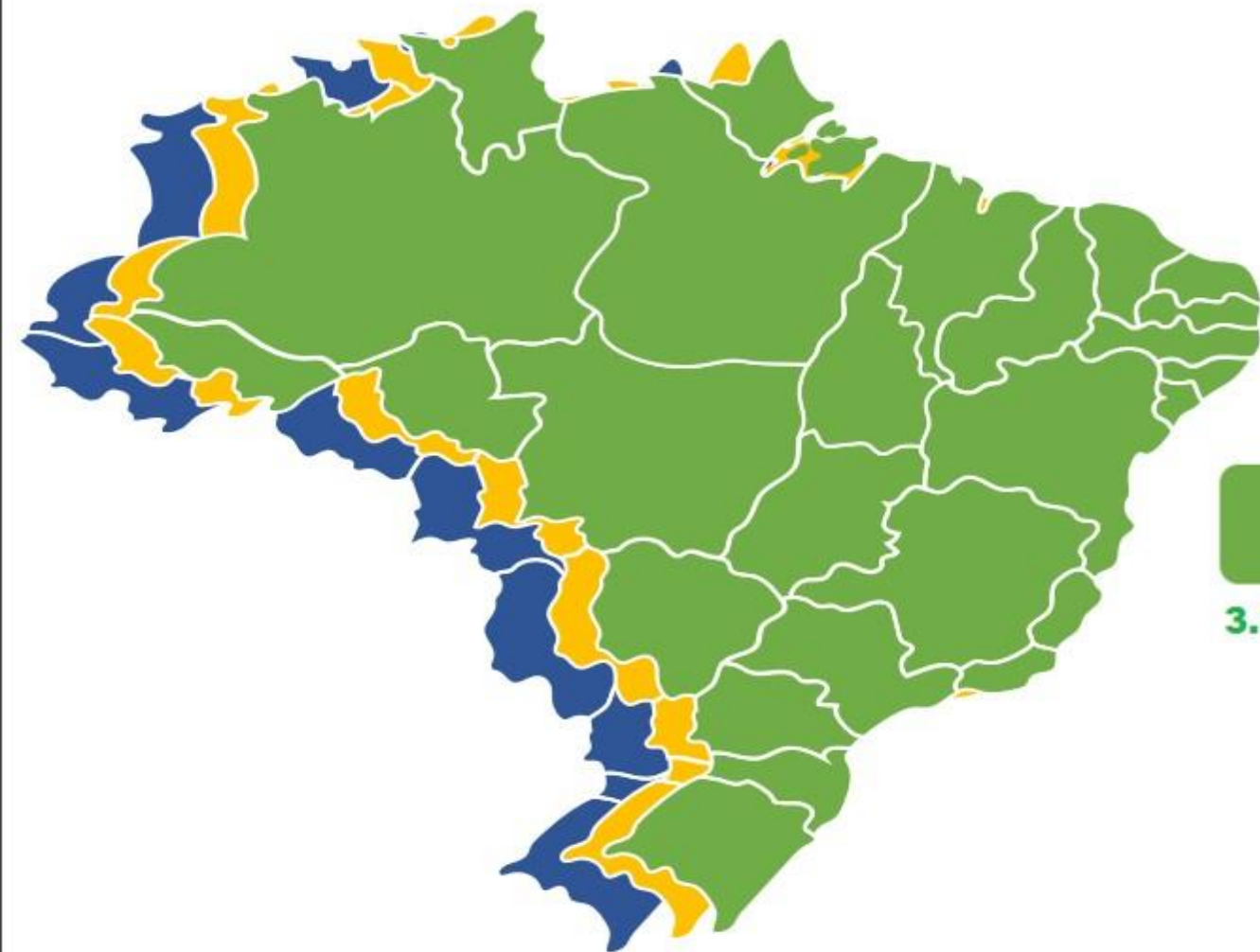
The purpose of the Auction is granting licenses to use radio frequencies in the following bands:



Legend:

- To be auctioned
- Not to be auctioned (Industry 4.0)
- Allocated before 2021
- Allocated in 2021

NATIONAL 3,5 GHz



3 X 100 MHz

Claro

3.3

Vivo

3.4 3.4

Tim

3.5 3.5

3.6



REGIONAL 3,5 GHz



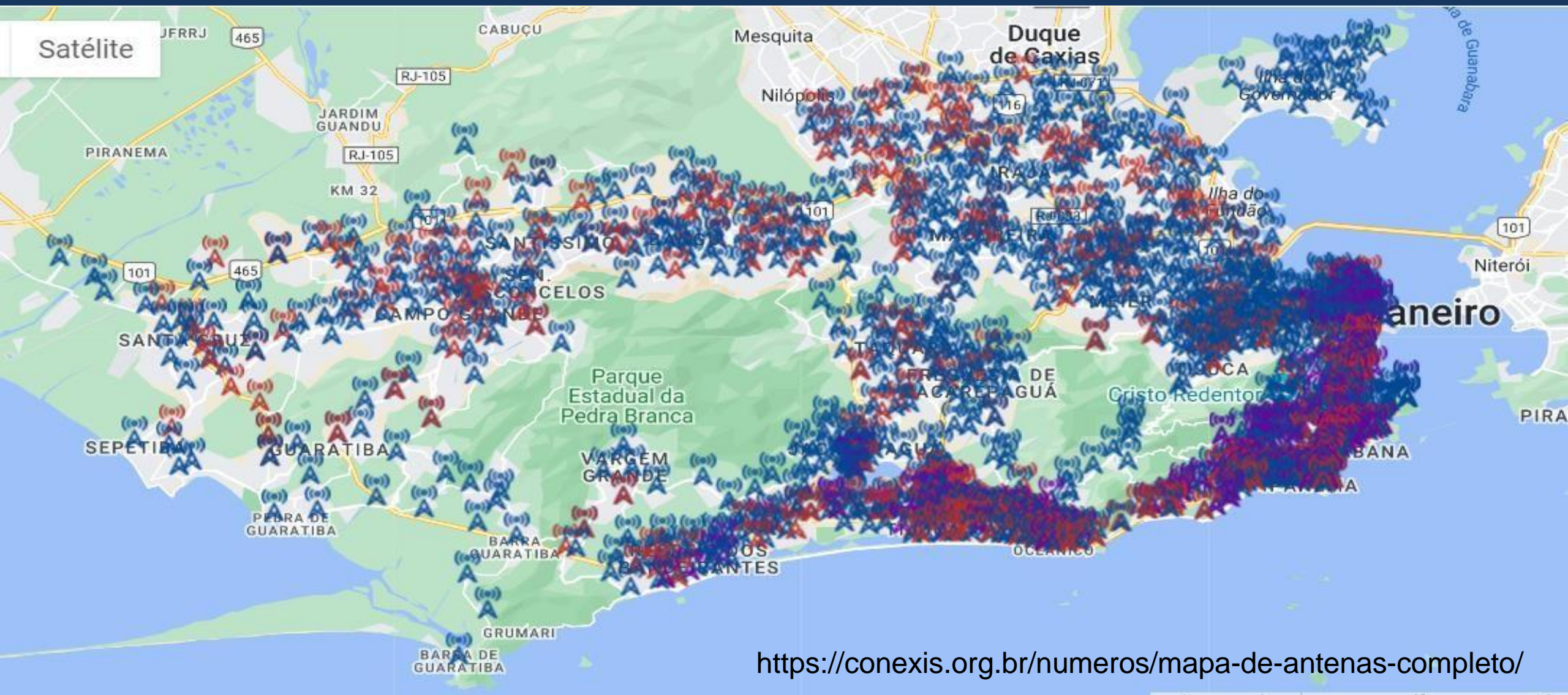
80 MHz

3.60 GHz

3.68 GHz

REGION	OPERATOR
São Paulo + Norte	Sercomtel
Nordeste	Brisanet
Centro-Oeste *	Brisanet
Sul	Consórcio 5G Sul
RJ, ES e MG *	Cloud2u
Setores 3, 22, 25 e 33 do PGO	Algar Telecom

5G BASE STATIONS IN RIO DE JANEIRO – January 2023



<https://conexis.org.br/numeros/mapa-de-antenas-completo/>



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www.decea.gov.br





Risk Mitigation 5G / 3,5 GHz X Radio Altimeter



Public Consultation No. 36 – ANATEL (05/20/2022)



- *“The National Telecommunications Agency (ANATEL) submits to comments and suggestions from the overall public, a proposal for Operational Requirements for 5G stations operating in the 3.5 GHz band for the protection of radio altimeters operating in the 4.2 – 4.4 GHz band.”*
- 20 contribution received including contributions from:

EMBRAER, ANAC, **DECEA**, IATA/BOEING, ABEAR, RIOgaleão, ABINEE, CLARO, TIM, TELEFONICA, QUALCOMM, GSMA, 5G Americas.
- **06/28/2022 - ANATEL published Act No. 9064**

Note: Acts from ANATEL have national regulatory status.



RESOLVES:

- *Art. 1º To establish, on a provisional and precautionary basis, that the **main beams of the antennas** used in base, nodal or repeater stations operating in the **sub-band from 3,300 MHz to 3,700 MHz**, installed in areas close to the aerodromes specified in the Annex, have their pointing limited between the horizon line and below (downtilt).*
- *Art. 1º, § 1º The area covered by the caput is bounded by the rectangle comprised by the following distances:*
 - I.- 2100 meters from the edges of the landing and take-off runway; and*
 - II.- 910 meters on each side of the central axis of the runway.*



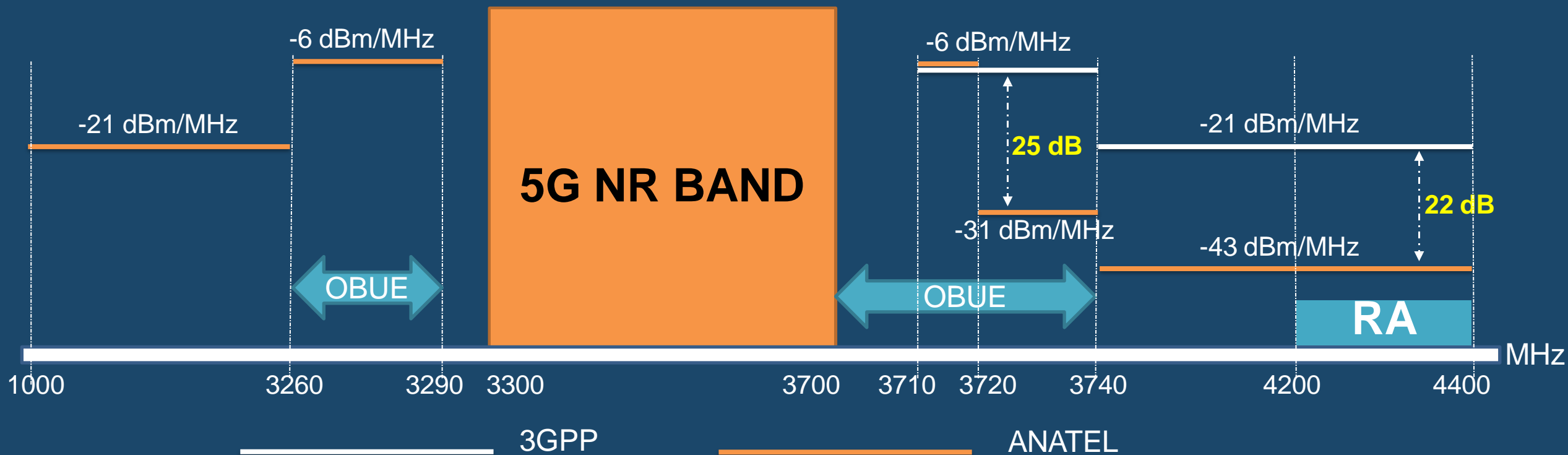
RESOLVES:

- *Art. 1º, § 2º. The **pointing limit** provided for in Art 1º applies to **both AAS** (Advanced Antenna System) and **non-AAS antennas**;*
- *Art. 2º. For the base station, nodal or repeater installed in the areas defined in § 1º art. 1º, the **maximum power (EIRP)**, by polarization, **must be limited** to:
 - I. **67 dBm/100 MHz**, when operating in the **3,300 MHz to 3,600 MHz** sub-band; or*
 - II . **65 dBm/100 MHz**, when operating in the subband **above 3,600 MHz**.**
- *Art. 3º. The rules established by this ACT **will be reviewed until Dec 31, 2022**, considering the evolution of the matter at the national and international level.*

3,5 GHz Emission Limits - ANATEL and 3GPP

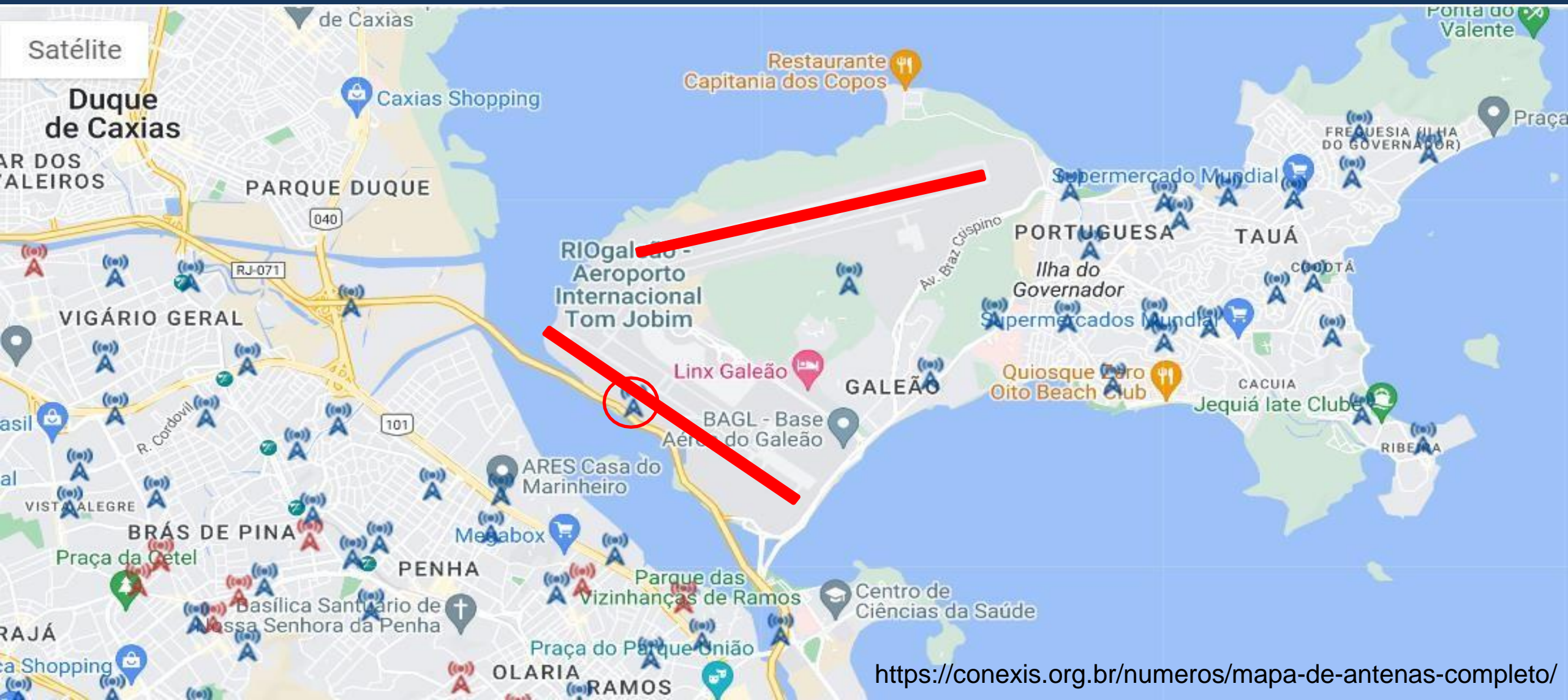


Unwanted Emission Limits – TRP limits for Base Stations with AAS



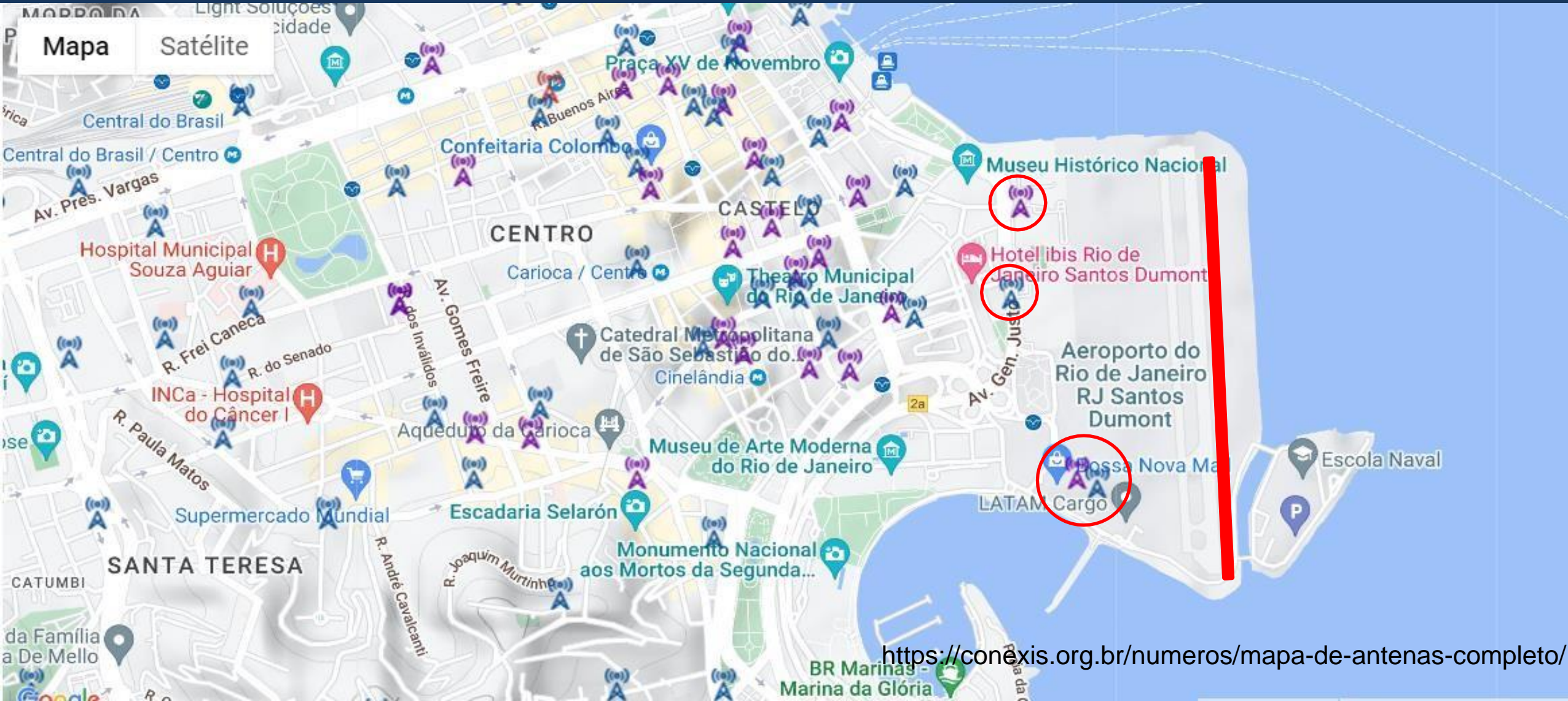
- EIRP max = 67 dBm /100 MHz per polarization @ 3300-3600 MHz in the areas defined in § 1º of art. 1º
- EIRP max = 65 dBm /100 MHz per polarization above 3600 MHz in the areas defined in § 1º of art. 1º
- EIRP max = 65 dBm /10 MHz per polarization @ 3300-3700 MHz outside areas defined in § 1º of art. 1º

5G BASE STATIONS - GALEÃO INTERNATIONAL AIRPORT



<https://conexis.org.br/numeros/mapa-de-antenas-completo/>

5G BASE STATIONS – SANTOS DUMONT AIRPORT





- *“The National Telecommunications Agency (ANATEL) submits to comments and suggestions from the overall public, the proposed **amendment of Act nº 9064**, of June 28, 2022.”*
- **02/01/2023 - ANATEL published Act No. 1051**

RESOLVES

- *Art. 1º Amend Art. 3 of Act No. 9064, which becomes effective with the following wording:
“Art. 3º The rules established by this Act (9064) **will be reviewed until July 31, 2023**, considering the evolution of the studies at national and international level.”*



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