



**National Broadband Plan:  
Next Steps in Implementing Public Safety  
Broadband and the D Block Auction  
May 12, 2010**



## Two Fundamental Goals

1. Rapid development of a nationwide, interoperable broadband wireless network for public safety.
2. Availability of spectrum capacity for commercial services on terms that foster competitive, universal mobile broadband.

# Summary of U.S. Cellular Positions

*U.S. Cellular supports NBP proposals to auction the D Block and fund the development of a nationwide, interoperable broadband network for public safety.*

- The FCC should proceed with a D Block auction as soon as practicable, using reasonably-sized license areas and no package bidding.
- Given its unique synergies with the PSBB spectrum, the FCC should especially encourage the formation of shared network partnerships between public safety and D Block licensees.
- The FCC should mandate the use of LTE technology in the public safety broadband network and the D Block.
- The FCC should require all LTE networks built using 700 MHz spectrum to support roaming and priority access on an equitable and compensatory basis.
- The FCC should require all 700 MHz licensees to utilize devices that support all paired spectrum blocks in the 700 MHz band.
- Congress should appropriate funds for build-out of the public safety broadband network.

# Move Forward with the D Block Auction

*The FCC should proceed with the D Block auction as soon as practicable to increase the opportunities for public safety broadband systems to be deployed in partnership with D Block licensees.*

- Other 700 MHz licensees are well down the path to commercial deployment of LTE devices.
- The FCC is considering waivers and the builders of these systems and any that follow should have the opportunity to consider partnerships with D Block licensees.
- The band 14 ecosystem needs a catalyst. Momentum for band 14 devices and technology will be significantly boosted by establishing commercial license interests in the band.

# Adopt Accessible License Sizes and Auction Rules

*The FCC should adopt license areas that make the D Block accessible to multiple bidders and should not use package bidding rules.*

- Reasonably-sized license areas will broaden the base of bidders and prospective partners for public safety.
- Reasonably-sized license areas will allow partnership opportunities in rural areas to flow to companies with the strongest existing infrastructures to leverage.
- Package bidding negates the benefits of smaller license areas and has proven difficult to implement without unintended consequences.
- The FCC should establish a National Committee of Commercial Public Safety Partners to represent 700 MHz licensees who are partners with public safety. This committee would provide a focal point for commercial partner input into ERIC proposals.

# Encourage D Block/PSBB Partnerships

*The D Block remains the first choice for partnerships with public safety and such partnerships should be encouraged.*

- D Block and PSBB operators will share 3GPP band 14 and have a natural synergy in the utilization of each others' excess capacity.
- Most spectrally efficient: Allows more efficient LTE channelization under a shared RAN model.
- Most cost effective: Shared equipment in the RAN and core.
- Avoids need to manage interference at the spectral boundary.

# Adopt LTE Technology

*The FCC should adopt the LTE standard for the public safety broadband network and as a license condition for the D Block.*

- Adoption of a common air interface will significantly advance the cause of interoperability.
- Deployments announced for the 700 MHz paired blocks will utilize LTE technology.
- The public safety community has selected LTE as its technology of choice for the public safety broadband network.

# Mandate Roaming and Priority Access

*The FCC should adopt reasonable and compensatory roaming and priority access obligations. The impact of these obligations should fall equitably on all networks deployed using paired 700 MHz spectrum.*

- The public safety community's vision for priority access is multi-faceted and includes user-class priority as well as QoS functions. Priority access functionality should be based initially on 3GPP Rel-8 capabilities.
- A public safety broadband network augmented by commercial capacity through roaming is a good fit for the normal/emergency usage dichotomy of public safety networks.
- A widespread roaming and priority access obligation will accelerate public safety access to better coverage and more capacity as commercial LTE networks are brought on line. It will give public safety access to a greater pool of capacity, limit exposure to a single-carrier network outage, and limit the potential impact of intensive public safety use on any single carrier's network and customers.
- Under non-emergency conditions, roaming and priority access should be subject to a maximum percentage of any single carrier's network capacity.
- Commercial operators participating in the shared roaming and priority access arrangement need to be able to roam onto the LTE networks of other participants in order to ensure balanced impact on commercial networks.
- Roaming should be provided at negotiated and fully compensatory rates.

# LTE Supports Roaming and Priority Access

*LTE supports flexible Priority and QoS mechanisms that can be configured to meet the needs of Public Safety. 3GPP Release 8 specifications standardize the Evolved Packet System (EPS) Quality of Service (QoS) concepts that can be applied to Public Safety Use Cases.*

- Allocation and Retention Priority (ARP)
  - Can be used by to determine priority when performing allocation and retention of bearers
  - Provides preemption vulnerability capability to determine whether a bearer should be dropped by a pre-emption capable bearer with a higher ARP priority value
- Access Class Barring
  - Devices assigned to specific Access Classes, including public and reserved Classes for Public Safety and Emergency
  - Network Access can be managed to dynamically prevent or limit network access under specific conditions such as network load or emergency conditions
- Cell Status
  - Provides network operators the flexibility to control cell status for each of its cells, so as to allow or prevent the terminals to select and reselect specific cells

# LTE Will Continue to Develop New Features

*Future releases of 3GPP, including Rel-9 and Rel-10, will enhance capabilities to support Public Safety requirements.*

- Enhancements for Multimedia Priority Service (eMPS)
  - Defines a set of functionality required to guarantee delivery and completion of multimedia calls (Voice, Video, Data), via priority access, in congestion or partial network outage scenarios due to catastrophic events.
- Relays
  - Provide enhancements to cell-edge coverage.
- Carrier and Spectrum Aggregation
  - Provides support for wider transmission bandwidths by aggregating contiguous and non-contiguous carriers.
- Coordinated Multi-Point transmission and reception
  - Coordination of transmission and reception of signals from/to one UE providing improvement in coverage, and throughput performance.

# Require Full Spectrum Devices in 700 MHz

*The FCC should adopt a full spectrum device requirement for the 700 MHz band.*

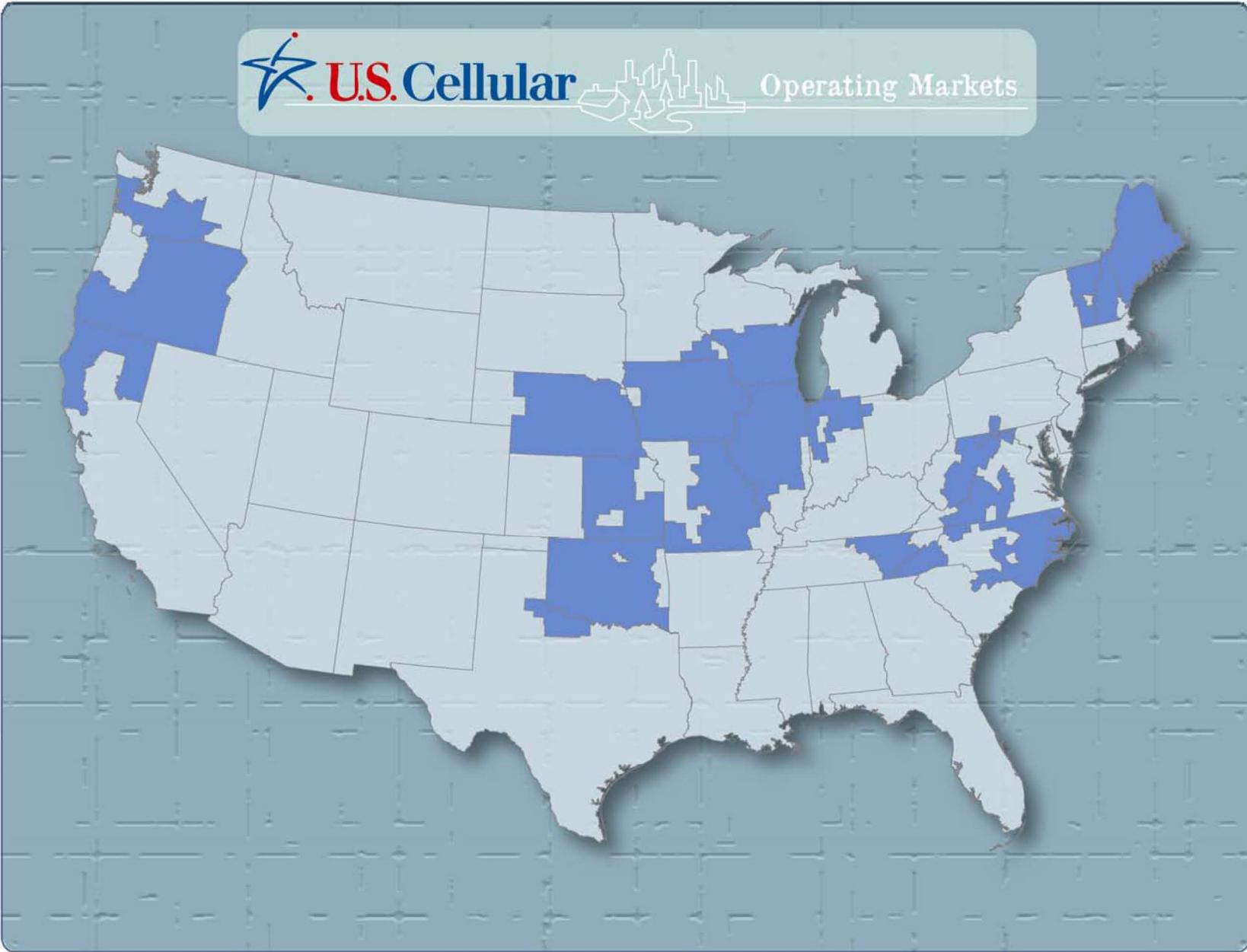
- The 700 MHz band plans, Auction 73 results, and the resulting decisions of the dominant players, have created an ecosystem issue that threatens to further concentrate the industry and marginalize public safety and other commercial spectrum.
- The FCC should require that all LTE devices operated on the paired 700 MHz blocks support the other paired blocks capable of supporting LTE channels (Lower A, B, C and Upper C, D, and PSBB).
- This requirement is essential expand the number of providers potentially available to partner with public safety and to provide roaming/priority access as contemplated by the NBP.
- A full spectrum solution is technically and financially feasible and might be best accomplished through a two band class approach (band class 12 plus a new band class combining 13,14 and the Upper A Block)

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# About U.S. Cellular



 **U.S. Cellular**  Operating Markets



# Coverage and Quality for Public Safety Broadband Wireless Services

- With USF support for voice services, US Cellular deployed cell towers to areas that lacked quality wireless voice service. Examples of new towers for unserved areas in 2009:
  - Iowa (Leando, Whittmore, Union, Green Bay, Akron, Ocheyedon)
  - Missouri (Rover, Sunnyview, Wyaconda, Chestnut Ridge, Dove Mountain, Cassville)
  - Nebraska (Grant, Pierce West, Snyder, Spalding, Chambers, Pleasanton, Franklin, Eustis, Leigh, Burr Crab Orchard)
  - Oregon (Bonanza, Malin, Hillcrest, Spray, Kings Spring)
- US Cellular has 3G coverage enabled on about 60% of its cell sites, reaching about 75% of its post-pay customers
  - Broadband coverage to many previously unserved and underserved areas
- Nine consecutive J.D. Power awards for highest call quality in North Central Region

