



MOBILE BROADBAND GROWTH IN LATIN AMERICA

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4G Americas

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4G AMERICAS

4G Americas will advocate for and foster the advancement and full capabilities of 3GPP mobile broadband technologies, including LTE-Advanced, throughout the ecosystem's networks, services, applications and wirelessly connected devices in the Americas.

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AGENDA

- Technology Evolution
 - 5G
 - Mobile Market Statistics
 - Mexico Mobile Broadband Market
 - Spectrum & Regulatory Issues
 - Broadband Market Statistics
 - Conclusions
 - References
- 



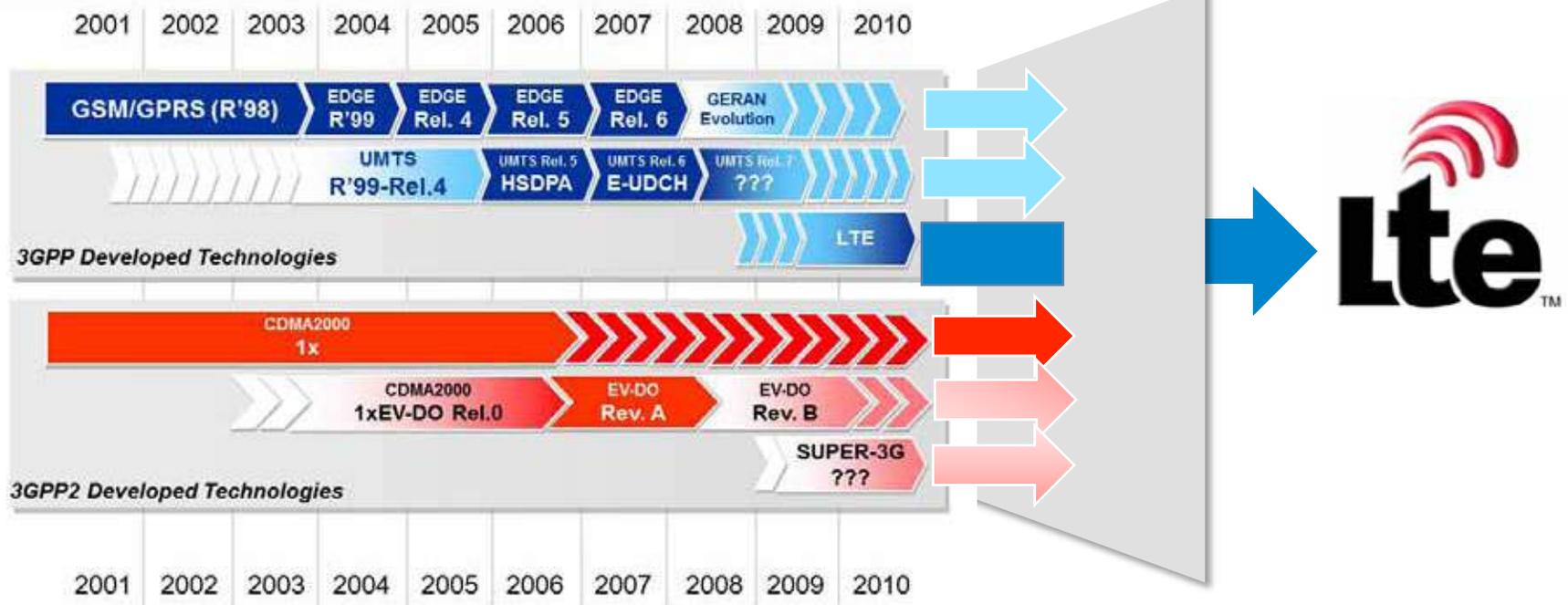
Technology Evolution

THE TECHNOLOGY WARS RAGE

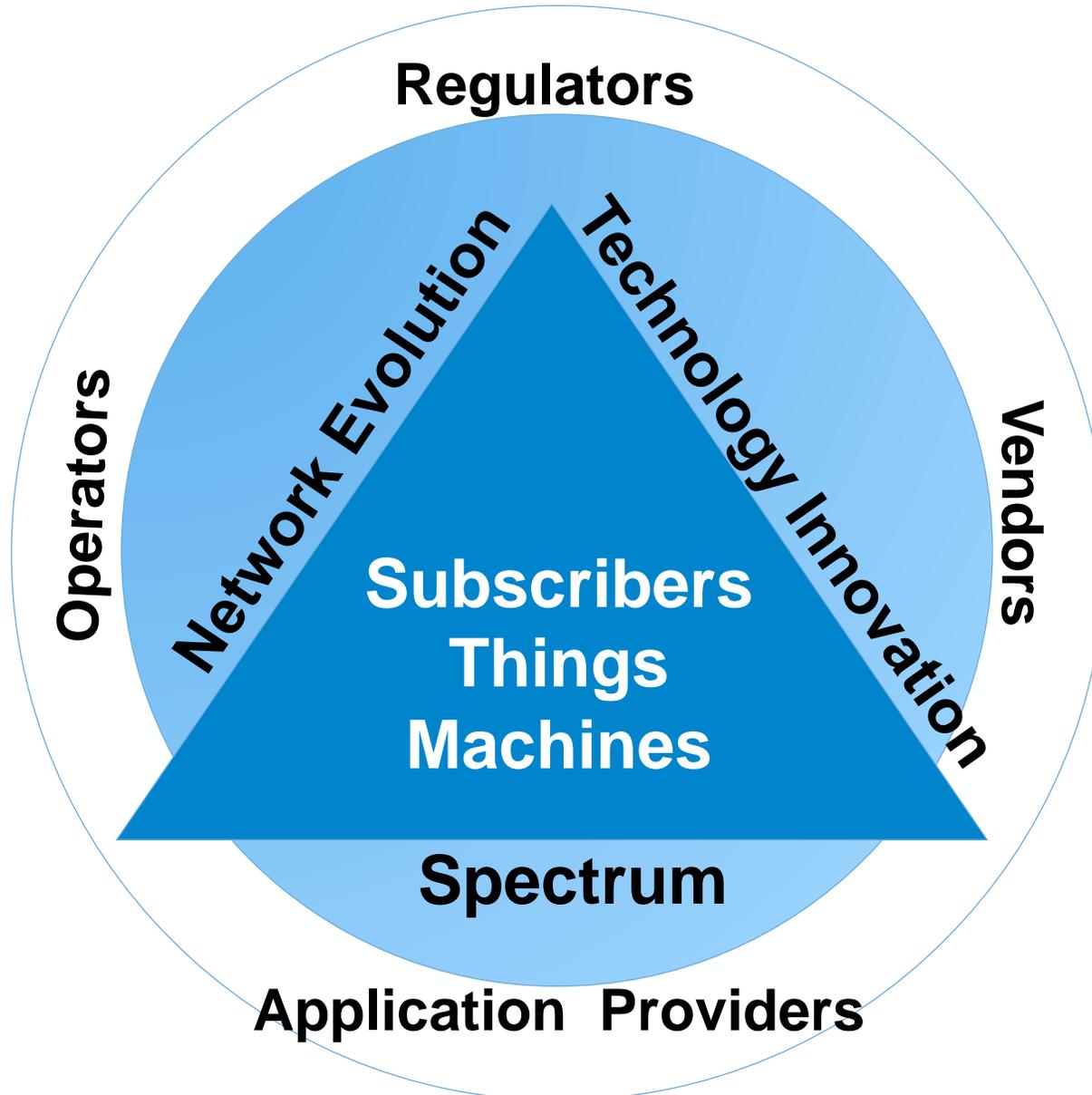
3GPP / 3GPP2 Technology Roadmaps

2014

GSM vs CDMA, EV-DO vs. HSDPA



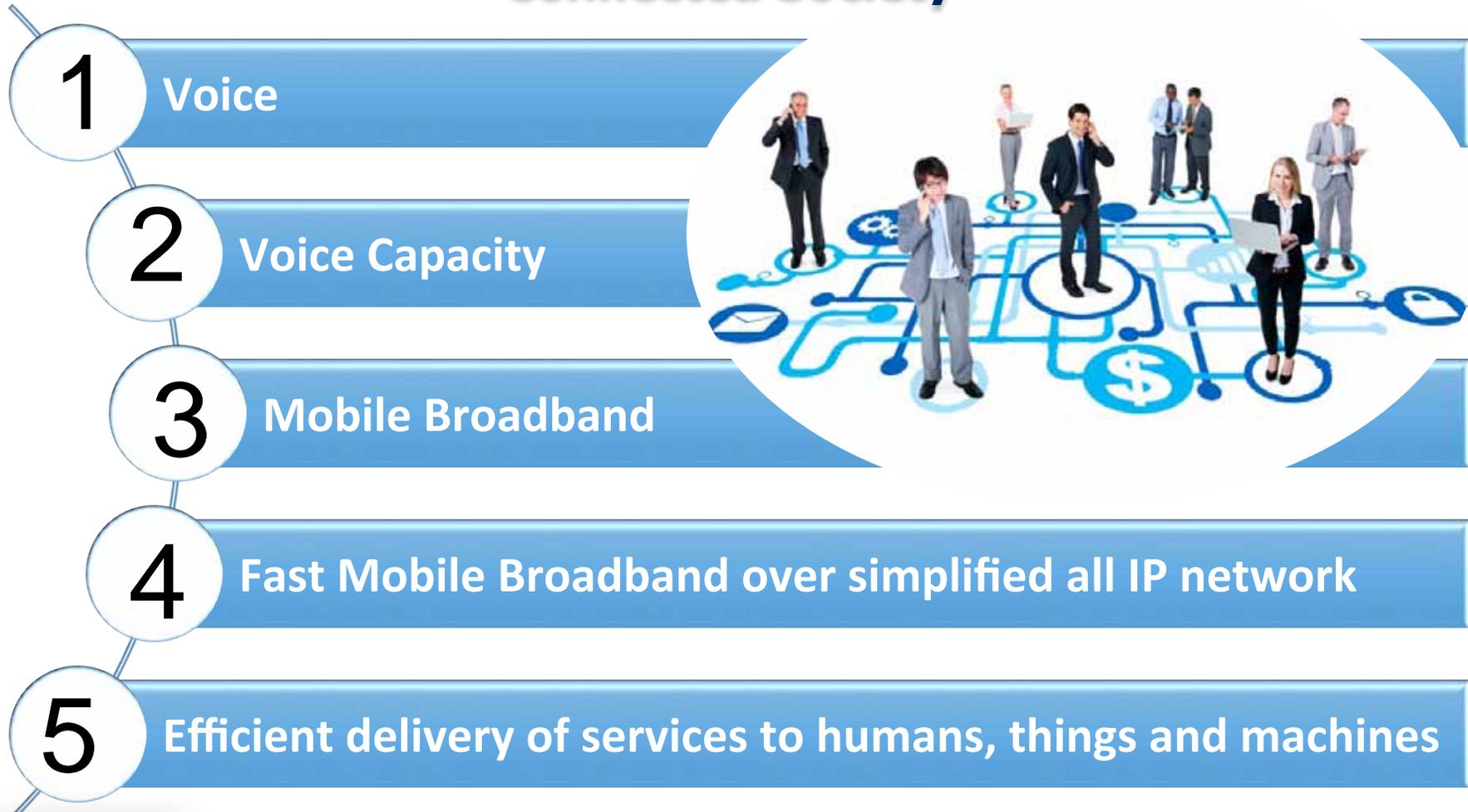
ECOSYSTEM EVOLUTION VALUE CIRCLE





NETWORK EVOLUTION

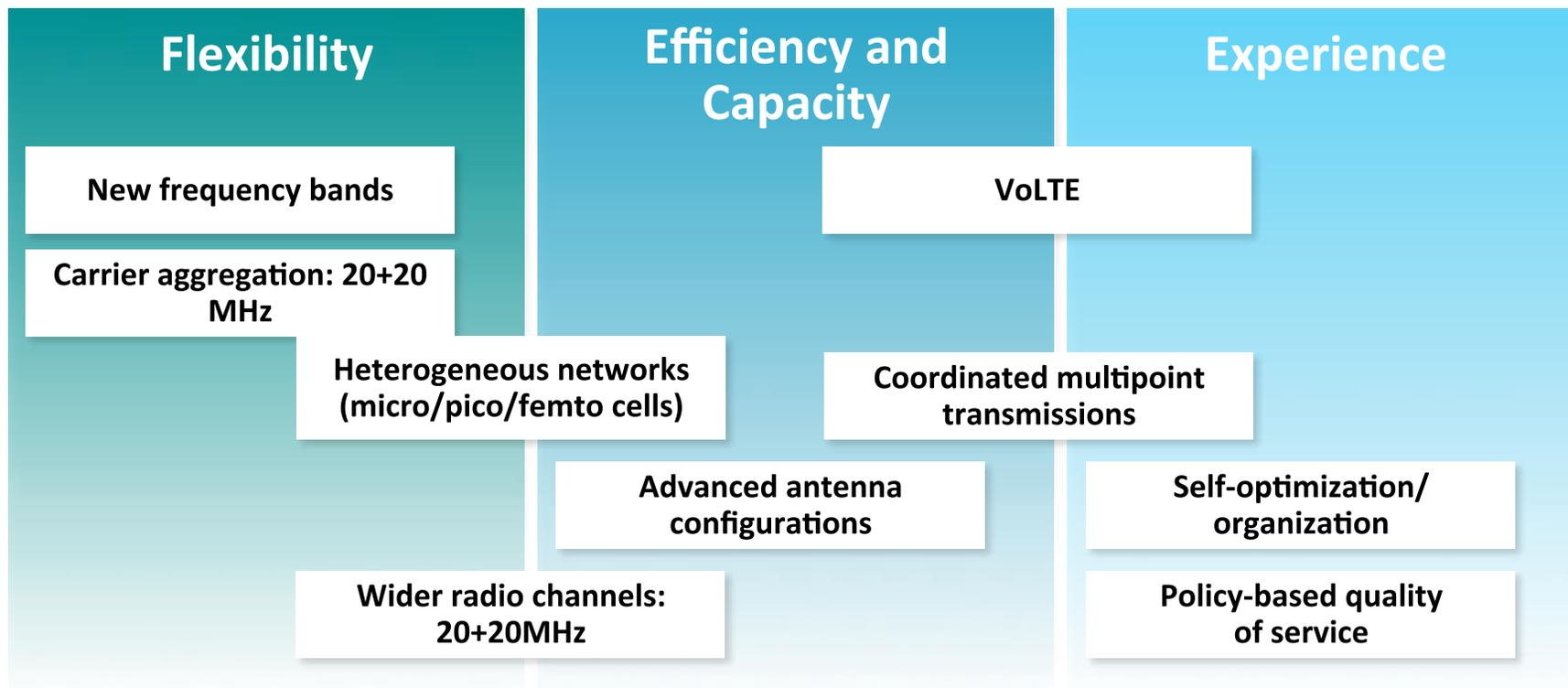
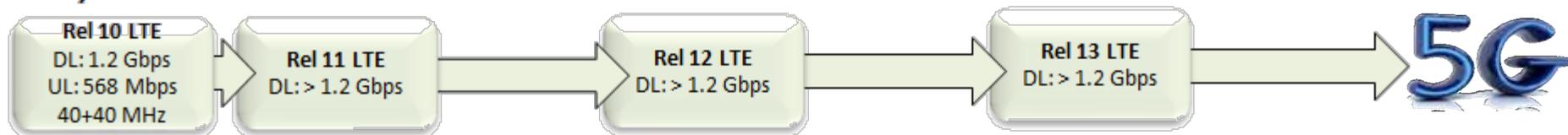
"Mobile Broadband at the Center of the Universe of the Connected Society"



THE PATH TO 2020 AND BEYOND!

| 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020

LTE, LTE-Advanced



GLOBAL CONNECTIVITY GROWTH

Connected Car



62%

Of new cars sold worldwide will have embedded connectivity by 2018 – *Analysys Mason*

Wearables



78%

Annual increase forecast until 2018 – *IDC*

M2M



24%

Compound Annual Growth Rate until 2018 to reach 185 million units – *Berg Insight*



5G





KEY PRINCIPLES

5G is:

- Architected to meet the expected demand in 2020 and beyond
- Inclusive of the entire 5G interface, including air interface, devices, transport, packet core and more
- Allows time for true advances of technology, feasibility studies, standardization and product development
- A critical investment of the Americas
 - **Features considered 5G requirements should be implemented as LTE-Advanced extensions in advance of full 5G availability.**

5G MARKET DRIVERS & USE CASES

INTERNET OF THINGS



EXTREME VIDEO AND GAMING APPLICATIONS



CONTEXT AWARE SERVICES



EXPLOSIVE DATA DENSITY USAGE

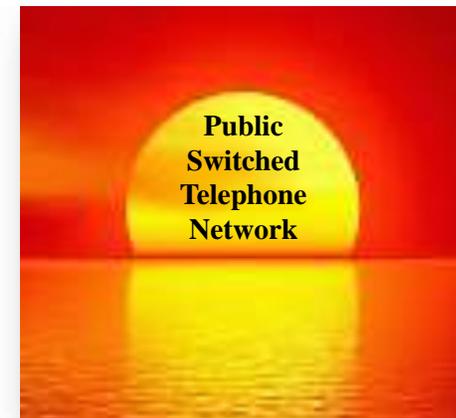


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4G Americas PRESS RELEASE



5G: A New Frontier for Mobile Broadband Innovation

4G Americas provides an Americas viewpoint on 5G requirements and recommendations

October 23 2014

BELLEVUE, Wash. – The debate around 5G continues as new mobile broadband developments emerge by the minute. It is not surprising that several theories and assumptions have been made on what requirements are needed for this new generation of mobile broadband technologies. Common questions on this hot topic typically include: When will 5G be deployed? What will characterize networks in 2020 and beyond? What are the likely solutions and technologies that will come in to play?

4G Americas, a wireless industry trade association representing the 3GPP family of technologies, including LTE and LTE-Advanced, today published an important and significant white paper titled, [*4G Americas' Recommendations on 5G Requirements and Solutions*](#). This notable white paper examines the 5G market drivers, use cases, requirements, regulatory considerations and technology elements for the purpose of being considered for the further development of the end-to-end 5G system for deployments in 2020 and beyond. The paper is aimed at providing readers with a clearer understanding of the vision of 5G, specifically with the technology solutions for consideration, as it expands further into the anxiously watching eyes of the wireless industry.

Chris Pearson, President of 4G Americas, stated, "5G networks will not be standardized, manufactured or deployed in a days' notice for tomorrow; however, the long term planning cycle is upon the mobile broadband industry, and it is imperative that the Americas region be represented. This 4G Americas white paper provides a vision of 5G that can be utilized throughout the world."



Mobile Market Statistics

Growth and Forecasts

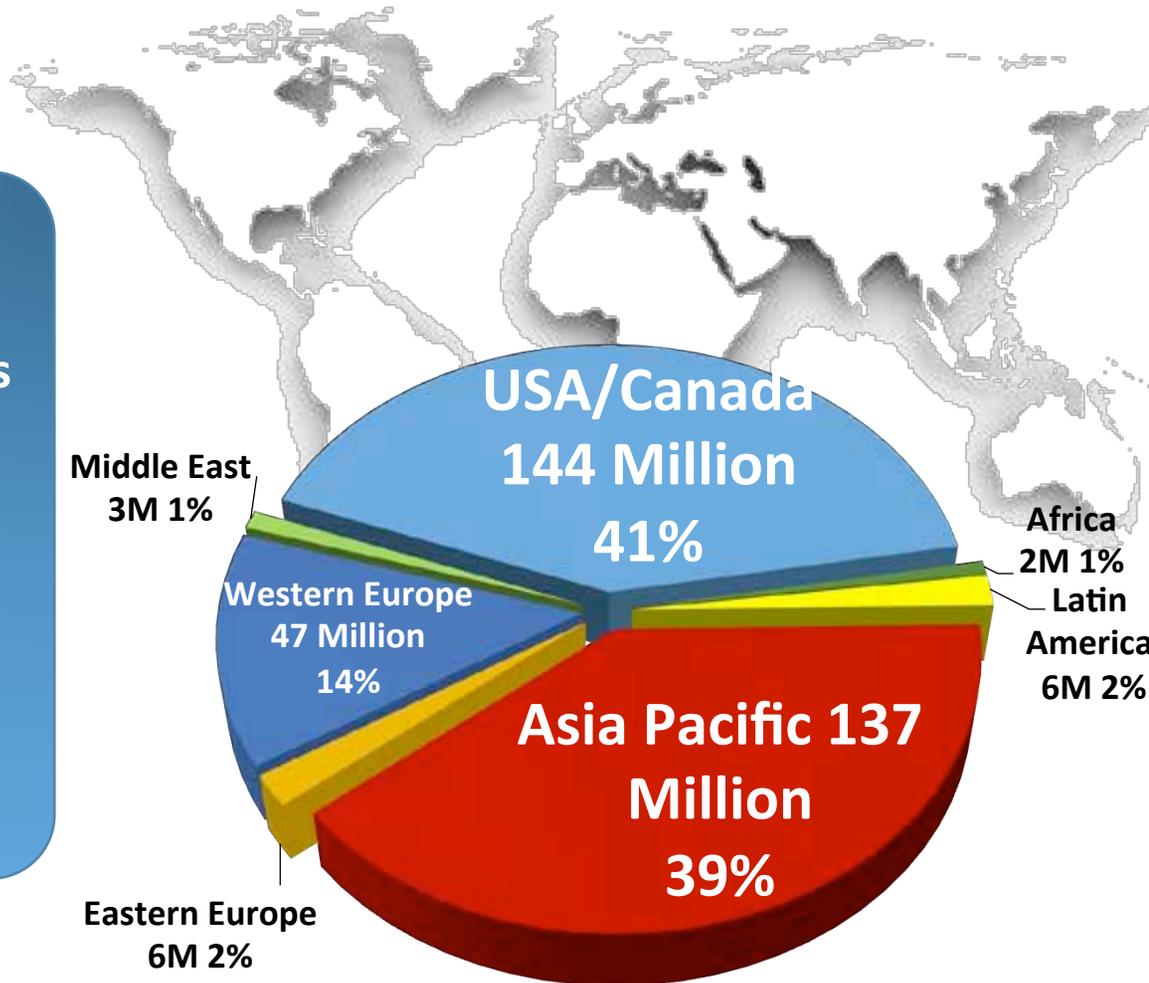
LTE MOBILE BROADBAND MARKET UPDATE



346
Million
Subscriptions

324
Commercial
Networks

112
Countries



24
Commercial
Networks

18
Countries

USA = 140 million LTE subscriptions / 40% of global total

LTE IN CENTRAL AND SOUTH AMERICA



México

Movistar	1700/2100 AWS
Telcel	1700/2100 AWS



Colombia

Avantel	2100 MHz
Claro	2500/2690 MHz
Movistar	1700/2100 AWS
Tigo/UNE	1700/2100 AWS 2500/2690 MHz



Bolivia

Entel	700 MHz
Tigo	700 MHz



Brazil

Claro	2500/2690 MHz
Nextel	1800 MHz
Oi	2500/2690 MHz
ON*	2500/2690 MHz
Sky Telecom*	2500/2690 MHz
TIM	2500/2690 MHz
VIVO	2500/2690 MHz



Chile

Claro	2500/2690 MHz
Entel	2500/2690 MHz
Movistar	2500/2690 MHz



Costa Rica

ICE/Kolbi	2600 MHz
Claro	1800 MHz
Movistar	1800 MHz



Ecuador

CNT Mobile	1700/2100 AWS
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Guatemala

Movistar	1900 MHz
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Paraguay

Personal	1900 MHz
VOX	1700/2100 AWS



Peru

Movistar	1700/2100
Claro	1900



Uruguay

Antel	1700/2100 AWS
Claro	1700/2100 AWS



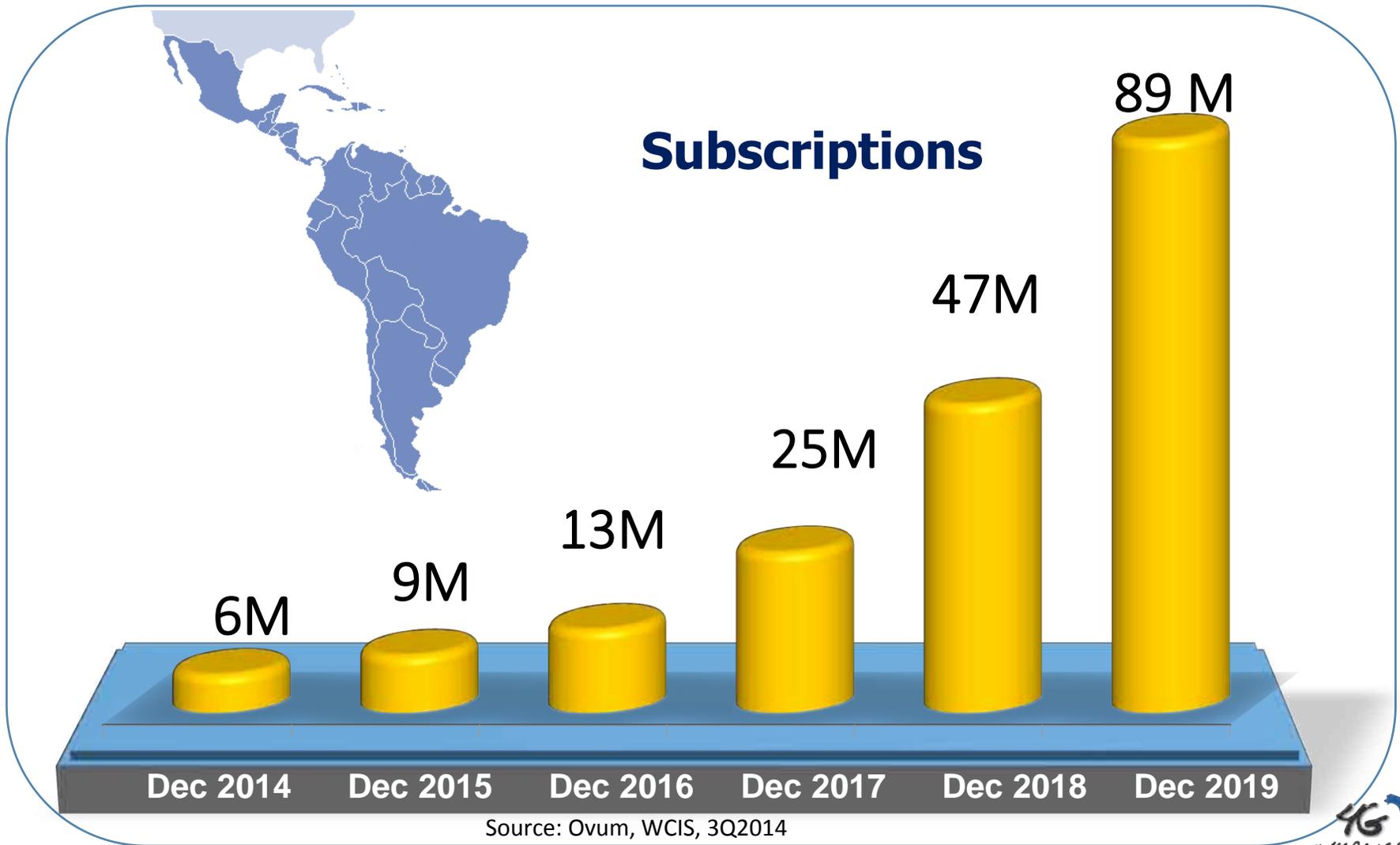
Venezuela

Movistar	1900 MHz
Digitel	1800 MHz

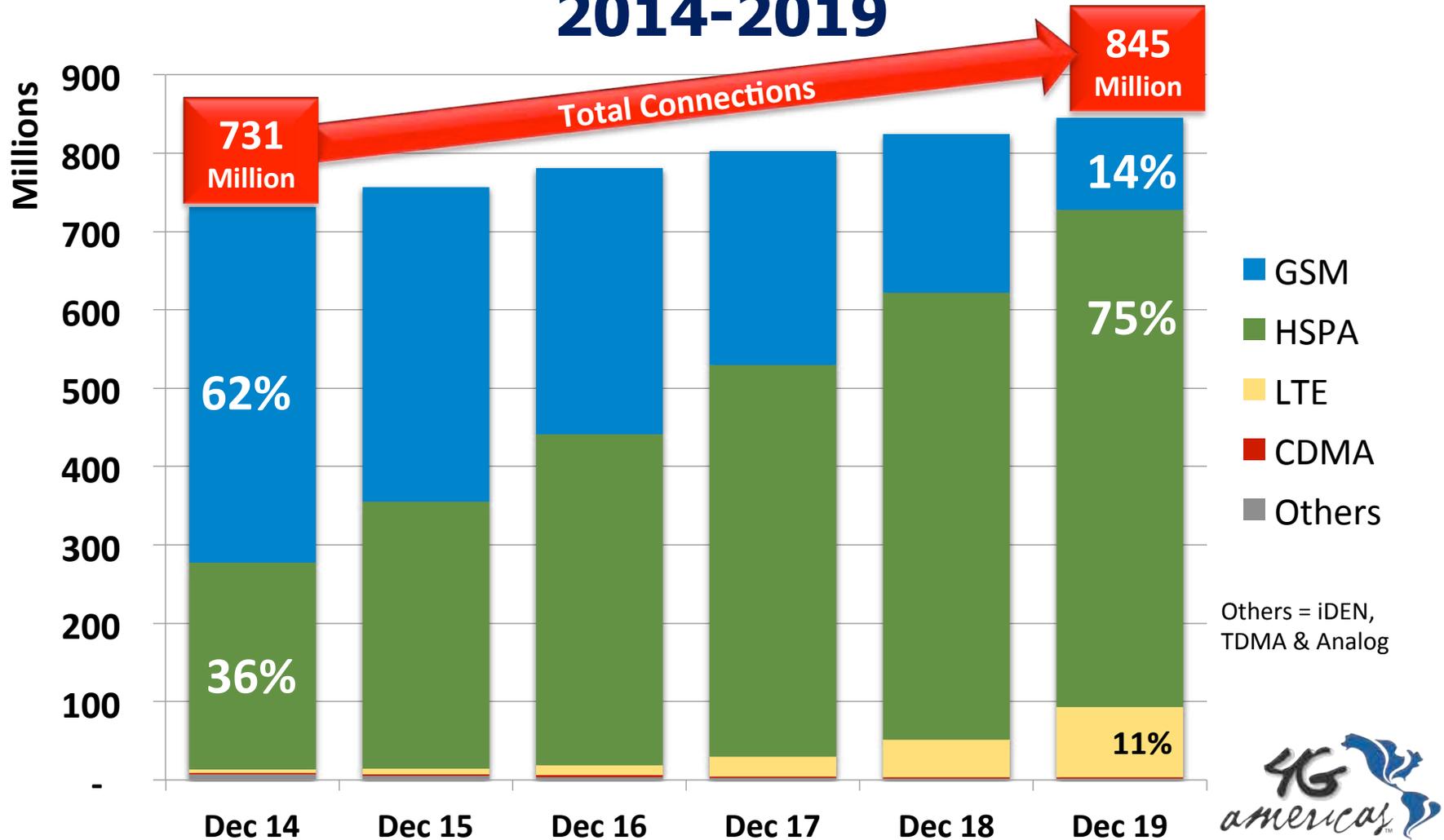


*Indicates TDD networks (remainder FDD)

FORECASTED LTE SUBSCRIBER GROWTH IN LATIN AMERICA



LATIN AMERICA & CARIBBEAN MOBILE TECHNOLOGY FORECAST 2014-2019



Source: Ovum, WCIS+, Sept 2014 Forecast Estimates

OVER-THE-TOP (OTT*) MOBILE MESSAGING USER PENETRATION IN LATIN AMERICA



% of Mobile Users

	2013	2014
Mexico		75%
Argentina		64%
Brazil	30%	60%
Chile	54%	-
Colombia	37%	-
Latin America	40%	67%

*messaging apps that circumvent traditional SMS services

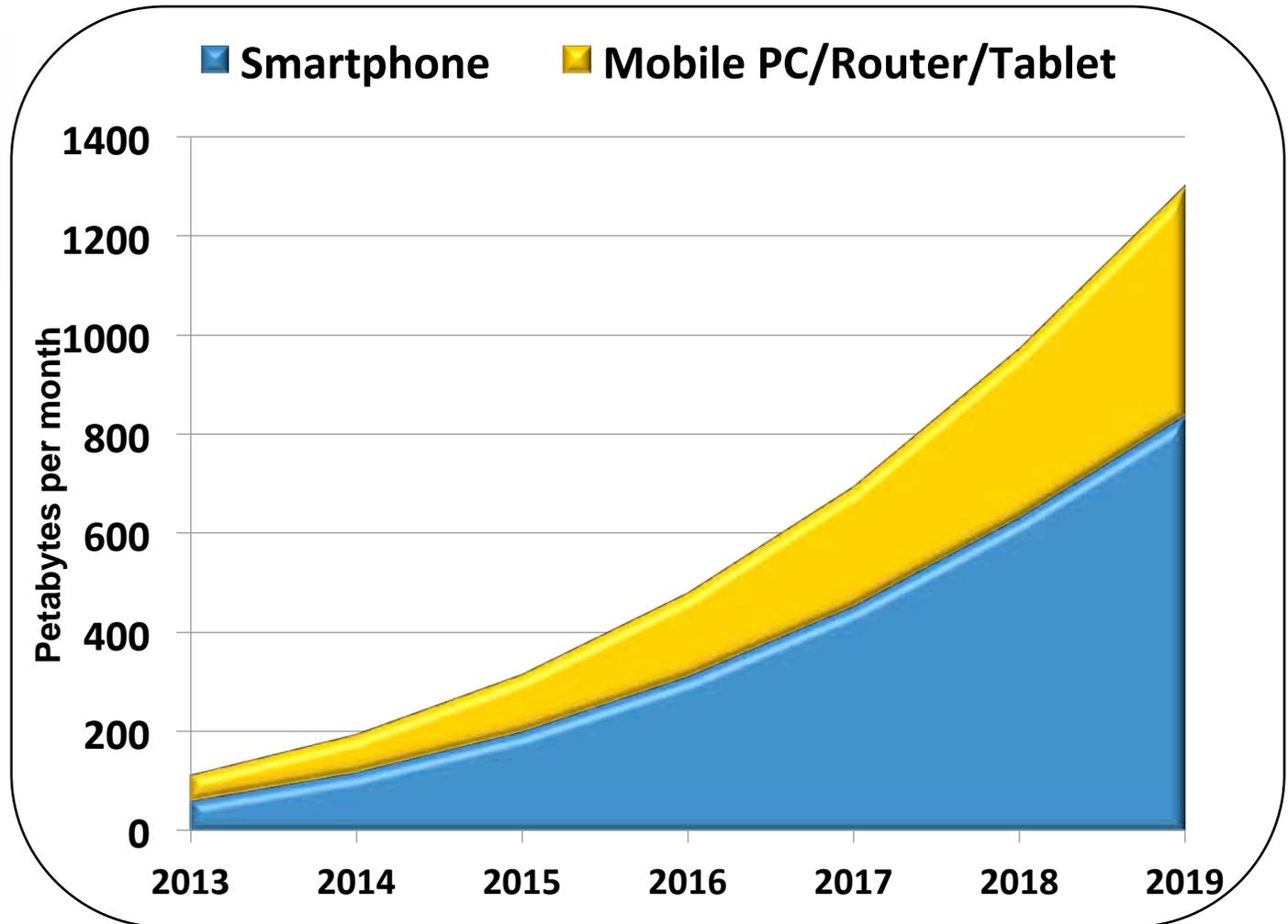
Source: Ericsson, "Market Outlook & Consumer Trends" Aug 26, 2014

9X INCREASE IN MOBILE DATA USAGE IN LATIN AMERICA 2013-2019

Mobile Data Growth by Device Type



From **53 PB** to **463 PB** monthly, the majority from smartphones



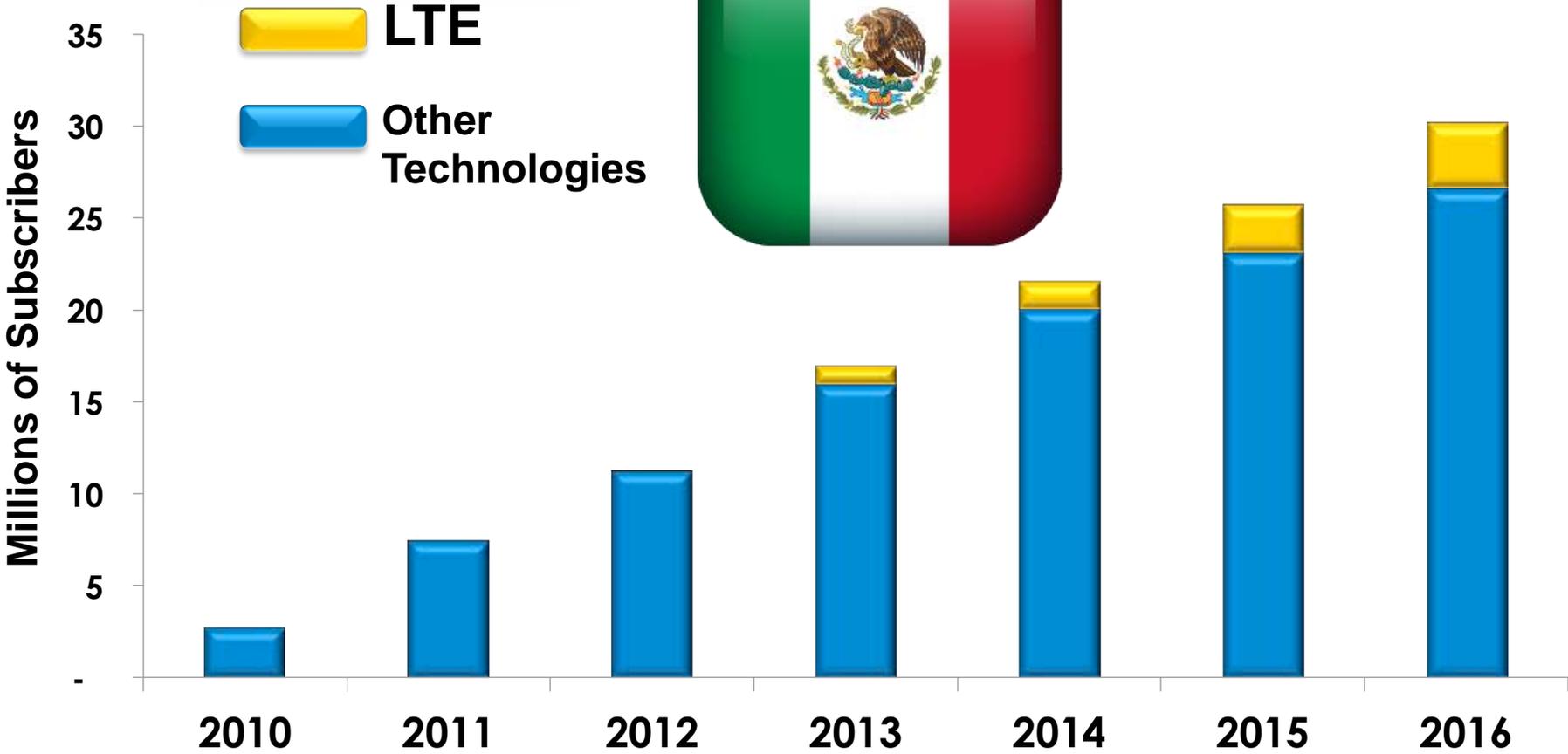
Source: Ericsson Mobility Report, August 2014

MEXICO MOBILE BROADBAND MARKET

- At the present time, there are not enough incentives that would allow us to talk about mobile broadband mass adoption. Even though its growth in Mexico has been constant, it still is not an accessible service to the vast majority of the population. Even though prepaid amounts to 85% of all mobile lines, mobile broadband only 5% of these customers contract broadband prepaid services vs. 70% of mobile broadband penetration amount postpaid customers.

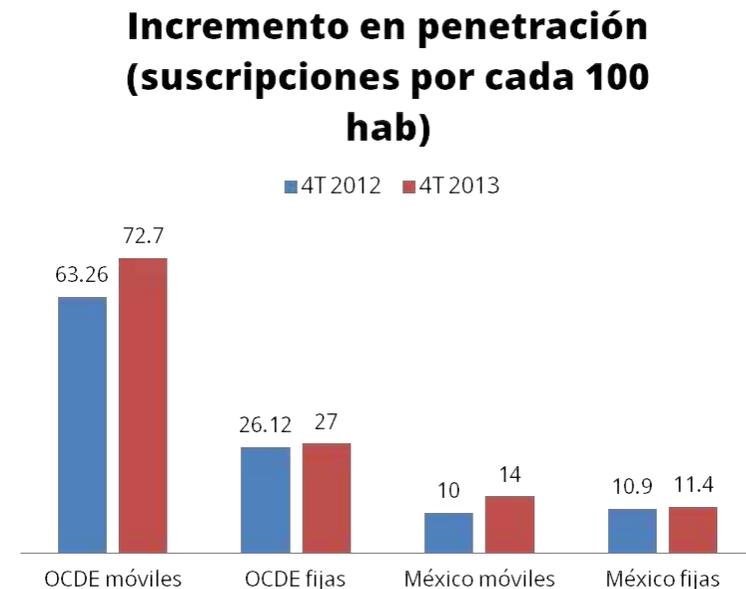
MOBILE BROADBAND GROWTH FORECAST

México



MEXICO MOBILE BROADBAND MARKET

- During 2014, Mexico would need 18.4 million net adds for fixed broadband services and 70.3 million for mobile broadband services to reach the OECD's average rates for these services.



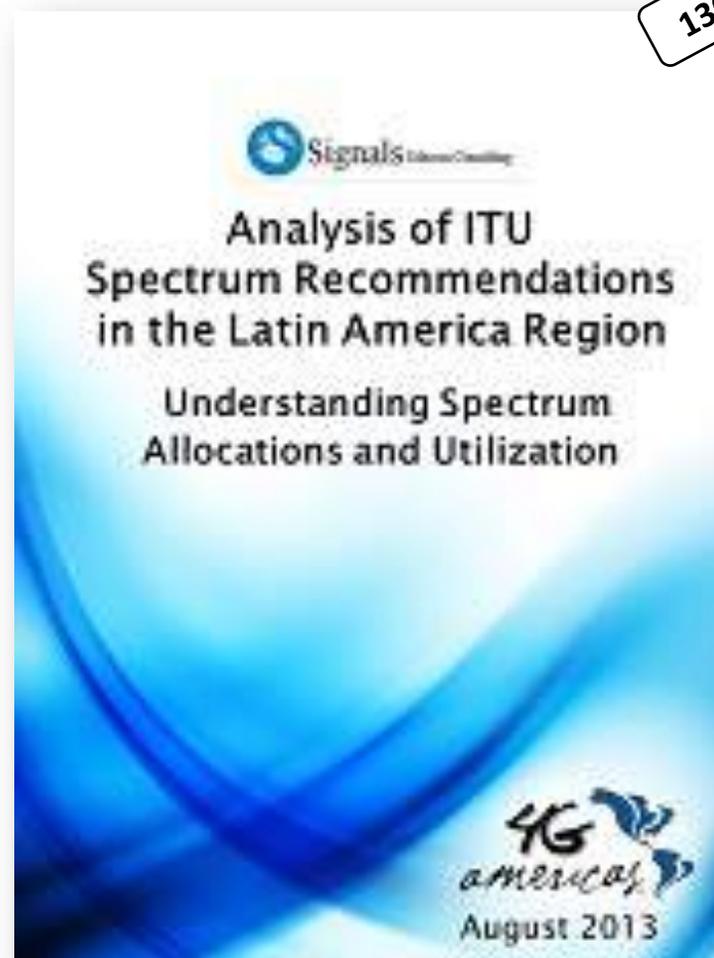


Spectrum & Regulatory Issues

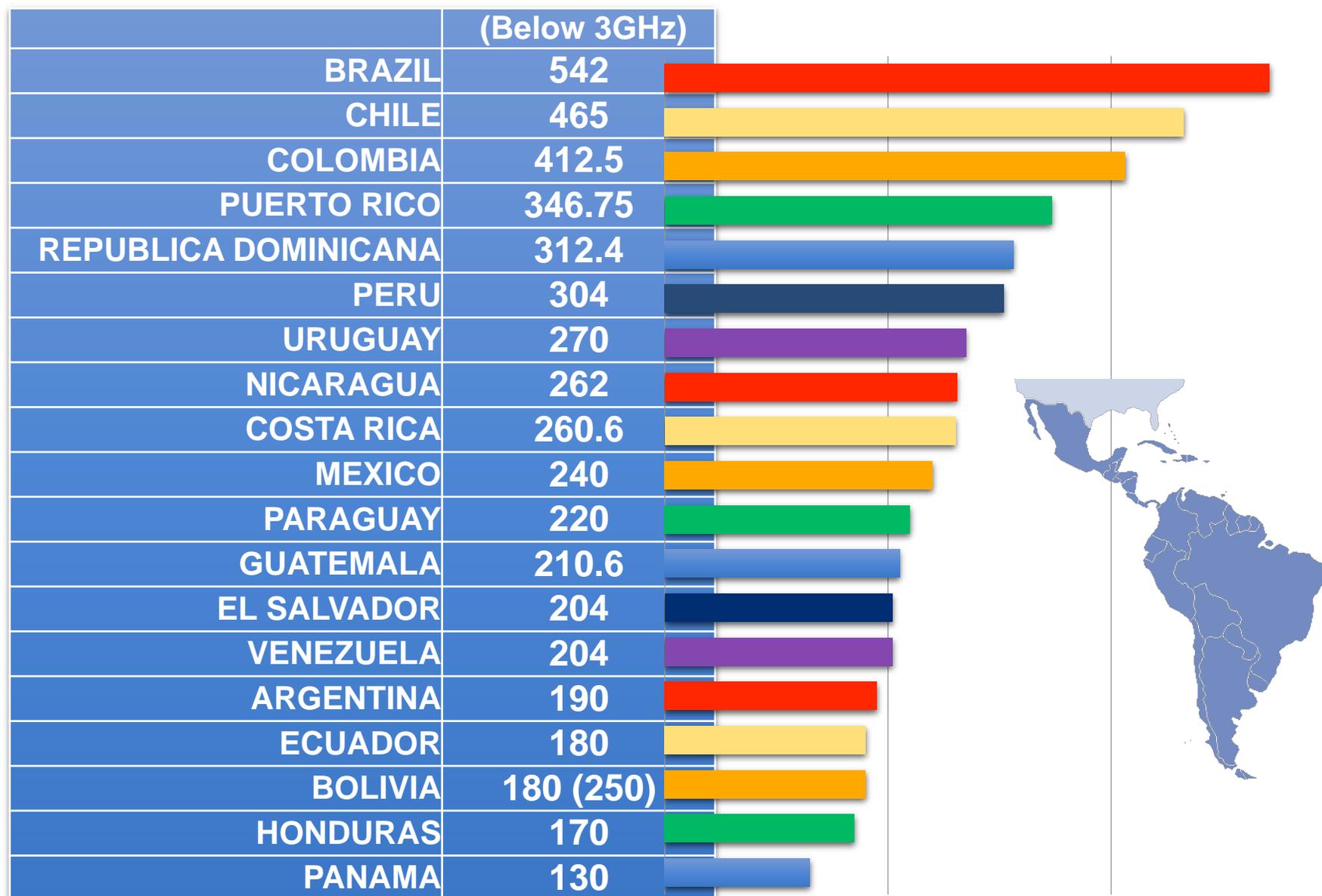


LATIN AMERICA SPECTRUM STATUS

- **Reference point** - requirement for 1300 MHz by 2015 indicated by the ITU (ITU-R M.2078)
- **Summary of Regional Situation:** 3 markets are between 30%-40% of this goal, 6 are between 20%-30%, and the remainder are between 10%-20%.
- **Source:** 4G Americas, *Analysis of ITU Spectrum Recommendations in the Latin American Region* (2013).



AUCTIONED MOBILE WIRELESS SPECTRUM



ALLOCATED SPECTRUM BANDS (MHz)

	700	850	900	1700	1800	1900	1700/2100	2100	1900/2100	2300	2500
Argentina	√	√	-	-	-	√	√	-	-	-	-
Bolivia	√	√	-	-	-	√	√	-	-	-	-
Brasil	√	√	√	-	√	√	-	-	√	-	√
Chile	√	√	-	-	-	√	√	-	-	-	√
Colombia	-	√	-	-	-	√	√	-	-	-	√
Costa Rica	-	√	-	-	√	-	-	√	-	-	√
Dom. Republic	-	√	√	√	√	√	√	-	-	-	-
Ecuador	√	√	-	-	-	√	√	-	-	-	-
El Salvador	-	√	√	-	-	√	-	-	-	-	-
Guatemala	-	√	√	-	-	√	-	-	-	-	-
Honduras	-	√	-	-	-	√	√	-	-	-	-
Mexico	-	√	-	-	-	√	√	-	-	-	-
Nicaragua	√	√	-	-	√	√	-	-	-	-	-
Panama*	√	√	-	-	-	√	-	-	-	-	-
Paraguay	-	√	-	-	-	√	√	-	-	-	-
Peru	-	√	√	-	-	√	√	-	-	-	-
Puerto Rico	√	√	√	-	-	√	√	-	-	√	-
Uruguay	-	√	√	-	√	√	√	-	√	-	-
Venezuela	-	√	√	-	√	√	-	-	-	-	-

Source: Signals Telecom Consulting

LTE DEVICES PER BAND

LTE FDD

Frequency	Band	Devices
1800 MHz	Band 3	769
2600 MHz	Band 7	740
2100 MHz	Band 1	544
800 MHz	Band 20	467
800/1800/2600	Tri-band	413
AWS	Band 4	405
700 MHz	Bands 12, 17	379
850 MHz	Band 5	345
900 MHz	Band 8	335
700 MHz	Band 13	308
1900 MHz	Band 2	220
1900 MHz	Band 25	107
APT700	Band 28	33

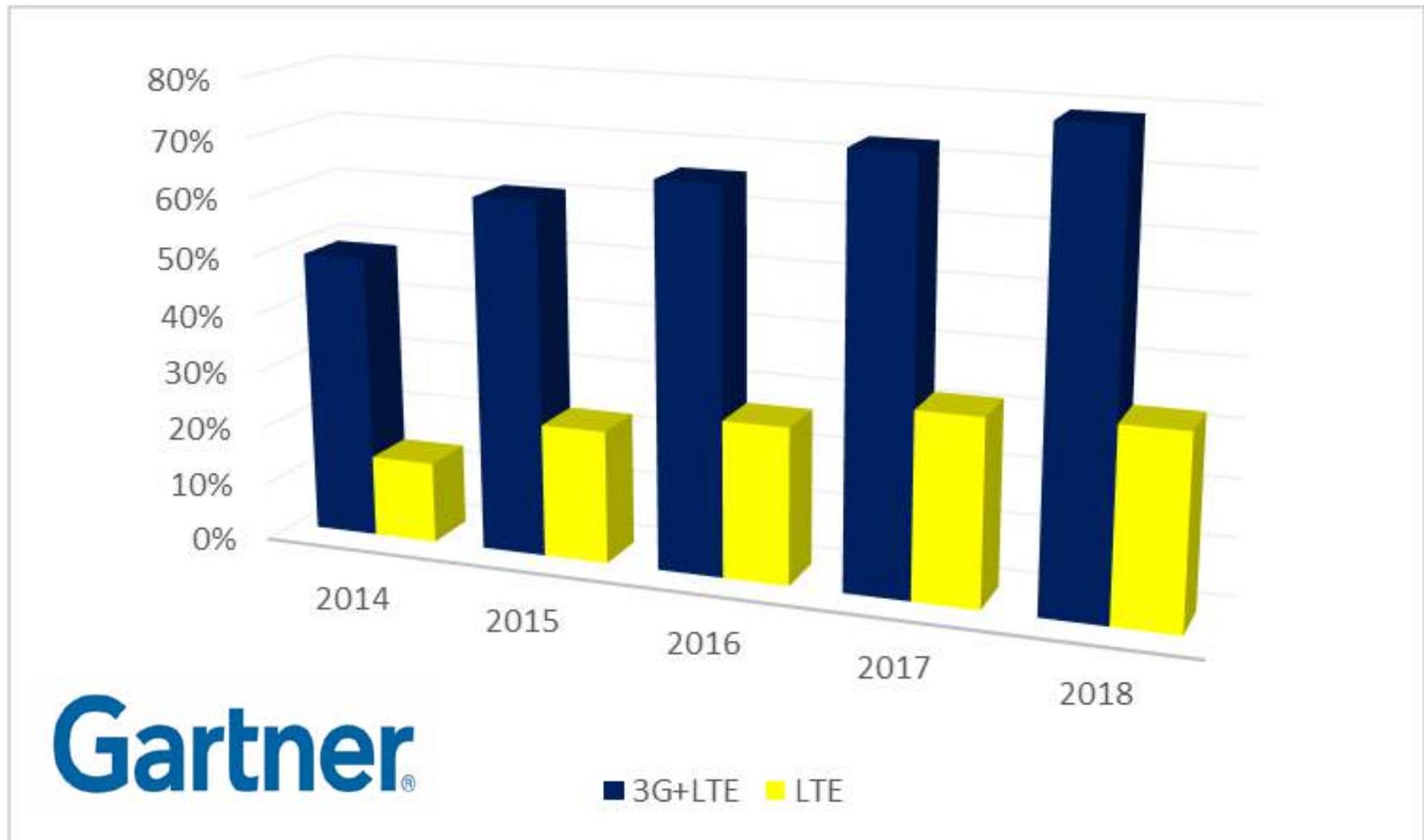


LTE TDD

Frequency	Band	Devices
2300 MHz	Band 40	361
2600 MHz	Band 38	360
1900 MHz	Band 39	203
2600 MHz	Band 41	183
3500 MHz	Band 42,43	24



Latin America Handset Sales



Source: Gartner Group

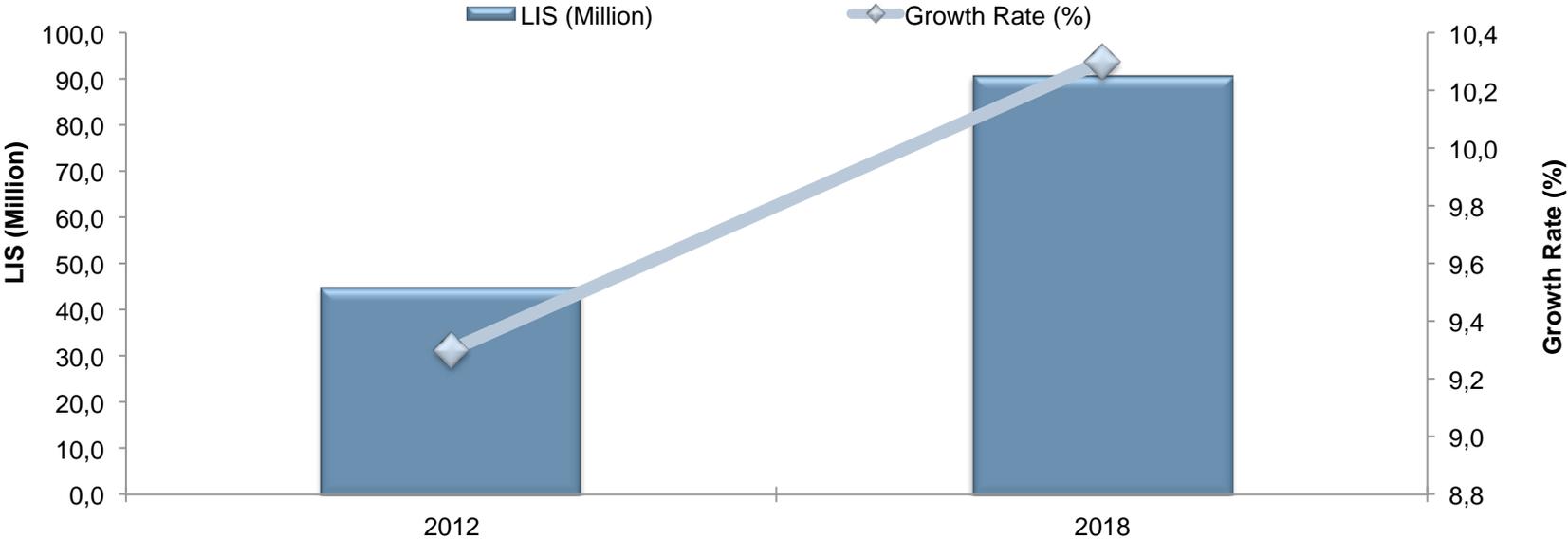


Broadband Market Statistics

Growth and Forecasts

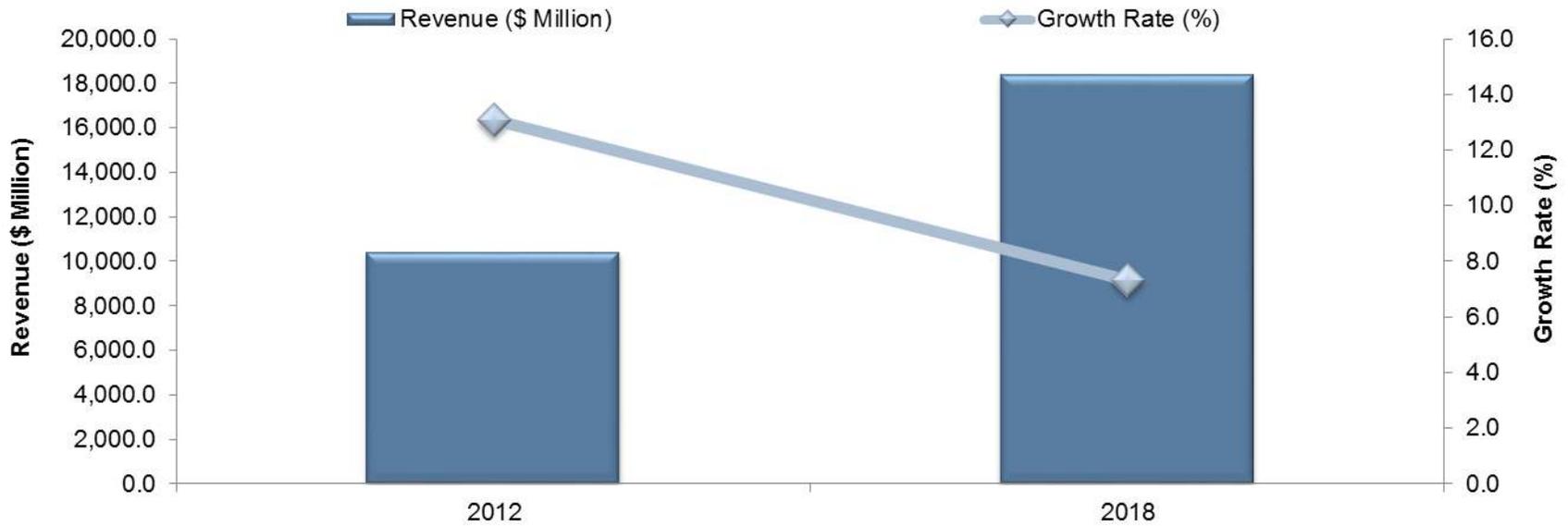
CALA BROADBAND MARKET

Year	LIS (Million)
2012	45.0
2018	90.8
CAGR (2012–2018)	12.4



CALA BROADBAND MARKET

Year	Revenue (\$ Million)
2012	10,409.7
2018	18,401.4
CAGR (2012–2018)	10.0



CALA BROADBAND MARKET

Monthly Kb Price in Latin America & Caribbean: Selected Operators, 1Q14

Market	Operator	Connection Type	Downlink Kbps	Monthly Kb Price US\$
Chile	VTR GlobalCom	Cable Modem	120,000	0.0011
Brazil	Telefonica	DSL	200,000	0.0003
Chile	Movistar	DSL	150,000	0.0005
Barbados	LIME	DSL	160,000	0.0006
Brazil	GVT	DSL	150,000	0.0009
Jamaica	Flow	Cable Modem	100,000	0.0010
Trinidad & Tobago	Flow	Cable Modem	100,000	0.0010
Brazil	Sercomtel	DSL	200,000	0.0011
Mexico	Cablevisión	Cable Modem	100,000	0.0011
Chile	Manquehue	DSL	100,000	0.0013
Bahamas	Cable Bahamas	Cable Modem	50,000	0.0014
Argentina	Fibertel	Cable Modem	30,000	0.0015
Jamaica	LIME	DSL	20,000	0.0016
Curaçao	UTS	DSL	50,000	0.0016
Argentina	Telecom (Arnet)	DSL	15,000	0.0017
Brazil	Net	Cable Modem	120,000	0.0018
Puerto Rico	Liberty	Cable Modem	40,000	0.0022
Puerto Rico	PRT (Claro)	DSL	50,000	0.0026
Ecuador	CNT	DSL	25,000	0.0028
Panama	Cable & Wireless	DSL	25,000	0.0032
Colombia	UNE	DSL	20,000	0.0044
El Salvador	Claro	DSL	10,000	0.0058
Grenada	LIME	DSL	8,000	0.0070
Nicaragua	Claro	DSL	10,000	0.0070
Aruba	Setar	Cable Modem	70,000	0.0072
Trinidad & Tobago	Blink (TSST)	DSL	10,000	0.0080
Venezuela	Inter	Cable Modem	10,000	0.0088
Colombia	ETB	DSL	10,000	0.0093
Costa Rica	ICE	DSL	10,000	0.0099
Aruba	Setar	DSL	16,000	0.0105
Dominican Republic	Claro	DSL	10,000	0.0128
Dominica	LIME	DSL	8,000	0.0138
St. Kitts & Nevis	LIME	DSL	8,000	0.0144
St. Lucia	LIME	DSL	8,000	0.0144
Anguilla	LIME	DSL	8,000	0.0162
Guyana	GT&T	DSL	1,500	0.1000

1Q14*

Anguilla	\$ 74.40
Antigua & Barbuda	\$139.50
Aruba	\$ 98.31
Bahamas	\$ 60.24
Barbados	\$148.73
Belize	\$102.72
Bermuda	\$ 52.48
British Virgin Islands	\$ 75.00
Cayman Islands	\$ 73.44
Dominica	\$ 55.80
Dominican Rep.	\$ 11.70
Grenada	\$ 45.57
Jamaica	\$ 9.29
Puerto Rico	\$ 49.50
Saba	\$150.00
St. Kitts & Nevis	\$ 55.80
St. Lucia	\$ 64.17
St. Vincent & Grenadines	\$ 64.17
Sint Marteen	\$ 21.00
Trinidad & Tobago	\$ 39.92
US Virgin Islands	\$199.00
Regional Average	\$ 72.31

Source: Signals Telecom Consulting

CALA BROADBAND MARKET

Global Rank	Country/Region	Q2 '14 Avg. Mbps	QoQ Change	YoY Change
14	United States	11.4	8.9%	39%
19	Canada	10.4	6.8%	27%
51	Uruguay	5.6	31%	197%
65	Chile	4.4	35%	51%
67	Mexico	4.4	9.4%	23%
70	Argentina	4.2	34%	111%
76	Ecuador	3.6	9.2%	23%
82	Colombia	3.4	12%	17%
85	Peru	3.1	13%	51%
89	Brazil	2.9	11%	19%
93	Panama	2.8	6.6%	6.0%
107	Costa Rica	2.3	14%	8.7%
128	Venezuela	1.4	9.1%	10%
132	Paraguay	1.3	9.7%	3.3%
137	Bolivia	1.1	16%	20%

Figure 22: Average Connection Speed by Americas Country

Global Rank	Country/Region	Q2 '14 Peak Mbps	QoQ Change	YoY Change
13	Uruguay	49.7	9.7%	225%
17	United States	45.3	12%	30%
20	Canada	43.9	11%	28%
61	Chile	28.5	36%	48%
74	Argentina	23.5	25%	63%
78	Mexico	22.3	16%	18%
83	Ecuador	21.8	15%	11%
86	Colombia	21.0	25%	25%
88	Peru	20.2	18%	27%
89	Brazil	20.2	13%	8.1%
111	Panama	14.3	14%	5.9%
127	Costa Rica	11.4	13%	-7.8%
132	Paraguay	9.6	6.6%	-0.9%
133	Venezuela	9.4	19%	11%
134	Bolivia	8.9	6.8%	1.8%

Figure 23: Average Peak Connection Speed by Americas Country



Puerto Rico Avg. 6.89 Mbps / Peak 37.71 Mbps

USA BROADBAND MARKET

	State	Q2 '14 Avg. Mbps	QoQ Change	YoY Change
1	Delaware	16.2	24%	50%
2	Virginia	14.6	6.0%	33%
3	Washington	14.2	13%	40%
4	District of Columbia	13.9	8.3%	23%
5	Massachusetts	13.8	5.8%	24%
6	Connecticut	13.7	17%	37%
7	Rhode Island	12.9	-0.4%	30%
8	New Hampshire	12.8	4.2%	20%
9	Utah	12.8	5.8%	24%
10	Oregon	12.8	9.4%	42%

Figure 17: Average Connection Speed by State

	State	Q2 '14 Peak Mbps	QoQ Change	YoY Change
1	Delaware	62.5	21%	49%
2	Virginia	59.4	10%	37%
3	District of Columbia	59.4	15%	21%
4	Massachusetts	58.5	12%	27%
5	New Jersey	57.5	17%	39%
6	Connecticut	56.9	21%	42%
7	Washington	56.6	13%	26%
8	Rhode Island	56.2	5.7%	38%
9	Maryland	55.5	15%	88%
10	New Hampshire	52.9	13%	21%

Figure 18: Average Peak Connection Speed by State

Puerto Rico Avg. 6.89 Mbps / Peak 37.71 Mbps



CALA BROADBAND MARKET

Global Rank	Country/Region	% Above 10 Mbps	QoQ Change	YoY Change
14	United States	39%	7.6%	72%
17	Canada	35%	12%	77%
43	Uruguay	10%	131%	14917%
48	Argentina	5.9%	195%	1569%
49	Chile	5.8%	429%	816%
53	Mexico	4.0%	77%	288%
58	Brazil	1.8%	92%	149%
61	Colombia	1.1%	155%	409%
-	Ecuador	2.8%	98%	217%
-	Panama	0.9%	88%	261%
-	Peru	0.7%	162%	1598%
-	Costa Rica	0.6%	30%	65%
-	Venezuela	0.2%	121%	101%
-	Bolivia	0.2%	122%	196%
-	Paraguay	<0.1%	122%	567%

Figure 24: High Broadband (>10 Mbps) Connectivity by Americas Country

Global Rank	Country/Region	% Above 4 Mbps	QoQ Change	YoY Change
17	Canada	84%	1.3%	4.6%
35	United States	72%	-1.6%	6.2%
55	Uruguay	53%	55%	3455%
64	Chile	42%	72%	183%
67	Mexico	38%	15%	53%
69	Argentina	36%	42%	340%
74	Colombia	26%	50%	89%
75	Brazil	26%	22%	71%
76	Ecuador	25%	11%	45%
80	Peru	18%	130%	865%
82	Panama	15%	23%	37%
87	Costa Rica	9.2%	132%	214%
93	Venezuela	1.6%	60%	1.9%
-	Bolivia	13%	90%	93%
-	Paraguay	1.0%	96%	356%

Figure 25: Broadband (>4 Mbps) Connectivity by Americas Country



USA BROADBAND MARKET

	State	% Above 10 Mbps	QoQ Change	YoY Change
1	Delaware	65%	33%	81%
2	Rhode Island	55%	0.6%	51%
3	Massachusetts	55%	1.1%	31%
4	Connecticut	54%	16%	68%
5	New Jersey	53%	11%	57%
6	New Hampshire	53%	1.2%	32%
7	Virginia	49%	9.5%	59%
8	New York	47%	7.4%	47%
9	Washington	47%	4.8%	51%
10	Michigan	46%	2.1%	84%

Figure 19: High Broadband (>10 Mbps) Connectivity, U.S. States

	State	% Above 4 Mbps	QoQ Change	YoY Change
1	Delaware	95%	2.8%	2.7%
2	Connecticut	92%	8.1%	13%
3	Rhode Island	92%	-0.6%	3.1%
4	Hawaii	87%	1.0%	22%
5	New Hampshire	84%	-0.5%	1.3%
6	New Jersey	83%	2.8%	10%
7	Massachusetts	83%	-0.4%	0.1%
8	South Dakota	82%	-0.2%	6.7%
9	Virginia	81%	0.7%	7.5%
10	New York	81%	-1.2%	-2.1%

Figure 20: Broadband (>4 Mbps) Connectivity, U.S. States



CONCLUSIONS



- **The economic impact of broadband** in the region is tremendous and operators are one of the largest investors
- **Cooperation** among operators and regulators is essential to the future of wireless in the region
- Regulations that **foster the growth of mobile broadband** in the region are vital to closing the Digital Divide
- Mobile Broadband is vital to **enhancing the connected society** in Latin America
- **More spectrum is needed** in the region to foster mobile broadband growth.
- Policies that support societies' needs in **education and health** are essential

REFERENCES

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THANK YOU!

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