



# Spectrum prices and regulatory framework

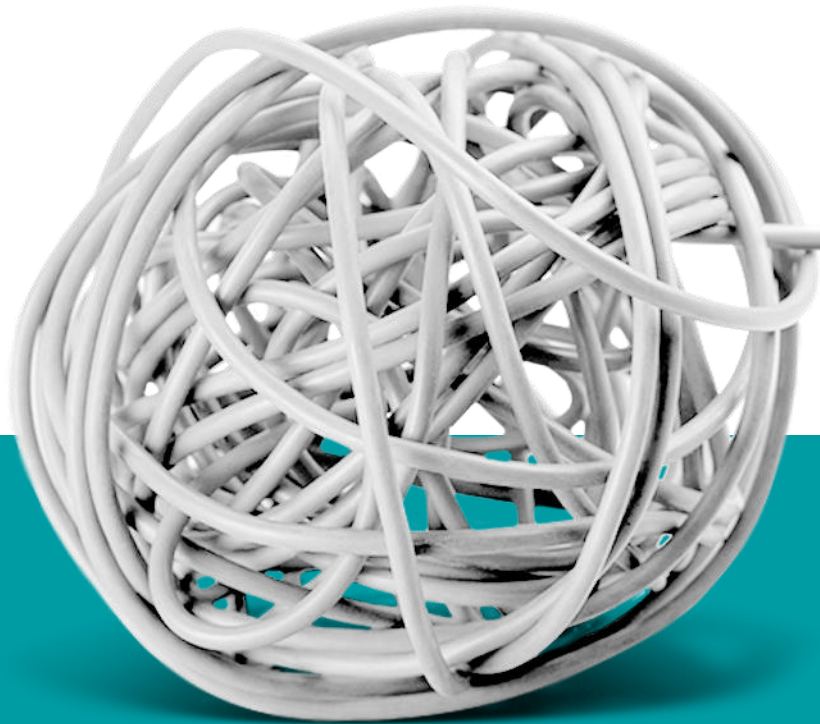
7 February 2023

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Cullen International

# what we do

regulation made simple



Cutting through the complexity of regulation in:



telecommunications



media



digital economy



postal

and



competition law

as applied in the above sectors



News Alerts



Monitoring



Benchmarks



Databases



Enquiries



regulatory training



custom research



conferences & networking



who we are  
in numbers

regulation  
made simple

>35

Years of  
Experience

70

Countries Covered

4x4

Covering  
4 Sectors Across  
4 Continents

>70

Team Members

>270

Clients  
from

25

Different  
Nationalities

90

Different  
Countries

26

Different  
Languages

# Agenda

- Spectrum assignment: different approaches and key factors
- Value of spectrum: licenses rights and use fees
- Spectrum awards and coverage
- Spectrum refarming
- Spectrum prices in latest awards in Latin and Central America
- Spectrum assignment and challenges for Caribbean countries
- Challenges and conclusions



# Spectrum assignment: different approaches and key factors

# Spectrum, a scarce resource to use carefully

**prevent  
interference**

Ensure the co-existence of different services using the same frequency band or adjacent bands

**harmonise**

Generate economies of scale for equipment, reduce risk of cross-border interference, roaming

**maximise  
economic and  
social value**

Deliver services that meet the needs of society and consumers

# Regulatory approaches

## command and control

- National regulator decides allocation and assignment
- Management fees
- Spectrum awards by grant or beauty contest

## market mechanisms

- Market decides on best use of spectrum
- Incentive pricing
- Spectrum awards by auctions and trading

## licence exempt

- No one controls the spectrum
- Risk of interference
- Some rules, e.g. power levels

Policy goals influence awards conditions

**Service obligations?**

**Coverage obligations?**

Technology neutrality?

**How many licences?**

**Spectrum caps?**

**Service neutrality?**

**Infrastructure sharing?**

**Access conditions?**

National roaming?

Reserved spectrum?



# Policy goals influence awards conditions

## SOCIAL GOALS

Customer needs

Competition

Liberalisation

## ECONOMIC GOALS

Fair competition / market entry assistance

# Types of award

## grant

- First come, first served
- No competition
- National favourites

## beauty contest

- Competition
- Selection criteria and weightings set by regulator
- Transparency can be an issue
- Is regulator the best person to judge the market?

## auction

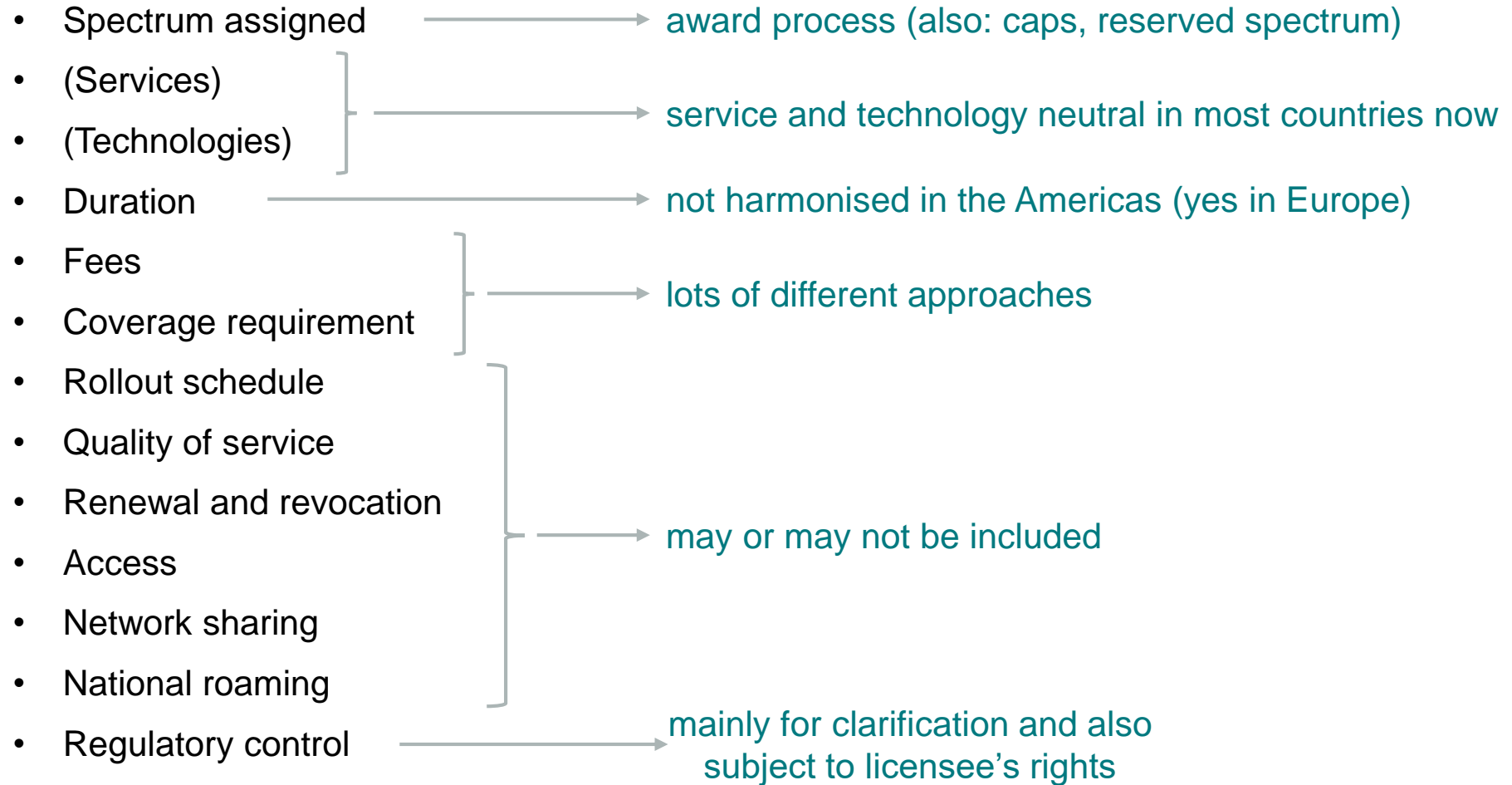
- Competition
- Transparent
- Winners value the spectrum most highly
- Market players decide the value of the spectrum

## “free for all”

- No licensing
- Anyone can use
- Open access

# Typical licence conditions

- (but lots of variations!)





Value of spectrum:  
licenses rights and use fees

# Choices to be made: fees?

set by

based on

fee level



administrative fees  
recoup cost of managing radio spectrum



annual: usage fees, incentive pricing  
“tax” based on assessment of value of spectrum to user



one-off: auctions  
extract value at award stage – determined by user

but auction rules can  
significantly affect valuations

# One-off and periodic fees



# Destination of spectrum fees

Country	Auction revenues	Periodic fees
Argentina	State budget	State budget
Brazil	Telecommunications Enforcement Fund ( <a href="#">FISTEL</a> )	Telecommunications Enforcement Fund ( <a href="#">FISTEL</a> )
Canada	State budget	State budget
Chile	State budget	State budget
Colombia	ICT Fund, managed by the ICT Ministry	ICT Fund, managed by the ICT Ministry
Costa Rica	National Telecoms Fund ( <a href="#">Fonatel</a> ) managed by Sutel	Spectrum NRA's costs (Sutel)
Ecuador	State budget	State budget
Mexico	State budget	State budget
Paraguay	State budget	State budget
Peru	State budget	Spectrum authority (MTC) budget
United States	State budget	Not applicable

# Spectrum fees for mobile bands

Country	One-off fees for licences	Latest payment method annual fees	Annual fees for spectrum licences
Argentina	Set by award (or benchmarking for refarming)	10 or 30 WD	Yes, specific equation
Brazil	Set by award	10% with licences + 6 annual installments (indexed)	No, BUT 2 % of profits bi-annually for most licences
Canada	Set by award	100% in 35 WD	No, only after renewal
Chile	Set by award	10 WD	Yes, specific equation
Colombia	Set by award	40% monetary (the rest coverage) 10% within 30 CD 5% from years 6 to 11 10% per year for another 6 years.	Yes, specific equation
Costa Rica	Set by award	n/a	Yes, specific equation
Ecuador	Set by award	Depends on the award	Yes, specific equation
Mexico	Set by award	30 WD	Yes, set by Law
Paraguay	Set by award	60 WD	Yes, specific equation
Peru	Set by award	n/a	Yes, specific equation (deductions for rural infrastructure investment)
United States	Set by award	30 WD	No





# Spectrum awards and coverage obligations

## Non-monetary obligations

- Most countries in the Americas set coverage obligations in the latest spectrum licence awards.
- Some countries setting detailed coverage requirements and schedule, including roads and rural areas (Argentina, Brazil, Colombia, Costa Rica, Peru, Paraguay)
- Others setting coverage requirements as a % of the population (Canada, Ecuador, Mexico, United States)

# Coverage obligations - detailed

Country	Band/Year	Coverage obligation
Argentina	2.5 GHz/2017	List of towns to cover within 1 year
	AWS, 700 MHz/2014	Five stages, cities, small towns and roads (>500 pop. Covered in 5 years)
Brazil	2.5 GHz, 450 MHz/2012	List of cities (<30,000 pop.), rural áreas covered in 3 years
	700 MHz/2014	No, BUT Anatel allowed to comply with above using 700 MHz
	5G multiband/2021	5G coverage: all 5,570 cities and 1,700 villages 4G coverage: all federal highways (35,784 km) and 7,430 villages Fibre deployment, public schools
Chile	700 MHz/2014	Populated areas within 24 months 1,281 rural areas, 503 schools and 13 roads (854 km) within 18 months
	5G multiband/2021	5G deployed within three years and 18 months to achieve 88% of coverage scope
Paraguay	AWS/2015	Coverage of 250 cities within 40 months, including 30 low population cities
	700 MHz/2018	100 base stations in rural areas in 3.5 years per block Base stations in rural areas in 4 years and specific towns without service in 4.5 years
Peru	700 MHz/2016	190 Peruvian districts covered within five years and expansion of mobile broadband internet in rural area

# Coverage obligations- %

Country	Band/Year	Coverage obligation
Canada	700 MHz/2014	Deployment requirements are specific to service areas, range from 20% coverage to 50% coverage within ten years of licence issuance.
Ecuador	700 MHz, AWS/2012	At least 50% of rural locations have access to broadband in 2015 At least 75% of the population has access to broadband in 2017
US	700 MHz/2008	Depends on block, between 30 and 75% of coverage in the licence area
	3.6 GHz/2021	Mobile or point-to-multipoint services must cover at least 45% of the licence areas within four years and at least 80% of the population within eight years. Specific FWA and IoT coverage Use it, lease it or loose it and licence term reduction

# Other obligations

- Wholesale access obligations played a significant role in spectrum awards in Argentina, Canada, Chile, Colombia, Paraguay and Peru, usually consisting of ensuring access by mobile virtual operators or imposing national roaming or infrastructure sharing on incumbent operators.
- In Brazil and Paraguay, spectrum licensees in the 700 MHz spectrum band must bear the cost of migrating broadcasters to lower bands, and also bear the costs to mitigate interference between IMT and broadcasting services.
- Some countries also set social obligations in their spectrum awards, mandating: (offer of subsidised service or equipment in Colombia and Paraguay, creation of info centres in Paraguay and research and development investment in telecom-related issues in Canada).

## Lower spectrum fees for operators in the Americas to invest in rural coverage

- Countries are introducing more flexible rules for spectrum fees, including allowing telecoms operators to pay reduced spectrum fees in exchange for network coverage commitments, especially in rural areas.
- Colombia started a regulatory sandbox on the exchange of spectrum fees for coverage commitments (Dec. 2022).
- The Colombian government also approved rules for spectrum payments to be exchanged for coverage commitments in telecommunications universal access projects (Dec. 2020)
- The ICT modernisation law allowed spectrum licensees to use coverage commitments as a payment method, but only up to 60% of their total assigned spectrum (June 2020).

## Lower spectrum fees for operators in the Americas to invest in rural coverage

- Ecuadorian regulator approved amendments to the spectrum licence fees and spectrum use rights regulation. The amendments allow telecoms operators to allocate up to 50% of their annual spectrum fees to national priority projects to improve connectivity in rural or isolated areas (Dec. 2022).
- Peru published a list of rural localities eligible for the deduction of infrastructure investment in new mobile technology (3G or higher) from the annual spectrum fees (April 2022). This followed the approval in February 2021 of lower annual spectrum fees (up to 40%) in exchange for investment in rural areas.
- The Brazilian regulator, Anatel, can also fully or partially convert licence renewal fees into 4G investment targets, with the targets needing to be established “according to government guidelines” (July 2018)

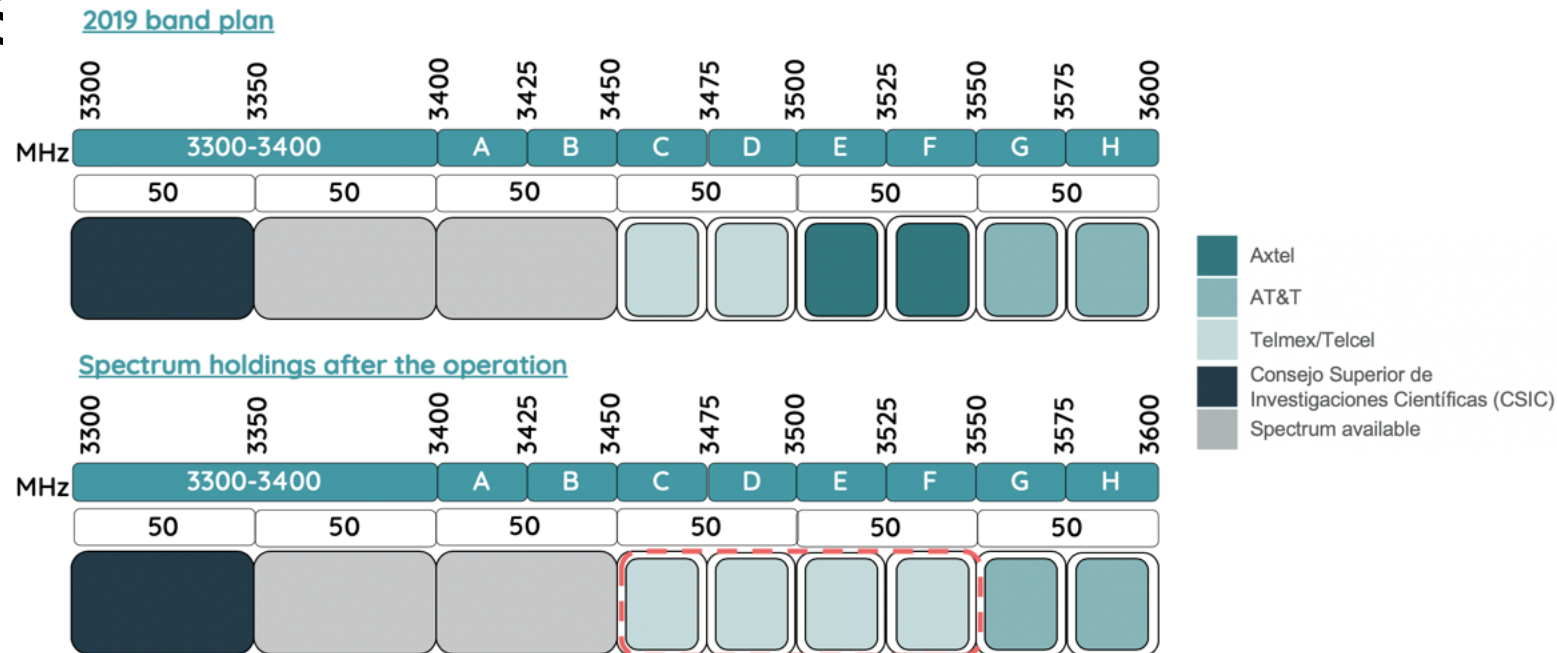
# Spectrum refarming





# Mexico – Telcel and Axtel (2020) 1/2

IFT approved the commercial acquisition by Telcel of 50 MHz in the 3.5 GHz band originally awarded to Axtel to provide fixed wireless access services



## Mexico – Telcel and Axtel (2020) 1/2

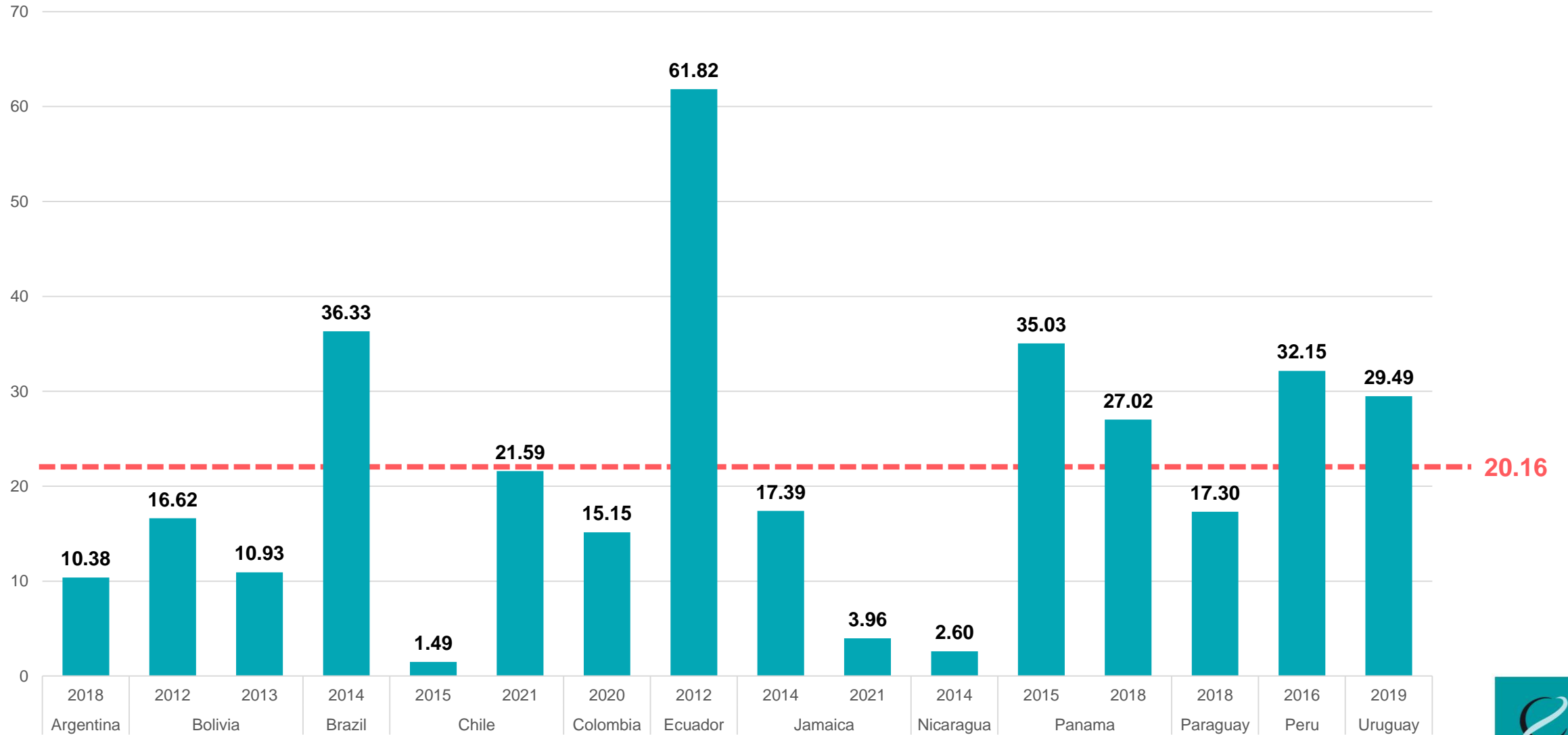
- **Oct. 2019** IFT authorised the refarming of the 3.5 GHz band, granting operators in this band – Axtel, AT&T and Telmex contiguous blocks of 50 MHz in each of the nine regions of Mexico
- **Jan. 2020** América Móvil transferred this 50 MHz licence from its fixed operator Telmex to its mobile network operator Telcel.
- **July 2020:** Telcel acquires another 50 MHz from Axtel and expresses intention to use the spectrum for 5G
- **Feb. 2021:** IFT authorises to use for 5G (satellite protection, annual spectrum fee US\$43.39m)



# Spectrum prices in latest awards

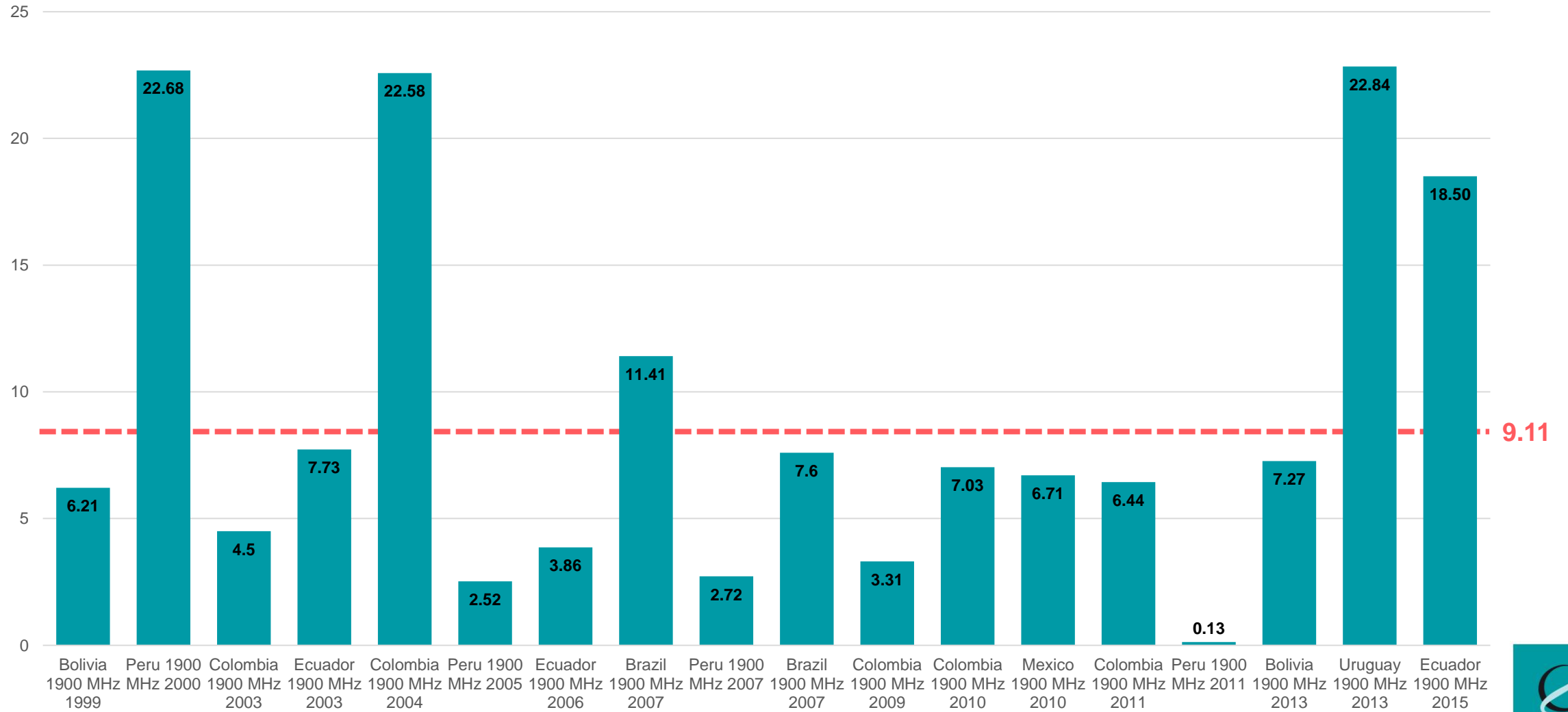
# 700 MHz

US\$ cents/MHz/Pop



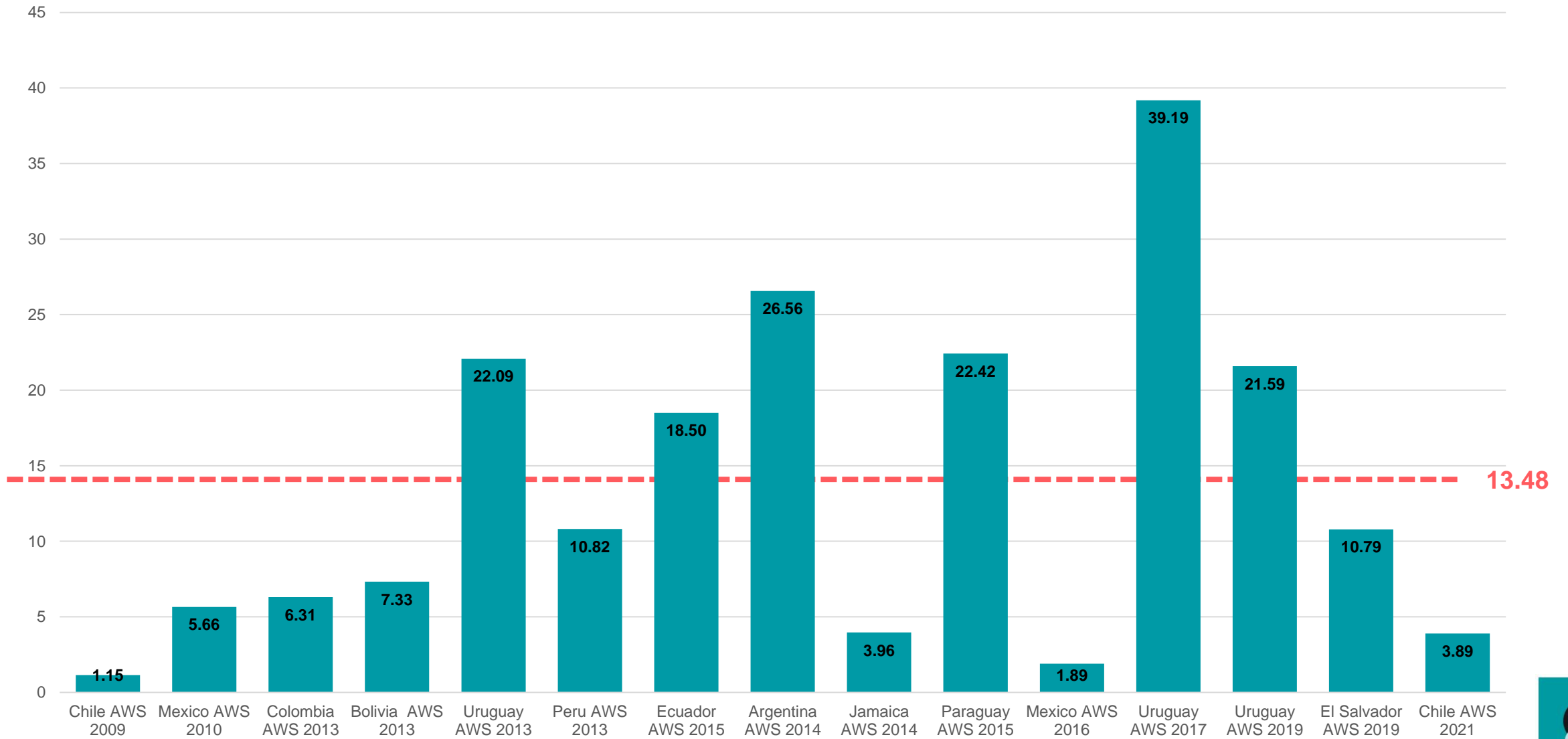
# 1900 MHz

US\$ cents/MHz/Pop



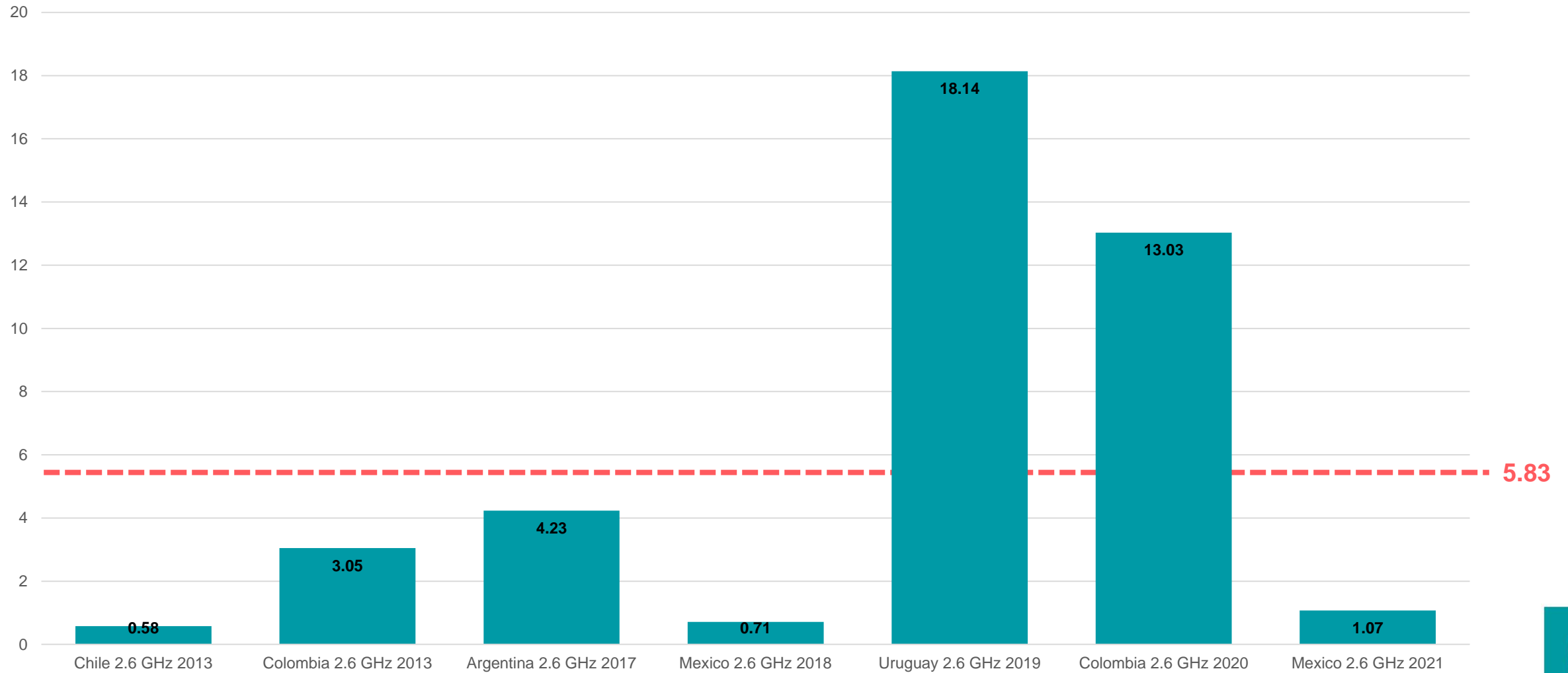
# AWS

US\$ cents/MHz/Pop



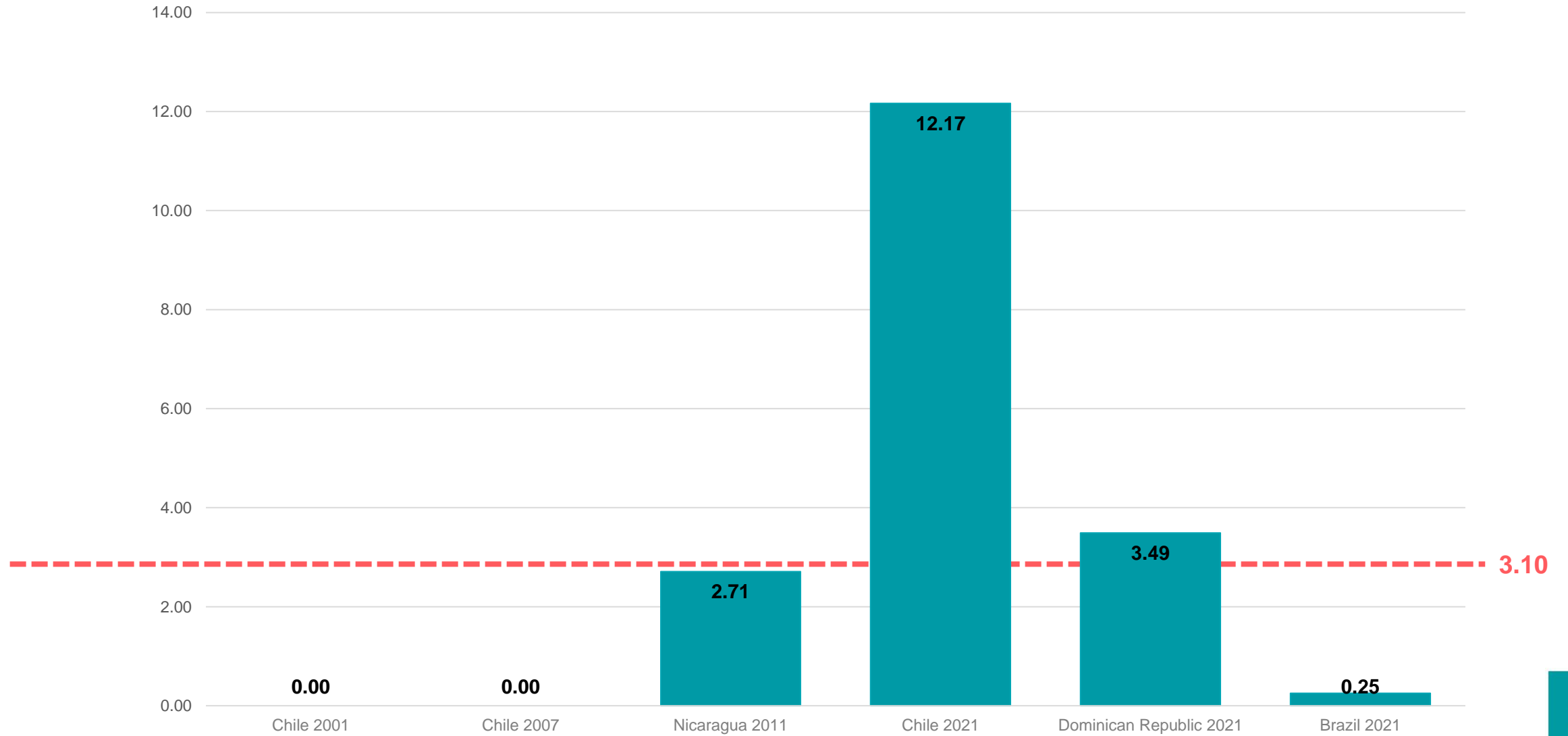
# 2.6 GHz

US\$ cents/MHz/Pop



# 3.5 GHz

US\$ cents/MHz/Pop

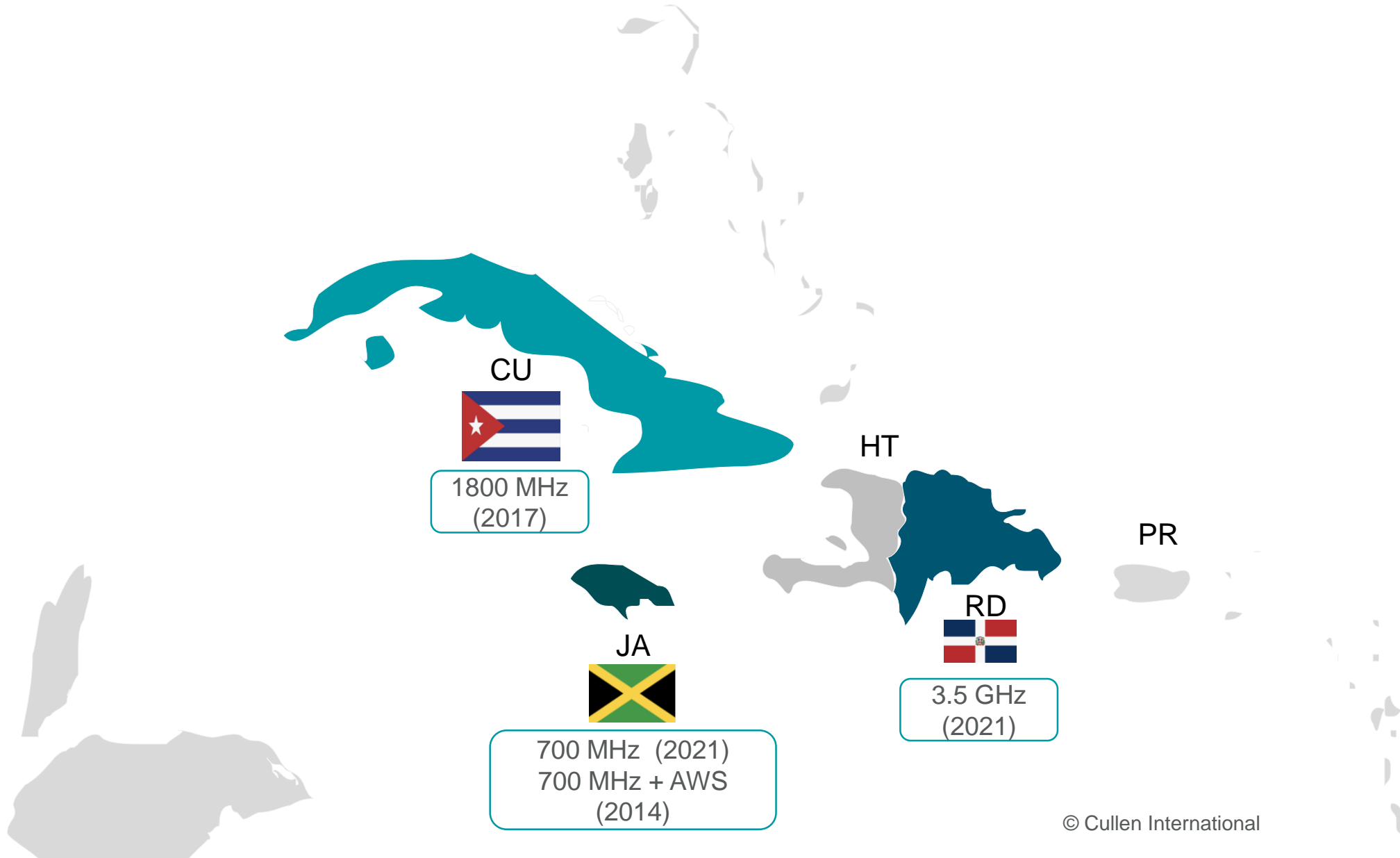






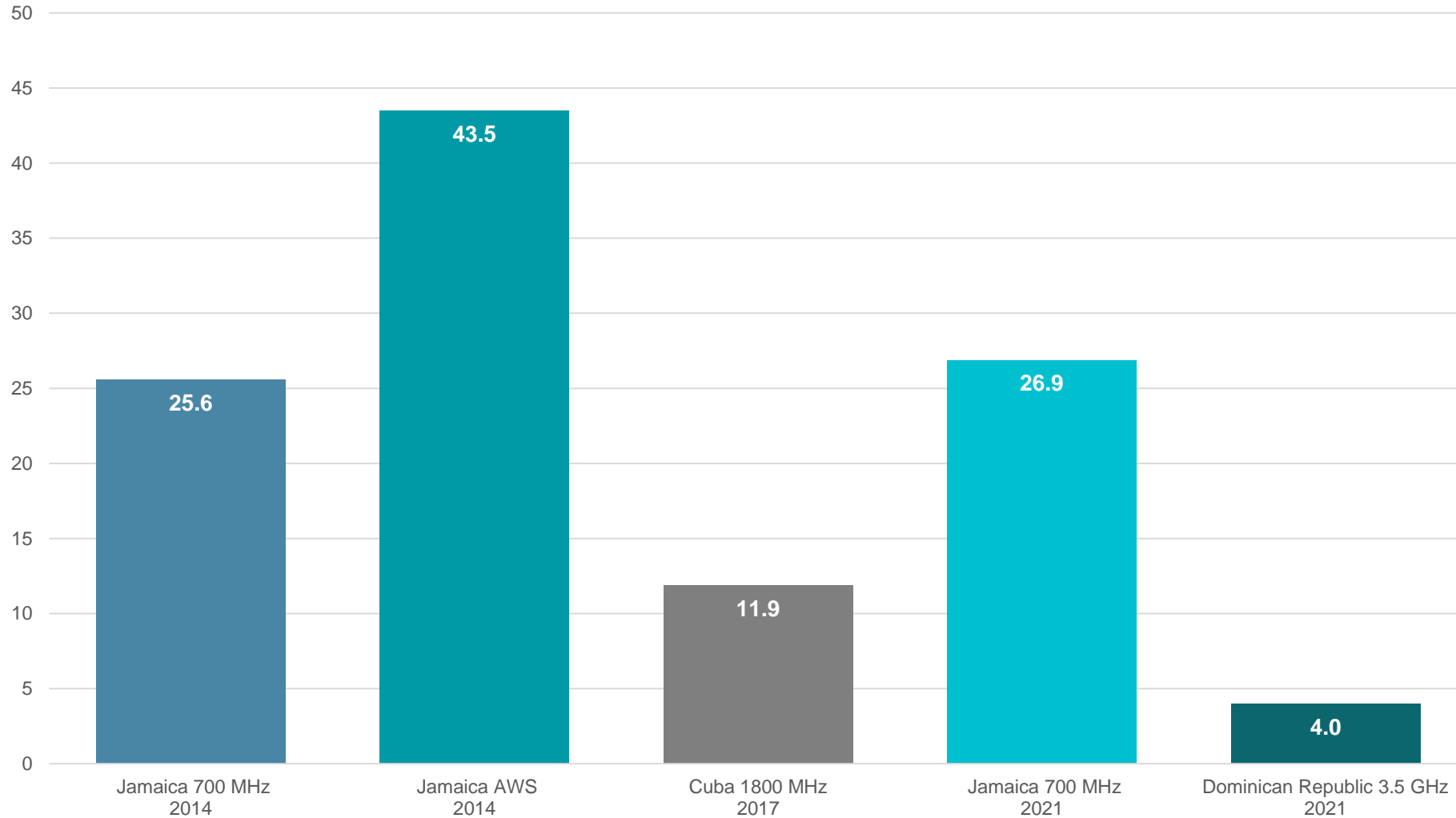
# Spectrum awards and challenges for Caribbean countries

# Central America and the Caribbean: Latest awards



# Caribbean islands: latest awards results

US\$ cents/MHz/Pop



## The Caribbean Islands: challenges

- Not enough data to benchmark
- Countries of reference: Americas/ Europe?
- Caribbean islands have a different national reality
- Telecoms markets with few competitors
- Service providers are licensed separately in each jurisdiction and, therefore, each is a separate market

# The Caribbean Islands: evolving telecoms market

- **New regulatory frameworks**
  - Eastern Caribbean Telecommunications Authority (ECTEL), telecoms regulator for the five – Dominica, Grenada, St Kitts and Nevis, Saint Lucia, and St Vincent and the Grenadines.
  - Consult on several draft changes to its Regional Spectrum Management Plan (600 MHz for IMT).
- **New joint spectrum management**
  - Ectel + National regulatory authorities
- **New entrants**
  - Rock Mobile (Jamaica)
  - Iliad (Antilles-Guyane region)
  - Orange (Martinique)

# The Caribbean Islands: awards approach

- **First come first served**
  - Virgin Islands
- **Auctions**
  - Jamaica
  - Dominican Republic
  - Puerto Rico + Virgin Islands (US)
  - Trinidad and Tobago
- **Grants (direct)**
  - Cuba
  - Belize
  - ECTEL Member States

# Upcoming and ongoing spectrum awards

## 5G Spectrum award French overseas territory

Arcep ongoing 5G spectrum award for Guadeloupe, Guyana, Martinique, Saint Barthelemy, Saint-Martin and Saint Pierre and Miquelon (15-year licences)

- 700 MHz and 3.4 GHz–3.8 GHz bands in French Guiana, Saint Barthelemy, and Saint-Martin (Spectrum cap per band)
- four blocks of 2×5MHz FDD in the 700 MHz band
  - Dauphin Telecom, Digicel, Free Mobile, and Orange Caraibe (50 MHz blocks 3.5 GHz)
- 38 blocks of 10MHz spectrum in the 3.4 GHz–3.8 GHz band
- 900 MHz and 2.1GHz bands in Saint Barthelemy: one 2×4.8MHz block and one 2×5MHz, respectively



# The Caribbean Islands- Upcoming and ongoing spectrum awards

## 5G Spectrum award French overseas territory

### French Guiana



- Interested operators request one of the four 2x5MHz blocks in the 700MHz band: Digicel, Free Caraibe, Orange Caraibe, and Outremer Telecom (SFR) in French Guiana
- The spectrum in the 3.4 GHz– 3.8 GHz band and the frequencies still available after the 700 MHz award, will be auctioned






# Challenges on spectrum assignment and pricing

- Amount of spectrum available: More spectrum. Even new spectrum.
- Design of the award
- Transparency in spectrum assignment
- Definition of regulatory plans
- Impact analysis of policy changes
- Spectrum licenses rights and use fees (one-off, recurrent)

# The data source

spectrum database

ABOUT | MY CULLEN   

Europe  Americas

€ \$

## Licences

Country	<1 GHz	1-3 GHz	3-6 GHz	>24 GHz
Argentina	700 MHz <input type="checkbox"/> 850 MHz <input type="checkbox"/> 900 MHz <input type="checkbox"/>	1900 MHz <input type="checkbox"/> AWS <input type="checkbox"/> 2.6 GHz <input type="checkbox"/>		
Bolivia	700 MHz <input type="checkbox"/> 850 MHz <input type="checkbox"/>	1900 MHz <input type="checkbox"/> AWS <input type="checkbox"/>		
Brazil	450 MHz <input type="checkbox"/> 700 MHz <input type="checkbox"/> 850 MHz <input type="checkbox"/> 900 MHz <input type="checkbox"/>	1800 MHz <input type="checkbox"/> 1900 MHz <input type="checkbox"/> 2.1 GHz <input type="checkbox"/> 2.3 GHz <input type="checkbox"/> 2.6 GHz <input type="checkbox"/>	3.5 GHz <input type="checkbox"/>	26 GHz <input type="checkbox"/>
Canada	600 MHz <input type="checkbox"/> 700 MHz <input type="checkbox"/>	1900 MHz <input type="checkbox"/> AWS <input type="checkbox"/> 2.6 GHz <input type="checkbox"/>	3.5 GHz <input type="checkbox"/>	

# The data source

spectrum database

ABOUT | MY CULLEN

Twitter LinkedIn Profile

Licences Awards Reports

Europe Americas

Jamaica

All groups of bands

All bands

Show

€ \$

Country

## Licences in Jamaica



Graphic

### Country facts

List of operators	Capital	Area (km <sup>2</sup> )	Population
Cable & Wireless JM, Digicel JM	Kingston	10,991	2,961,161

Band	Operators	MHz	Awards
700 MHz	Cable & Wireless JM	2x5	2021
	Digicel JM	2x12	
	Rock Mobile	2x10	
850 MHz	Digicel JM	2x21	

# The data source

## Regulation of spectrum fees



Summary	General rules	Spectrum fees for mobile bands	Other versions
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Spectrum fees for mobile bands			
	One-off fees for licences	Payment method	Annual fees for spectrum licences
Argentina	Set by award (or benchmarking for refarming)	Full payment required upon award (within a timeframe of up to 30 days). E. g. • 700 MHz and AWS within ten working days (Flash) • 2.5 GHz: within 30 working days (Flash)	Yes  Fees are calculated and paid on a monthly basis  Fee calculation depends on telecommunication service and spectrum used.  (Enacom Resolution 1196 of 2018, 4266 of 2019 and 2385 of 2022, Flash)
Brazil	Set by award	Set in each spectrum award  E.g.: 700 MHz auction:	No  Spectrum licences usually require companies to pay 2% of profits every two years.



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