

# LTE Technology and Rural Broadband

DiploFoundation Webinar



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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**



# Snapshot: Verizon

## ***Global Provider of Technology Solutions***

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



# 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

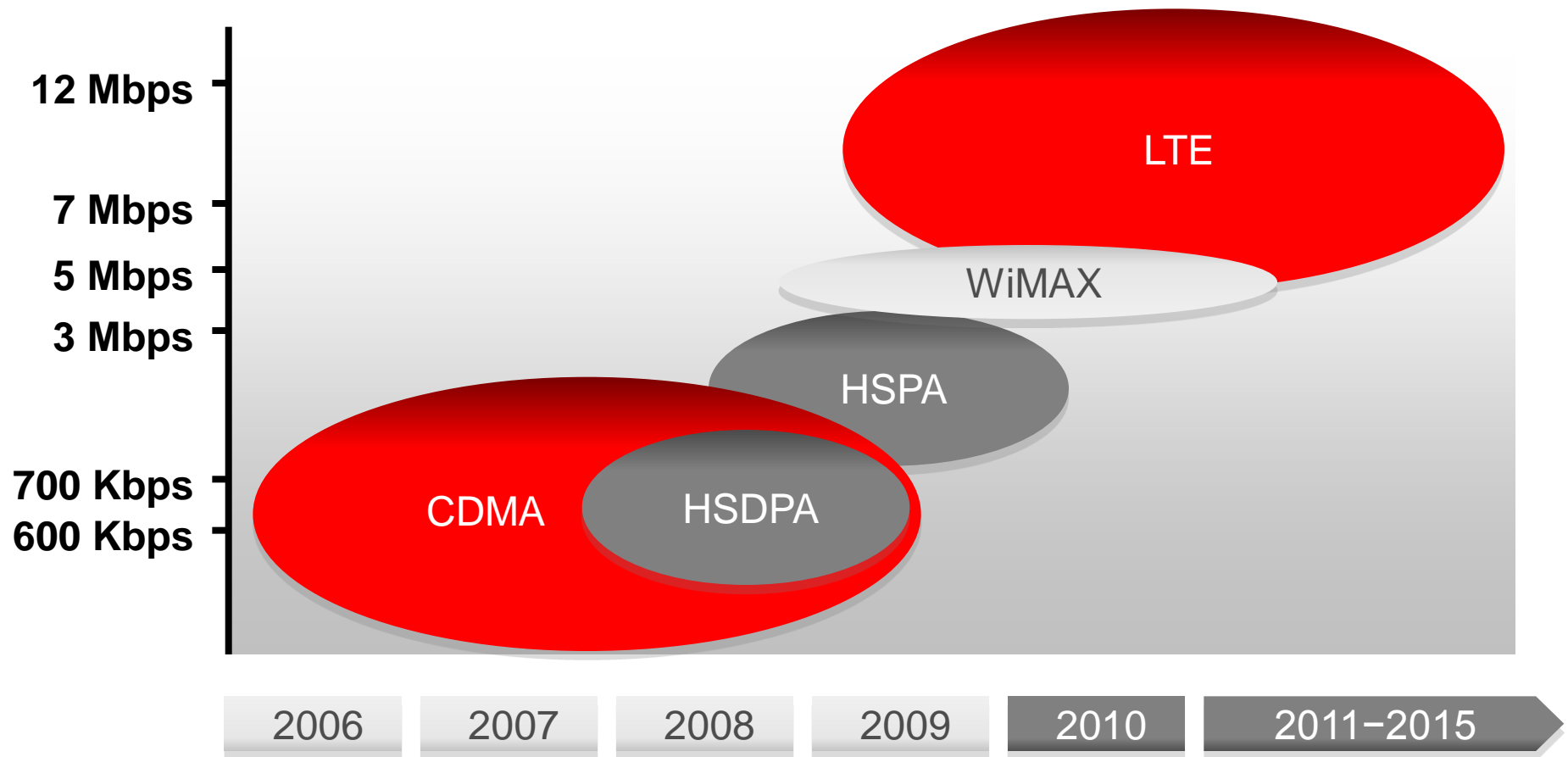
700 MHz  
850 MHz Cellular  
1.9 GHz PCS  
1.7 / 2.1 GHz AWS

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

\* through partnership with Clearwire



# 4G LTE Technology Evolution and Performance Capabilities

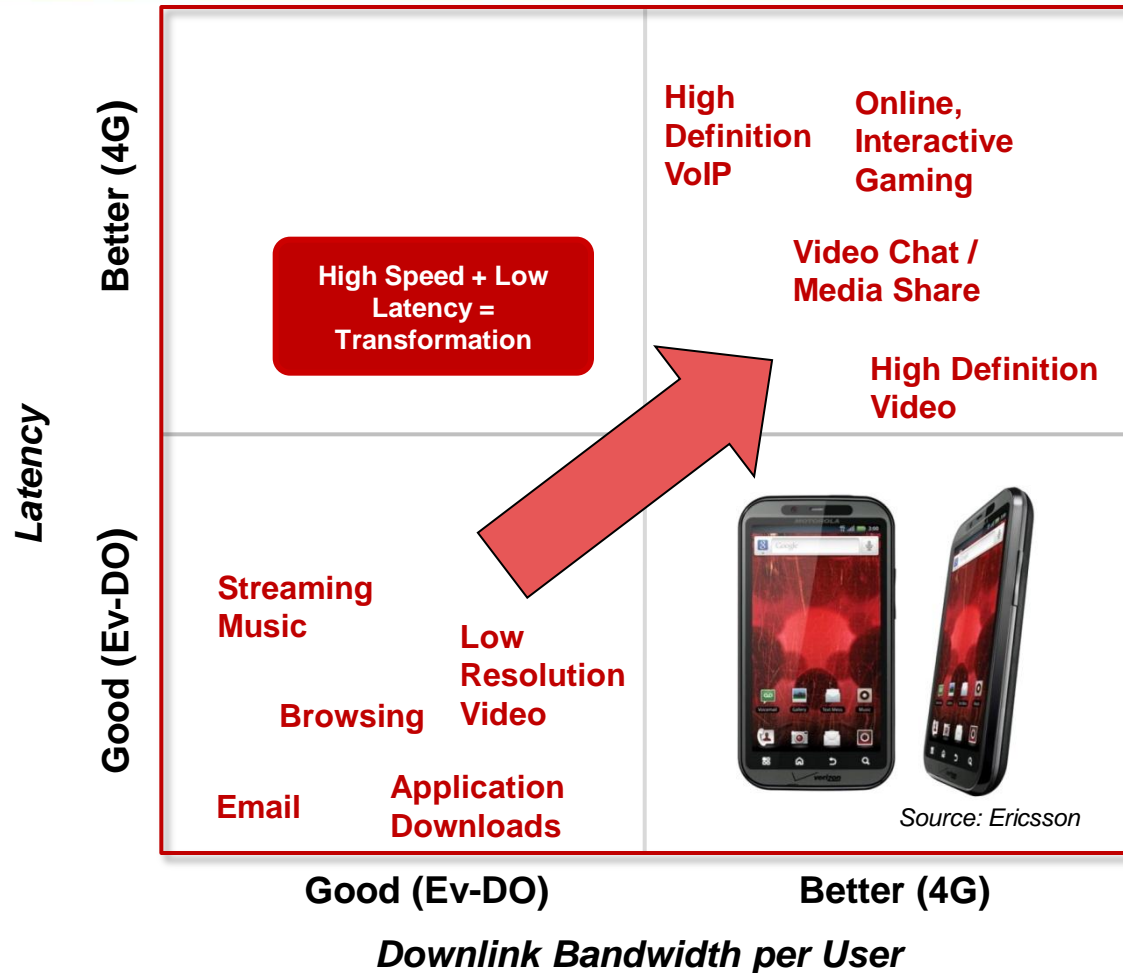


**4G LTE speeds are up to 10x faster than 3G**



# 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 1<sup>st</sup> 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

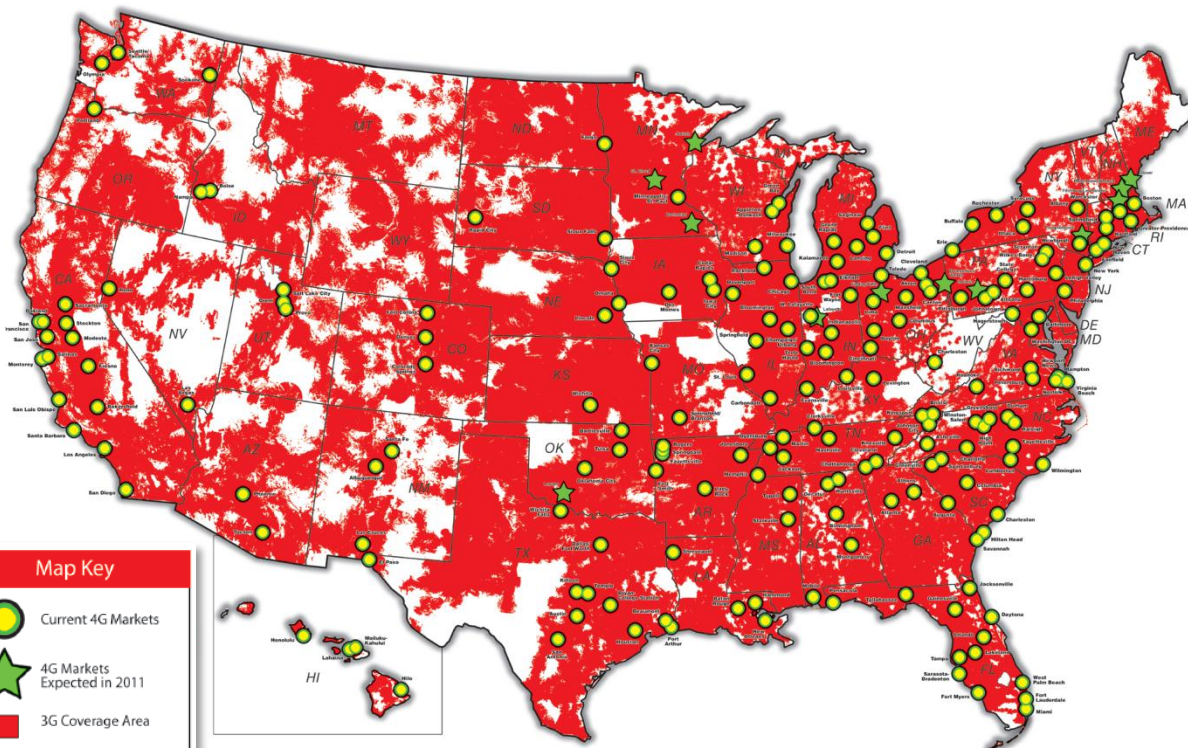
4G LTE deployed in 190 total markets by year end, covering more than 200m people.

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

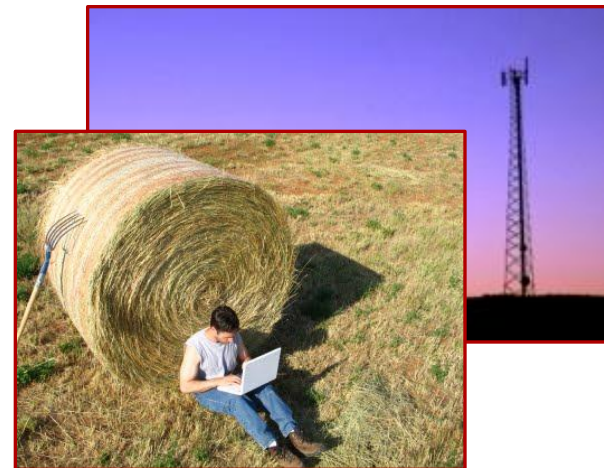
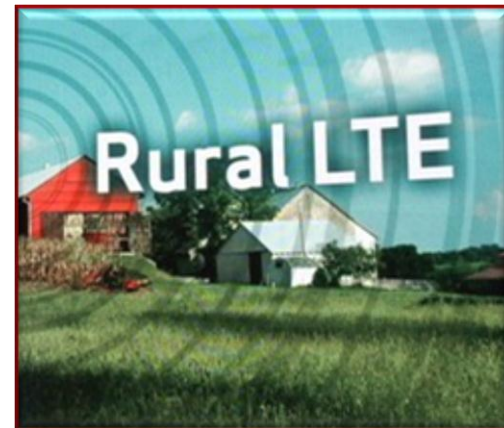






# 4G LTE Rural Applications

- **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!

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