

The T-Band Spectrum Panel Session: A Public Safety Community Concern [November 3, 2015 - Norman, Oklahoma]

Steve Proctor
SAFECOM Chair

Bob Symons
NCSWIC Acting Chair

Stu Overby – Moderator
Vice Chair, Spectrum Management Committee
Co-Chair, T-Band Working Group
National Public Safety Telecommunications Council (NPSTC)

Ray Edey
Executive Director,
Interagency Communications Interoperability System (ICIS)

Steve Staffier
Statewide Interoperability Coordinator (SWIC)
Executive Office of Public Safety and Security (EOPSS),
Commonwealth of Massachusetts



NPSTC T-Band Study

- **Stu Overby**
Vice Chair, Spectrum Management Committee
Co-Chair, T-Band Working Group
National Public Safety Telecommunications Council (NPSTC)
- **T-Band Study Overview**
 - T-Band Background
 - NPSTC Analysis Summary
 - NPSTC Conclusions
 - T-Band Report Update



The T-Band Background: Availability

- T-Band spectrum (470-512 MHz) allocated in 1971
- Public Safety & Business/Industrial users in the band
- Land mobile operation allowed in 11 urban areas
 - Boston, Chicago, Dallas, Houston, Los Angeles, Miami, New York, Philadelphia, Pittsburgh, San Francisco, Washington, DC.
- Spectrum amount/location in band vary by urban area
- Base stations locate within 50-mile radius of urban center; mobiles within 30-mile radius of base stations
- Land mobile and TV share the spectrum



The T-Band Background: Congressional

- Section 6103 of Public Law 112-96, enacted 2/22/12:
 - FCC must reallocate and begin auctioning Public Safety (PS) T-Band spectrum within 9 years of enactment (by 2/22/2021)
 - Public Safety relocation shall be completed within two years after auction is completed [i.e., by 2023].
 - Proceeds from auction “*shall be available to the Assistant Secretary [of Commerce] to make grants in such sums as necessary to cover relocation costs for the relocation of public safety entities from the T-Band spectrum.*”
 - Law is silent on Industrial/Business (I/B) T-Band spectrum



The T-Band Background: FCC

- FCC Follow-up
 - 4/26/12: FCC froze licensing of new and expanded PS and I/B T-band systems and exempted T-Band from narrowbanding.
 - FCC freeze is not required by the legislation
 - 2/11/13: FCC Public Notice sought input on how to comply with the legislation.
 - 10/24/14: FCC decision released 24 channel pairs of 700 MHz reserve spectrum with priority for T-Band licensees that commit to return same amount of T-Band channels.



NPSTC Analysis: 2012/2013

- 60 member T-Band Working Group formed June 2012
- Report released March 15, 2013 addressed the overall impact to Public Safety
 - Clarified T-Band Usage / License Analysis
 - Analyzed Potential Spectrum Alternatives
 - Estimated Relocation Cost, if spectrum were available
 - Qualifies likely auction revenue, compared to relocation cost
- Full NPSTC Report available at:
 - www.npstc.org: then enter “T-Band Report” in the search tool



NPSTC March 2013 Report: T-Band Spectrum by Market

Metro Area	TV Channels Designated for Land Mobile Use	Nominal Amount of Spectrum in MHz (includes both Public Safety and Industrial/Business)	% of Active Land Mobile Channels Licensed to Public Safety. [% Varies Across TV Channels]
Boston	14, 16	12	64%, 87%
Chicago	14, 15	12	40%, 56%
Dallas	16	6	20%
Houston	17	6	3%
Los Angeles	14,15,16,20	24	93%, 100%, 100%, 83%
Miami	14	6	17%
New York	14,15,16	18	69%, 70%, 100%
Philadelphia	19,20	12	82%, 78%
Pittsburgh	14,18	12	41%, 100%
San Francisco	16,17	12	37%, 35%
Washington, DC	17,18	12	28%, 21%

- Public Safety and Industrial/Business Channels are intermixed



NPSTC March 2013 Report: T-Band License Analysis by Market

Urban Area	Licensees	Channels Licensed	RF Sites	Repeaters	Mobiles/Portables
Boston	209	596	636	1,081	30,439
Chicago	114	279	212	477	23,965
Dallas	19	55	51	95	3,392
Houston	6	7	8	8	277
Los Angeles	50	546	474	7,814	41,701
Miami	15	43	28	70	2,067
New York	222	1054	751	3,348	94,831
Philadelphia	150	790	467	2,893	61,734
Pittsburgh	30	107	88	369	9,598
San Francisco	54	216	234	694	16,990
Washington, DC	22	129	87	465	10,103
Totals	925	3,822	3,036	17,314	295,097

- Public safety T-band usage varies by metro region
- Boston, Chicago, Los Angeles, New York & Philadelphia are the biggest Public Safety T-Band users



NPSTC March 2013 Report: Where Do I Move?

- NPSTC examined viability of other public safety bands as potential relocation homes:
 - 4/26/12, FCC froze licensing of new and expanded
 - Usage characterized by metro market
 - Essentially no open channels at VHF or UHF
 - Only a few channels open at 800 MHz
 - 700 MHz narrowband could partially support T-Band relocation, but does not fully solve problem
 - Unclear when 700 MHz NPSBN will support mission critical voice at coverage and reliability levels of T-Band systems
- See Report for full analysis methodology and results



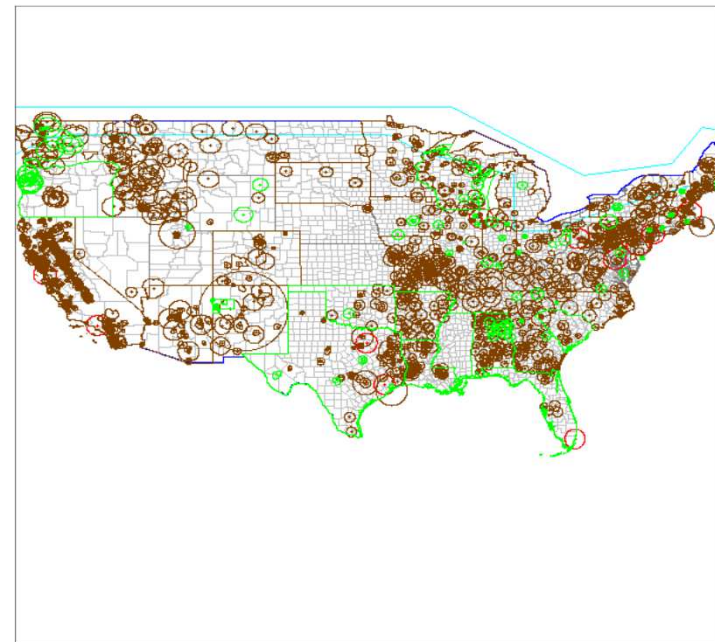
NPSTC March 2013 Report: Move to VHF ?

**PS VHF: 3.6 MHz; 480 channels-
12.5 kHz spaced at 7.5 kHz centers**

T-Band Market	VHF: Total PS Channels Licensed 50 mile Radius	VHF: Total PS Licenses 50 mile Radius
Boston, MA	783	2612
Chicago, IL	698	4262
Dallas/Fort Worth, TX	594	2206
Houston, TX	588	2141
Los Angeles, CA	639	2176
Miami, FL	515	833
New York/N.E. NJ	799	4687
Philadelphia, PA	745	3889
Pittsburgh, PA	736	3804
San Francisco/Oakland, CA	615	2019
Washington, DC/MD/VA	669	1659

Analysis courtesy of APCO International

**The Least Congested VHF Channel-
Used in 10 of 11 T-Band Areas**

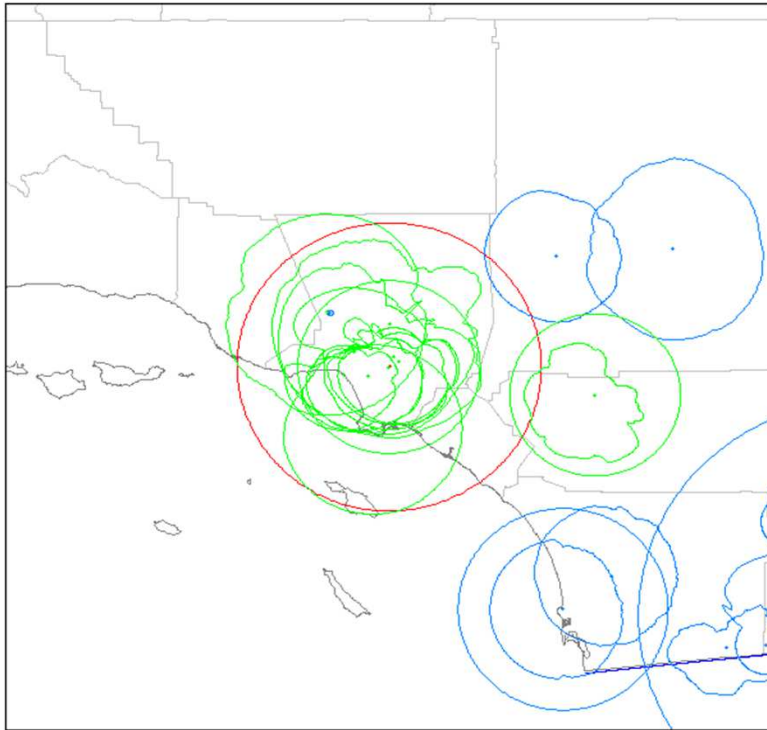


Analysis courtesy of Public Safety Coordination Associates (PSCA)



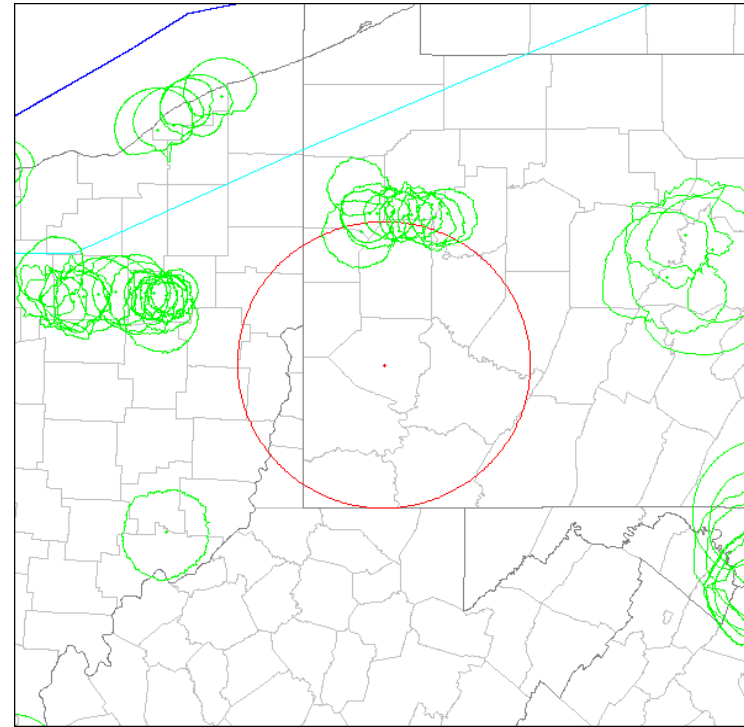
NPSTC March 2013 Report: Sample 800 MHz Band Analysis

Los Angeles 856.2375 MHz
Heavily Used



Analysis courtesy of David Eierman

Pittsburgh 854.9875 MHz
Some Availability



Red: T-Band Area
Green: 800 MHz Channel Being Analyzed
Blue: Adjacent 800 MHz Channel

NPSTC March 2013 Report: Move to 800 MHz ?

Table 3.5: Analysis of the Public Safety 800 MHz Interleaved Channels

T-Band Market	800 MHz Interleaved Channels Open	800 MHz Interleaved Channels <u>Partially</u> Open	T-Band Channels Licensed in Market that Need to Be Re-accommodated
Boston	0	0	596
Chicago	0	1	279
Dallas	3	5	55
Houston	3	0	7
Los Angeles	0	0	546
Miami	1	1	43
New York	1	0	1054
Philadelphia	1	7	790
Pittsburgh	3	5	107
San Francisco	3	2	216
Washington, DC	1	2	129



NPSTC March 2013 Report: Move to 700 MHz ?

Analysis of the Public Safety 700 MHz Channels

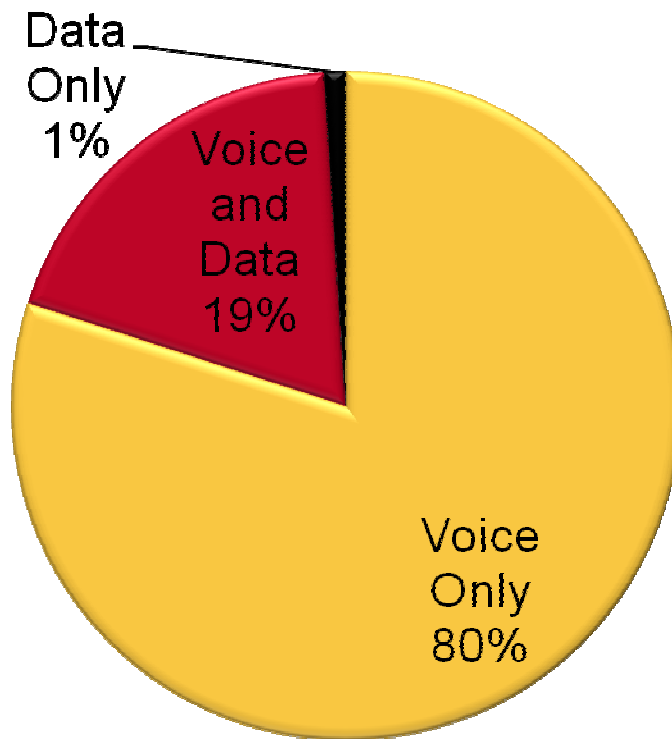
T-Band Market	700 MHz General Use Channel Pairs Allotted in Plan to Counties within 50 Mile Radius (Based on 12.5 kHz CH Pairs)	700 MHz General Use Channel Pairs Allotted in Plan to Counties within 50-Mile Radius <u>but Not Yet Licensed</u> (based on 12.5 kHz CH Pairs)	T-Band Channel Pairs Licensed in Market that Need to Be Re-accommodated
Boston	164	164	596
Chicago	183	153	279
Dallas	92	44	55
Houston	201	90	7
Los Angeles	342	203	546
Miami	136	93	43
New York	368	261	1054
Philadelphia	575	473	790
Pittsburgh	140	140	107
San Francisco	346	216	216
Washington, DC	220	147	129

Most Challenging Problem Areas: Boston, Chicago, Los Angeles, New York, Philadelphia

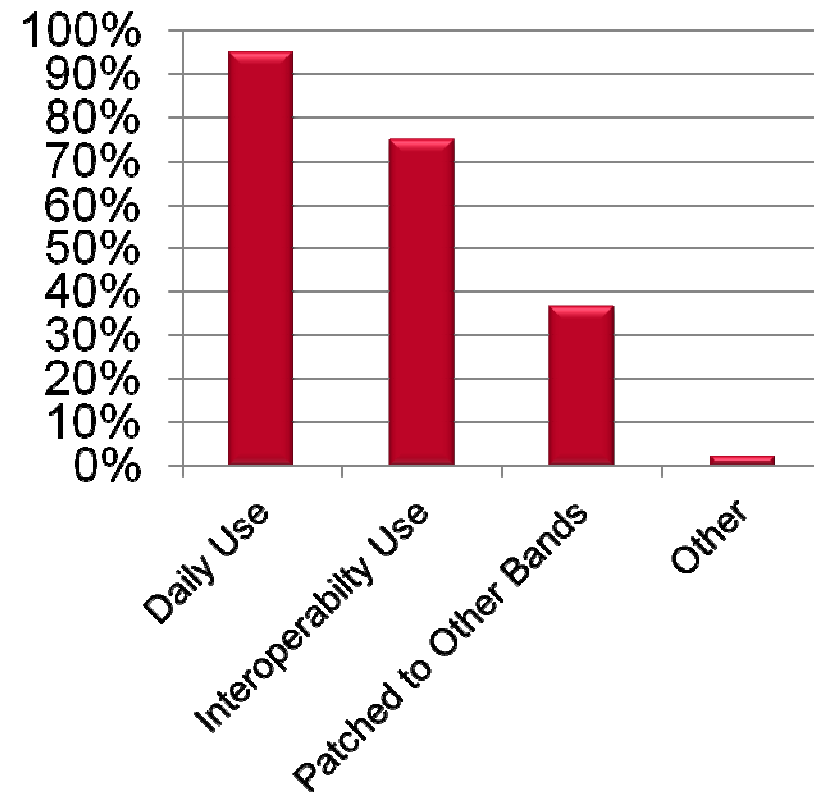


Primary Need is Voice for Both Daily Use and Interoperability

System Type



System Purpose



NPSTC Survey: 117 Responses
August-October 2012



NPSTC March 2013 Report: Cost Analysis Methodology

- Cost Analysis:
 - Used FCC T-Band license info, except where working group members had specific knowledge of deployed assets
 - For cost purposes, assumed all T-Band systems would migrate to 700 MHz land mobile spectrum
 - Included costs for systems, sites, repeaters, mobiles & portables, other (BDAs, VRs, spares, taxes, etc.) and planning
- See Report for full analysis methodology and results

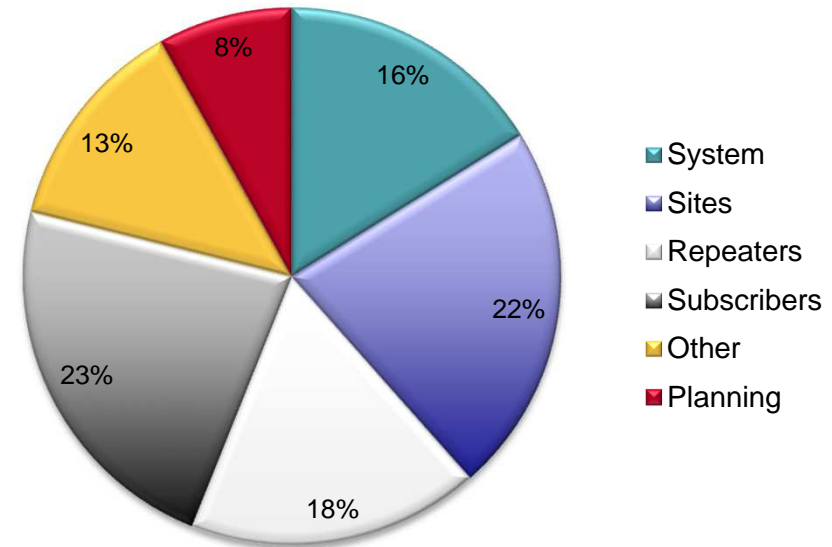


NPSTC March 2013 Report: Cost Analysis Results

Regional Costs

Region	Total Cost (M)
Boston	\$ 831.0
Chicago	\$ 759.7
Dallas	\$ 82.8
Houston	\$ 11.4
Los Angeles	\$ 857.3
Miami	\$ 49.4
New York	\$ 1,428.4
Philadelphia	\$ 1,151.6
Pittsburgh	\$ 203.4
San Francisco	\$ 355.1
Washington, DC	\$ 209.5
Total	\$ 5,939.7

Category Costs

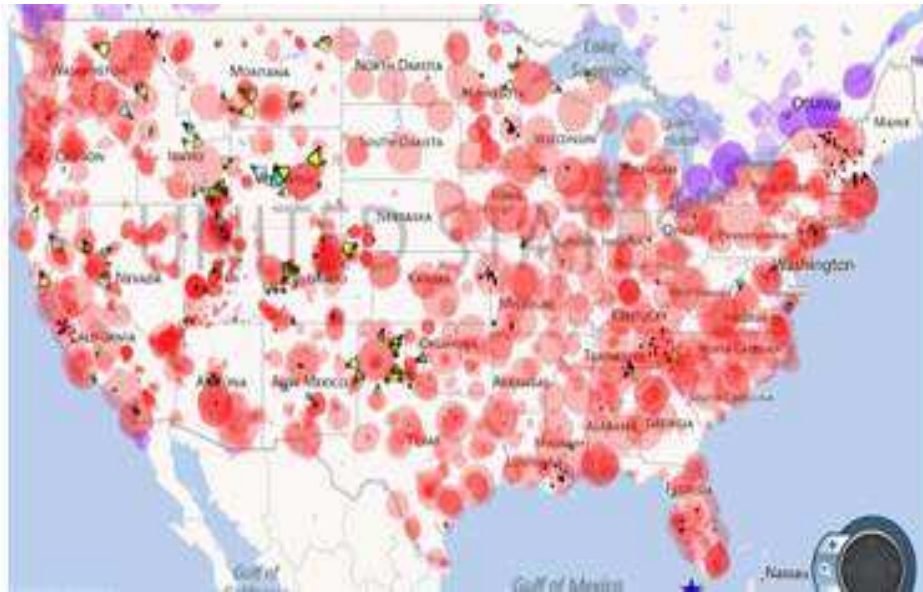


Total Cost Estimate: \$5.9B



NPSTC March 2013 Report: Potential Auction Revenue

- Relocating public safety does little to make the T-Band attractive for commercial wireless broadband use in auction
- Numerous TV broadcast operations remain on CH 14-20



TV Channels 14-20
Map Developed from Spectrum Bridge Website

NPSTC March 2013 Report: Summary Conclusion

Given the lack of alternative spectrum, cost of relocation, major disruption to vital public safety services, and likelihood that the spectrum auction would not even cover relocation costs, NPSTC believes implementing the T-Band legislation is not feasible, provides no public interest benefit, and the matter should be re-visited by Congress.



Planned NPSTC Report Refresh

- Planned Areas for T-Band Report Refresh:
 - Highlight specific case studies regarding the operational impact of removing T-Band spectrum
 - Update the view and timeline for NPSBN mission critical voice technology and buildout
 - Update potential relocation spectrum availability, e.g., 24 channels pairs of 700 MHz reserve spectrum
 - Review FCC license data for any significant changes
 - Update analysis of TV stations remaining in T-Band that would need to be moved for any meaningful conversion of spectrum to commercial use



Los Angeles Area T-Band

Ray Edey

Executive Director,
Interagency Communications Interoperability System (ICIS)

Los Angeles Area Impact

- T-Band Usage
- Auction Impact in Los Angeles
- Obstacles to Successful Auction



I.C.I.S. in the Los Angeles Region

Interagency Communications Interoperable System A California Joint Powers Authority

- Who is I.C.I.S.?
 - 37 Public Safety Police & Fire Agencies
 - 23 Regional 9-1-1 Dispatch Centers
 - 20,000 Radios Registered to the System
 - Operational Throughout 4,000 Square Miles of LA County
 - 86 T-Band Channel Pairs (30 more in process)
 - 26 Repeater Sites (12 more in process)
- JPA Formed in 2003 and System Operational in 2004



Los Angeles T-Band

- The Los Angeles Region Employs T-Band Television Channels 14, 15, and 16
- There is No Unencumbered T-Band
- LASD/LARICS Holds All of Channel 15



Los Angeles T-Band

- Los Angeles County: 4,300 Square Miles/12,000,000 People
- There are 88 Cities within Los Angeles County
- 46 Independent Police Departments
- 31 Independent Fire Departments
- 31 Cities including Los Angeles Hold T-Band Spectrum
- Los Angeles County/LARICS Holds 350+ Channel Pairs
- There is no 700/800 MHz Spectrum Available



T-Band Auction Impact

- From I.C.I.S. Discussions:
 - Congress acted on the belief there would be a true LTE Mission Critical Communications Technology fully developed and implemented by the time of the auction.
 - Other staffers believed migrating from T-Band to alternative spectrum was a mere “reprogramming.”
 - No one consulted users and FCC on assessment of true complexity and actual impact of a T-Band Auction.



T-Band Auction Impact

- A Transition from T-Band to another frequency band before the emergence of an LTE Solution will force a costly double-migration.
- Agencies will have to abandon functional T-Band Systems and Establish New 700/800 Systems (assuming it even exists).
- Later, these same agencies will need/desire to migrate their 700-800 MHz LMR systems to LTE.



Actual Obstacles to T-Band Auction

- There is no bull market for T-Band
- Even the *gross* funds raised by a T-Band Auction will fall far short of the cost of migrating the systems, not to mention the stranded capital inherent in the abandoned of fully-operable T-Band infrastructure
- The Stranded Capital in the T-Band Systems will be in the Billions, much of which are Federal Homeland Security dollars
- The cost to migrate to alternative spectrum will be even greater
- The later cost of electively migrating to an LTE solution will also likely be in the billions



Boston Area T-Band

Steve Staffier

Statewide Interoperability Coordinator (SWIC)

Executive Office of Public Safety and Security (EOPSS)

Commonwealth of Massachusetts

Boston Area Impact

- T-Band Interoperability
- T-Band Concerns



T-Band Interoperability in the Boston Area

Boston Marathon



Concerns from Massachusetts...

- Unable to expand/upgrade existing UHF T-Band Systems
- Affecting approximately 200 radio systems (Local/Regional)
- Extensive Investments over the last 10 years to improve Interoperability (BAPERN/Metro Fire)
- Complete LMR success during the Boston Marathon Bombing Event and Manhunt



The T-Band Giveback: A Public Safety Community Concern

Questions?



Break

Please return in 10 minutes



T-Band Migration Working Session: Developing Talking Points for T-Band Issues

Stu Overby – Moderator

Vice Chair, Spectrum Management Committee

Co-Chair, T-Band Working Group

National Public Safety Telecommunications Council (NPSTC)

Ray Edey

Executive Director,

Interagency Communications Interoperability System (ICIS)

Steve Staffier

Statewide Interoperability Coordinator (SWIC)

Executive Office of Public Safety and Security (EOPSS),

Commonwealth of Massachusetts



T-Band Migration Working Session: Developing Talking Points for T-Band Issues

- Receive any additional input from representatives in affected T-Band areas
- Discuss Planning Efforts
 - FCC Freeze
 - Provisions of Section 6103 of Public Law 112-96 enacted 2/22/12
- Near term: Remainder of 2015/2016
- Longer term: 2017 & beyond



T-Band Migration Working Session: Developing Talking Points for T-Band Issues

- Working Session: Developing Talking Points for T-Band Issues
 - Discussion
 - Executive Briefing Talking Points
 - Moderator's Closing Remarks



T-Band Challenges for the Public Safety Community

Live Capture:



Executive Briefing Talking Points

Live Capture:

