5G Market Drivers & Use Cases

INTERNET OF THINGS

CONTEXT AWARE SERVICES

PUBLIC SAFETY

EXTREME VIDEO AND GAMING APPLICATIONS

EXPLOSIVE DATA DENSITY USAGE

PSTN SUNSET

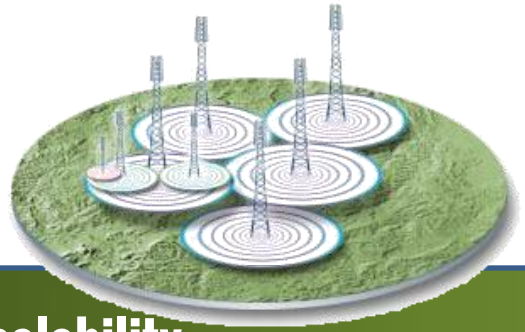
5G Requirements

5G

USER DRIVEN REQUIREMENTS

- Battery Life
- Per-user Data Rate and Latency
- Robustness and Resiliency
- Mobility
- Seamless User Experience
- Context Aware Network

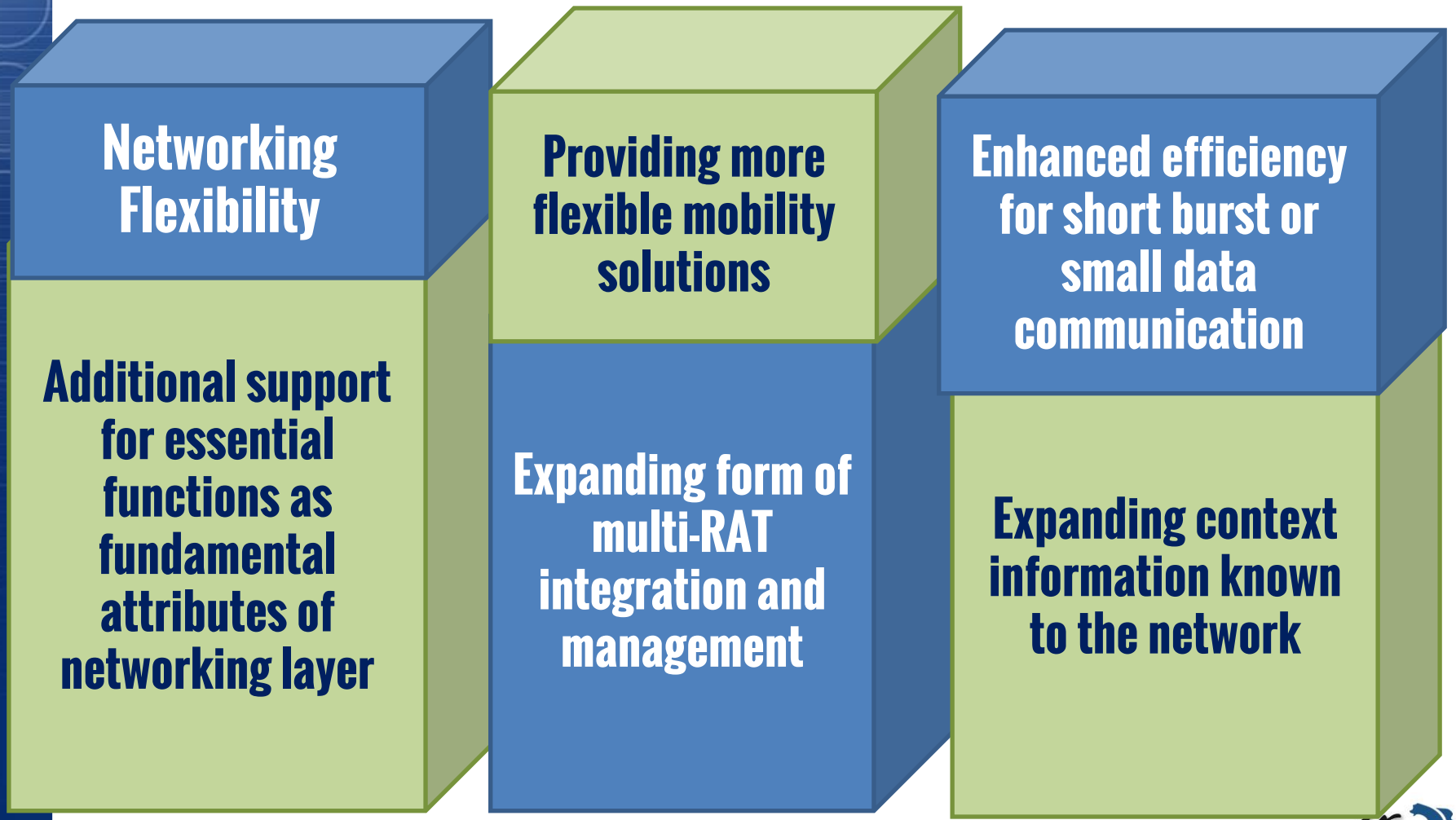
NETWORK DRIVEN REQUIREMENTS



- Scalability
- Network Capacity
- Cost Efficiency
- Automated System Management & Configuration
- Network Flexibility
- Energy Efficiency
- Coverage
- Security
- Diverse Spectrum Operation
- Unified System Framework

Building on 4G for 5G

5G WILL ENHANCE SOME OF THE BUILDING BLOCKS DEFINED IN 4G



4G Americas Recommended Potential 5G Technologies

- Massive MIMO
- RAN Transmission - Centimeter and Millimeter Waves
- New Waveforms
- Shared Spectrum Access
- Advanced Inter-Node Coordination
- Simultaneous Transmission Reception
- Multi-RAT Integration & Management
- D2D Communications
- Efficient Small Data Transmission
- Wireless Backhaul / Access Integration
- Flexible Networks
- Flexible Mobility
- Context Aware Networking
- Information Centric Networking
- Moving Networks

4G Americas Recommendations for 5G

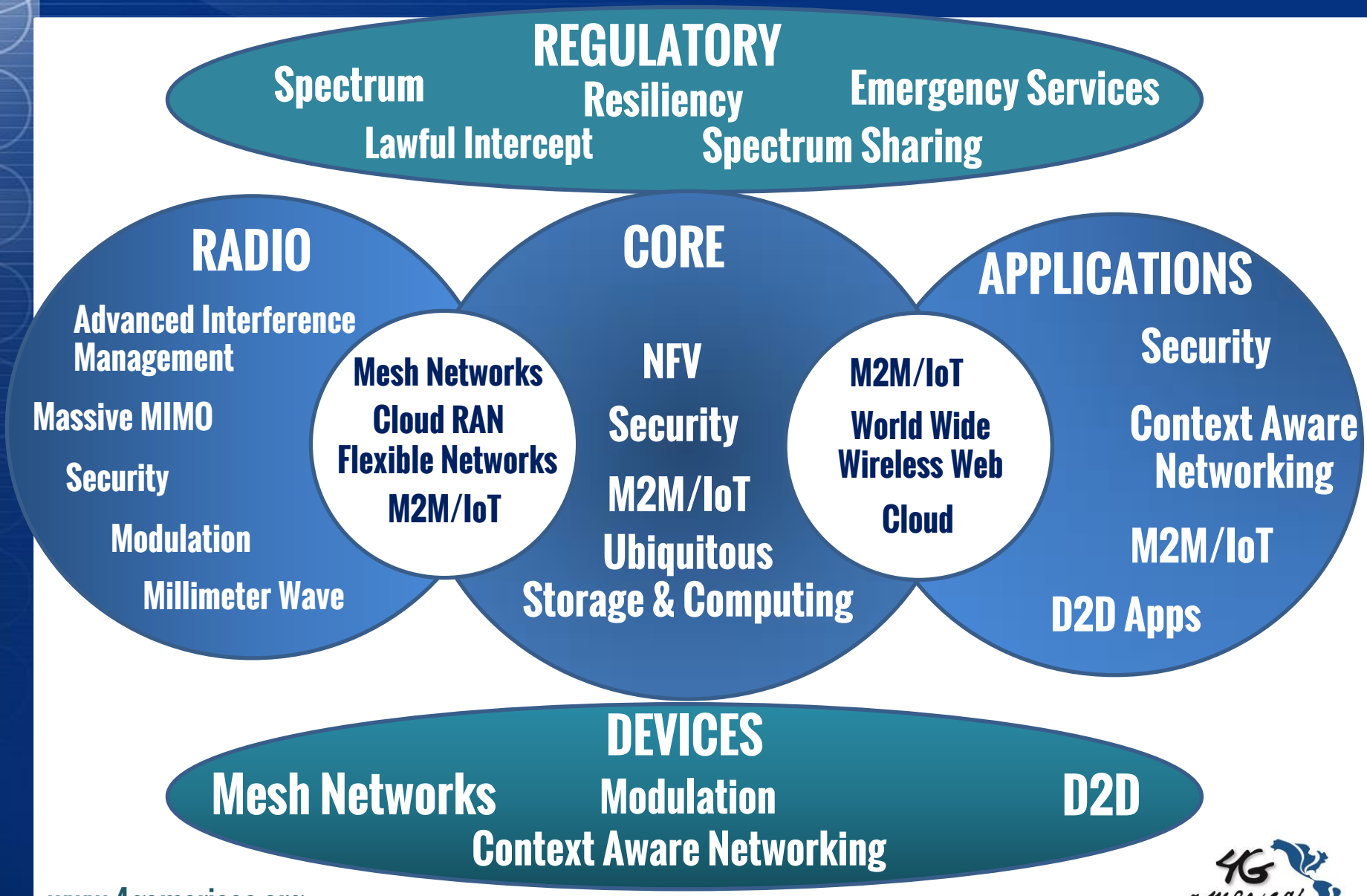
The ITU has defined requirements and approved standards for IMT-2000 (“3G”) and IMT-Advanced (“4G”) and will do so for 5G.

The current discussion by leading global bodies will provide consensus for what the mobile industry needs by 2020 and beyond.

4G LTE has a robust innovation roadmap through 2020 with enhancements in Carrier Aggregation, small cells and device to device signaling, among other 3GPP release enhancements.

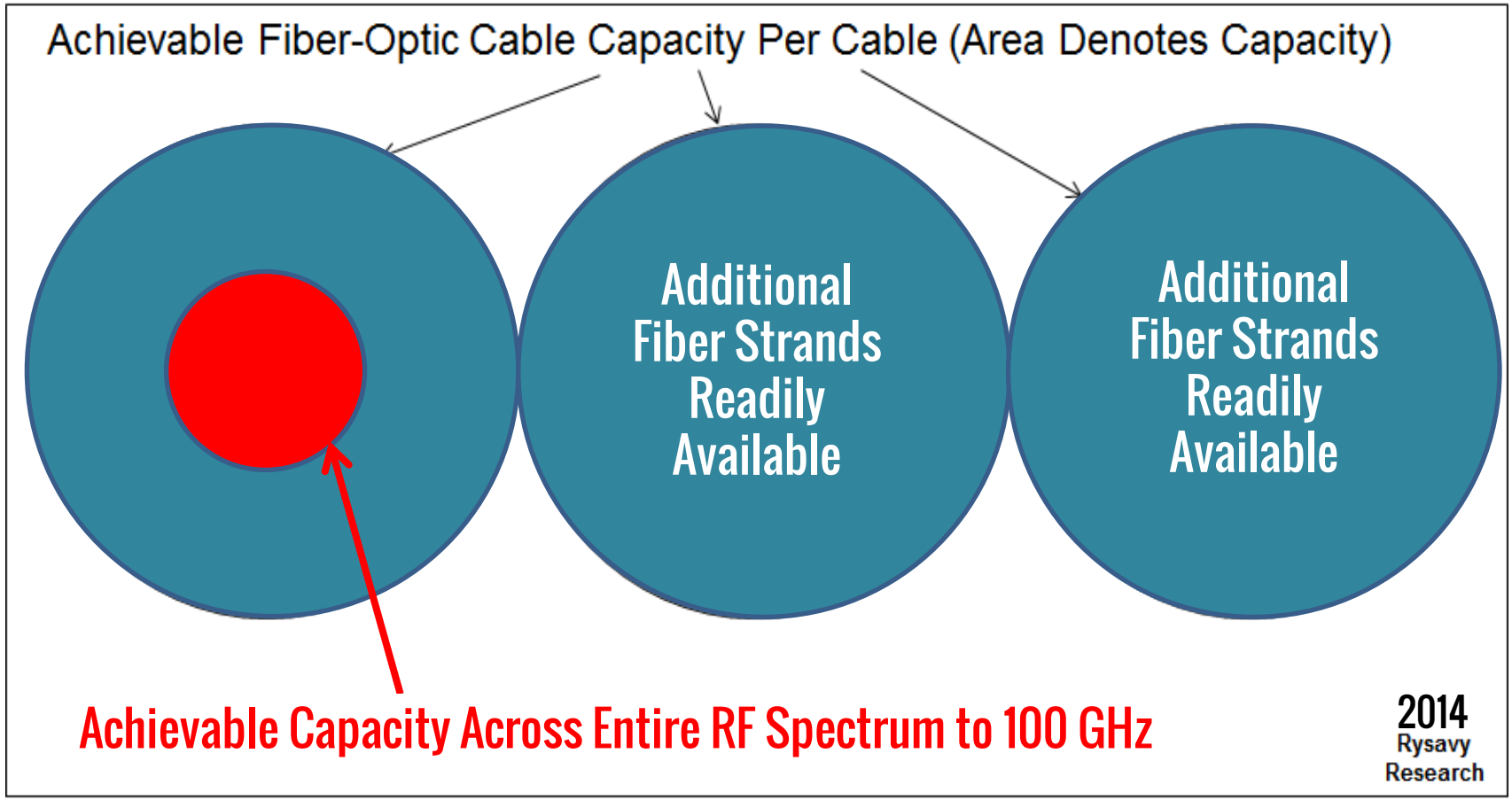
Associations such as 4G Americas are working on recommendations and requirements for 5G technology solutions to continue innovation and success in the industry.

End-to-End 5G Ecosystem

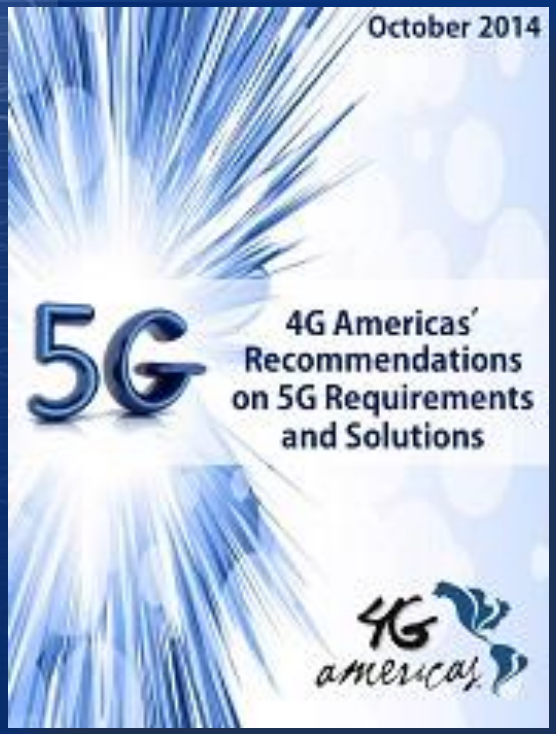


Radio Spectrum for the Connected Universe

Wireless vs Fixed Capacity



4G Americas Recommendations on 5G Requirements and Solutions



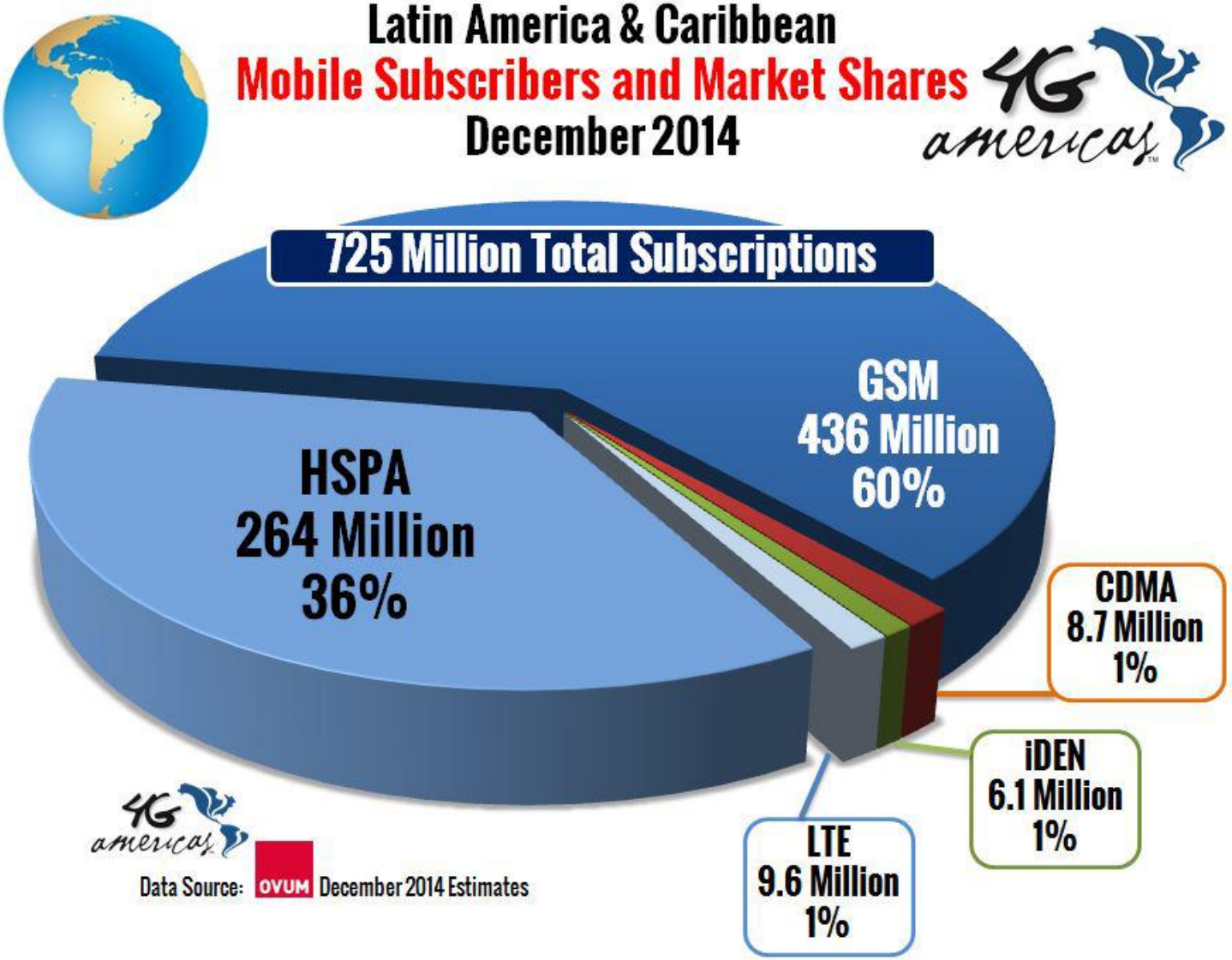
WHITE PAPER

- Addresses key use cases, challenges and requirements for future wireless access
- Pinpoints key new technologies and solutions that can be used to address those challenges

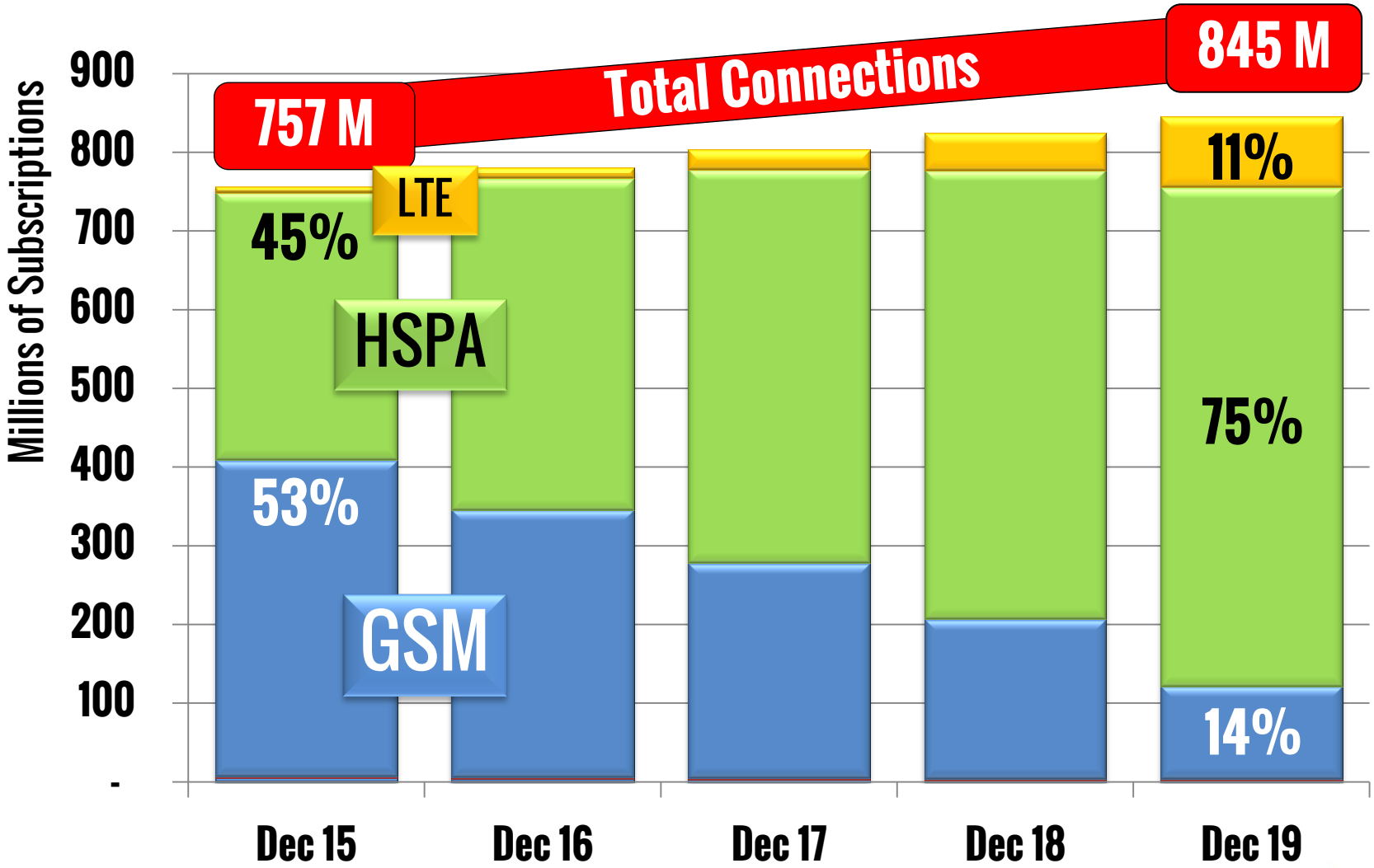
Available for free download at www.4gamericas.org

Latin America

Latin America Market Trends for 2015

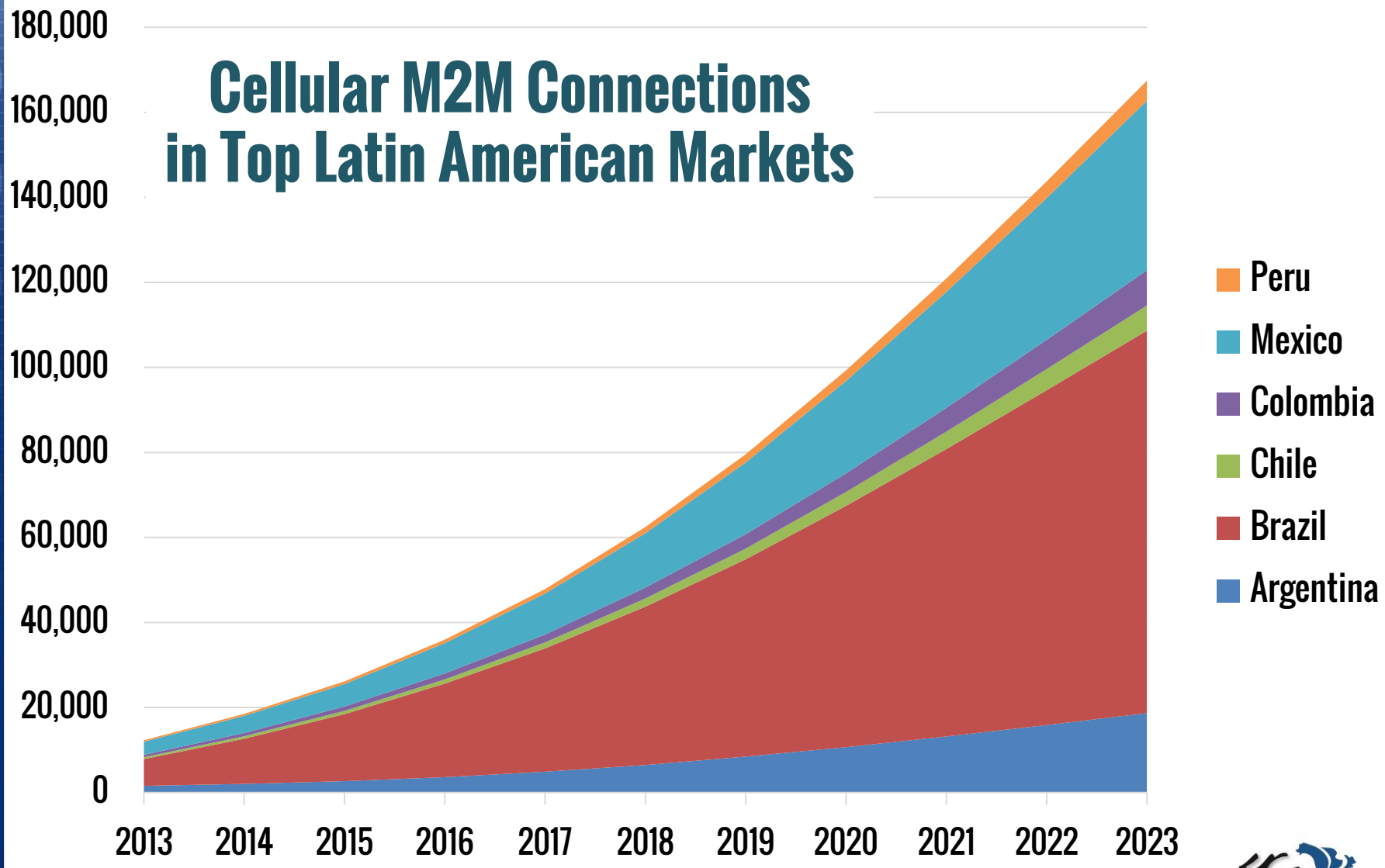


Latin American Mobile Technology Forecast 2015-2019



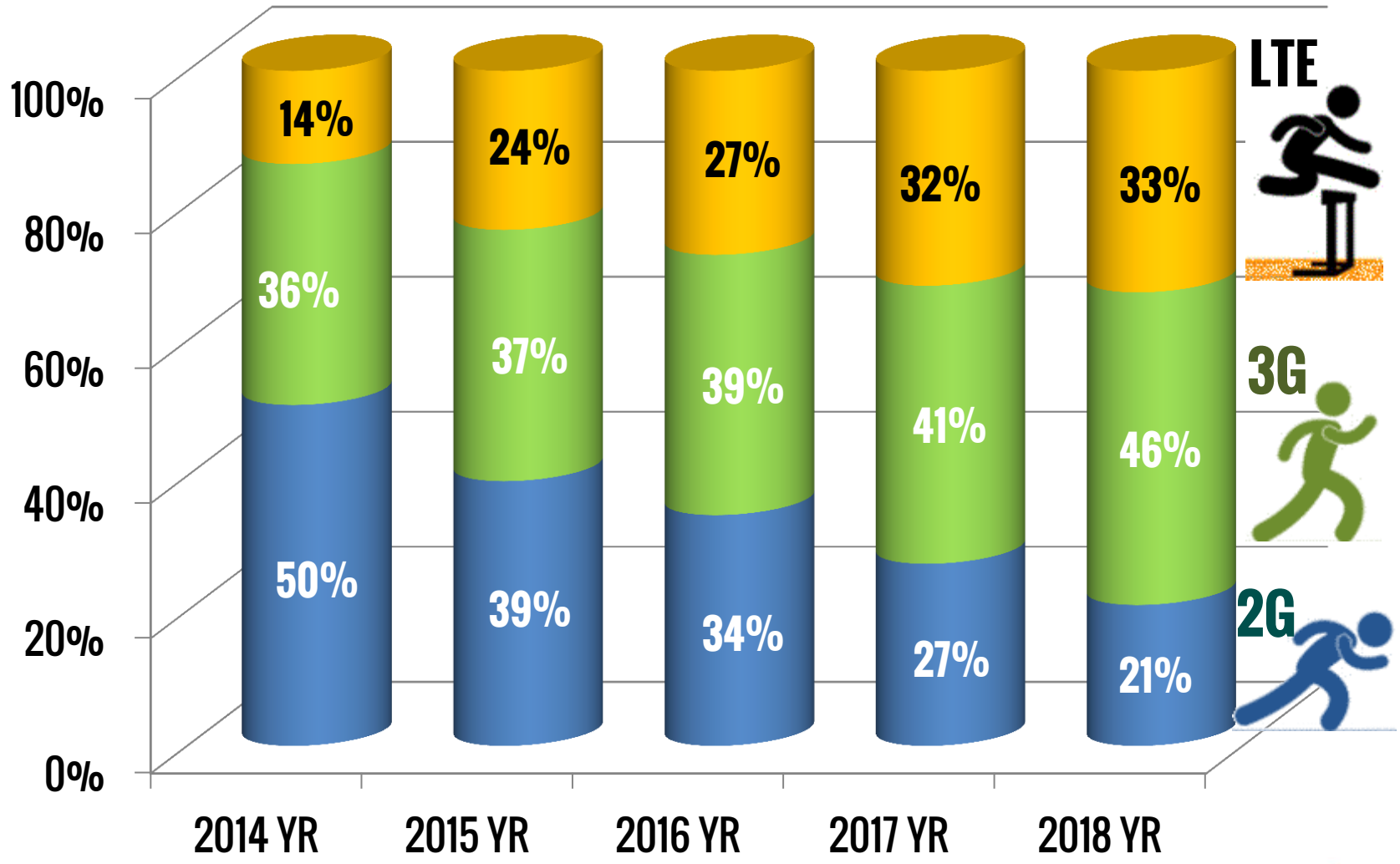
Data Source: OVUM December 2014 Estimates

Update on Mobile Broadband in the Region



Source: Machina Research, 2014

Smartphone Sale Forecast in Latin America



Source: Gartner

LTE Deployments and Impact in Latin America

Caribbean

12 LTE Commercial Networks
6 Countries

Latin America

45 LTE Commercial Networks
16 Countries

Year in Review in Latin America & Caribbean

2014

Rapid Growth of Commercial LTE Networks throughout the region

- 19 new launches → 44 commercial networks YE 2014
- Leaders in commercial LTE Deployments
  Brazil = 7 Puerto Rico = 5

Spectrum allocation pivotal for rapid LTE expansion

- Argentina, Brazil, Chile & Venezuela
  - Argentina, Brazil & Chile allocated **700 MHz licenses**

Mexico = Acceleration of LTE due to changes in competitive market landscape

LTE = viable alternative to fixed services in non-Spanish speaking Caribbean

What to Expect in the coming year!

700 MHz spectrum allocation gains momentum

Spectrum Allocation Processes in
Colombia, Costa Rica, Mexico, Panama, Puerto Rico, Trinidad-Tobago, Jamaica, Bahamas

At least ten new LTE launches in the region with Argentina and Venezuela taking the spotlight

LTE™

2015

LTE geographic coverage expansion will translate into greater technology adoption

Greater emphasis by governments on how to use mobile broadband to foster development in rural areas

Increased interest in IoT and 5G

4G americas

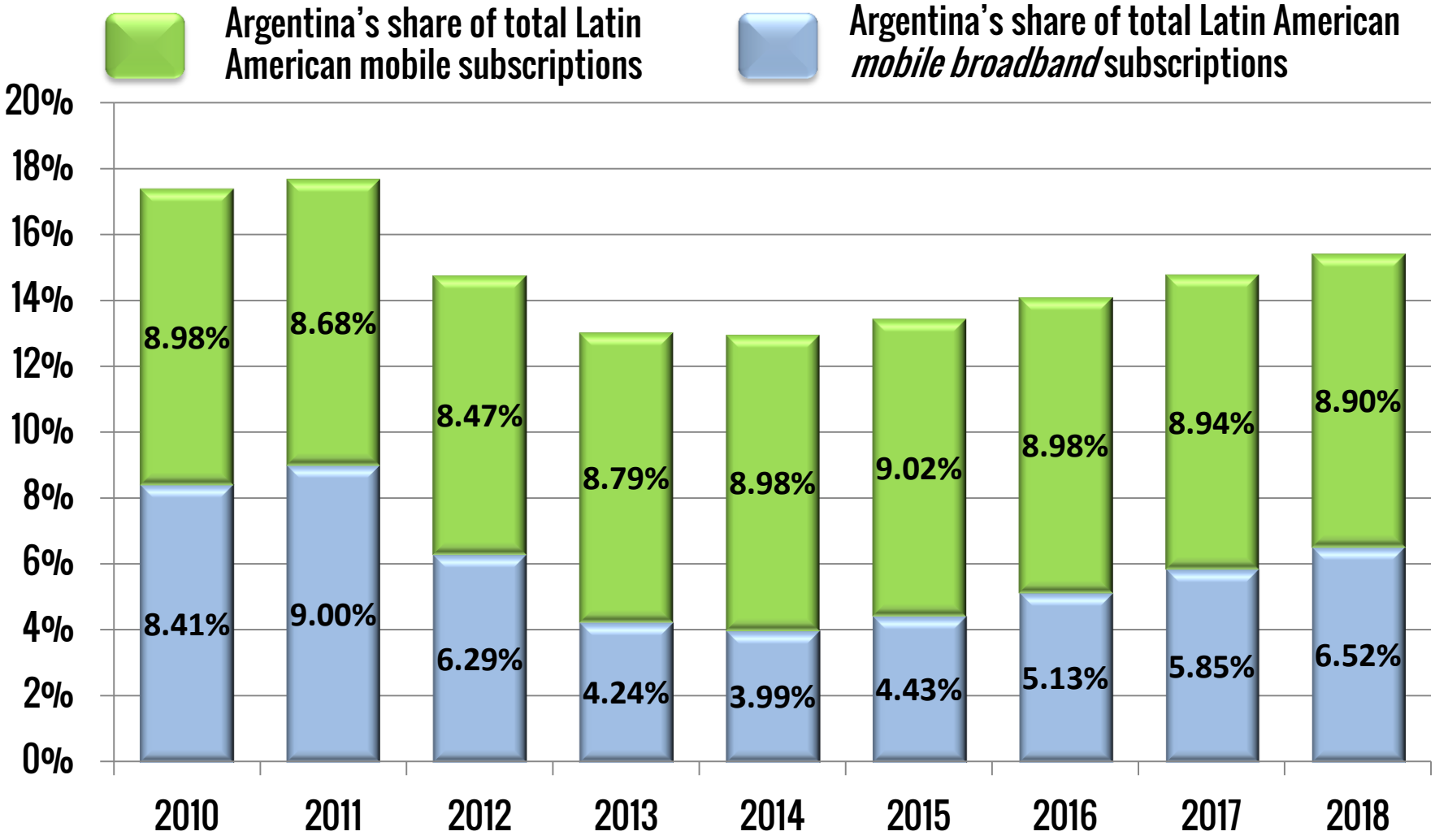
Assigned Spectrum Bands (Mhz)

	700	850	900	1700	1800	1900	1700/2100	2100	1900/2100	2300	2600
Argentina	√	√	-	-	-	√	√	-	-	-	-
Bolivia	√	√	-	-	-	√	√	-	-	-	-
Brazil	√	√	√	-	√	√	-	-	√	-	√
Chile	√	√	-	-	-	√	√	-	-	-	√
Colombia	-	√	-	-	-	√	√	-	-	-	√
Costa Rica	-	√	-	-	√	-	-	√	-	-	√
Dominican Rep.	-	√	√	√	√	√	√	-	-	-	-
Ecuador	√	√	-	-	-	√	√	-	-	-	-
El Salvador	-	√	√	-	-	√	-	-	-	-	-
Guatemala	-	√	√	-	-	√	-	-	-	-	-
Honduras	-	√	-	-	-	√	√	-	-	-	-
Mexico	-	√	-	-	-	√	√	-	-	-	-
Nicaragua	√	√	-	-	√	√	-	-	-	-	-
Panama	√	√	-	-	-	√	-	-	-	-	-
Paraguay	-	√	-	-	-	√	√	-	-	-	-
Peru	-	√	√	-	-	√	√	-	-	-	-
Puerto Rico	√	√	√	-	-	√	√	-	-	√	-
Uruguay	-	√	√	-	√	√	√	-	√	-	-
Venezuela	-	√	√	-	√	√	√	-	-	-	√

Source: Signals Telecom Consulting

Case Study: Argentina

Argentina in the Latin American Mobile Landscape

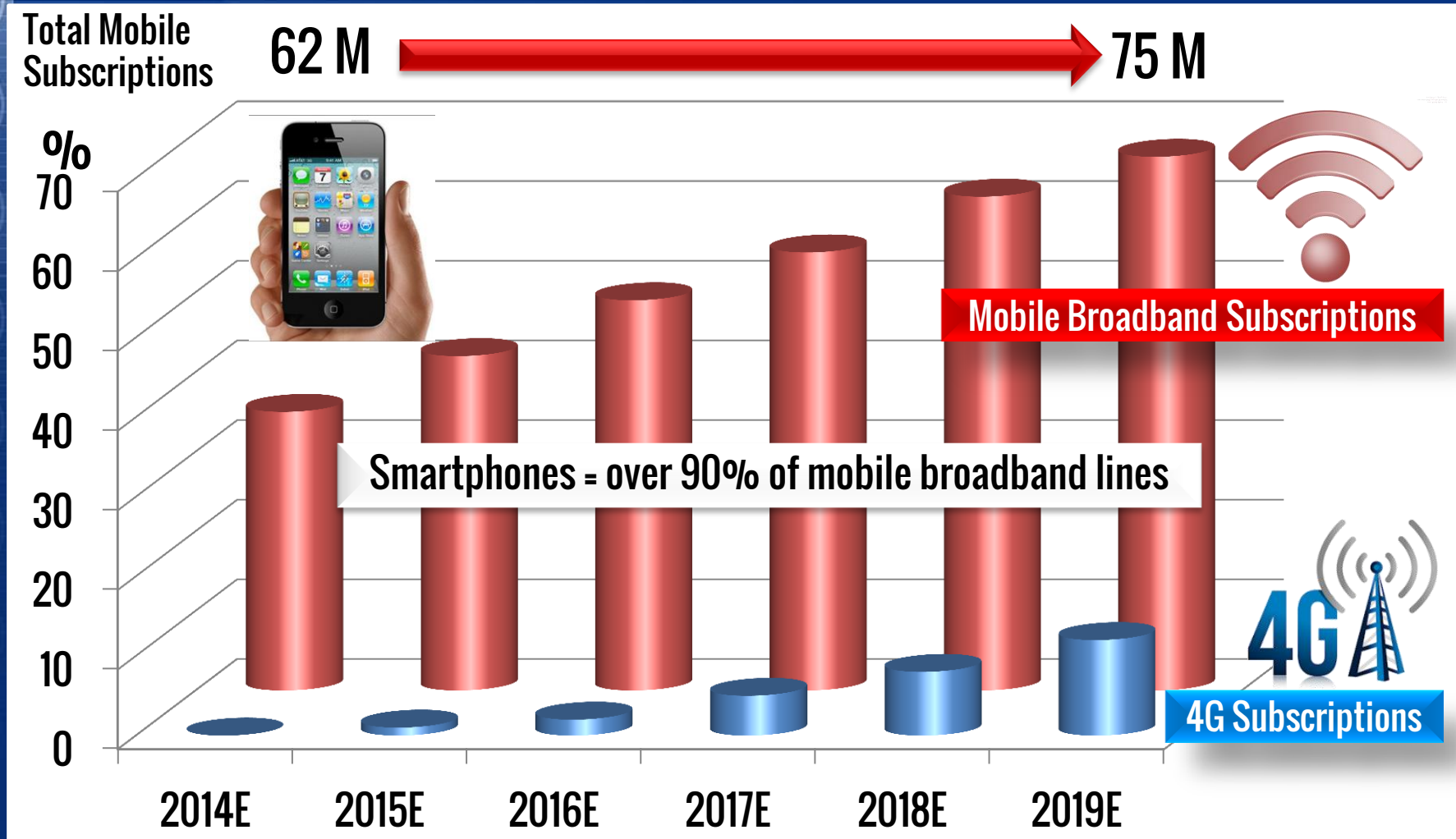


Source: Strategy Analytics

ARGENTINA : Most recent mobile device change

Source: Informe "Telefonia móvil - segmento individuos 2014" por Carrier y Asociados

Argentina Smartphone Subscription Forecast



Source: Pyramid Research, 2014