

LTE Technology and Rural Broadband
DiploFoundation Webinar



Milan Vuckovic
Analyst, Wireless Policy Development
Verizon Communications

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- **Snapshot of Verizon & US Mobile Marketplace**
- **4G LTE Technology Evolution and Performance Capabilities**
- **Verizon 4G LTE Deployment Experience**
- **Innovation and Socio-Economic Benefits of 4G LTE Technology**
- **4G LTE Rural Applications**
- **Questions & Answers**



Global Provider of Technology Solutions

Wireless	Consumer and Small Business	Enterprise Business
<p>109M total connections</p> <p>America's largest and most reliable wireless 3G network, covering more than 290 million people</p> <p>4G LTE wireless broadband launched in 2010, available in 371 markets covering more than 240 million Americans in August 2012, entire 3G footprint by mid-2013</p> <p>Industry-leading customer loyalty for U.S. wireless providers</p>	<p>Largest 100% fiber-optic network in the U.S.</p> <p>Transformed from traditional telecom into a broadband and entertainment business</p> <p>5.1M FiOS Internet subscribers and 4.5M FiOS TV subscribers</p> <p>8.7M Wireline Broadband connections</p> <p>16.5 million premises passed with FTTH</p>	<p>Enterprise (including 99% of Fortune 1000) and government customers worldwide</p> <p>More than 200 data centers in 22 countries</p> <p>Leading provider of cloud and information security services</p> <p>Reaching customers in 2700+ cities, more than 150 countries</p> <p>485,000 route miles of cable over six continents</p>



Snapshot: U.S. Mobile Broadband Marketplace

Mobile Broadband Technologies

Spectrum Assets

Sprint



CDMA 1xEV-DO (Rev 0 | Rev A)
802.16 WiMAX
LTE

1.9 GHz PCS
2.5 GHz EBS/BRS *
800 MHz SMR

verizon wireless



CDMA 1xEV-DO (Rev 0 | Rev A)
LTE

700 MHz
850 MHz Cellular
1.9 GHz PCS
1.7 / 2.1 GHz AWS

..T..Mobile..

802.11 WiFi
HSPA
HSPA+
LTE (1H 2013)

1.9 GHz PCS
1.7 / 2.1 GHz AWS

at&t



802.11 WiFi
HSPA
HSPA+
LTE

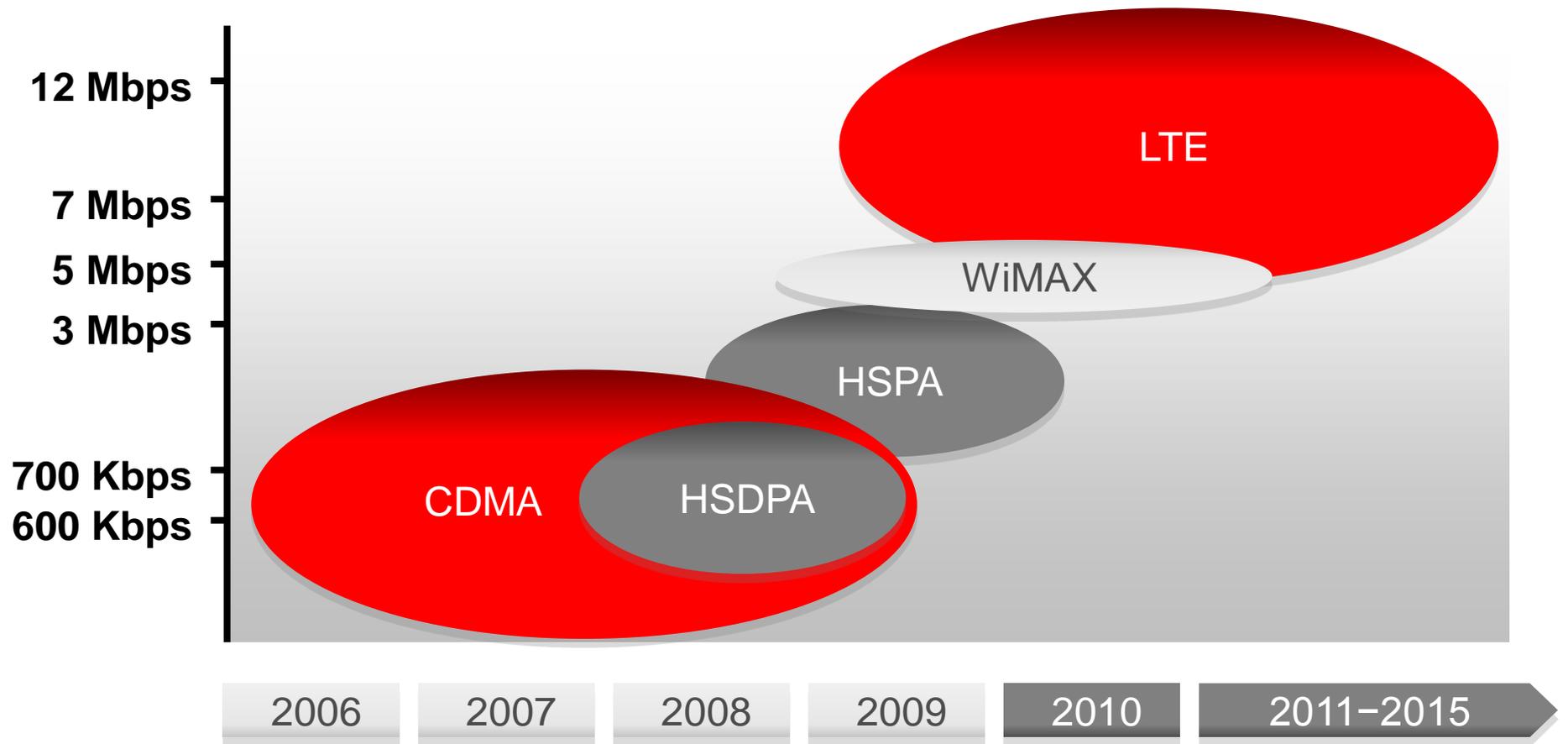
700 MHz
850 MHz Cellular
1.9 GHz PCS
1.7 / 2.1 GHz AWS

Competition has led to aggressive deployment of mobile broadband and significant capital investment.

* through partnership with Clearwire



4G LTE Technology Evolution and Performance Capabilities

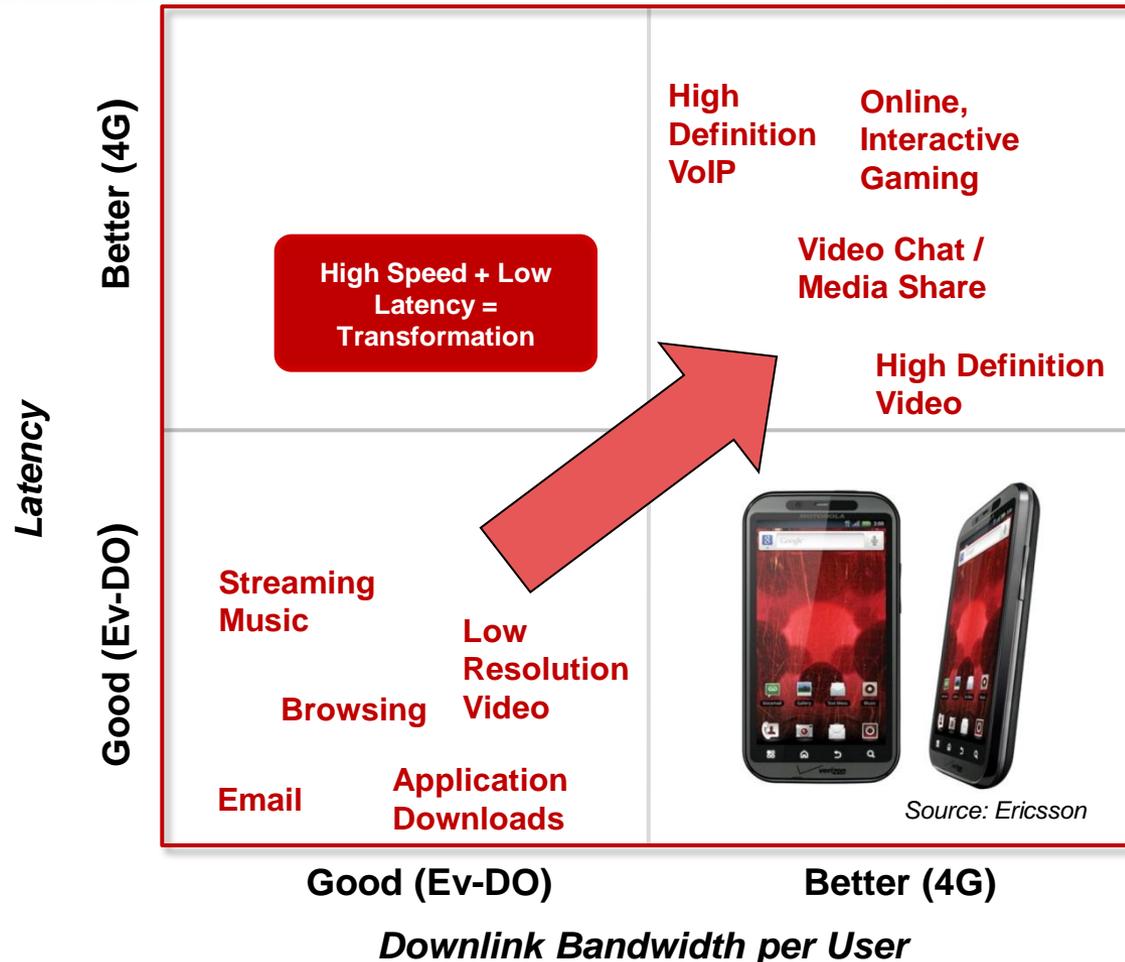


4G LTE speeds are up to 10x faster than 3G



4G LTE Technology Evolution and Performance Capabilities

- **Downlink and uplink performance:** 5 – 12 Mbps DL and 2 – 5 Mbps UL.
- **Low latency and jitter:** Allows real time communication and interaction.
- **All-IP:** LTE + IP Multimedia Subsystem facilitates the development of converged applications and simultaneous voice and data.
- **High spectral efficiency:** Permits more users in a constrained amount of spectrum.
- **Always on:** Continuous packet connectivity allows 4G devices to efficiently maintain sessions – avoids delays incurred for session set-up.



LTE's global adoption will drive scale and simplify roaming



Verizon 4G LTE Deployment Experience

Leadership



Early Adoption



Global

300+ Carriers in:

- | | | |
|-----------|-------------|--------------|
| Argentina | Germany | Portugal |
| Armenia | Hong Kong | Puerto Rico |
| Australia | India | Saudi Arabia |
| Austria | Indonesia | Senegal |
| Bahrain | Italy | Singapore |
| Belgium | Japan | South Africa |
| Brazil | South Korea | Sri Lanka |
| Brunei | Kuwait | Sweden |
| Cambodia | Malaysia | Taiwan |
| Canada | Mexico | Thailand |
| Chile | Namibia | UAE |
| China | Netherlands | UK |
| Colombia | New Zealand | Uruguay |
| Ecuador | Norway | USA |
| Egypt | Pakistan | Uzbekistan |
| Finland | Paraguay | Venezuela |
| France | Peru | Vietnam |
| | Philippines | |

Source: 4GAmericas.org; July 2012

Verizon: World's 1st large-scale 4G LTE network



Verizon 4G LTE Deployment Experience

Verizon Wireless 4G LTE Markets

2010

4G LTE deployed in 38 markets and 60 major airports, reaching more than 110m people.

2011

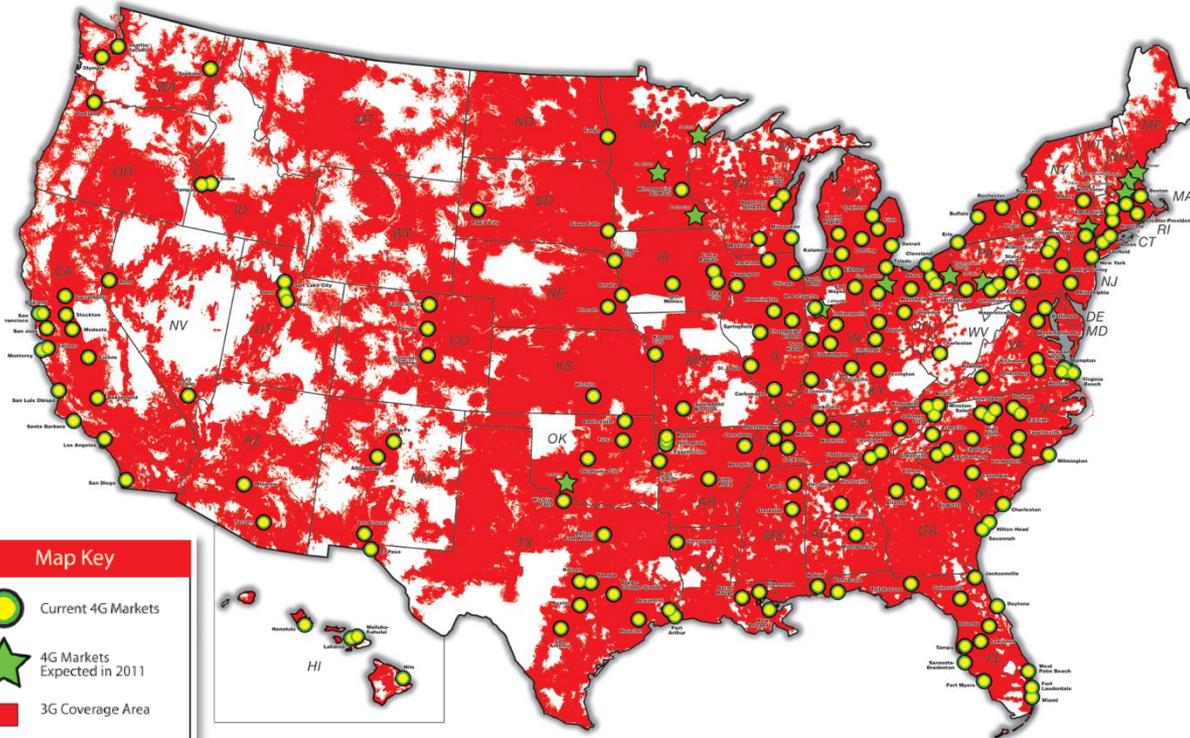
4G LTE deployed in 190 total markets by year end, covering more than 200m people.

2012

4G LTE will cover 250m people by the end of the year.

2013

4G LTE will cover the entire Verizon 3G footprint, currently more than 290m people.



Map Key

- Current 4G Markets
- 4G Markets Expected in 2011
- 3G Coverage Area
- 4G/3G Coverage Not Available

First large-scale 4G LTE deployment in the world



Verizon 4G LTE Deployment Experience



HTC



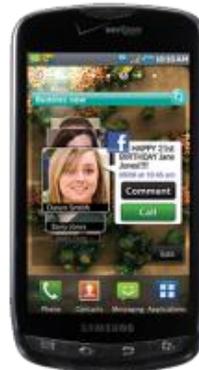
LG



4Q10

1H11

July 2012



Samsung



Samsung



Apple



Innovation and Socio-Economic Benefits of 4G LTE Technology

**Application
Innovation Center**
(San Francisco, CA)



LTE Innovation Center
(Waltham, MA)

4G Venture Forum
(Basking Ridge, NJ)





Innovation and Socio-Economic Benefits of 4G LTE Technology

Healthcare



Education



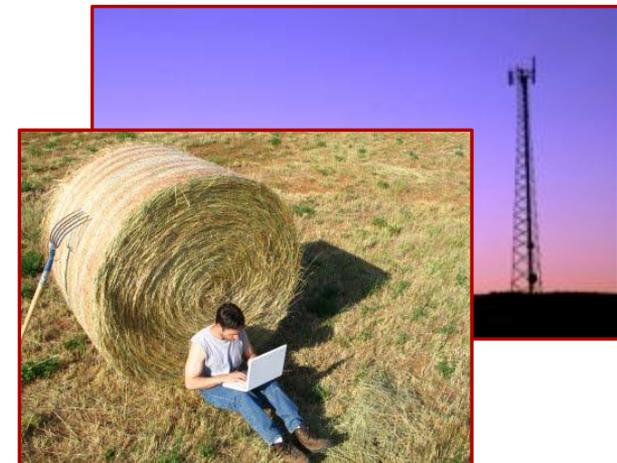
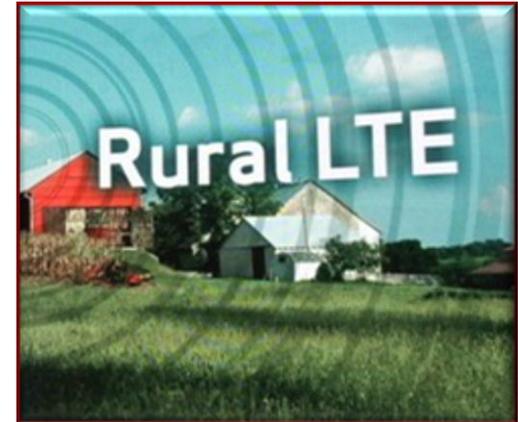
Sustainability





4G LTE Rural Applications

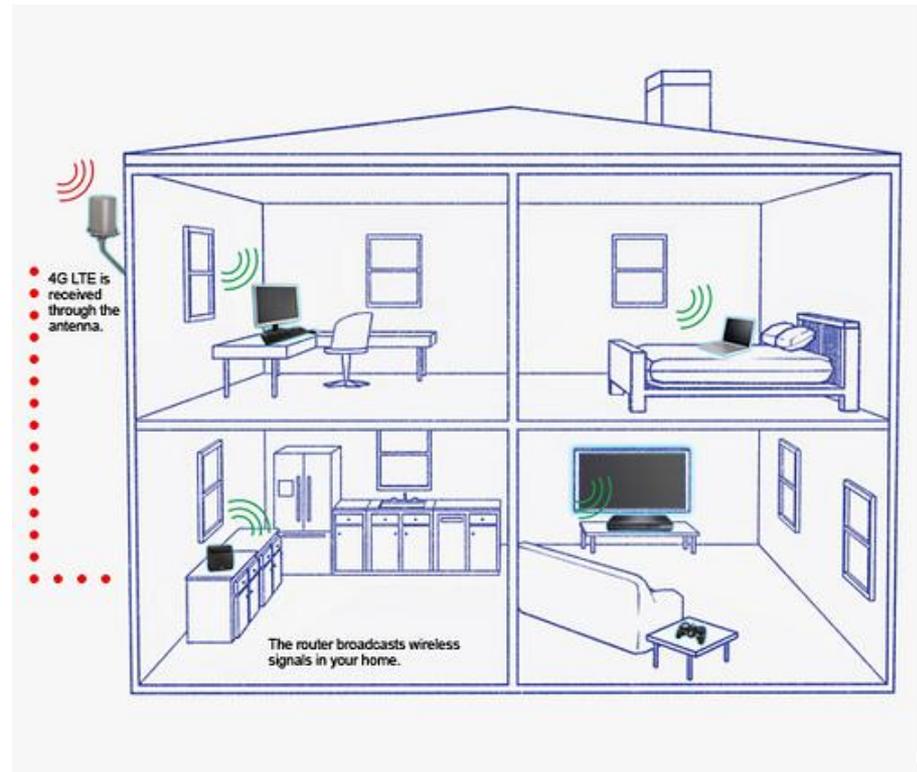
- **Extend LTE mobile broadband service to rural communities.**
 - Bring benefits of 4G services to rural markets quickly and efficiently
 - Expand VzW's national coverage footprint
- **Forge business relationships with qualified program participants who can build and maintain a high-quality 4G LTE mobile broadband network.**
 - Infrastructure Resources
 - Telecommunications Expertise
 - Commitment to Customers
- **Ensure a consistent customer experience in both VzW and participant coverage areas.**
- **Allow rural operators to benefit from Verizon's technical expertise and packet core investment.**





4G LTE Rural Applications

- In-home LTE-based broadband service
 - Ideal broadband solution for rural areas that traditionally have not had reliable access to high-speed Internet
- Brings the power and speed of our 4G LTE network to the home
- Available nationwide



- US Public Policy Has Enabled Vibrant Mobile Broadband Marketplace
 - Exclusivity
 - Flexibility
 - Competition
- 4G LTE Delivers Wireline Broadband Speeds in Wireless Environment
- 4G LTE Enables Innovation and Delivers Economic Benefits
- 4G LTE is Ideal for Reaching Unserved and Underserved Rural Areas



Thank You!

Milan Vuckovic

milan.vuckovic@verizon.com