A Responsible Way Forward

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Needed to Make A Positive Future for Public Safety Happen:

1. Public Safety (PS) Interoperability and Priority Roaming on LTE Commercial Networks
2. 700 MHz Devices Support All 700 MHz Band Classes (Including PS Band Class 14)
3. 700 MHz Infrastructure supports all Band Classes
4. Supportive Regulatory Structure Enabling Competition to Create Shared Public Safety-Commercial Networks

Public Safety Priority Access Requirements can be met now and for the foreseeable future

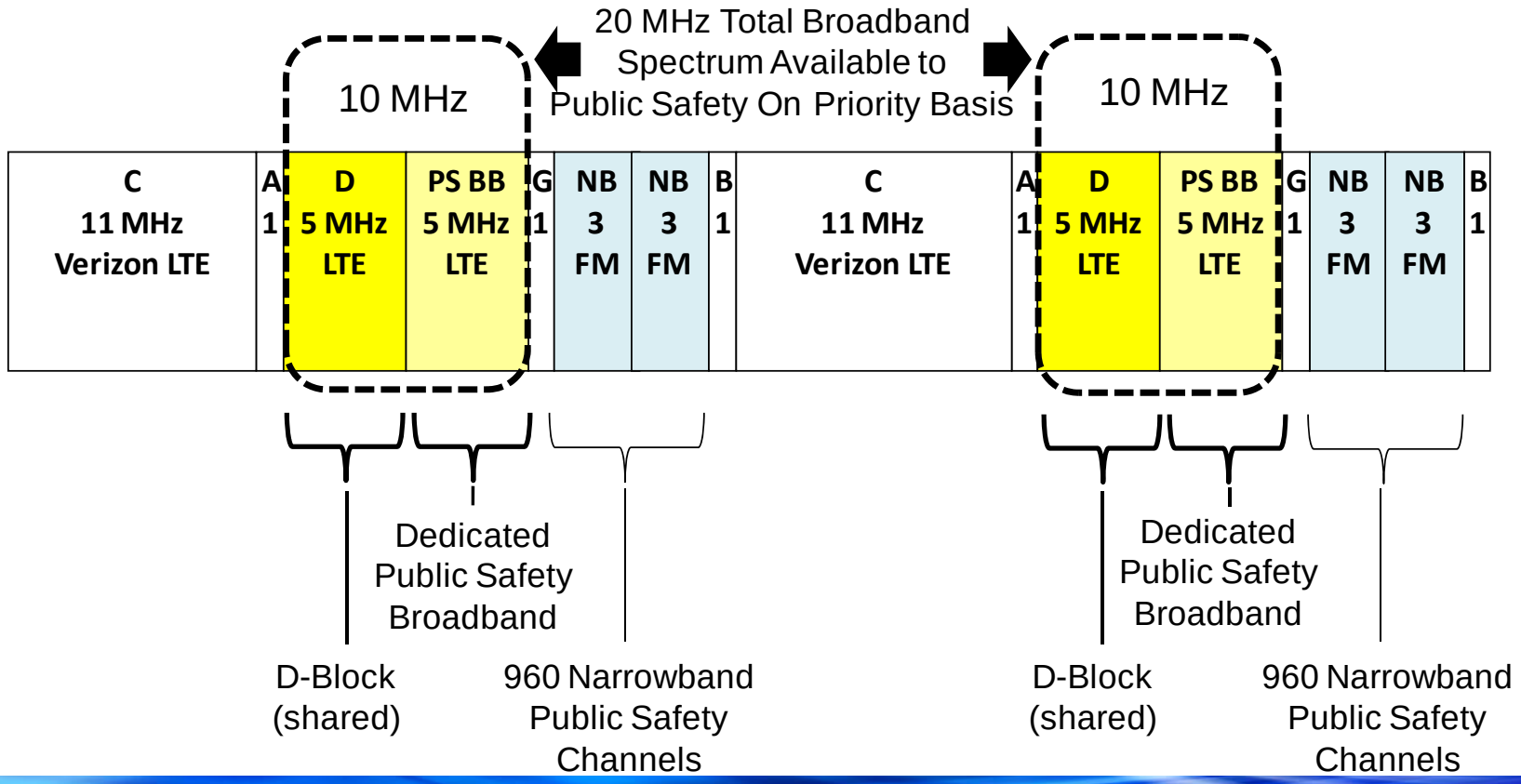
Possible: The LTE Standard Allows Priority Access for Public Safety Across Shared Commercial Spectrum

Valuable: Commercial Spectrum Sharing Adds to Dedicated Broadband Spectrum That Public Safety Already Has

Responsible: Approach Offers Significant Operational and Economic Benefits for Public Safety, Taxpayers and Innovation

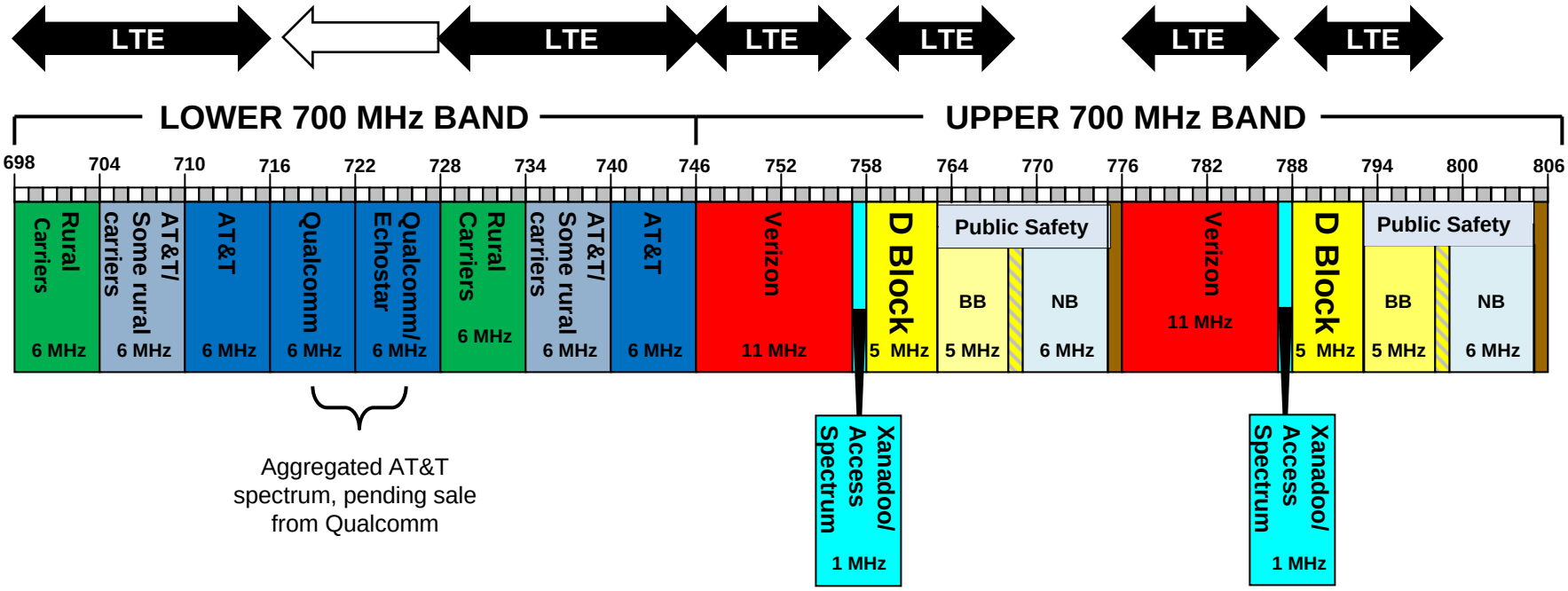
Focus of Current Discussion: The Upper 700 MHz Band

- 24 MHz Already Allocated to Public Safety
  - 10 MHz Dedicated for Nationwide Broadband
  - 12 MHz Dedicated for Narrowband (+2 MHz guard)
- D-Block is Adjacent to Public Safety Broadband Spectrum
  - Public Safety Can Advantageously Share with Commercial on Priority Basis



Real Opportunity: Full 700 MHz LTE Band Set

LTE Enables Sharing Across All 700 MHz LTE Bands,
Assuming Electronics Support All 700 MHz



Public Safety / Commercial 700 MHz Networks Use the Long Term Evolution (LTE) Standard

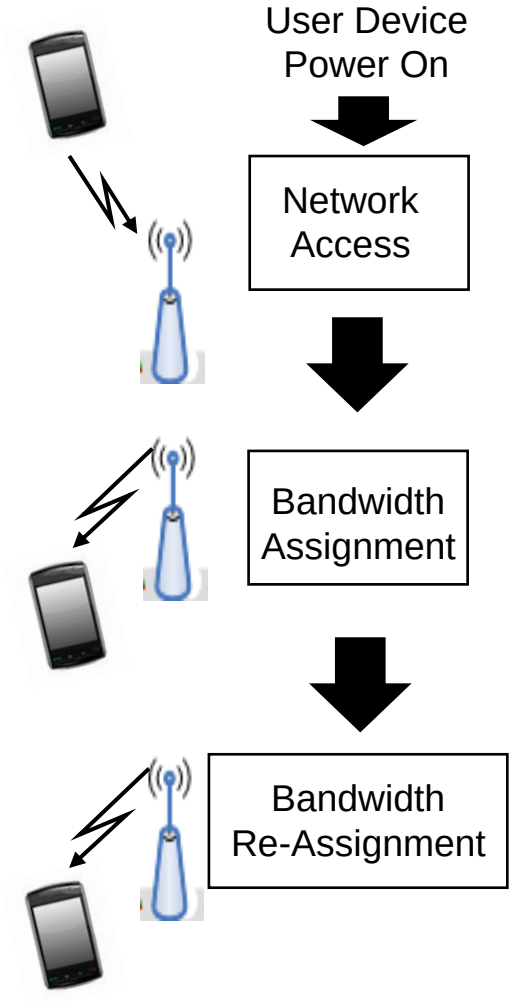
- **LTE is the Newest Generation of Global Wireless Standards**
  - **Built from ground up, for data, with integrated priorities built in**
- LTE is Fully IP Based making it Radically Different than Traditional "Circuit-Based" Radio Systems
  - User Information Sent as a Series of "**Packets**"
  - Same Approach as Internet
  - LTE Radio Channel Successfully Shared by Many Users Simultaneously
  - **"All Circuits Busy" No Longer Applies**
- **LTE Priority Access Replaces "Ruthless Preemption"**
  - Offers New Capacity Management Capabilities Not Possible on Previous Analog Networks
  - Preemption Provided in the LTE Standard
  - LTE Anticipates, Manages and Builds Priority Access in from Day-One to Assure that the Highest Priority Communications Go Through First

Key Aspects of a Public Safety Motivated Priority Access Scenario

- Public Safety Uses Their Dedicated Network Where Available
- **Automatic Handover** of Public Safety Users from Congested Dedicated Public Safety to Shared Commercial Network Where Both Networks Exist
- Public Safety Users **Can Connect on a Congested Network**
  - LTE Standard *Access Control* Delays Commercial Connection Requests so Public Safety Connection Requests Get Through
- Public Safety **Information Gets Through on Crowded Traffic Channels**
  - LTE Standard *Preemption Parameter* Gives Public Safety Traffic Priority Over Lower Priority Traffic
- **Priority Mechanisms Are Integral to the Existing LTE Standard**
  - Already Adopted by Public Safety and Commercial Operators in 700 MHz Band
  - LTE is Packet Based (like the Internet), Radically Different Than Previous Networks
  - LTE's Priority Mechanisms Were Not Possible on Previous Wireless Networks

LTE's 3 Priority Methods

Multiple Priority Levels at Each Level



1) **Initial Network Access:** High Priority Users Get Through Over Lower Priority Users During High Network Demand
   - 16 Access Classes
   - Classes 12-14 Reserved for High Priority
   - **LTE Access Barring** Inhibits Low-Priority Users If Necessary

2) **Assignment of Radio Bearers** (Packet Streams)
   - 9 Application and Bit Rate Categories
   - Packet Scheduling Prioritizes High-Priority Traffic Over Low-Priority Traffic

3) **LTE Allocation and Retention Priority**
   - 15 Priority Levels
   - Levels (2-7) for High Priority Users
   - **LTE Preemption Parameter** Allows High-Priority Users to "Preempt" Low-Priority Users to Get Bandwidth on a Crowded Network

LTE Meets Public Safety Needs for Accessing Commercial Networks

Public Safety *Requirement*	Priority Access *Solution*
Ubiquitous, Interoperable Coverage (Wherever 700 MHz Service Exists)	**•*Home Access* Where Both Dedicated Public Safety and Commercial Networks Exist •*Roaming Access* on Commercial Network If No Dedicated Public Safety Network Exists**
Public Safety Users Get Through on a Crowded *Control* (Access) Channel	**•LTE Inhibits Transmissions from Commercial Users (LTE *Access Barring*)***
Public Safety Traffic Gets Through on a Crowded *Traffic* Channel	**• LTE Can Preempt Commercial Traffic if Necessary to Allow Public Safety Traffic Through (LTE *Allocation Retention Priority*)* • Can divert commercial users to 3G network**
Public Safety Has Guaranteed Broadband Capacity on the Commercial Network	**•Pre-Set (extendable), Guaranteed Public Safety Capacity on Shared Commercial Network through Agreement with Carrier • Overflow Capacity on top of Exclusive Public Safety Dedicated Spectrum**
Automatic Access to the Shared Commercial Network	**•Automatic LTE *Handover* to Commercial Partner Where Both Dedicated and Commercial Networks Exist**

The Best Way Forward

- **LTE's Packet Architecture Ideal for Commercial Network Sharing**
  - Provides overflow capacity for extreme incidents, and enhanced geographic coverage, beyond the dedicated public safety network
  - Seamless interoperability and priority access wherever the shared commercial network exists
  - Public safety maintains control of public safety capacity and traffic
- **Significant Public Safety Advantages with Commercial Partnerships**
  - Better geographic coverage for urban *and* rural jurisdictions
  - Lower network operating and capital costs; lower device costs
  - Higher dedicated public safety network capacity
  - Faster deployment of dedicated public safety network
  - State-of-the-art functionality pacing commercial capabilities
- **Better Stewardship of Spectrum and National, Economic Interests**
  - Most efficient use of spectrum
  - Contributes billions to US Treasury, creates jobs and spurs investment