American Tower International Market Overview

**Introduction**
International Portfolio Overview • International Markets Poised for Smartphone Growth

**Advanced Wireless Markets**
Germany • France

**Evolving Wireless Markets**
Argentina • Mexico • Brazil • South Africa • Chile • Peru

**Developing Wireless Markets**
Colombia • Paraguay • India • Ghana • Uganda • Costa Rica • Nigeria

Note: Definitions and Data Sources Available on Last Page of Presentation
## International Portfolio Overview (1)

<table>
<thead>
<tr>
<th>Country</th>
<th>India</th>
<th>France</th>
<th>Germany</th>
<th>Ghana</th>
<th>Nigeria</th>
<th>South Africa (2)</th>
<th>Uganda</th>
<th>EMEA</th>
<th>Argentina (5)</th>
<th>Brazil</th>
<th>Chile</th>
<th>Colombia</th>
<th>Costa Rica</th>
<th>Mexico (4)</th>
<th>Paraguay</th>
<th>Peru</th>
<th>Latin America</th>
</tr>
</thead>
<tbody>
<tr>
<td># of Sites (5)</td>
<td>58,034</td>
<td>2,484</td>
<td>2,208</td>
<td>2,201</td>
<td>4,757</td>
<td>2,530</td>
<td>1,431</td>
<td>15,611</td>
<td>8</td>
<td>18,889</td>
<td>1,304</td>
<td>4,484</td>
<td>494</td>
<td>9,139</td>
<td>836</td>
<td>764</td>
<td>35,918</td>
</tr>
<tr>
<td>% of 4Q17 Property Revenue</td>
<td>17.7%</td>
<td>1.0%</td>
<td>1.0%</td>
<td>1.8%</td>
<td>3.2%</td>
<td>1.6%</td>
<td>0.9%</td>
<td>9.6%</td>
<td>0.2%</td>
<td>9.4%</td>
<td>0.6%</td>
<td>1.4%</td>
<td>0.3%</td>
<td>6.1%</td>
<td>0.1%</td>
<td>0.3%</td>
<td>18.4%</td>
</tr>
<tr>
<td>% of 4Q17 Property Gross Margin</td>
<td>11.2%</td>
<td>1.0%</td>
<td>1.3%</td>
<td>1.5%</td>
<td>2.8%</td>
<td>1.5%</td>
<td>0.7%</td>
<td>8.8%</td>
<td>0.2%</td>
<td>9.0%</td>
<td>0.5%</td>
<td>1.2%</td>
<td>0.3%</td>
<td>6.7%</td>
<td>0.1%</td>
<td>0.3%</td>
<td>18.3%</td>
</tr>
</tbody>
</table>

### International Tenants (5) % of Total Property Revenue

<table>
<thead>
<tr>
<th>International Tenants (5)</th>
<th>% of Total Property Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airtel</td>
<td>~5%</td>
</tr>
<tr>
<td>Telefónica</td>
<td>~5%</td>
</tr>
<tr>
<td>Tata</td>
<td>~5%</td>
</tr>
<tr>
<td>AT&amp;T</td>
<td>~4%</td>
</tr>
<tr>
<td>Vodafone</td>
<td>~3%</td>
</tr>
<tr>
<td>MTN</td>
<td>~3%</td>
</tr>
<tr>
<td>Idea Cellular</td>
<td>~3%</td>
</tr>
<tr>
<td>Telecom Italia</td>
<td>~2%</td>
</tr>
<tr>
<td>Reliance-Jio</td>
<td>~2%</td>
</tr>
<tr>
<td>Nextel Intl.</td>
<td>~2%</td>
</tr>
</tbody>
</table>

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(1) Reflects the Company's Asia, EMEA and Latin America segments.
(2) Portfolio also includes fiber and fiber-related assets, which are excluded from the site count.
(3) Portfolio primarily consists of urban telecommunications assets, fiber and the rights to utilize certain existing utility infrastructure for future telecommunications equipment installation, all of which are excluded from the site count.
(4) Portfolio also includes urban telecommunications assets, including fiber, concrete poles and other infrastructure, which are excluded from the site count.
(5) Includes in-building and outdoor DAS networks.
(6) Represents top 10 international tenants for the quarter ended December 31, 2017.
International Markets Poised for Smartphone Growth

Wireless Penetration vs. Mobile Broadband (3G/4G) Penetration\(^{(1)}\)

(Size of bubbles = Number of mobile subscribers; Wireless and Broadband penetration calculated by dividing subscriber numbers by total population)

**Notes:** \(^{(1)}\) Data for Peru, Ghana, & Nigeria calculated using CAGR’s from 2Q2015; Data for USA calculated using Cisco VNI 3G/4G penetration.

**Sources:** Altman Vilandrie & Co. research, Bank of America Merrill Lynch Wireless Matrix, GSMA Intelligence, BuddeComm, Statista, OECD, Cisco VNI Report

**Costa Rica,** despite high wireless and Broadband penetration, significantly lags behind in mobile Broadband speeds

**AMT’s International Exposure Provides Access to Significantly Less Mature Wireless Markets**
Advanced Wireless Markets

Germany • France
Germany

WIRELESS MARKET OVERVIEW:

<table>
<thead>
<tr>
<th>Indicator</th>
<th>As of 3Q17</th>
<th>2010 – 3Q17 CAGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wireless Subscribers</td>
<td>118M</td>
<td>1%</td>
</tr>
<tr>
<td>Wireless Penetration</td>
<td>143%</td>
<td>1%</td>
</tr>
<tr>
<td>Average Monthly Voice MOU</td>
<td>161(1)</td>
<td>3%</td>
</tr>
<tr>
<td>ARPU</td>
<td>$16</td>
<td>0%</td>
</tr>
</tbody>
</table>

Key Catalysts

- **2018 auction** for 5G transition in the 2 GHz (2x60 MHz) & 3.6 GHz (300 MHz) bands
- ~80% LTE Coverage (66.3 million customers) as of end of 2017
- **LTE rollout by all major operators** in 800 and 2600 MHz bands
- **T-Mobile rolled out LTE in 900 MHz** in Mar’17 to increase coverage
- **LTE-A launched by all major carriers**

Data as a % of Wireless Revenue

![Graph showing data as a % of wireless revenue from 2010 to 2017]

WIRELESS CARRIER OVERVIEW:

**Top 3 Carrier Characteristics**

<table>
<thead>
<tr>
<th>Carrier</th>
<th>AMT Customer?</th>
<th>Subscriber Market Share</th>
<th>Spectrum Holdings</th>
<th>Current Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>O₂ (Telefonica Europe)</td>
<td>✓</td>
<td>38%</td>
<td>~360 MHz</td>
<td>2G/3G /4G</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Holdings in 700, 800, 900, 1800, 1900, 2100, 2600, and 3500 MHz bands</td>
<td></td>
</tr>
<tr>
<td>T-Mobile (Deutsche Telekom)</td>
<td>✓</td>
<td>36%</td>
<td>~220 MHz</td>
<td>3G/4G</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Holdings in 700, 800, 900, 1500, 1800, 2100, and 2600 MHz bands</td>
<td></td>
</tr>
<tr>
<td>Vodafone</td>
<td>✓</td>
<td>26%</td>
<td>~230 MHz</td>
<td>3G/4G</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Holdings in 700, 800, 900, 1500, 1800, 2100, and 2600 MHz bands</td>
<td></td>
</tr>
</tbody>
</table>

**Carrier-Announced Network Deployment Timelines**

<table>
<thead>
<tr>
<th>Year</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>O₂ Roll-out in 800 MHz in rural areas</td>
</tr>
<tr>
<td>2013</td>
<td>HSPA+ in 2012</td>
</tr>
<tr>
<td>2014</td>
<td>LTE-A launched in Nov’14</td>
</tr>
<tr>
<td>2015</td>
<td>LTE-A launched in 1Q15</td>
</tr>
<tr>
<td>2016</td>
<td>LTE-A launched in 900 MHz</td>
</tr>
<tr>
<td>2017</td>
<td>LTE coverage reaches 93%</td>
</tr>
<tr>
<td>2018</td>
<td>Rollout of NB-IoT sensors</td>
</tr>
</tbody>
</table>

Notes: (1) AV&C projection based on Bank of America Merrill Lynch Wireless Matrix 2015 (2) AV&C projection based on Bank of America Merrill Lynch Wireless Matrix 3Q15

Sources: American Tower research & analysis, Altman Vilandrie & Co. research & analysis, Bank of America Merrill Lynch Global Wireless Matrix January 2018, carrier annual reports, press releases and news articles
France

Wireless Market Overview:

<table>
<thead>
<tr>
<th>Indicator</th>
<th>As of 3Q17</th>
<th>2010 – 3Q17 CAGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wireless Subscribers</td>
<td>70M</td>
<td>1%</td>
</tr>
<tr>
<td>Wireless Penetration</td>
<td>119%</td>
<td>3%</td>
</tr>
<tr>
<td>Average Monthly Voice MOU</td>
<td>88(1)</td>
<td>1%</td>
</tr>
<tr>
<td>ARPU</td>
<td>$24</td>
<td>-6%</td>
</tr>
</tbody>
</table>

Key Catalysts

- Temporary spectrum in the 3400 MHz-3800 MHz and 26 GHz bands for 5G trials awarded by ARCEP
- Bouygues and SFR will end 4G roaming deal by 2018 due to pressure from ARCEP, accelerates LTE network buildout (Jun'16)
- ARCEP fines Orange and SFR for not meeting rural coverage agreement (Sep'16)
- LTE-A launched by all major carriers
  - Providers to invest ~$4B to roll out 4G w/ no coverage gaps by 2020
- Orange announces rollout of LTE based broadband service (Mar’17)

Wireless Carrier Overview:

Top 4 Carrier Characteristics

<table>
<thead>
<tr>
<th>AMT Customer?</th>
<th>Sub Mkt. Share</th>
<th>Spectrum Holdings(2)</th>
<th>Current Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orange</td>
<td>✓</td>
<td>32%</td>
<td>~90 MHz</td>
</tr>
<tr>
<td>SFR Numericable</td>
<td>✓</td>
<td>29%</td>
<td>~80 MHz</td>
</tr>
<tr>
<td>Bouygues</td>
<td>✓</td>
<td>20%</td>
<td>~75 MHz</td>
</tr>
<tr>
<td>Free Mobile</td>
<td>✓</td>
<td>19%</td>
<td>~55 MHz</td>
</tr>
</tbody>
</table>

Carrier-Announced Network Deployment Timelines

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>Launch Jun’12 in Marseille</td>
</tr>
<tr>
<td>2013</td>
<td>5G trials scheduled for late 2018/ early 2019</td>
</tr>
<tr>
<td>2014</td>
<td>LTE-A launched in Jun’14</td>
</tr>
<tr>
<td>2015</td>
<td>Ultra LTE-A with 300Mb/s speed rollout in November</td>
</tr>
<tr>
<td>2016</td>
<td>First to launch VoLTE Nov’15</td>
</tr>
<tr>
<td>2017</td>
<td>95% LTE coverage</td>
</tr>
<tr>
<td>2018</td>
<td>700 &amp; 1800 MHz bands added</td>
</tr>
</tbody>
</table>

Notes: (1) AV&Co. projection based on Bank of America Merrill Lynch Wireless Matrix 2Q15 (2) AV&Co. projection based on data as % of revenue for Orange 09’-12’ and 12’-16’ CAGR for Germany as similar market Sources: American Tower research & analysis, Altman Vilandrie & Co. research & analysis, Bank of America Merrill Lynch Global Wireless Matrix January 2018, carrier annual reports, press releases and news articles, ARCEP
Evolving Wireless Markets

Argentina • Mexico • Brazil • South Africa • Chile • Peru
Argentina

WIRELESS MARKET OVERVIEW:

<table>
<thead>
<tr>
<th>Indicator</th>
<th>As of 3Q17</th>
<th>2010 – 3Q17 CAGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wireless Subscribers</td>
<td>61M</td>
<td>2%</td>
</tr>
<tr>
<td>Wireless Penetration</td>
<td>138%</td>
<td>1%</td>
</tr>
<tr>
<td>Average Monthly Voice MOU</td>
<td>109(1)</td>
<td>0%</td>
</tr>
<tr>
<td>ARPU</td>
<td>$7</td>
<td>13%</td>
</tr>
</tbody>
</table>

Key Catalysts

- **Telecom Argentina to invest $5B by 2020** (announced 2018)
- **ENACOM auctions 2.5 GHz (2500 MHz – 2690 MHz) bands** with Movistar and Claro winning 30 MHz and Personal winning 40 MHz (Jul’17)
- **By 2016 Argentina surpassed 60% 4G coverage across the country**
- **ENACOM publishes guidelines** to encourage telecom competition (Jan’17)

Data as a % of Wireless Revenue

- 31% 37% 41% 46% 48% 53% 54% 59%

~88% increase

WIRELESS CARRIER OVERVIEW:

<table>
<thead>
<tr>
<th>Top 3 Carrier Characteristics</th>
<th>AMT Customer?</th>
<th>Subscriber Market Share</th>
<th>Spectrum Holdings(3)</th>
<th>Current Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>América Móvil</td>
<td>✓</td>
<td>37%</td>
<td>~135 MHz Holdings in 700, 850, 1700, 1850, 1900, 2000 MHz</td>
<td>2G/3G/4G</td>
</tr>
<tr>
<td>movistar</td>
<td>✓</td>
<td>32%</td>
<td>~125 MHz Holdings in 700, 850, 1700, 1850, 1900, 2000 MHz</td>
<td>2G/3G/4G</td>
</tr>
<tr>
<td>Personal</td>
<td>✓</td>
<td>31%</td>
<td>~100 MHz Holdings in 700, 850, 1700, 1900, 2100 MHz</td>
<td>2G/3G/4G</td>
</tr>
</tbody>
</table>

Carrier-Announced Network Deployment Timelines

- **2012**
  - HSPA+ Launch (Jun’14)
- **2013**
  - HSPA+ Launch (Dec’14)
- **2014**
  - HSPA+ Launch (Jun’14) ~68% coverage, 3M users (Jun’16) First 5G tests conducted w/ Ericsson
- **2015**
  - HSPA+ Launch (Jun’14)
- **2016**
  - HSPA+ Launch (Jun’14) 6M LTE customers, 86% coverage in major cities
- **2017**
  - HSPA+ Launch (Jun’14)
- **2018**
  - HSPA+ Launch (Jun’14) Announces plans to invest $2.65B over 5 years in network (Feb’15) Will invest $100M in further network buildout

Notes: (1) AV&Co. projection based on Bank of America Merrill Lynch Wireless Matrix 2Q15 (2) AV&Co. projection based on Bank of America Merrill Lynch Wireless Matrix 3Q15 (3) Holdings vary by region.
Sources: American Tower research & analysis, Altman Vilandrie & Co. research & analysis, Bank of America Merrill Lynch Global Wireless Matrix January 2018
Mexico

WIRELESS MARKET OVERVIEW:

<table>
<thead>
<tr>
<th>Indicator</th>
<th>As of 3Q17</th>
<th>2010 – 3Q17 CAGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wireless Subscribers</td>
<td>112M</td>
<td>3%</td>
</tr>
<tr>
<td>Wireless Penetration</td>
<td>90%</td>
<td>2%</td>
</tr>
<tr>
<td>Average Monthly Voice MOU</td>
<td>232(1)</td>
<td>3%</td>
</tr>
<tr>
<td>ARPU</td>
<td>$7</td>
<td>-5%</td>
</tr>
</tbody>
</table>

**Key Catalysts**

- **Ifetel to approve or reject separation of Telmex** proposed by AMX in Q1 2018
- **March 2018 auction of 2.5 GHz (2500-2690 MHz)**, all operators allowed to participate
  - **Conditions published** and the minimum reference value for each 20 MHz is set at $18.7mm
- **Red Compartida, 20-year wholesale wireless broadband procurement**, was awarded to **Altan Consortium** (2); gives access to 90 MHz of 700 MHz band (Nov’16)
- **National roaming agreement** signed by America Mobil and Telefonica (Dec’16)

**Data as a % of Wireless Revenue**

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24%</td>
<td>30%</td>
<td>35%</td>
<td>39%</td>
<td>44%</td>
<td>47%</td>
<td>54%</td>
<td>63%</td>
<td></td>
</tr>
</tbody>
</table>

-161% increase

WIRELESS CARRIER OVERVIEW:

**Top 3 Carrier Characteristics**

<table>
<thead>
<tr>
<th>Carrier</th>
<th>AMT Customer?</th>
<th>Subscriber Market Share</th>
<th>Spectrum Holdings(3)</th>
<th>Current Technology</th>
<th>Current Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>América Móvil</td>
<td>✓</td>
<td>66%</td>
<td>~200 MHz Holdings in AWS-1, AWS-3, 850, 1900 MHz, 2500 GHz</td>
<td>2G/3G /4G</td>
<td></td>
</tr>
<tr>
<td>Telefónica</td>
<td>✓</td>
<td>21%</td>
<td>~61 MHz Holdings in 850 and 1900 MHz</td>
<td>2G/3G /4G</td>
<td></td>
</tr>
<tr>
<td>AT&amp;T(4)</td>
<td>✓</td>
<td>13%</td>
<td>~130 MHz Holdings in AWS-1, SMR, 850, 1900 MHz</td>
<td>2G/3G /4G</td>
<td></td>
</tr>
</tbody>
</table>

**Carrier-Announced Network Deployment Timelines**

- **AT&T(4)** completed acquisitions of Iusacell and Nextel; Sources: American Tower research & analysis, Altman Vilandrie & Co. research & analysis, Bank of America Merrill Lynch Global Wireless Matrix January 2018

Notes: (1) AV&Co. projection based on Bank of America Merrill Lynch Wireless Matrix 2Q15/3Q15 (2) Altan consortium consists of Morgan Stanley, IFC, Axtel, Megacable, Multitel (3) Holdings vary by region (4) AT&T completed acquisitions of Iusacell and Nextel; Sources: American Tower research & analysis, Altman Vilandrie & Co. research & analysis, Bank of America Merrill Lynch Global Wireless Matrix January 2018
Brazil

WIRELESS MARKET OVERVIEW:

<table>
<thead>
<tr>
<th>Indicator</th>
<th>As of 3Q17</th>
<th>2010 – 3Q17 CAGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wireless Subscribers</td>
<td>240M</td>
<td>2%</td>
</tr>
<tr>
<td>Wireless Penetration</td>
<td>115%</td>
<td>1%</td>
</tr>
<tr>
<td>Average Monthly Voice MOU(1)</td>
<td>129</td>
<td>2%</td>
</tr>
<tr>
<td>ARPU</td>
<td>$7</td>
<td>1%</td>
</tr>
</tbody>
</table>

Key Catalysts

- **Anatel set to allocate 2300 MHz – 2400 MHz band** for mobile use
- **Nokia and TIM sign contract to buildout LTE network** in 700 MHz band (Mar’17)
- **Vivo and Claro move forward with their site sharing partnership, will add 180 joint base stations in rural areas** (May’16)
- **Oi’s Creditors approve plan to exit bankruptcy protection** that depends on a $1.2 billion capital increase and monthly fines to Anatel (Dec’17)
  - Oi filed for bankruptcy protection in June’16

Data as a % of Wireless Revenue

<table>
<thead>
<tr>
<th>Year</th>
<th>16%</th>
<th>19%</th>
<th>23%</th>
<th>26%</th>
<th>32%</th>
<th>39%</th>
<th>48%</th>
<th>58%</th>
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</thead>
<tbody>
<tr>
<td>2010</td>
<td></td>
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<td></td>
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<tr>
<td>2011</td>
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<td>2012</td>
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<td>2013</td>
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<td>2014</td>
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<td>2015</td>
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<td>2016</td>
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<td>2017</td>
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<td></td>
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<tr>
<td>2018</td>
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</tr>
</tbody>
</table>

WIRELESS CARRIER OVERVIEW:

**Top 4 Carrier Characteristics**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>vivo™ Telefónica</td>
<td>✓ 31%</td>
<td>~107 MHz Holdings in 450, 700, 800, 1800, 1900, 2100, and 2500 MHz bands</td>
<td>2G/3G/ 4G</td>
<td>UMTS/ HSPA+ Launch Apr’13</td>
<td></td>
</tr>
<tr>
<td>Telecom Italia</td>
<td>✓ 25%</td>
<td>~73 MHz Holdings in 450, 700, 800, 1700-1860, 1920-2165, and 2500 MHz bands</td>
<td>2G/3G/ 4G</td>
<td>UMTS/ HSPA+ Reached 76M subs by EOY 2014</td>
<td></td>
</tr>
<tr>
<td>América Móvil</td>
<td>✓ 25%</td>
<td>~106 MHz Holdings in 450, 700, 800, 1700-1860, 1900-2165, and 2500 MHz bands</td>
<td>2G/3G/ 4G</td>
<td>UMTS/ HSPA+ Reached 76M subs by EOY 2014</td>
<td></td>
</tr>
<tr>
<td>Tele Norte Leste</td>
<td>✓ 17%</td>
<td>~47 MHz Holdings in 450, 800, 1700-1860, 1900-2165, and 2500 MHz bands</td>
<td>2G/3G/ 4G</td>
<td>UMTS/ HSPA+ Reached 76M subs by EOY 2014</td>
<td></td>
</tr>
</tbody>
</table>

**Carrier-Announced Network Deployment Timelines**

<table>
<thead>
<tr>
<th>Year</th>
<th>UMTS/ HSPA+</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>Launch Apr’13</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>Reached 47% of pops covered and coverage of 183 cities by EOY 2015</td>
<td>57% 4G availability reached</td>
</tr>
<tr>
<td>2014</td>
<td>Reached 56% of pops covered and coverage of 101 cities by EOY 2015</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>Reached 76M subs by EOY 2014</td>
<td>$3.6B in planned capex 2015-2017</td>
</tr>
<tr>
<td>2016</td>
<td>Reached 47% of pops covered and coverage of 183 cities by EOY 2015</td>
<td>90% Coverage of urban pop by 4Q17</td>
</tr>
<tr>
<td>2017</td>
<td>Planned $3.6B to expand 3G and 4G networks</td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>LTE-A launched in Jun’16</td>
<td></td>
</tr>
<tr>
<td>2019</td>
<td>93 markets by Oct’14, 71M LTE subs by EOY 2014</td>
<td></td>
</tr>
<tr>
<td>2020</td>
<td>Planned $3.6B to expand 3G and 4G networks</td>
<td></td>
</tr>
<tr>
<td>2021</td>
<td>LTE-A coverage in 140 cities</td>
<td></td>
</tr>
<tr>
<td>2022</td>
<td>Did not bid on 700 MHz</td>
<td>Moving forward with bankruptcy proceedings</td>
</tr>
</tbody>
</table>

Notes: (1) AV&Co. projection based on Bank of America Merrill Lynch Wireless Matrix 2Q15/3Q15 (2) Holdings vary by region, calculated using mean holdings, weighting each region equally

South Africa

WIRELESS MARKET OVERVIEW:

<table>
<thead>
<tr>
<th>Indicator</th>
<th>As of 3Q17</th>
<th>2010 – 3Q17 CAGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wireless Subscribers</td>
<td>91M</td>
<td>9%</td>
</tr>
<tr>
<td>Wireless Penetration</td>
<td>162%</td>
<td>7%</td>
</tr>
<tr>
<td>Average Monthly Voice MOU(1)</td>
<td>150</td>
<td>6%</td>
</tr>
<tr>
<td>ARPU</td>
<td>$8</td>
<td>-4%</td>
</tr>
</tbody>
</table>

Key Catalysts

- **Additional spectrum auctions** over the next few years (700 MHz, 800 MHz, and 2.6 GHz) will aid carriers’ 4G expansion
  - Originally Jan'17, **postponed twice to unconfirmed date**
- **LTE-A launched or testing** in progress by major carriers; buildout constrained by lack of spectrum
- **Increased emphasis on rural coverage** by regulatory authorities likely to lead to demand for tower space

Data as a % of Wireless Revenue (2)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>19%</td>
<td>22%</td>
<td>26%</td>
<td>31%</td>
<td>35%</td>
<td>39%</td>
<td>45%</td>
<td>54%</td>
</tr>
</tbody>
</table>

~184% increase

WIRELESS CARRIER OVERVIEW:

Top 4 Carrier Characteristics

<table>
<thead>
<tr>
<th>Carrier</th>
<th>AMT Customer?</th>
<th>Subscriber Market Share</th>
<th>Spectrum Holdings</th>
<th>Current Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vodafone</td>
<td>✓</td>
<td>44%</td>
<td>~81 MHz Holdings in 900, 1800, and 2100 MHz bands</td>
<td>3G/4G</td>
</tr>
<tr>
<td>MTN Group</td>
<td>✓</td>
<td>34%</td>
<td>~81 MHz Holdings in 900, 1800, and 2100 MHz bands</td>
<td>2G/3G/4G</td>
</tr>
<tr>
<td>Saudi Oger Ltd.</td>
<td>✓</td>
<td>17%</td>
<td>~81 MHz Holdings in 900, 1800, and 2100 MHz bands</td>
<td>3G/4G</td>
</tr>
<tr>
<td>Telkom SA</td>
<td>✓</td>
<td>5%</td>
<td>~160 MHz Holdings in 1800, 2100, 2300, and 3500 MHz bands</td>
<td>3G/4G</td>
</tr>
</tbody>
</table>

Carrier-Announced Network Deployment Timelines

<table>
<thead>
<tr>
<th>Year</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vodafone</td>
<td>LTE</td>
<td>VoLTE trials launched in Sep’14</td>
<td>2,600 LTE sites by EoY 2015</td>
<td>55% LTE coverage Feb’16</td>
<td>8 LTE-A sites by Apr’16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MTN Group</td>
<td>LTE</td>
<td>Launched in 3 cities in Dec’12</td>
<td>1,000 LTE sites by Nov’14</td>
<td>Added 3,148 LTE sites in 2015</td>
<td>LTE-A launched in 3 suburbs in Mar’16</td>
<td>South Africa’s first 5G trial Jan’18</td>
<td></td>
</tr>
<tr>
<td>Saudi Oger Ltd.</td>
<td>LTE</td>
<td>Trials since 2012</td>
<td>Upgraded infrastructure in 4Q14</td>
<td>LTE launched in Sep’15</td>
<td>Plans for 4,000 base stations LTE-A launched in 3 cities Apr’16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Telkom SA</td>
<td>LTE</td>
<td>Reached 6 cities</td>
<td>LTE-A trials since Nov14; rolled out to 27 suburbs by May’15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: (1) AV&Co. projection based on Bank of America Merrill Lynch Wireless Matrix 2Q15 (2) AV&Co. projection based on Bank of America Merrill Lynch Wireless Matrix 3Q15 Sources: American Tower research & analysis, Altman Vilandrie & Co. research & analysis, Bank of America Merrill Lynch Global Wireless Matrix January 2018, annual reports
WIRELESS MARKET OVERVIEW:

### Indicator As of 3Q17 2010 – 3Q17 CAGR

<table>
<thead>
<tr>
<th>Indicator</th>
<th>As of 3Q17</th>
<th>2010 – 3Q17 CAGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wireless Subscribers</td>
<td>25M</td>
<td>2%</td>
</tr>
<tr>
<td>Wireless Penetration</td>
<td>134%</td>
<td>1%</td>
</tr>
<tr>
<td>Average Monthly Voice MOU(1)</td>
<td>132</td>
<td>-3%</td>
</tr>
<tr>
<td>ARPU</td>
<td>$12</td>
<td>1%</td>
</tr>
</tbody>
</table>

**Key Catalysts**

- **Claro conducted a 5G lab trial** using the 27 GHz band, the first in Latin America
- **Entel finished national LTE-A rollout in Mar’17**, both Movistar and Claro are investing in further buildout
- **Rural 4G rollouts** should further drive coverage tower growth
- **Minimum connection speed rules** to be introduced will drive investment
  - Minimum speed will be a % of average speed available on each plan; providers required to provide app for speed tests

**Data as a % of Wireless Revenue (2)**

- 2010: 19%
- 2011: 21%
- 2012: 22%
- 2013: 23%
- 2014: 30%
- 2015: 35%
- 2016: 37%
- 2017: 41%

**Notes:**

- (1) AV&Co. projection based on Bank of America Merrill Lynch Wireless Matrix 2Q15
- (2) AV&Co. projection based on Bank of America Merrill Lynch Wireless Matrix 3Q15

Sources: American Tower research & analysis, Altman Vilandrie & Co. research & analysis, SUBTEL, Bank of America Merrill Lynch Global Wireless Matrix January 2018

WIRELESS CARRIER OVERVIEW:

### Top 3 Carrier Characteristics

<table>
<thead>
<tr>
<th>Carrier</th>
<th>AMT Customer?</th>
<th>Subscriber Market Share</th>
<th>Spectrum Holdings</th>
<th>Current Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Entel</strong></td>
<td>✓</td>
<td>37%</td>
<td>~110 MHz Holdings in 700, 1900, and 2600 MHz bands</td>
<td>3G/4G</td>
</tr>
<tr>
<td><strong>Telefónica</strong></td>
<td>✓</td>
<td>35%</td>
<td>~95 MHz Holdings in 700, 850, 1900, and 2600 MHz bands</td>
<td>3G/4G</td>
</tr>
<tr>
<td><strong>América Móvil</strong></td>
<td>✓</td>
<td>28%</td>
<td>~95 MHz Holdings in 700, 850, 1900, and 2600 MHz bands</td>
<td>3G/4G</td>
</tr>
</tbody>
</table>

### Carrier-Announced Network Deployment Timelines

- **2012**: HSPA+ ~175k subs by Dec’14
- **2013**: LTE launched in two cities as of Aug’16
- **2014**: LTE-A launched in two cities as of Aug’16
- **2015**: $3.5B investment promised 2016-2020
- **2016**: LTE-A launched Jul’16
- **2017**: $3.5B investment promised 2016-2020
- **2018**: First to achieve national LTE-A coverage

- **Telefónica**: LTE started nationwide deployment in 2013
- **América Móvil**: 4G nationwide in Jun’13
- **Claro**: LTE-A launched in Santiago in Oct’16

Notes:

- (1) AV&Co. projection based on Bank of America Merrill Lynch Wireless Matrix 2Q15
- (2) AV&Co. projection based on Bank of America Merrill Lynch Wireless Matrix 3Q15

Sources: American Tower research & analysis, Altman Vilandrie & Co. research & analysis, SUBTEL, Bank of America Merrill Lynch Global Wireless Matrix January 2018
### Peru

#### Wireless Market Overview:

<table>
<thead>
<tr>
<th>Indicator</th>
<th>As of 3Q17</th>
<th>2010 – 3Q17 CAGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wireless Subscribers</td>
<td>36M(1)</td>
<td>6%</td>
</tr>
<tr>
<td>Wireless Penetration</td>
<td>101%</td>
<td>4%</td>
</tr>
<tr>
<td>Average Monthly Voice MOU(2)</td>
<td>168</td>
<td>10%</td>
</tr>
<tr>
<td>ARPU</td>
<td>$8</td>
<td>0%</td>
</tr>
</tbody>
</table>

### Key Catalysts

- **Telefónica** to spend $108m for 4G
- **New entrants such as Dolphin Telecom** and **Bitel** stimulate demand for towers
  - Dolphin signed MVNO agreement in early 2017
- **2Q16 700 MHz auction results** – Entel: 2x15 MHz ($290M USD); Claro: 2x15 MHz ($306M USD); Movistar: 2x15 MHz ($315M USD)
  - As a result, Claro doubled its 4G footprint in 4Q16
- Government encourages expansion to sparsely populated areas driving coverage tower demand

### Wireless Carrier Overview:

#### Top 4 Carrier Characteristics

<table>
<thead>
<tr>
<th>AMT Customer?</th>
<th>Subscriber Market Share</th>
<th>Spectrum Holdings</th>
<th>Current Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telefónica</td>
<td>✓</td>
<td>~145 MHz Holdings in 700, 850, 900, 1700/2100, 1900, and 3500 MHz bands</td>
<td>2G/3G /4G</td>
</tr>
<tr>
<td>América Móvil</td>
<td>✓</td>
<td>~110 MHz Holdings in 700,1900 and 2600 MHz bands</td>
<td>2G/3G /4G</td>
</tr>
<tr>
<td>Entel</td>
<td>✓</td>
<td>~145 MHz Holdings in 700, 850, 1900, 2600 MHz, and AWS bands</td>
<td>2G/3G /4G</td>
</tr>
<tr>
<td>Bitel</td>
<td>✓</td>
<td>~85 MHz Holdings in 900 and 1900 MHz bands</td>
<td>2G/3G /4G</td>
</tr>
</tbody>
</table>

#### Carrier-Announced Network Deployment Timelines

<table>
<thead>
<tr>
<th>Year</th>
<th>Carrier</th>
<th>Technology</th>
<th>Key Milestones</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>HSPA+</td>
<td></td>
<td>Launch in Lima Jan'14</td>
</tr>
<tr>
<td>2013</td>
<td>LTE</td>
<td></td>
<td>5 cities/300k subs by 2015</td>
</tr>
<tr>
<td>2014</td>
<td>HSPA+</td>
<td></td>
<td>~2.000 locations reached with LTE by 4Q16</td>
</tr>
<tr>
<td>2015</td>
<td>LTE</td>
<td></td>
<td>Targeted nationwide coverage by EOY 2015</td>
</tr>
<tr>
<td>2016</td>
<td>W-CDMA</td>
<td></td>
<td>~1B Network investment 16-20’</td>
</tr>
<tr>
<td>2017</td>
<td>GSM/UMTS</td>
<td></td>
<td>$400M investment over the next 10 years</td>
</tr>
<tr>
<td>2018</td>
<td>LTE</td>
<td></td>
<td>Launch in 500 population centers Dec’16</td>
</tr>
</tbody>
</table>

Notes: (1) Adjusted BAML data to account for Bitel subscribers. (2) AV&Co. projection based on Bank of America Merrill Lynch Wireless Matrix 2Q15/3Q15 (3) Dolphin Telecom announced plans to become a mobile operator in Peru in February 2017; Sources: American Tower research & analysis, Altman Vilandrie & Co. research & analysis, Bank of America Merrill Lynch Global Wireless Matrix January 2018; Gartner Mobile Services Forecast 1Q15
Developing Wireless Markets

Colombia • Paraguay • India • Ghana • Uganda • Costa Rica • Nigeria
### Colombia

#### Wireless Market Overview:

**Snapshot**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>As of 3Q17</th>
<th>2010–3Q17 CAGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wireless Subscribers</td>
<td>51M</td>
<td>2%</td>
</tr>
<tr>
<td>Wireless Penetration</td>
<td>104%</td>
<td>1%</td>
</tr>
<tr>
<td>Average Monthly Voice MOU^(1)</td>
<td>211</td>
<td>4%</td>
</tr>
<tr>
<td>ARPU</td>
<td>$6</td>
<td>1%</td>
</tr>
</tbody>
</table>

**Key Catalysts**

- MinTIC asks for parties interested in the 700, 1900 MHz spectrum auction to come forward (Mar’17); date of auction delayed until 2018
- **LTE networks launched** by all major players, outnumber 3G connections for the first time in Apr’17
- CRC reviewing barriers to infrastructure deployment, paving the way for future tower deployments
- **Tigo-Une merger** provides stronger third carrier; $250M network investment announced at time of merger

**Data as a % of Wireless Revenue^(2)**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>19%</td>
<td>23%</td>
<td>24%</td>
<td>24%</td>
<td>26%</td>
<td>30%</td>
<td>33%</td>
<td>36%</td>
<td></td>
</tr>
</tbody>
</table>

#### Wireless Carrier Overview:

**Top 3 Carrier Characteristics**

<table>
<thead>
<tr>
<th>AMT Customer?</th>
<th>Subscriber Market Share</th>
<th>Spectrum Holdings</th>
<th>Current Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>57%</td>
<td>~80 MHz Holdings in 850, 1900, and 2500 MHz bands</td>
<td>3G/4G</td>
</tr>
<tr>
<td>América Móvil</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>✓</td>
<td>28%</td>
<td>~75 MHz Holdings in 850, 1900, and AWS bands</td>
<td>3G/4G</td>
</tr>
<tr>
<td>Telefónica</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>✓</td>
<td>15%</td>
<td>~140 MHz Holdings in 1900, 2500 MHz, and AWS bands</td>
<td>3G/4G</td>
</tr>
<tr>
<td>Millicom (50%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>✓</td>
<td>EPM Group (50%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Carrier-Announced Network Deployment Timelines**

- **AMT**
  - HSPA+ Launched Dec’13
  - LTE Coverage 374 municipalities by Oct’16
  - Plans to reach 100% nationwide coverage by 2018

- **Movistar**
  - HSPA+ Launched Dec’13
  - LTE Covers 76 cities, 300k subs by Nov’14
  - Launched VoLTE in Sep’16

- **Tigo**
  - HSPA+ Launched Dec’13
  - LTE 288k LTE customers by EOY 2014
  - Plans to reach 100% nationwide coverage by 2018

- **Una**
  - UMTS/ HSPA+ LTE
  - First Colombian 4G network
  - LTE coverage in 75 cities

Notes: (1) AV&Co. projection based on Bank of America Merrill Lynch Wireless Matrix 2Q15 (2) AV&Co. projection based on Bank of America Merrill Lynch Wireless Matrix 3Q15

Sources: American Tower research & analysis, Altman Vilandrie & Co. research & analysis, Bank of America Merrill Lynch Global Wireless Matrix January 2018; Gartner Mobile Services Forecast 1Q15
Paraguay

WIRELESS MARKET OVERVIEW:

### Subscriber Market Share 4Q2016

- **Claro**: 16%
- **Personal**: 48%
- **Tigo**: 33%
- **Vox**: 3%

### Key Catalysts

- **700 MHz auction Jan ‘18**, generated $85 million
  - Auction saw **7, 2x5 MHz paired bands sold**
  - **Tigo Paraguay won auction** with ~30 MHz, followed by **Claro and Personal** with ~20 MHz each
  - **Vox** did not participate
- **Tigo to invest $100mm to provide 66% coverage** with LTE by 2020
- **Personal reaches 250k LTE subscribers** in Oct’16

### Top 4 Carrier Characteristics

<table>
<thead>
<tr>
<th>Indicator</th>
<th>As of 4Q16</th>
<th>2010 – 4Q16 CAGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wireless Subscribers</td>
<td>7.5M</td>
<td>4%</td>
</tr>
<tr>
<td>Wireless Penetration</td>
<td>107%</td>
<td>2%</td>
</tr>
<tr>
<td>Data as % of Revenue(1)</td>
<td>50%</td>
<td>40%</td>
</tr>
<tr>
<td>ARPU(1)</td>
<td>$7</td>
<td>11%</td>
</tr>
</tbody>
</table>

### Carrier-Announced Network Deployment Timelines

<table>
<thead>
<tr>
<th>Carrier</th>
<th>Technology</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Claro</td>
<td>HSPA+</td>
<td>Claro to deploy LTE on 1700 MHz/2100 MHz acquired in Dec’15</td>
</tr>
<tr>
<td></td>
<td>LTE</td>
<td>Launch (Apr’16)</td>
</tr>
<tr>
<td><strong>Tigo</strong></td>
<td>HSPA+</td>
<td>Tigo to deploy LTE on 1700 MHz/2100 MHz acquired in Dec’15</td>
</tr>
<tr>
<td></td>
<td>LTE</td>
<td>Launch (Mar’16) Tigo covers 127 districts with 4G by end of 2017</td>
</tr>
<tr>
<td><strong>Vox</strong></td>
<td>HSPA+</td>
<td>Vox to launch 4G expansion by end of 2016</td>
</tr>
</tbody>
</table>

Notes: (1) Claro and Millicom 2017 annual reports used as benchmark for Data as a % of revenue and ARPU, growth represents YoY growth (2) Calculated from Dec’16 numbers (3) Spectrum holdings from 2018 750 MHz auction not released, calculated based on amount paid and price per band. Sources: American Tower research & analysis, Altman Vilandrie & Co. research & analysis, RCR Wireless, Conatel
India

**WIRELESS MARKET OVERVIEW:**

### Snapshot

<table>
<thead>
<tr>
<th>Indicator</th>
<th>As of 3Q17</th>
<th>2010 – 3Q17 CAGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wireless Subscribers</td>
<td>1.1B</td>
<td>11%</td>
</tr>
<tr>
<td>Wireless Penetration</td>
<td>89%</td>
<td>5%</td>
</tr>
<tr>
<td>Average Monthly Voice MOU(1)</td>
<td>374</td>
<td>0%</td>
</tr>
<tr>
<td>ARPU</td>
<td>$2</td>
<td>-4%</td>
</tr>
</tbody>
</table>

### Key Catalysts

- **India planning mass spectrum sale of more than 3,000 MHz of frequencies across numerous bands**
- **3Q16 spectrum auction:** 700, 800, 900, 1800, 2100, 2300, 2500 MHz; Winners: Vodafone, Airtel, Reliance Jio, and Idea Cellular
  - 60% unsold, no bids for 700 MHz;
  - New entrant Jio to acquire RCom
  - Vodafone and Idea merger set to close in 1H18, creating India’s largest mobile operator
- **Aircel** filed for bankruptcy in late February 2018 (~7% market share)

### Data as a % of Wireless Revenue(1)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Data</td>
<td>12%</td>
<td>14%</td>
<td>17%</td>
<td>17%</td>
<td>22%</td>
<td>28%</td>
<td>33%</td>
<td>40%</td>
<td>~235% increase</td>
</tr>
</tbody>
</table>

**WIRELESS CARRIER OVERVIEW:**

### Top 3 Carrier Characteristics

<table>
<thead>
<tr>
<th>AMT Customer?</th>
<th>Sub Mkt Share(2)</th>
<th>Spectrum Holdings(3)</th>
<th>Current Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bharti, Singtel</strong></td>
<td>✓</td>
<td>32%</td>
<td>~49 MHz Holdings in 900, 1800, 2100, and 2300 MHz bands</td>
</tr>
<tr>
<td><strong>Vodafone/Idea</strong></td>
<td>✓</td>
<td>35%</td>
<td>~60 MHz Holdings in 900, 1800, 2100, 2300 and 2500 MHz bands</td>
</tr>
<tr>
<td><strong>Reliance Jio/RCom</strong></td>
<td>✓</td>
<td>17%</td>
<td>~60 MHz Holdings in 850, 900, 1800, 2100 and 2300 MHz bands</td>
</tr>
</tbody>
</table>

### Carrier-Announced Network Deployment Timelines

<table>
<thead>
<tr>
<th>Year</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HSPA+</strong></td>
<td>First 4G compatible phones in Feb’14</td>
<td>LTE coverage across 300 cities/towns in Aug’15</td>
<td>Widest coverage with 180,000 mobile sites (2G/3G/4G)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>HSPA</strong></td>
<td></td>
<td>LTE in 5 major cities by early 2016</td>
<td>Merger to finalize Apr’18</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>HSPA+</strong></td>
<td></td>
<td>LTE expansion to 20 circles by Mar’17</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LTE</strong></td>
<td></td>
<td>First LTE circle launch independently in Nov’15</td>
<td>Jio acquired RCom Dec’17</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LTE</strong></td>
<td></td>
<td>LTE launch in Dec’15, full deployment over 3 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: (1)AV&Co. projection based on Bank of America Merrill Lynch Wireless Matrix 2Q15/3Q15. (2)Market shares exclude MTNL and BSNL which account for ~10% of wireless market and Aircel which accounts for ~7%
(3)Spectrum holdings vary by region; calculated using mean holdings, weighting each region equally. Sources: American Tower research & analysis, AV&Co. research & analysis, BAML Global Wireless Matrix January 2018, TRAI.
Ghana

WIRELESS MARKET OVERVIEW:

<table>
<thead>
<tr>
<th>Indicator</th>
<th>As of 2Q17</th>
<th>2010 – 3Q17 CAGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wireless Subscribers</td>
<td>36M</td>
<td>11%</td>
</tr>
<tr>
<td>Wireless Penetration</td>
<td>131%</td>
<td>8%</td>
</tr>
<tr>
<td>Average Monthly Voice MOU</td>
<td>119</td>
<td>0%</td>
</tr>
<tr>
<td>Yearly ARPU</td>
<td>$3(1)</td>
<td>-14%</td>
</tr>
</tbody>
</table>

Key Catalysts

- **Data demand expected to grow at ~83% CAGR through 2020**
- **Changing competitive landscape** due to Millicom and Bharti merger
- **Rapidly growing subscriber base** and solid macroeconomic conditions expected to drive growth in wireless
- **MTN launched 4G in all regions** in Jun’16, the first nationwide 4G network, w/ smaller entrants launching regional 4G networks
- **4Q15 800 MHz auction results** – MTN Ghana won 2x10 MHz (only MTN result announced)

WIRELESS CARRIER OVERVIEW:

**Top 3 Carrier Characteristics**

<table>
<thead>
<tr>
<th>AMT Customer?</th>
<th>Subscriber Market Share</th>
<th>Spectrum Holdings</th>
<th>Current Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTN Group</td>
<td>✓</td>
<td>48%</td>
<td>~20 MHz Holdings in 800, 900, 1800, and 2100 MHz bands</td>
</tr>
<tr>
<td>Vodafone</td>
<td>✓</td>
<td>24%</td>
<td>~65 MHz Holdings in 900, 1800, and 2100 MHz bands</td>
</tr>
<tr>
<td>Airtel Tigo</td>
<td>✓</td>
<td>26%</td>
<td>~20 MHz Holdings in 900 and 1800 and 2100 MHz bands</td>
</tr>
</tbody>
</table>

**Carrier-Announced Network Deployment Timelines**

- **MTN Group**
  - HSPA+
    - Spent $96M on network in 2014; 2.3k 2G sites and 1.2k 3G+ sites
  - 2016: Invested $62M network investment promised in 2014
  - Signed merger deal Mar’17
  - 2018: Signed merger deal Mar’17

- **Vodafone**
  - UMTS/HSPA
    - Invested 700M in network
    - 2,000 cell sites by May’15
  - 2018: Signed merger deal Mar’17

- **Airtel Tigo**
  - UMTS/HSPA
    - Spent $24M on 3G network: plan to deploy 275 new cell sites
    - 7.6M homes passed by Dec’15
  - 2018: Signed merger deal Mar’17

Notes: (1) Data from 2Q17; AV&Co. projection based on 2008-4Q14 CAGR
### Wireless Market Overview:

#### WIRELESS MARKET OVERVIEW:

<table>
<thead>
<tr>
<th>Indicator</th>
<th>As of 3Q17</th>
<th>2010 – 3Q17 CAGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wireless Subscribers</td>
<td>24M</td>
<td>20%</td>
</tr>
<tr>
<td>Wireless Penetration</td>
<td>66%</td>
<td>16%</td>
</tr>
<tr>
<td>Data as % of Revenue</td>
<td>30%</td>
<td>7%</td>
</tr>
<tr>
<td>Yearly ARPU</td>
<td>$2.06</td>
<td>-16%</td>
</tr>
</tbody>
</table>

#### Key Catalysts

- **Major MNOs to outsource tower builds**
- **Airtel, MTN Uganda and Smile** (3) to expand 4G networks and services, however buildout restricted by lack of spectrum
- **Rural coverage** improvement initiatives underway, including 770km fiber ring to towns in western Uganda
- New market entrant Vodafone launched 4G LTE network in Feb’15 in 2 cities using 2.6 GHz band

### Wireless Carrier Overview:

#### Top 4 Carrier Characteristics

<table>
<thead>
<tr>
<th>AMT Customer?</th>
<th>Subscriber Market Share</th>
<th>Spectrum Holdings</th>
<th>Current Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTN Group</td>
<td>✓ 51%</td>
<td>up to 44 MHz</td>
<td>2G/3G /4G</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Holdings in 2300, 2500, 2600, 3500 and 900, 1800 MHz bands</td>
<td></td>
</tr>
<tr>
<td>Airtel</td>
<td>✓ 33%</td>
<td>up to 14MHz</td>
<td>2G/3G /4G</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Holdings in 900, 1800, 2100 MHz band</td>
<td></td>
</tr>
<tr>
<td>UCOM</td>
<td>✓ 9%</td>
<td>up to 44 MHz</td>
<td>2G/3G</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Holdings in 900, 1800, 2100, 2300, 2500, 3500 MHz bands</td>
<td></td>
</tr>
<tr>
<td>Africell</td>
<td>✓ 4%</td>
<td>Holdings in 800, 1800 and 2100 MHz bands</td>
<td>2G/3G /4G</td>
</tr>
</tbody>
</table>

#### Carrier-Announced Network Deployment Timelines

- **2012**: MTN Group
- **2013**: Launched LTE in Kampala in Apr’13
- **2014**: Expanded LTE network to all major towns in Jul’15
- **2015**: Plans to invest 114M in network expansion and upgrade
- **2016**: Bharti
- **2017**: UCOM
- **2018**: Africell

Notes: (1) CAGR based on '07-1Q15 period (2) Based on 2017 MTN (3) Smile announced $46M network investment in Apr17.

---

**AMERICAN TOWER**
### WIRELESS MARKET OVERVIEW:

#### Snapshot

<table>
<thead>
<tr>
<th>Indicator</th>
<th>As of 4Q16</th>
<th>2010 – 4Q16 CAGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wireless Subscribers</td>
<td>8.3M</td>
<td>18%</td>
</tr>
<tr>
<td>Wireless Penetration</td>
<td>170%</td>
<td>17%</td>
</tr>
<tr>
<td>Data as % of Revenue</td>
<td>50%</td>
<td>31%</td>
</tr>
<tr>
<td>ARPU</td>
<td>$9.3</td>
<td>-4%</td>
</tr>
</tbody>
</table>

#### Key Catalysts

- **70 MHz** of spectrum (2×20MHz in 1800MHz and 2×15MHz in 1900MHz/2100MHz) left over from 2011 auction *auctioned Jul’17*
  - Movistar and Claro each win 35 MHz
- Auction of **100 MHz of 700 MHz** band likely to occur late 2018 / early 2019
- **Sutel lifts tariff regulations** from 4 out of eleven markets analyzed (Dec’16)
- **ICE market share has declined** rapidly since monopoly ended in 2011
- **Fonatel funds network expansion projects** to underserved communities

#### Subscriber Market Share 3Q2017

- Grupo ICE / Kolbi: 58%
- Telefónica: 22%
- América Móvil: 19%
- Other: 1%

### WIRELESS CARRIER OVERVIEW:

#### Top 3 Carrier Characteristics

<table>
<thead>
<tr>
<th>AMT Customer?</th>
<th>Subscriber Market Share</th>
<th>Spectrum Holdings</th>
<th>Current Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grupo ICE / Kolbi</td>
<td>✓</td>
<td>58%</td>
<td>~550 MHz Holdings in 850, 1800, and 2600 MHz bands</td>
</tr>
<tr>
<td>Claro</td>
<td>✓</td>
<td>19%</td>
<td>~70 MHz Holdings in 1800 and 2100 MHz bands</td>
</tr>
<tr>
<td>Telefónica</td>
<td>✓</td>
<td>22%</td>
<td>~60 MHz Holdings in 850, 1800, and 2100 MHz bands</td>
</tr>
</tbody>
</table>

#### Carrier-Announced Network Deployment Timelines

<table>
<thead>
<tr>
<th>Year</th>
<th>Carrier</th>
<th>Technology</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>HSPA+</td>
<td>LTE</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>HSPA</td>
<td>LTE in Nov’13</td>
<td>354 LTE base stations reaching 4M people by EOY 2014</td>
</tr>
<tr>
<td>2014</td>
<td>HSPA</td>
<td>LTE network in Jul’14</td>
<td>$19.9M investment on 4G expansion; Rolls out to 24 new locations</td>
</tr>
<tr>
<td>2015</td>
<td>HSPA+</td>
<td>LTE network in Apr’14</td>
<td>Will triple coverage by EOY 2016</td>
</tr>
<tr>
<td>2016</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: (1) The four deregulated markets are international telephony, fixed internet, international roaming and transit telecommunications
Sources: American Tower research & analysis, Altman Vilandrie & Co. research & analysis, BuddeComm Costa Rica Mobile Report 3Q2017, Sutel
**WIRELESS MARKET OVERVIEW:**

### Snapshot

<table>
<thead>
<tr>
<th>Indicator</th>
<th>As of 3Q17</th>
<th>2010 – 3Q17 CAGR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wireless Subscribers</td>
<td>140M</td>
<td>8%</td>
</tr>
<tr>
<td>Wireless Penetration</td>
<td>74%</td>
<td>4%</td>
</tr>
<tr>
<td>Average Monthly Voice MOU(1)</td>
<td>164</td>
<td>11%</td>
</tr>
<tr>
<td>ARPU</td>
<td>$3</td>
<td>-11%</td>
</tr>
</tbody>
</table>

**Key Catalysts**

- All carriers currently expanding LTE
- National Broadband Plan seeks to cover 80% of population with 3G by 2018
- **Ntel deploys LTE-A** in three cities (1Q17)
- Low penetration vs. other African nations presents growth opportunities
- MTN was **only bidder** in May’16 2.6GHz auction due to high prices (won 2x30 MHz)

**Data as a % of Wireless Revenue**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6%</td>
<td>7%</td>
<td>21%</td>
<td>23%</td>
<td>28%</td>
<td>32%</td>
<td>41%</td>
<td>50%</td>
<td></td>
</tr>
</tbody>
</table>

**Approximate ~738% increase**

**WIRELESS CARRIER OVERVIEW:**

**Top 4 Carrier Characteristics**

<table>
<thead>
<tr>
<th>Carrier</th>
<th>AMT Customer?</th>
<th>Subscriber Market Share</th>
<th>Spectrum Holdings</th>
<th>Current Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MTN Group</strong></td>
<td>✓</td>
<td>36%</td>
<td>110 MHz</td>
<td>2G/3G /4G</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Holdings in 700, 800, 900, 1800, 2100, 2600 MHz</td>
<td></td>
</tr>
<tr>
<td><strong>Globacom</strong></td>
<td></td>
<td>25%</td>
<td>60 MHz</td>
<td>2G/3G /4G</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Holdings in 900, 1800, and 2100 MHz bands</td>
<td></td>
</tr>
<tr>
<td><strong>Bharti</strong></td>
<td>✓</td>
<td>27%</td>
<td>60 MHz</td>
<td>2G/3G /4G</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Holdings in 900, 1800, and 2100 MHz bands</td>
<td></td>
</tr>
<tr>
<td><strong>Emirates Telecom Corp.</strong></td>
<td>✓</td>
<td>12%</td>
<td>60 MHz</td>
<td>2G/3G /4G</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Holdings in 900, 1800, and 2100 MHz bands</td>
<td></td>
</tr>
</tbody>
</table>

**Carrier-Announced Network Deployment Timelines**

- **MTN Group**
  - 2G coverage was 87% of population; 3G was 49% of population
  - $1.2B network upgrade
  - Launched in 6 cities 3Q16
  - Rolled out 4G on 800MHz acquired from Visafone 3Q16

- **Globacom**
  - 2014 expansion resulted in 90% 3G coverage of its network
  - Coverage of 60 locations by Nov’16

- **Bharti**
  - 3G across 36 states
  - Launched parts of Lagos 3Q16

Notes:
1. AV&Co. projection based on Bank of America Merrill Lynch Wireless Matrix 2Q15
2. AV&Co. projection based on Bank of America Merrill Lynch Wireless Matrix 3Q15
Sources: American Tower research & analysis, Altman Vilandrie & Co. research & analysis, Bank of America Merrill Lynch Global Wireless Matrix January 2018, Nigerian Communications Commission, GSMA
Appendix: Spectrum Auction Summary and Definitions
<table>
<thead>
<tr>
<th>Year</th>
<th>Bands Auctioned</th>
<th>Winners</th>
<th>Tech.</th>
<th>Build-out Requirements</th>
<th>Expected: 2018-19</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>AWS-3</td>
<td>AT&amp;T, Verizon, Dish, T-Mobile</td>
<td>4G</td>
<td>Licensees must cover 40% of their licensed population within six years and 75% of their licensed population within 12 years</td>
<td>mmWave spectrum (28, 37, 39, 64-71 GHz and other bands) auction likely, date not announced</td>
</tr>
<tr>
<td>2016</td>
<td>600MHz</td>
<td>T-Mobile, Dish, Comcast, AT&amp;T</td>
<td>4G</td>
<td>Licensees must cover 40% of their licensed population within six years and 75% of their licensed population within 12 years</td>
<td>CBRS 3.5 GHz (3550 MHz – 3700 MHz) bands gaining momentum, backed by major wireless providers</td>
</tr>
<tr>
<td>2015</td>
<td>700, 900, 1500, and 1800 MHz</td>
<td>Deutsche Telekom, Vodafone, Telefonica O2</td>
<td>4G</td>
<td>N/A</td>
<td>1800MHz spectrum renewal process and new fiber regulatory framework in 2018</td>
</tr>
<tr>
<td>2015</td>
<td>700 MHz</td>
<td>SFR, Orange, Bouygues, Free Mobile</td>
<td>4G</td>
<td>Licensees are required to cover 50% of rural areas by Jan22 and increase coverage on mobile transport including underground trains</td>
<td>3.5 GHz (3410 MHz – 3460 MHz) allocation for fixed wireless set for 2018-2019</td>
</tr>
<tr>
<td>2014</td>
<td>700, 850, 1700, 1900 MHz</td>
<td>Personal, Claro, Telefonica</td>
<td>3G/4G</td>
<td>N/A</td>
<td>No known plans</td>
</tr>
<tr>
<td>2017</td>
<td>2500 MHz</td>
<td>Movistar, Claro, Personal</td>
<td>4G</td>
<td>Successful bidders must roll out service on 2.5 GHz (2500 MHz – 2690 MHz) bands in 24-48 months</td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td>1710-1780 (AWS-1), 2110-2180 (AWS-3)</td>
<td>AT&amp;T, America Movil</td>
<td>4G</td>
<td>N/A</td>
<td>2.5 GHz (2500-2690 MHz) auction set to take place March 2018, all carriers allowed to participate</td>
</tr>
<tr>
<td>2016</td>
<td>700 MHz</td>
<td>Altan Consortium</td>
<td>4G</td>
<td>Awardee of “Red Compartida” government contract is required to build out a nationwide LTE wholesale network</td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>450MHz, 2.5GHz</td>
<td>Claro, TNL, Vivo, Telecom Italia Mobile, Sunrise, Sky Brasil</td>
<td>4G</td>
<td>Coverage in major cities and rural areas required before soccer world cup and Olympic games (2016)</td>
<td>Auction of “Lot C” of spectrum auction from 2015 will include additional 1.9 and 2.5 MHz spectrum; also potential re-auction of 700 MHz; Anatel to allocate 2300 MHz – 2400 MHz band for mobile use</td>
</tr>
<tr>
<td>2014</td>
<td>700MHZ</td>
<td>Claro, TIM, Vivo, Algar</td>
<td>4G</td>
<td>Responsible for clearing 700 MHz of legacy interference</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>1.8, 1.9, 2.5-2.69 GHz</td>
<td>Telefonica Brasil, Claro, TIM Brasil</td>
<td>4G</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>2.6 GHz</td>
<td>Claro, Entel, Movistar (20 MHz each)</td>
<td>4G</td>
<td>12 months to deploy their networks across most of Chile; must also connect ~583 isolated areas within 24 months</td>
<td>No known plans</td>
</tr>
<tr>
<td>2014</td>
<td>700 MHz</td>
<td>Claro, Entel, Movistar</td>
<td>4G</td>
<td>Requires coverage of 854 km of roads, 503 schools, 98% of population</td>
<td>No known plans</td>
</tr>
<tr>
<td>2013</td>
<td>AWS</td>
<td>Movistar, Nextel (Entel)</td>
<td>4G</td>
<td>$400mn of investment required in the first 10 years for each block of spectrum</td>
<td>No known plans</td>
</tr>
<tr>
<td>2016</td>
<td>700MHz</td>
<td>Entel, Claro, Movistar</td>
<td>4G</td>
<td>Each licensee required to roll out LTE to 195 underserved towns (15 in y1, 129 in y2, 51 in y3)</td>
<td>No known plans</td>
</tr>
</tbody>
</table>

Sources: Regulatory authorities, Press releases, Fierce Wireless, AV&Co. Research & Analysis; Note: N/A indicates no major build-out requirements or no data available
### Spectrum Auction Summary – Developing Wireless Markets

#### Completed Major Auctions: 2012-2017

<table>
<thead>
<tr>
<th>Year</th>
<th>Bands Auctioned</th>
<th>Winners</th>
<th>Tech.</th>
<th>Build-out Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colombia</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>1.7, 2.5 GHz</td>
<td>Movistar, Claro, Tigo, <strong>DirectTV, Avantel</strong></td>
<td>4G</td>
<td>Purchase ~550K tablets for poor students and improve wireless internet quality in rural areas</td>
</tr>
<tr>
<td>Paraguay</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>1.7, 2.1 GHz</td>
<td>Tigo, Claro</td>
<td>4G</td>
<td>N/A</td>
</tr>
<tr>
<td>2012</td>
<td>800, 1800 MHz</td>
<td>Vodafone, Airtel, Uninor, Idea, <strong>Videocon</strong></td>
<td>2G</td>
<td>N/A</td>
</tr>
<tr>
<td>2014</td>
<td>900, 1800 MHz</td>
<td>Vodafone, Airtel, Idea, Uninor, RCOM, Aircel, <strong>Jio</strong></td>
<td>2G</td>
<td>N/A</td>
</tr>
<tr>
<td>India</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>800, 900, 1800 MHz</td>
<td>MTS India</td>
<td>2G</td>
<td>N/A</td>
</tr>
<tr>
<td>2015</td>
<td>800, 900, 1800 and 2100 MHz</td>
<td>Airtel, Vodafone, Idea, RCOM, <strong>Jio, Aircel, Tata</strong></td>
<td>2G/3G</td>
<td>N/A</td>
</tr>
<tr>
<td>2016</td>
<td>800, 1800, 2100, 2300, and 2500 MHz</td>
<td>Reliance Jio, Bharti Airtel, Idea, Vodafone</td>
<td>2G/3G/4G</td>
<td>N/A</td>
</tr>
<tr>
<td>Uganda</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>no major auctions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ghana</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>800 MHz</td>
<td>MTN Ghana</td>
<td>4G</td>
<td>N/A</td>
</tr>
<tr>
<td>Costa Rica</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td>1800, 1900, 2100 MHz</td>
<td>Movistar, Claro</td>
<td>3G/4G</td>
<td>N/A</td>
</tr>
<tr>
<td>Nigeria</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>2.3GHz</td>
<td>Bitflux (consortium of VDT, BitCom, and Superflex)</td>
<td>3G/4G</td>
<td>N/A</td>
</tr>
<tr>
<td>2016</td>
<td>2.6GHz</td>
<td>MTN</td>
<td>3G/4G</td>
<td>N/A</td>
</tr>
</tbody>
</table>

#### Expected: 2018-19

<table>
<thead>
<tr>
<th>Country</th>
<th>Expected Bands and Winners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colombia</td>
<td>Auctions in 700, 900, 1900 and 2500 MHz bands delayed into 2018 (no date announced)</td>
</tr>
<tr>
<td>Paraguay</td>
<td>January 2018 Auction of 700 MHz bands (2x5 MHz paired blocks in 713-803 MHz bands), Tigo wins ~30 MHz, with Claro and Personal winning ~20 MHz (unofficially)</td>
</tr>
<tr>
<td>India</td>
<td>Planning mass spectrum sale of more than 3,000 MHz of frequencies in the 700 MHz, 800 MHz, 900 MHz, 1800 MHz, 2100 MHz, 2300 MHz, 2500 MHz, 3300 MHz-3400 MHz and 3400 MHz – 3600 MHz bands</td>
</tr>
<tr>
<td>Ghana</td>
<td>No known plans</td>
</tr>
<tr>
<td>Nigeria</td>
<td>No known plans</td>
</tr>
</tbody>
</table>

Sources: Regulatory authorities, Press releases, Fierce Wireless, AV&Co. Research & Analysis; Note: N/A indicates no major build-out requirements or no data available
Definitions and Data Sources

Definitions

- **ARPU**: The monthly average revenue per user is calculated by dividing service revenues by the average subscriber base during the quarter.

- **Data as % of ARPU**: Data revenue including messaging revenues, as reported by carriers as percentage of ARPU.

- **Subscribers**: Data based on reported subscribers by carriers. This may include more than one SIM card per user, which may be counted as multiple subscribers.

- **Voice Minutes of Use**: The minutes of use per month per average user is calculated by dividing total minutes of use as reported by carriers, using estimates where available, by the average subscriber base during the quarter.

- **Wireless Penetration**: Mobile subscribers as a percentage of country population.

Data Sources

- [Bank of America Merrill Lynch](#) - Global Wireless Matrix 05 January 2018

- [Altman Vilandrie & Company](#) - Research and Analysis

- [American Tower](#) - Research and Analysis