Creating a Nationwide Public Safety Broadband Network

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In the Beginning....

- 1995 – FCC/NTIA Forms Public Safety Wireless Advisory Committee (PSWAC) to Assess Public Safety Communications Needs to 2010

- September 11, 1996 – PSWAC Reports Needs of:
  - 97.5 MHz of New Spectrum by 2010
  - Including 25 MHz by Within Five Years
In the Beginning….

- Balanced Budget Act of 1997: Allocate 24 MHz of Spectrum Between 746 and 806 MHz (From TV Channels 60-69 Created by Digital TV Transition) to Public Safety
- FCC Designates Channels 63,64,68,69 for Public Safety

700 MHz (TV Channels 60-69)

Public Safety-TV Channels 63,64,68,69
On February 8, 2006, the President signed a law that requires TV Broadcasters to vacate these channels no later than **February 17, 2009**.
FCC Further Notice of Proposed Rulemaking (FNPRM) – April 27, 2007

- A complex proceeding involving both the lower and the upper 700 MHz band to be auctioned as well as several proposed band plans

- The proposed creation of a single National Public Safety License and Communications Network

- Enables a Public/Private Partnership to build a shared network in the 700 MHz band – former TV Channels 63, 64, 68, 69 along with Channels 62 and 67
- Combined spectrum assets are the basis for the shared network
- Public Safety access to 10 MHz of contiguous commercial spectrum (D Block)
- Issues a single nationwide license to the Public Safety Broadband Licensee (PSBL)
- Requires negotiating a Network Sharing Agreement
- The D Block licensee (the private partner) must build, at their expense, the network to public safety specifications
Previous Band Plan - Upper 700 MHz

New Band Plan - Adopted by FCC on July 31, 2007

Single National Public Safety License For National Broadband Network

Spectrum To Be Auctioned With Public Safety Network Requirements For National Broadband Network
Public Safety Spectrum Allocation in the 700 MHz Band

**Public Safety 700 MHz Allocations**

<table>
<thead>
<tr>
<th>Total Allocation (12 x 12)</th>
<th>24 MHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broadband Portion (5 x 5)</td>
<td>10 MHz</td>
</tr>
<tr>
<td>Narrowband Portion (6 x 6)</td>
<td>12 MHz</td>
</tr>
<tr>
<td>Guardband Portion (1 x 1)</td>
<td>2 MHz</td>
</tr>
</tbody>
</table>

**Legend**

- PSBL = Public Safety Broadband Licensee
- PSST = Public Safety Spectrum Trust
- PS Entities = Public Safety Narrowband Licensees
- SWBN = Shared Wireless Broadband Network
- BB = Broadband
- NB-V = Narrowband Voice (e.g., P25 systems)
- PS-GB = Public Safety Guardband

- FCC allocated spectrum to public safety for broadband data services
- Commercial D block, to be combined with public safety broadband allocation
Public/Private Partnership

- Commercial investment to build out the infrastructure
- Significant cost efficiencies
- Commercial “off-the-shelf” technologies adapted for Public Safety
- Nationwide broadband network
- Access to an additional 10 MHz of broadband spectrum during emergencies creates ability to scale
- Priority Access for Public Safety
Expected Nationwide Network

Sufficiently robust to meet reliability and performance requirements of Public Safety

- Hardening of transmission facilities
  - Cell sites and antenna towers built to withstand harsh weather and disaster conditions such as flooding and hurricane force winds

- Backup power sufficient to maintain operations for extended period of time
  - Enhanced battery backup with deployable generators
  - In place emergency generators for primary sites
  - Comprehensive generator service plan
Public Safety Control

- Sufficient capacity to meet requirements of Public Safety
  - Every day but also during large events, disasters and catastrophic situations
  - Automatic **Priority Access** with “**Ruthless Pre-emption**”

- Operational capabilities consistent with features typical of Public Safety systems

- PSBL has right of approval of all public safety network devices

- PSBL can purchase subscriber equipment from any manufacturer for use on the network
Capabilities

- State-of-the-art Security and Encryption

- At least one “dual mode” handset capable of operating on either 700 MHz or satellite frequencies

- Mobile voice, video, and data capability that is seamlessly interoperable across agencies, jurisdictions, and geographic regions
Terrestrial Coverage* of Public Safety Network in 2019

- 99.3% Population
- 73.5% CONUS Land Mass
- 63% US Land Mass
- All counties w/ population > 5 per sq. mile
- Satellite coverage in “white spaces”

* Map coverage is approximate – maps not to scale
June, 2007 - The Public Safety Spectrum Trust (PSST) was created in the District of Columbia as a not-for-profit corporation.

November, 2007 – FCC Issues nationwide Public Safety Broadband License to the PSST.
The Public Safety Spectrum Trust (PSST) is now governed by a fifteen member board – one representative from each of the following organizations:

AASHTO - American Association of State Highway Transportation Officials  
AHA - American Hospital Association  
APCO - Association of Public-Safety Communications Officials-International  
FCCA - Forestry Conservation Communications Association  
IACP - International Association of Chiefs of Police  
IAFC - International Association of Fire Chiefs  
ICMA - International City/County Managers Association  
IMSA - International Municipal Signal Association  
NASEMSO - National Assn of State Emergency Medical Services Officials  
NASNA – National Association of State 9-1-1 Administrators  
NEMA – National Emergency Management Association  
NENA - National Emergency Number Association  
NFOP – National Fraternal Order of Police  
NGA - National Governors Association  
NSA - National Sheriffs’ Association
More recently….

- January 24, 2008 – The 700 MHz auction began
- March 21, 2008 – Auction completed, raised nearly $20B
- Only one bid for D Block spectrum; did not meet minimum bid requirement of $1.3B
- FCC Report & Order allowed for another auction if there is no winning bid for the D Block
- Second Further Notice of Proposed Rule-making
  - Regional approach to auction
  - Price reduced, other proposed changes
- Report and Order Draft not Circulated
- February 17, 2009 TV clearing deadline moved to June 12, 2009
- Stimulus Plan and Transition Impact
Public Safety Spectrum Trust

A Nationwide Public Safety Mobile Broadband 700 MHz Network

WHY??
EMS Frequencies

- **VHF** – 155.xxx MHz
  - 155.340/155.175 (ambulance to hospital)
  - 155.280 (hospital to hospital)

- **UHF** – 463.xxx/468.xxx MHz
  - (10 "MED Channels")
  - Frequency Coordination
  - Voice Communications
  - Biotelemetry

- **Telephone**

- **700/800 MHz**
What We Lack

- Situational Awareness (SA)
  - Events
  - Resources

- Common Operating Picture (COP)

- Effective Voice Communications to Transfer Complicated Medical Information
TECHNOLOGY  ➔  EMS

“Push-me-pull-you”
Ridgeway Hospital

LIFE FLIGHT
To MVC

JONES MEM. HOSP. (DIVERT)

VERNON FD VOLUNTEER AMBULANCE

MERCY HOSP.

UNITED AMB.
UNITED CCT
United Wheelchair

MVC

CITY TRAUMA CTR.

CARDIAC

EMSREMS

RIDGEWAY EMS

RIDGEWAY HOSP.

Specialist Call List
Service Call List

- SOAP Notes
- 3/4 Lead EKG
- 12 Lead EKG
- VS Monitor

MVA

MVC

Pt.1
Pt.2

Tib/Fib Fx x1/x1
AO x 4
140/90;88;18;CR+
2ary -; GCS-,TS-
VHF/UHF

Won’t Cut It:

– Current: 9.6+ kbps @ 25KHz bandwidth
  – Early Dial-Up: 14.4 kbps
  – Current Dial-Up: 56 kbps
  – Mote V.S. Transmission: 76+ kbps
  – Basic video (300-700 kbps)
  – Ultrasound/CT?

– Narrow-banding by 2013: 12.5/6.25 KHz
– (More Available Channels for Voice)
– Narrowband 700/800 MHz
Commercial Wireless

- Current EMS Gateway Technology

Commercial Wireless:
- No priority for public safety users
  - Air Card Access Reliability
- Little cost savings for public safety users
- Systems not hardened/redundant to public safety standards
- Buyer beware
  - Own a Blackberry??
Mobile Wireless Data Technology Options

Tier 1/2 Data
- CDPD, RAM, ARDIS
- Narrowband PCS
- 2G WWAN
- 2.5G GPRS, 1x-RTT
- P25 data

Tier 3 Data
- 9.6 K
- 19.2 K
- 56 K
- 1 M
- 2 M
- 4 M
- 54 M
- 100 M

Tier 4++ Data
- 2 M
- 4 M
- 10 M
- 20 M
- 54 M
- 100 M
- 200 M

Rate

Mobility/ Coverage
- Personal
- Local
- ½ mile
- Wide
- 5 miles

Wireless LANs
- 802.11x

Meshed 802.11x

Spreading Spectrum Wireless LANs
- Meshed 802.11x

HPD

TIA902

802.20

3G UMTS, EV-DO

2.7G EDGE, WiDEN

2.5G GPRS, 1x-RTT

CDPD, RAM, ARDIS

802.16e

2G WWAN

802.11x

4.9 GHz

700 MHz

77

700 MHz

4.9 GHz

Personal

Local

½ mile

Wide

5 miles