

FCC Actions on TAC Recommendations – 2011

FCC has taken action on eight recommendations:

- ☑ (Jointly) Municipal Race-to-the-Top Program ; Best Practices/Technology Outreach to State & Local Governments
 - FCC cited the TAC recommendations in its April NOI on Broadband Acceleration and is collecting data on best practices
 - NOI record closed September 30. FCC staff reported to the Chairman on recommended next steps, including timelines and necessary resources.
- ☑ Broadband Infrastructure Executive Order (#2)
 - Executive Order 13616 signed to accelerate commercial broadband deployment on federal land
- ☑ Promote Small Cell Deployment (#8)
 - Following initial FCC/GSA talks, TAC recommended holding a workshop to explore implementing public & private building deployment
 - FCC organized workshop in October



FCC Actions on TAC Recommendations – 2011

FCC took immediate action on four recommendations:

- ☑ **Prepare for PSTN Transition & Stranded Investments**
 - FCC hosted a workshop on the PSTN transition Dec. 14.
- ☑ **New Metrics to Measure Broadband Network Quality**
 - FCC hosted a workshop on Public Safety network reliability in Sept.
 - FCC worked with ISPs as part of Broadband Measurement Program (i.e. Measuring Broadband America effort) to gain agreement on and, in the longer term, standardize metrics for broadband service
- ☑ **Facilitate a National IPv6 Transition**
 - Established IPv6 working group in CEA
 - Incorporating IPv6 metrics in broadband measurement program
 - Coordinating with other federal agencies on IPv6 deployment issues
- ☑ **Develop Materials Highlighting Benefits of Broadband Deployment in Private Buildings (#11)**
 - FCC staff in WCB and CGB have been assigned to come up with ideas for materials by January 2012



FCC Actions on TAC Recommendations - 2011

FCC is waiting on further analysis on three recommendations:

Advocacy for Rapid Tower Siting (#3)

- “Shot Clock” order held on appeal. Statutory legislation passed covering collocation/antenna replacement timelines

Model an Online Deployment Coordination System (#5)

- Referred to Interagency Advisory Committee

Develop Consensus on Spectrum Efficiency Categories and Metric Definitions (#10)

- Order on VoIP outage requirements, Measuring Broadband America Program established metrics with industry/academia and submitted standards proposal to IETF and Broadband Forum, CAF program requires service metrics to be met



FCC Actions on TAC Recommendations – 2012

- ☑ Recommendation on small cell deployment
 - NPRM on small cell use of 3.5 GHz spectrum
12/12/2012 Commission Meeting
- ☑ Recommendation on Spectrum Efficiency
 - Receiver group white paper on interference policy



TAC 2012 Activities

- Workshop on spectrum efficiency and receivers – 3/12
- Forum on Future of Wireless Broadband Plans – 7/12
- Forum on M2M at CTIA 10/12
- Met with industry trade groups, companies, government experts, academics and organized a number of sub-groups to pursue recommendations on specific issues
- PSTN Group white paper on VoIP interconnection
- Receivers and Spectrum Working Group
 - Developed case studies to identify issues
 - Proposed FCC standards/receiver interference website
 - Proposed strategies to define expectations for received evolution and accommodate change
 - Proposed policy for Interference limits



Agenda

- Receivers and Spectrum (Dennis Roberson)
- Wireless Security and Privacy (Kevin Sparks)
- Multi-band Devices (Brian Markwalter)
- Network of the Future—PSTN Critical Transition Issues (Russ Gyurek)
- M2M Communications (Shahid Ahmed)
- Conclusion and Discussion



Technology Advisory Council
Wireless Security & Privacy WG

Final Report to the TAC
Recommendations

Dec. 10, 2012



Charter & Members

- **Examine** security and privacy vulnerabilities of air interfaces used by commercial wireless networks, as well as the broader wireless ecosystem, **assess** how they are currently being addressed, and **recommend** what role, if any, the FCC should play
- Includes cellular and Wi-Fi wireless networks
 - Cellular and Wi-Fi
 - Networks and devices
 - Technical and operational/usage aspects
 - End user and network impacts

TAC Members

- Brian Daly – AT&T
- Kevin Kahn – Intel
- Randy Nicklas – XO Communications
- Dan Reed – Microsoft (formerly)*
- Kevin Sparks – Alcatel-Lucent (chair)
- Paul Steinberg – Motorola Solutions

- FCC Liaison – Greg Intocchia, Ahmed Lahjouji

Additional WG members

- Bill Boni – T-Mobile USA
- Martin Dolly – AT&T
- Greg Ennis – Wi-Fi Alliance
- Matthew Gast – Aerohive Networks
- Ali Khayrallah – Ericsson
- Simon Mizikovsky – Alcatel-Lucent
- George Popovich – Motorola Solutions

* no longer representing Microsoft



Roadmap to the Recommendations

A. End User Education

B. Wi-Fi Public Hotspot Security

Near Term

Longer Term

C. Clearinghouse/Clean Room

D. App Screening/Whitelisting

C/D Enabler: Mitigating Legal and Regulatory Impediments

2013 TAC Follow-on Work



End User Security & Privacy Education

- Consumers' general awareness of security/privacy threats associated with mobile devices and wireless connectivity has been growing ... but not *nearly* as fast as the threats have been multiplying in number and sophistication
- While the awareness and sophistication of mobile users varies widely, a large portion of the population that has little sense of urgency and limited patience with security measure “annoyances”
- The FCC can use its public profile and “bully pulpit” to rally a wireless-ecosystem-wide coalition to organize a very visible, actionable and effective public awareness education effort to address this widening gap



Recommendation: High Profile Joint FCC/Industry Consumer Awareness Campaign

- FCC/CTIA/CEA jointly initiate a high profile education campaign to raise public awareness of mobile security/privacy threats and drive broad adoption of specific user-actionable safeguards
- Recommended that the campaign includes the following key components:
 - Clear industry partnership, spanning the Wireless ecosystem
 - Communicates a common message clearly, simply and concisely to a broad consumer audience
 - Focuses on the most critical and actionable vulnerabilities
 - Deployed in multiple formats, prominently visible at a wide range of product and service consumer touch points
 - Unified with common name/slogan/logo/theme to maximize connection with consumers
 - Uses data sources and analysis to measure/estimate adoption and effectiveness
 - Incorporates mechanism for periodic review and revision



Wi-Fi Public Hotspot Security

- Public Wi-Fi hotspots have not historically offered users the same level of security protections available in enterprise and residential Wi-Fi networks
- Recent industry initiatives, if widely deployed, can significantly expand availability of enhanced hotspot security
 - Wi-Fi Alliance's Passpoint integrates WPA2 encryption and authentication into public hotspot access methods
- FCC can work with industry partners to encourage adoption of enhanced security by hotspot operators, network equipment and end-device manufacturers
- Recommendation: series of FCC-sponsored workshops on advanced security for Wi-Fi hotspot deployments

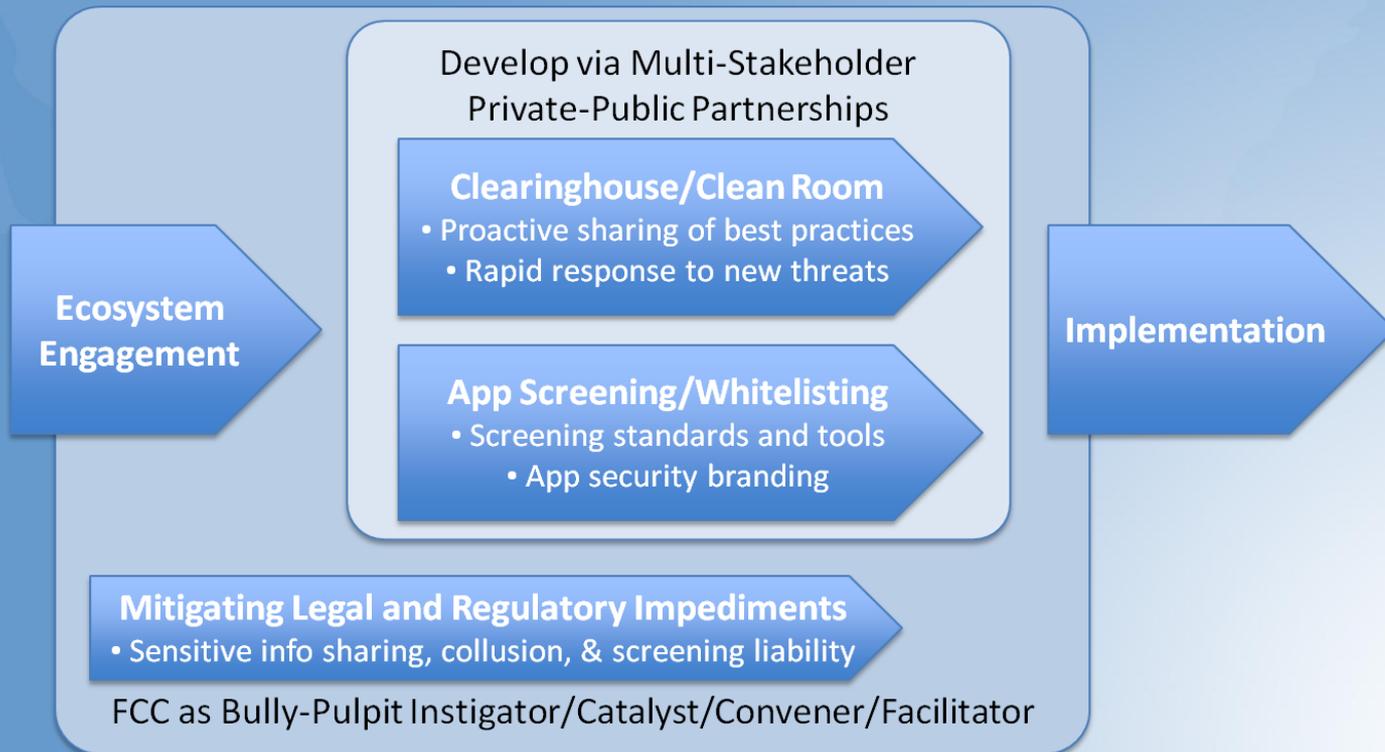


Recommendation: FCC Workshops on Advanced Hotspot Security

- FCC, in conjunction with partner industry organizations, should convene a series of workshops covering best practices for deploying Wi-Fi hotspot security in light of recent industry initiatives
- Partner organizations could include Wi-Fi Alliance, WBA, GSMA
- Target audience for Wi-Fi Security workshops should include:
 - Large service providers with hotspot business units
 - Other hotspot service providers, e.g. airport administrators, hotel operators
 - Government representatives, including municipalities providing hotspot service
- Workshops should be webcast
- Panel/speakers drawn from industry organizations, hotspot equipment vendors, and hotspot service providers



Longer Term Recommendations: Focus on Anti-Malware Ecosystem Collaboration



Up-Front Ecosystem Engagement Recommendation

- FCC to use its bully pulpit to engage and enroll key stakeholders from across the wireless ecosystem
 - OS vendors, apps stores, anti-malware providers, apps vendors, service providers
 - Industry groups (CTIA, CEA, etc.) representing industry segments
 - Other relevant government agencies (NIST, CERT, etc.)
- FCC conducts workshops with the goal to:
 - Raise awareness, sense of urgency, and issue a call-to-action
 - Recognize industry wide nature of problem – not an issue that can be owned/solved by any single industry sub-segment
 - Consider input from industry on best partnership venue(s) to develop targeted anti-malware mechanisms
 - Identify issues that impede collaboration among industry players
 - Seek pledges of support for such development efforts



Anti-Malware Clearinghouse/Clean Room Recommendation

FCC initiates and facilitates development of two key ecosystem-wide anti-malware coordination mechanisms:

- Offline secure information clearinghouse
 - Proactively accumulate, organize, and provide secure access to information about malware threats and detection/mitigation best practices
 - Involve OS vendors, apps stores, anti-malware providers, apps vendors, service providers
 - Facilitate “blacklisting”, advancing security techniques, anti-malware tool creation (for end-user detection, reporting, app branding awareness)
- Incident response coordination allowing rapid dissemination for prompt action when attacks discovered (“CDC” for operators)
 - Establishing “clean room” mechanism which allows companies to communicate threats, findings & solutions in real time, such that the knowledge is cumulative and fully accessible
 - Provide some form of anonymity mechanism to enable competing companies to more freely share relevant information



Anti-Malware Screening/Whitelisting Recommendation

FCC initiates and facilitates development of consistent anti-malware screening, whitelisting, and security branding mechanisms:

- Create screening and labeling guidelines with help from NIST
 - Build upon NIST’s existing work on mobile device security / BYOD guidelines
 - Establish minimum malware screening guidelines for all app stores, and encourage going well beyond
 - Screening efforts/guidelines need to address two types of threat categories
 - Intentional malware disguising as legitimate applications
 - Non-malware that contains flaws which allow other entities to exploit it
 - Explore the possibilities for tiered offerings (e.g. “Enterprise grade” stamp of approval)
 - Provide consistent sandboxing guidelines to help limit damage when apps misbehave
- Encourage screening tool development/maturation by partnering with CERT
 - Leverage CERT’s expertise on software assurance and malware code analysis
 - Creation of new screening tools, and certification of existing vendors’ app store screening offerings
- Form collaborative initiatives with major app store providers
 - For consistent security labeling, building upon their individual efforts at app store screening



Mitigation of Legal/Regulatory Barriers Recommendation

- Exploration of technical and procedural enablers is not sufficient
 - Legal concerns have the potential to be a major impediment to industry wide info sharing, rapid response, and app screening/whitelisting/branding efforts
 - Regulatory/legislative actions need to provide “air cover” for these concerns, covering:
 - Competitive concerns – e.g. anonymity mechanisms, to enable competing companies to more freely share relevant information
 - Collusion and privacy concerns – e.g. “clean room” mechanisms, allowing companies to safely communicate threats, findings and solutions in real time
 - Liability concerns – e.g. legal liability limitation for app screening and branded whitelisting
 - It is recommended that in parallel with the industry recommendations on the preceding slides, the FCC should act directly to explore ways to mitigate these liability concerns



Implementation of Ongoing Anti-Malware Mechanisms

- Recommended that the development partnership activities be given the latitude to define the best structure for executing the ongoing “product-mode” operation of the sharing, response, and whitelisting mechanisms
- Expected that many or most of the same stakeholders (industry groups, government agencies, companies) would continue to be directly involved
- Critical, however, to ensure that these mechanisms be agile and adaptive to the ever-changing threat landscape
- The evolving capabilities of these longer term mechanisms need to be incorporated into later iterations of the near term end user education initiatives

Recommendations for Follow-on Work in 2013 TAC

- TAC considers continuing work, discussed in M2M and Wireless Security WGs, toward encouraging a timely migration of M2M applications from 2G to 3G/4G
 - Goal would be to try to avoid negative impact on M2M growth, due to a “collision” between M2M cost drivers to stay on 2G vs. the security, address space (IPv6) and spectrum efficiency drivers to retire 2G services
- Work could include consideration of the following aspects:
 - Encouragement/stimulation of lower cost 3G/4G M2M device modules
 - Streamlining of FCC approval process for 3G/4G M2M devices
 - Guidance on band support, to balance coverage and module cost
 - Insight on likely timelines, to promote an orderly transition as 2G services are retired
 - Removal or mitigation of any other barriers to M2M commercial growth



Appendix

Recommendation Work Descriptions



Consumer Awareness Recommended Actions

- Near Term
 - Enroll campaign partner organizations, and begin specific planning
 - CTIA and CEA would engage major portions of the ecosystem; build upon CTIA consumer content base
 - Develop name/slogan/logo/theme to maximize effectiveness (“Smoky the Bear” campaign effect)
 - Announce initiative as soon as general agreement reached with partner organizations
- Mid Term
 - Jointly develop education content and marketing rollout plans
 - One *common* set of advice to consumers - simple, brief, easy to understand and act upon checklist
 - Focused on most critical and actionable issues, including: device passwords and settings, Wi-Fi security, password storage, app permissions & usage, device remote locate/lock/wipe services
 - Consumer education materials could be tailored for vertical subsets of users
 - Human factors consultation and focus group testing recommended to verify content hits the mark
 - Leverage CTIA and CEA to solicit pledges by industry stakeholders to engage and support, and ultimately to promote education content with their products/services
 - In parallel, jointly develop marketing rollout plans
 - Communicated through many forms and channels – e.g. visible at a wide range of consumer touch points (device, app, services; point-of-sale, customer care, portals, etc.)
- Longer Term
 - Launch campaign
 - Mechanism for periodic reviews and ongoing revisions
 - Must keep up with advances in both threats and protections
 - Periodic review of measurable results – adoption and effectiveness

Wi-Fi Public Hotspot Security Recommended Actions

Near term

- Workshop planning sessions should be held among FCC and industry organization partners
- Develop workshop agenda/content for initial workshop
- Identify potential speakers, outreach approaches to target participants
- Develop plan for future workshops as appropriate

Longer term

- Tracking/reporting the deployment numbers for hotspot security
- Periodic workshops would serve to:
 - gauge and encourage adoption, as well as progress advancing standards
 - update best practices as additional Wi-Fi security capabilities become available and as new threats emerge
 - maintain focus and energy on an ongoing basis



Longer Term Work Description - Development

Clearinghouse/Clean Room

- Engage CERT and industry stakeholders to help establish best practices for defense, reporting, and response
- Leverage CERT expertise on software assurance and malware code analysis to foster screening tool development, and include the creation of new screening tools, and certification of existing vendors' app store screening
- Establish an application security branding mechanism and a minimum set of malware screening guidelines for secure branding within app stores
- Consider potential for global guideline alignment, e.g. EU, Japan, ...

App Screening/Whitelisting

- Work with NIST to develop application screening and labeling guidelines, by leveraging their existing work on mobile device security / BYOD guidelines (e.g. SP 800-124), and malware incident prevention/handling (e.g. SP 800-83). Screening efforts/guidelines need to address two types of threat categories: 1) intentional malware disguising as legitimate applications, 2) non-malware that contains flaws which allow other entities to exploit it
- Create consistent sandboxing guidelines to help limit damage from illicit applications
- Develop recommendations to standardize implementations/interfaces for network and device interfaces intrinsic to security. Further NIST's work (SP-800-164 Hardware-Rooted Security in Mobile Devices)
- Define a feedback process from users, anti-malware services, and screening tools that identifies malware as well as illicit applications and network services.
- Define an application whitelisting process that feeds back incident response information into timely updates
- On the consumer side, develop shorter term recommendations on end user education, along with security branding, and increased availability of consumer tools that facilitate real time communication of malware incidents.



Longer Term Work Description - Implementation

- In general, roll out the work products of the development efforts in a phased fashion, which best aligns with resource availability within NIST, US-CERT, and key industry stakeholders.
- Execute on whitelisting and application security branding
 - Application Store and Service Provider implementation of screening and application brand management practices (screening, blacklisting, updates to respond to threats)
 - End user awareness / education campaigns and collateral
- Execute on a clearinghouse/clean room model of industry information sharing and incident response
 - Model after the Centers for Disease Control and Prevention (CDC) - specifically the CDC's Situational Awareness Section for information sharing and incident response (<http://www.bt.cdc.gov/situationawareness/>)
 - Enable sharing of information on malware, new device/OS/app vulnerabilities, application blacklists, incident response, etc.
 - Engage industry experts in threat identification and response
 - Include representatives from OS vendors, apps stores, anti-malware providers, application vendors, and service providers.
 - Strike a balance between complete inclusion of all stakeholders, and the desire for rapid response, by limiting the clearinghouse to a core set of stakeholders, while facilitating the publishing of actions/recommendations to a much broader audience.
 - NOTE: The same forum may be used by ecosystem providers to deal with malicious cyber attacks (threat identification/classification, development of response tactics, implementing response and development of future defense mechanisms).

Technological Advisory Council

Receivers and Spectrum Working Group

10 December 2012



Working Group Members

- Lynn Claudy
- Richard Currier
- Dick Green
- Mark Gorenberg
- Dale Hatfield
- Greg Lapin
- Brian Markwalter
- Geoffrey Mendenhall
- Pierre de Vries
- Bob Pavlak
- Julius Knapp
- Dennis Roberson



Introduction

- Charter: The *Receivers and Spectrum* Work Group will tackle the issue of the role of receivers in ensuring efficient use of the spectrum and how to avoid potential obstacles to making spectrum available for new services

THEREFORE:

- Need to maximize the value of spectrum that comes from closer band packing, increased access, new services, device innovation...
- But increased density requires more care in optimizing the whole system, particularly transmitter vs. receiver trade-offs across band boundaries
- Goal to increase service density, reduce regulatory risk and encourage investment
 - By applying new receiver technology to provide more flexibility to future spectrum allocations and more efficient spectrum utilization
 - By clarifying, up-front, who will bear the cost of mitigating harmful interference in specific situations – Interference Limits Policy & Web-based Receiver Database



Summary of 2012 Work

- Case Studies of Various Bands –
 - DTV, 2.4 GHz, 2.7-2.8 GHz, 3550-3650 MHz
- Receiver Technology Progress Assessments
- FCC 2.4 GHz WiFi Receiver Testing
- FCC Web Accessible Receiver Standards Proposal
- Developed Interference Limits Policy Approach
 - White Paper – December 2012
- 2013 Topic Proposal Development



Summary of 2012 Work

- Actionable Recommendations for 2013
 - Implement web accessible receiver standards & voluntary receiver specification repository through FCC Dashboard
 - Initiate Multi-Stakeholder (MSH) group(s)
 - Interference limits policy at one or more service boundaries, including current/future receiver performance levels
 - Issue appropriate request for information on interference limits policy focusing on current bands of interest
 - Establish a focused effort to develop the needed technical foundation to support the establishment of harm claim thresholds
 - Launch work group recommendations for 2013 TAC



Multi-Stakeholder Groups

Use MSH process to work out boundary issues/implementation choices

MSH organizations focus on future and do not operate under or pursuant to formal government authority

Power derives from (a) respect for their processes (e.g., openness, fairness, inclusiveness, transparency, and flexibility) and (b) the quality of their outputs (e.g., standards, best practices, and recommendations)

MSH organizations have significant efficiency advantages and much of the governance of the Internet has been carried out by such organizations

In the best case would agree on parameter values that the FCC could bless

Hopefully they could at least agree on relevant parameters (but not values) & methods;

Value even if it just (a) identified critical issues and/or (b) laid out areas of consensus vs. areas where FCC needs to make public interest trade-off decision

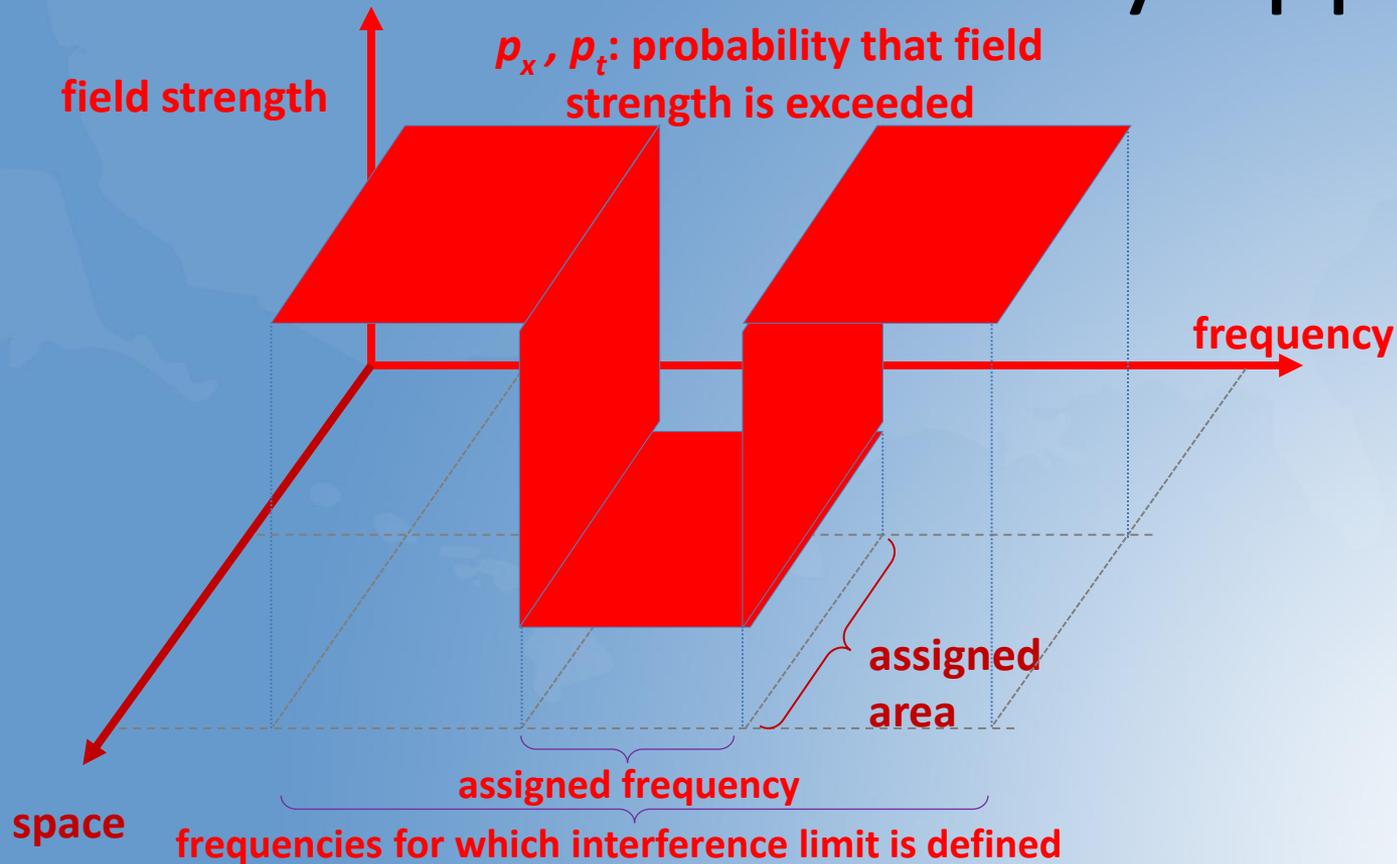
FCC should monitor progress of MSH process

Ensure that the record developed provides a thorough basis for NOI and/or NPRM

Represent interests of future licensees and stakeholders



Interference Limits Policy Approach



Web Accessible Receiver Standards / Voluntary Specifications Repository

Motivation

- More efficient use of spectrum is leading to closer spectral juxtaposition of services by different users/industries necessitating greater knowledge of standards / specifications for adjacent channel transmitters and receiver to insure immunity from interfering signals
- Industry and/or government receiver standards and recommended practices may exist (e.g. NTIA 2003 report on receiver spectrum standards) but are often unknown to transmitter / receiver developers designing devices for operation in adjacent bands
- An FCC Dashboard based website could serve as a central source for standards / specifications on receiver interference immunity characteristics as a design / service planning tool



WG Recommendations for TAC 2013

- Interference Studies
 - Statistical Analysis of Interference (versus worst case analysis)
 - Efficient Use of Spectrum (assess OOB limits, e.g., $43+10\log P$ and receiver limits)
 - GPS Band Co-Channel Interference (e.g., harmonics from 700 MHz, LPTV, etc.)
 - Improving Metrics of Defining Harmful Interference
 - Characterizing the evolving Noise Floor and its Policy Impacts
- Interference Resolution and Enforcement Program
 - Need holistic study of existing programs to develop new approaches that respond to the evolving interference environment



WG Recommendations for TAC 2013

- Emerging Technologies
 - The role of small cells in reducing interference issues
 - Interference cancellation technologies
 - Cost of advancing promising receiver technologies
- Radar and Communications Systems Interoperability
 - Potential for radar / communications spectrum sharing
 - Key challenges in bringing the two communities together



Discussion



Technological Advisory Council

Multi-band Devices Working Group
10 December 2012



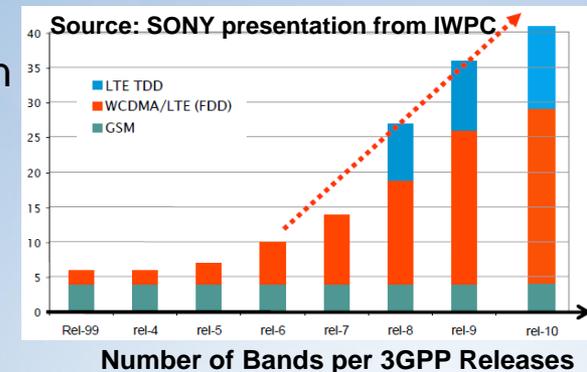
Charter and Working Group Members

- The Multi-band Devices Working Group will study the challenges in developing subscriber equipment that is capable of operating over numerous frequency bands.

- WG Chair: Brian Markwalter
- FCC Liaisons: Michael Ha, Chris Helzer
- WG Members:
 - John Chapin
 - Lynn Claudy
 - Marty Cooper
 - Jack Nasielski
 - Mark Richer
 - Jesse Russell
 - Peter Gaal
 - William Mueller
 - Art Morris
 - Jeff Shamblin

Problem Statement

- Diverse and Complex Frequency Options
 - 22 FDD bands, 11 TDD bands defined in 3GPP R10.6, and counting
 - 4 types of positioning (GPS, Glonass, Galileo, Compass)
 - Multiple types of unlicensed bands: WiFi, BT, NFC, etc
- Each carrier desires different combinations of band support
- International roaming further complicates the handset design
- Future spectrum allocation continues to be fragmented
- Spectrum Aggregation being standardized in 3GPP
- Lower (UHF) frequencies being used
- *What is the expected roadmap for receiver improvements?*
- *How does that roadmap inform policy and industry decisions?*

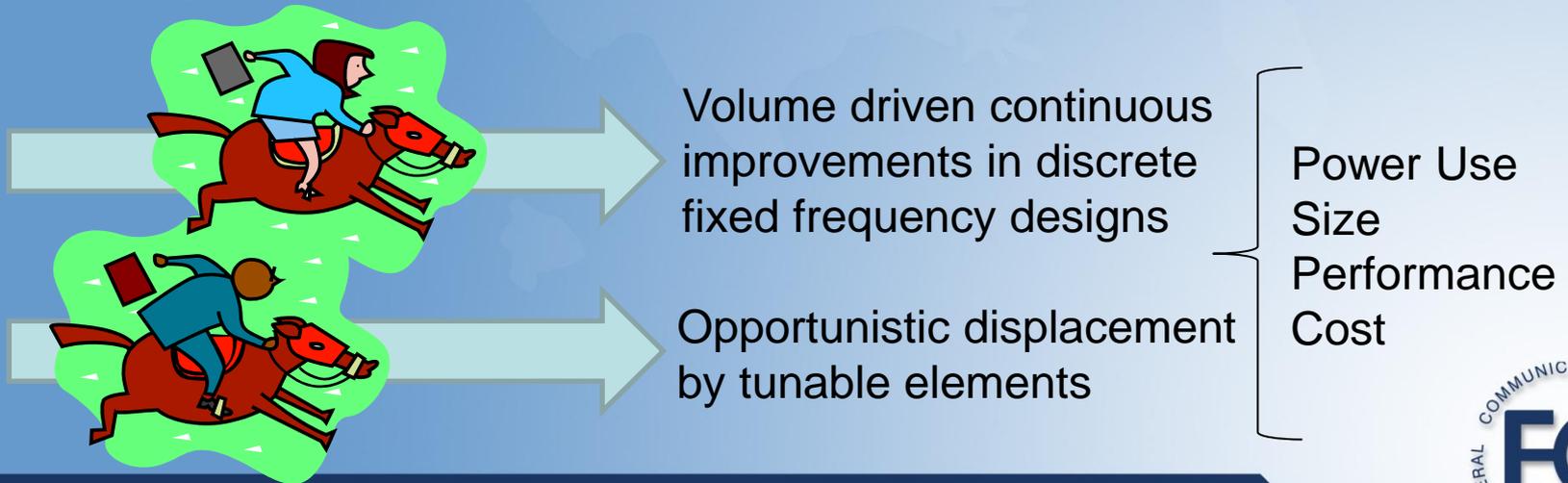


2012 Work Timeline

- First Quarter
 - Defining the problem
 - Hypothesis that agile handset technology will outpace band proliferation – Handsets will eventually handle any band combination
- Second Quarter
 - Understand current handset architectures and future agile front end
 - RF front end is limiting factor in agility
 - Roadmap concept: 1-3 years available today, 3-5 years visible today, 5-10 years predicted today

2012 Work Timeline continued

- Third Quarter
 - Capitalize on FCC's Forum on Future Wireless Band Plans
 - Drill down with experts on baseband, transceiver, RF front end and antenna
 - Understand rate of change and system design/cost issues
 - Captured good picture of near-term progress on tunable elements



Deliverables and Prior Recommendations

Deliverables

- Contributions on state of the art for tunable antenna, notch filter, LNA, PA (Compiled in separate pdf file)
- Mid-term handset RF Front End component roadmap

Recommendations

- Allocate spectrum in block sizes that are multiples of 5 MHz where possible
- Consider allocating unpaired spectrum for downlink only

Task for 2013 – Develop Long-term Handset Roadmap

- Key characteristics of a technology roadmap
 - Timeline out to 10 years to inform spectrum allocation decisions
 - Impartial, technology agnostic assessment
 - Created and updated over time
 - Involve worldwide industry and academia
 - Spotlight improvements that yield greater spectrum efficiency
 - Express roadmap in terms meaningful to spectrum allocation

Recommendation: Undertake Long Term Handset Technology Roadmap as a TAC Project

- Project requires FCC engagement to facilitate participation
- TAC provides the vehicle for project definition and management
- Will require targeted recruitment of specialists in fields such as
 - A/D and D/A converters
 - Antennas, including tunable
 - Filters, including tunable
 - LNAs and PAs
 - RF ICs and Digital CMOS
- Will also require recruitment of academic and research oriented experts with longer term view of handset technologies
- Challenge will be getting experts to project long-term developments in their field of expertise

2012 TECHNOLOGICAL ADVISORY COUNCIL

PSTN Working Groups A and B

Final Read Out And Summary Of Deliverables
December 10, 2012



2012 TAC Readout

- Initially, 2 PSTN Groups
 - PSTN Transition Issues – Team A
 - Co-Leaders: Nomi Bergman, Bright House; Russ Gyurek, Cisco
 - PSTN Successor Infrastructure – Team B
 - Co-Leaders: Brian Daly, AT&T; Tom Esvlin; John Barnhill, GENBAND
- Working groups merged after June meeting

Final Study Areas

- Total of 7 Study Areas
 - Copper Retirement (Re-Use)
 - PSTN User Impacts
 - Interconnection
 - Database Transition
 - Numbering (User/Service/App Identifiers)
 - Quality of Service
 - Robustness and Public Safety



Deliverables for 12-10-2012 TAC

- **Consolidated recommendations in 3 areas**
 - Databases and Identifiers
 - QoS and Interconnection
 - Robustness and Public Safety
 - 2-3 actionable recommendations for each area
- **Providing completed Q&A and other documentation for all study areas based on requests from FCC staff**
 - Multiple inputs from a variety of industry participants, including TAC Members, additional resources from member companies, plus other industry groups and experts who have contributed their time and talent to improve these submissions



Conclusions

- 2011 and 2012 TACs have made a number of recommendations for effecting the transition from the PSTN
- 2012 work has added clarity and detail, however the fundamental recommendations from 2011 are still important and, if implemented would add order to the transition as it is happening today
- Progress on several important issues will only occur through engagement of multi-stakeholder forums and action plan execution based on recommendations



Going Forward

- Revisit CLT-WG Recommendations from 2011
- Focus for 2013+ should be planning for transition
 - Recommend go-forward strategies that will facilitate an effective plan development and implementation

PSTN Transition Technical & Policy Issues

- Capabilities of the PSTN-replacement network: What functionality should/will be preserved or added?
 - Resiliency/reliability
 - 48V power at CPE, route diversity, network elements, etc.
 - Advanced communications services
 - HD voice, video conferencing, SMS/MMS text, etc.
 - Accessibility
 - 911
 - CALEA and homeland security
 - Privacy and personal security
 - Support for existing non-voice technologies that use the PSTN
 - Fax machines, alarm systems, etc.

Recommendations:

1. Develop a detailed plan for an orderly transition from the current PSTN system of record to a service rich network for achieving key national goals. The plan should include:
 1. A public-private partnership with industry, providers, and relevant organizations and stakeholders.
 2. Coordination mechanisms for the ongoing evolution of the network to rapidly incorporate new technologies and capabilities.
2. Establish a task force to conduct a thorough policy and regulatory analysis and review as it relates to the PSTN which results in policies for the new communication environment (Interoperability, Interconnect, E.164, numbering, reliability,...).
3. Identify mechanisms and a migration plan for critical services currently provided by the PSTN. Therefore, ensuring that critical services that need to be carried forward are met by well understood solutions. (E911, Disability access,...)

CLT-WG



CLT-WG

Report on Telephone Network Transition Workshop (Dec. 14, 2011)

- Comments on the FCC's Role in the Transition
- Focus on the future: Say more about what we are transitioning to (vs. the "sunset") to get energy and enthusiasm around the transition.
- FCC should step back and identify the social goals/needs that led to the current system of regulation and then work out which of those goals are still valid and how they will be carried forward into the future.
- Disagreement among panelists on need for continued regulation of PSTN
- New regulations (if any) should be agnostic with respect to specific technologies (e.g., IP).
- Concerns over broadband access duopoly; broadband wireless where possible; FCC as a backstop.
- Convene multi-stakeholder forums. Get voluntary consensus where possible; and chart plans for them.
- Develop the "punch list" of the many "corner cases" (fax, alarms, etc.) and chart plans for them.
- Need a plan for interoperability/interconnection amongst non-PSTN voice services (without PSTN backstop).
- Considerable support for a "flash cut date" to drive progress on the punch list
- minority view: transitions take a long time and co-existence may persist for decades



2011 Recommendations from CLT WG

1. Develop a detailed plan for an orderly transition from the current PSTN system of record to a service rich network for achieving key national goals. The plan should include:
 - a. A public-private partnership with industry, providers, and relevant organizations and stakeholders.
 - b. Coordination mechanisms for the ongoing evolution of the network to rapidly incorporate new technologies and capabilities.
2. Establish a task force to conduct a thorough policy and regulatory analysis and review as it relates to the PSTN which results in policies for the new communication environment (Interoperability, Interconnect, E.164, numbering, reliability,...).
3. Identify mechanisms and a migration plan for critical services currently provided by the PSTN. Therefore, ensuring that critical services that need to be carried forward are met by well understood solutions. (E911, Disability access,...)
4. Commit to ensuring ongoing universal access to evolving communication services to enable all Americans to participate in the nation's economy.
5. Investigate the need for the use of incentives to accelerate the transition to new services.
6. Create a communications and outreach program to educate the public about the transition.
 - a. Provide the public with the vision of what we are transitioning to: New services and capabilities which can greatly exceed the current services of the PSTN
 - b. Provide a roadmap and communicate the urgency to take action to avoid the loss of capability to support critical services.



Database Champion: Russ Gyurek, Cisco Systems

Identifiers Champion: Mark Bayliss, Visual Link Internet

DATABASE AND IDENTIFIERS



Acknowledgements

Users/ Services/ Application Identifiers

- **Champion: Mark Bayliss – Visual Link Internet**
 - Working group members including Kevin Kahn, KC Claffy, Mark Bayliss, John McHugh, Jesse Russell, Charlotte Field, Tom Esvlin
 - FCC support from Henning Schulzrinne, Rebekah Goodheart, and Daniel Kirschner.
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 - Tom McGarry, Neustar
 - Richard Shockey, SIP Forum
 - Hala Mowafy, Ericsson (Telcordia)



Acknowledgements – Databases

- Champion: Russ Gyurek – Cisco Systems, Nomi Bergman – Bright House
 - Working group members including Anthony Melone, Marvin Sirbu, Joe Wetzel, Harold Teets, Charlie Vogt, Jack Waters, John McHugh, John Barnhill
 - FCC support from Henning Schulzrinne, Rebekah Goodheart, and Daniel Kirschner.
- Special Acknowledgements:
 - ***Hala Mowafy, Ericsson (Telcordia)***
 - Doug Jones, Verizon
 - Kevin Bohn, Verizon
 - Mike McNamara, TWTelecom
 - Trace Hollifield, Bright House
 - Marva Johnson, Bright House
 - Tom McGarry, Neustar
 - Richard Shockey, SIP Forum
 - Arleen Elliott, Ericsson (Telcordia)
 - ATIS (Alliance for Telecommunications Industry Solutions)



Databases Work Group Actions

- Investigate comprehensive list of Databases used to support PSTN
- Reviewed Database by database Relevancy: Transition, post-transition
- Investigate potential areas for incentives to move transition forward

Additional Deliverables

- Finished Database matrix
- Referenced ATIS work
- Identified the top 3 databases:
 - ENUM
 - LNP
 - Toll-free
- Coordinated work with Public safety and M2M teams



Identifiers Work Group Actions

- Review current E.164 deployment
 - Who has access
- Review of Numbering and impacts to databases, call routing, LATA, etc
- Review of 10-digit dialing deployment
- Review E.164 exhaust schedule
- Summarized other potential identifiers
 - Email, IPv6, Other

Additional Actions

- Forecast shows 20-50 years before exhaust would occur on E.164
- Request FCC to initiate a proceeding on issues with numbers/identifiers
 - Direct Access to numbers
 - Relationship of Numbering to SIP/VoIP Interconnection and the PSTN Transition
- Q&A for subject areas provided by ATIS PSTN Transition Focus Group and other TAC Members



PSTN Working Groups

Discussion Questions – Database Transition

- Database Transition Questions - Group A
 - What legacy databases will need to transition to a future all-IP environment?
 - Summary of Existing Shared Databases follows the Q&A
 - Geographic numbering (NANPA, PA, NPAC)
 - Non-geographic numbering (SMS/800)
 - Public safety (ALI)
 - How will databases that are essential to the operations of the PSTN need to evolve to operate in an IP-based network?
 - Geographic numbering
 - Vonage petition¹ – FCC is evaluating a request to allow the assignment of NANP resources to VoIP providers
 - May need to add IP addressing information to numbering assignments
 - Non-geographic numbering
 - May need to add IP addressing information to numbering assignments
 - Public Safety
 - VoIP providers are required to integrate customer addresses into the existing ALI infrastructure

Database and Identifiers - Observations

- Databases perform many important functions in the PSTN that are being transitioned to support voice services on IP networks
 - Number translations of ported numbers and toll free numbers
 - Routing data for carrier interconnection
 - Calling name identification
- Varying frameworks for the transition of these functions are being pursued within the industry as needed
- Need to transition e.164 numbers as identifiers is understood
- No technical obstacles have been identified as market opportunities drive transition



Database and Identifiers - 2012

Recommendation	Near Term	Longer Term
<p>Sponsor industry workshops on the full range and scope of the impacts to routing databases as transition to IP occurs</p> <ul style="list-style-type: none"> • LNP and ENUM integration • Toll Free Services 	<ul style="list-style-type: none"> • Initially focus on specific routing database issues <ul style="list-style-type: none"> ○ ENUM model for sharing routing data for carrier interconnection ○ Toll Free, identify issues related to current dependence on LATA-based routing and called party based charging 	<ul style="list-style-type: none"> • Set schedule for nationwide 10 digit dialing • Align LATAs and rate centers elimination with “Bill and Keep” implementation date • Implement geographic number portability which becomes possible with elimination of LD specific charges to consumers
<ul style="list-style-type: none"> • Sponsor Multi-Stakeholder industry forum to address the future of identifiers in support of industry trends beyond the e.164 numbering plan. 	<ul style="list-style-type: none"> • Identify Key implementation areas to facilitate the transition to the new public communications <ul style="list-style-type: none"> ○ Consider identifiers outside e.164 numbering plan ○ Determine M2M impact (if any) for identifiers ○ Create International Database Strategy Team 	<ul style="list-style-type: none"> • Identify limitations requiring additional development to address and propose solutions <ul style="list-style-type: none"> ○ Security, anti-spoofing, Privacy (Identity) ○ Use of location data ○ Role of IPv6 and DNS in emerging identifiers

Supporting Documentation

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Potential Commission Actions

- *“A clear national policy on the Future of Numbering is... an essential precondition for further progress on the National Broadband Plan, SIP/VoIP Interconnection and the inevitable transition to all IP networks.” Shockey, Ex Parte, 9/4/2012*
- Initiate rulemaking on the full range and scope of issues with numbers/identifiers – relationship of Numbering to SIP/VoIP Interconnection and the PSTN Transition
- Consider setting a schedule to implement nationwide 10 digit dialing
 - – Align LATA’s and rate center elimination with “Bill and Keep” implementation date
 - – Fully decouple geography from number and Implement geographic number portability
- Sponsor multi-stakeholder forum to define requirements for E.164 real-time communications and for new databases that map E.164 to IP data.
- Sponsor a series of Technical Workshops involving network operations experts to address technical transition issues moving to an all IP network.
- Review approach with major IP to IP providers “Google, Skype, Sidecar and others” and work with ATIS, IETF and ARIN to stay aligned with Internet and industry initiatives.

Database Migration

Recommendations

- Ensure consistency in privacy policies between PSTN and IP spheres to minimize impact on end users
- Define a timeline covering both the Transition Phase and the early stages of the all-IP Successor network for industry players to comply with
 - Milestones should include impacts of major changes in addressing and numbering schemes
 - Addressing schemes (other than E.164 numbers) will impact the methods of accessing many databases and the data schema within the databases
- Confirm that DHS and National Security needs are satisfied. Routing databases are important to the national infrastructure
- Lay groundwork to facilitate query routing mechanisms to databases in an all IP network equivalent in function to that of global title translations (GTT)
- Promote the standardization for common interfaces/ capabilities that ensure service transparency to end users that depend on these databases



QoS Champion: David Clark

VoIP Interconnection Sub-Group Co-Champions:

- Harold Teets, TWT
- John Barnhill, GENBAND

QOS AND VOIP INTERCONNECTION RECOMMENDATIONS



QoS Team Acknowledgements

- **Champion: David Clark**
 - Working group members including Joe Wetzel, Kevin Kahn, Dan Reed, Jesse Russell, Tom Evslin, Harold Teets, Jesse Russell, John McHugh, Dale Hatfield
 - FCC support from Henning Schulzrinne, Rebekah Goodheart, and Daniel Kirschner.
- **Special Acknowledgements:**
 - Doug Jones, Verizon
 - Mike McNamara, TWTelecom
 - ATIS (Alliance for Telecommunications Industry Solutions)
 - PSTN Transition Focus Group
- **Background:**
 - With the move of VoIP and other critical services to IP-based platforms, the quality of these services will be of increasing public concern.
 - A variety of different IP-based platforms will be used for these services, so the interconnection of these platforms, and the service quality of these interconnections, will be of concern.



Work Group Actions

- Ongoing Work to define factors impacting QoS across the spectrum of service providers
 - Facilities Based Service Providers
 - Managed IP Networks, defined interworking
 - Non-facilities Based Service Providers
 - OTT providers, service delivery over the internet
- Multiple Meetings and discussions reviewing implications of national and international services and trends
- Finalized recommendations for FCC Action
- Finalized Q&A responses with input from ATIS and TAC Members



QoS/VoIP

- Reach agreement on call quality metrics.
 - Many aspects: packet-level impairments (e.g. loss and jitter), application-level impairments (e.g. echo), and signaling (e.g. call completion failures). These require different treatment.
 - Work with industry and standards bodies—build on ongoing work.
 - Short term: convene a fact-finding workshop to inform FCC planning.
- Identify circumstances that call for a defined minimum acceptable quality.
 - Subsidized services, emergency services are possible examples.
 - Cannot expect a uniform definition to apply in all circumstances.
 - FCC should state an expectation that interconnection will not be a source of impairment or blocking.
- Initiate a high-level conversation about U.S. policy for voice communication.
 - Commission Should revisit 2011 TAC recommendations



Quality tracking

- Encourage and track industry efforts to develop systems that measure and report end-to-end call quality.
 - Should be an ongoing effort as part of VoIP transition.
 - FCC should state expectation that design of VoIP systems will permit associating problems with responsible actors.
 - Alternative is direct FCC measurement of call quality.
 - A possible undertaking, but for which technologies?
- FCC should continue to track service quality of public internet
 - Apply “Measuring Broadband America” (MBA)-like model to better capture measurements for VoIP Services
 - End-user QoE is the goal



QoS: International issues

- Track efforts associated with call quality in other countries and in international calling.
 - Initial efforts should focus on fact-finding about state of play in other countries.



Supporting Documentation

BACKUP



12-20-2011 TAC slide 11

Report on Telephone Network Transition Workshop (Dec. 14, 2011)

Comments on the FCC's Role in the Transition

- Focus on the future: Say more about what we are transitioning to (vs. the “sunset”) to get energy and enthusiasm around the transition.
- FCC should step back and identify the social goals/needs that led to the current system of regulation and then work out which of those goals are still valid and how they will be carried forward into the future.
 - Disagreement among panelists on need for continued regulation of PSTN
 - New regulations (if any) should be agnostic with respect to specific technologies (e.g., IP).
 - Concerns over broadband access duopoly; broadband wireless could be important in this regard
- Convene multi-stakeholder forums. Get voluntary consensus where possible; FCC as a backstop.
 - Develop the “punch list” of the many “corner cases” (fax, alarms, etc.) and chart plans for them.
 - Need a plan for interoperability/interconnection amongst non-PSTN voice services (without PSTN backstop).
- Considerable support for a “flash cut date” to drive progress on the punch list
 - minority view: transitions take a long time and co-existence may persist for decades

Examples

12-20-2011 TAC slide 19

PSTN Transition

Technical & Policy Issues

- Capabilities of the PSTN-replacement network: What functionality should/will be preserved or added?
 - Resiliency/reliability
 - 48V power at CPE, route diversity, network elements, etc.
 - Advanced communications services
 - HD voice, video conferencing, SMS/MMS text, etc.
 - Accessibility
 - 911
 - CALEA and homeland security
 - Privacy and personal security
 - Support for existing non-voice technologies that rely upon the PSTN
 - Fax machines, alarm systems, etc.



12-20-2011 TAC slide 34

Recommendations:

1. Develop a detailed plan for an orderly transition from the current PSTN system of record to a service rich network for achieving key national goals. The plan should include:

1. A public-private partnership with industry, providers, and relevant organizations and stakeholders.
2. Coordination mechanisms for the ongoing evolution of the network to rapidly incorporate new technologies and capabilities.

2. Establish a task force to conduct a thorough policy and regulatory analysis and review as it relates to the PSTN which results in policies for the new communication environment (Interoperability, Interconnect, E.164, numbering, reliability,...).

3. Identify mechanisms and a migration plan for critical services currently provided by the PSTN. Therefore, ensuring that critical services that need to be carried forward are met by well understood solutions. (E911, Disability access,...)



VoIP Interconnection Team Acknowledgements

- Co-Champions: Harold Teets and John Barnhill,
 - Working group members including Dale Hatfield, Mark Bayliss, Marvin Sirbu, David Tennenhouse, Tom Evslin, Russ Gyurek, Joe Wetzel, Harold Teets
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 - Andrew Dugan and Rich Terpstra, Level3
 - Jonathan Mapes, Jim OBrien, and Christopher Murray, Earthlink
 - Joe Gillan, Gillan and Associates
 - Alessandro Forcina, Telecom Italia Sparkle, i3 Forum WS “Technical Aspects” Chairman
 - ATIS (Alliance for Telecommunications Industry Solutions) PSTN Transition Focus Group



Co-Chairs:

- Brian Daly, AT&T
- John Barnhill, GENBAND

ROBUSTNESS AND PUBLIC SAFETY



Acknowledgements

- Co-Chairs: Brian Daly and John Barnhill,
 - Working group members including Dale Hatfield, Mark Bayliss, Marvin Sirbu, David Tennenhouse, Tom Evslin, Russ Gyurek, Joe Wetzel, Harold Teets
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 - Mike McNamara, TWTelecom
 - DeWayne Sennett, AT&T
 - Linda K. Moore, Congressional Research Service
 - Sherry Lichtenberg, Ph.D. Principal Principal Researcher for Telecommunications, National Regulatory Research Institute.
 - ATIS (Alliance for Telecommunications Industry Solutions)
 - PSTN Transition Focus Group
 - Information Resources from NENA and e911.gov



Work Group Actions

- Investigated the status of Public Safety evolution in the USA and reviewed input from many sources
- Reviewed Alerting, GETS, FirstNet and NG911
 - Presentation focus is on NG9-1-1
 - Transition from circuit switched voice to IP enabled Real Time Comms
 - VoIP, SMS, MMS, Video Calling etc.
- Summarized FCC Proceedings and Orders addressing multiple Public Safety topics referenced in the NBP

Additional Deliverables

- Completed responses to assigned Working Group questions
- Documented Recent Legislation and FCC Actions to address actions
- Summarized NG911 and Public Safety recommendations
 - National Broadband Plan
 - FCC Chairman's Priorities
 - 2011 CSRIC recommendations
 - 911.gov



Robustness and Public Safety - Observations

- Technology is available to support NG 9-1-1 deployments
 - 10 Year plus history of work to define NG9-1-1 (NENA, ATIS, IETF, ITU, CSRIC et al)
 - Defines IP-based interfaces into the PSAP and Expands 911 (text, photos, videos, data)
 - Additional Technology Implementations and Policy Work still required
 - Location issues, new devices and applications, multiple device registrations and non-interconnected VoIP services
- Slow migration of emergency services to NG9-1-1, coupled with slow evolution of circuit switched networks implies a requirement to support both present and future capabilities
 - Existing 911 system will continue to function, however, will lack support for New Real-Time communications (SMS, Video, etc) and location support for new devices
 - The NG911 systems should ensure that existing TDM services will be supported for completion of emergency calls to the proper PSAP for as long as required.
- Highly Distributed Ownership is largest implementation hurdle
 - Federal, State, Community etc.
 - Multiple constituencies/ technologies
 - No central deployment funding
 - No recognized deployment timetable



Public Safety - 2012

Recommendation	Near Term	Longer Term
<ul style="list-style-type: none"> • Clarify Roles and Responsibilities of NG911 Deployment <ul style="list-style-type: none"> ○ Ownership, policy and regulation ○ NTIA, NHTSA, States, industry 	<p>Initiate Proceeding on regulatory framework and Create and establish NG911 implementation milestones</p>	<p>Recommend that Congress adopt the requested statutory framework proposals to ensure timely NG911 deployment</p>
<ul style="list-style-type: none"> • Establish a national funding strategy for NG911 considering all existing sources and other proposals as required. 	<p>Identify all federal funding sources for NG911 and recommend consolidated investment strategy and uniform criteria for awarding funds.</p>	<p>Recommend that Congress consider creating a long term funding mechanism for the transformation and operation of the national NG911 system</p>



Supporting Documentation

BACKUP



BACK-UP INFORMATION

- Recommendation History and Sources (slides 7 – 8)
- Sources – (slide 9)
- FCC Actions from NG911 Advancement Act of 2012 (slides 10 – 14)



Legal, Statutory and Regulatory Framework Recommendation



Recommendation 16.14:

- Congress should consider establishing a federal legal and regulatory framework for development of NG911 and the transition from legacy 911 to NG911 networks.

Develop a NG911 governance framework:

- Because no single governing entity has jurisdiction over NG911, the FCC will work with state and federal authorities, and other entities to provide technical expertise and develop an approach to NG911 governance.

FCC's as a citizen advocate

- should be a key participant in development of national NG911 strategy
- should seek from Congress clarity or expansion of responsibilities to promote transition
- Existing law, regs, and liability issues must be addressed and updated by the FCC/states

- Clarify jurisdictional frameworks and responsibilities and identify coordination required at each level of government to make IP-enabled 911 possible
- Consider developing model legislation that would update regulation, legislation and other policies to reflect modern communications and NG911 capabilities

Funding



Recommendation 16.13:

- The lack of coordinated funding is a roadblock for NG911 deployment. Several agencies administer existing grant/loan programs without central coordination or uniform criteria.
- requires detailed study to help Congress develop a grant program and long term funding mechanism for deployment and ops

Develop an NG911 Funding Model:

- To assist 911 authorities and Congress in considering NG911 funding options, the FCC's PS/HS Bureau will prepare a cost model focused on cost-effectiveness of the NG911 network infrastructure linking PSAPs and carriers.

- Panel should be formed to address 911 funding issues and make recommendations for funding construction and maintenance
- A Federal Block Grant Program should be established.
- A next generation —eligible costs list should be developed.

- Ensure that IP-enabled 911 upgrades are considered a fiscal priority for States and local jurisdictions and Federal grant programs
- Change outdated funding mechanisms to be more technology-neutral
- Ensure that 911 funds are preserved for 911

SOURCES

- “National Broadband Plan” - Final Report - MARCH 16, 2010
www.broadband.gov/plan/
- FCC Chairman Genachowski Announces Five Step Action Plan to Improve the Deployment of Next Generation 9-1-1 (NG911) – August 10, 2011
http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-309005A1.pdf
- CSRIC Working Group 4B “Transition To Next Generation 9-1-1” - Final Report – March 2011
www.fcc.gov/pshs/docs/csric/CSRIC-WG4B-Final-Report.pdf
- NG9-1-1 Implementation Coordination Office (911.gov)
http://www.911.gov/pdf/National_NG911_Migration_Plan_FINAL.pdf
dated August 2009
<http://www.911.gov/911-issues/funding.html> Funding and Policy Recommendations
- http://www.911.gov/pdf/2011_ECPC_Grants_Recommendations_to_Fed_Agencies_Final.pdf Grant Summary and Guidelines
- NENA NG 9-1-1 Transition Planning Site
www.nena.org/?page=NG911_TransPlanning
- Congressional Research Service (Linda K. Moore)
 - *The First Responder Network and Next-Generation Communications for Public Safety: Issues for Congress - Nov 1, 2012*
(www.fas.org/sqp/crs/homesec/R42543.pdf)
 - *Funding Emergency Communications: Technology and Policy Considerations – Jan 5, 2012*
(www.fas.org/sqp/crs/homesec/R41842.pdf)
 - *Emergency Communications: Broadband and the Future of 911 – Aug 25, 2010*
(www.fas.org/sqp/crs/homesec/R41208.pdf)
 - *Emergency Communications: The Future of 911 – June 16, 2009* (www.fas.org/sqp/crs/misc/RL34755.pdf)
- Safecom Grant Summary
(www.safecomprogram.gov/SiteCollectionDocuments/GrantProgramsforSAFECOMWebsite.pdf)



Middle Class Tax Relief And Job Creation Act Of 2012 (P.L. 112-96) -
February 22, 2012 - Next Gen 911 Advancement Act Of 2012

FCC ACTIONS AND DEADLINES



Next Gen 911 Advancement Act of 2012

PUBLIC LAW 112–96 - February 22, 2012

- SEC. 6504b. Commission to issue a public notice seeking comment on (1) the feasibility of Multi-Line Telephone Systems (MLTSs) to provide the precise location of a 911 caller and (2) the National Emergency Number Association’s “Technical Requirements Document on Model Legislation E911 for Multi-Line Telephone Systems” (NENA 06-750, Version 2)
 - ***DA 12-798 - PUBLIC SAFETY AND HOMELAND SECURITY BUREAU SEEKS COMMENT ON MULTI- LINE TELEPHONE SYSTEMS PURSUANT TO THE NEXT GENERATION 911 ADVANCEMENT ACT OF 2012 - CC Docket No. 94-102, WC Docket No. 05-196, PS Docket No. 07-114, PS Docket No. 10-255 – 05-21-2012***



Next Gen 911 Advancement Act of 2012

PUBLIC LAW 112–96 - February 22, 2012

- SEC. 6507. COMMISSION PROCEEDING ON AUTODIALING. - IN GENERAL.—
Not later than 90 days after the date of the enactment of this Act, the Commission shall initiate a proceeding to create a specialized Do-Not-Call registry for public safety answering points.
 - ***FCC 12-56 - Implementation of the Middle Class Tax Relief and Job Creation Act of 2012; Establishment of a Public Safety Answering Point Do-Not-Call Registry NPRM - CG Docket No. 12-129 – 05-22-2012***
 - ***FCC 12-129 - Implementation of the Middle Class Tax Relief and Job Creation Act of 2012; Establishment of a Public Safety Answering Point Do-Not-Call Registry Report and Order – CG Docket No. 12-129 - 10-17-2012***
 - ***Establishes Do-Not-Call Registry for TN’s used by PSAPs and prohibits automated dialers from contacting numbers in the registry***



Next Gen 911 Advancement Act of 2012

PUBLIC LAW 112-96 - February 22, 2012

SEC. 6509. COMMISSION RECOMMENDATIONS FOR LEGAL AND STATUTORY FRAMEWORK FOR NEXT GENERATION 9-1-1 SERVICES.

- By Feb. 22, 2013 - Commission, Secretary of Homeland Security, Administrator of the National Highway Traffic Safety Administration, and the Implementation Office, shall prepare and submit a report to Congress that contains recommendations for the legal and statutory framework for Next Generation 9-1-1 services, consistent with recommendations in the National Broadband Plan developed by the Commission pursuant to the American Recovery and Reinvestment Act of 2009, including the following:
 - A legal and regulatory framework for the development of Next Generation 9-1-1 services and the transition from legacy 9-1-1 to Next Generation 9-1-1 networks.
 - Legal mechanisms to ensure efficient and accurate transmission of 9-1-1 caller information to emergency response agencies.
 - Recommendations for removing jurisdictional barriers and inconsistent legacy regulations including:
 - proposals that would require States to remove regulatory roadblocks to Next Generation 9-1-1 services development, while recognizing existing State authority over 9-1-1 services;
 - eliminating outdated 9-1-1 regulations at the Federal level; and
 - preempting inconsistent State regulations.
- ✓ **DA12-1831 - PUBLIC SAFETY AND HOMELAND SECURITY BUREAU SEEKS COMMENT ON THE LEGAL AND STATUTORY FRAMEWORK FOR NEXT GENERATION 9-1-1 SERVICES PURSUANT TO THE NEXT GENERATION 9-1-1 ADVANCEMENT ACT OF 2012 - PS Docket No. 10-255, PS Docket No. 11-153, PS Docket No. 12-333 - 11-13-2012**



NG911 Advancement Act of 2012 Driven Proceedings

- **FCC Dockets on 911**
 - CC Docket No. 94-102
 - Revision of the Commission's Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Systems
 - WC Docket No. 05-196
 - E911 Requirements for IP-Enabled Service Providers
 - PS Docket No. 07-114
 - Wireless E911 Location Accuracy Req's
 - **PS Docket No. 10-255**
 - Framework for NG911 Deployment
 - **PS Docket No. 11-153**
 - Facilitating the Deployment of Text-to-911 and Other NG911 Applications
- Section 6504b: Multi-Line Systems
 - DA 12-798 – Multi-Line Telephone Systems – CC No. 94-102, WC No. 05-196, PS No. 07-114, PS No. 10-255 05-21-2012
- Section 6507: PSAP Do-Not-Call List
 - FCC 12-56 – Establishment of a PSAP Do-Not-Call Registry NPRM – CG No. 12-129 – 05-22-2012
 - FCC 12-129 Establishment of a PSAP Do-Not-Call Registry Report and Order – CG No. 12-129 - 10-17-2012
- Section 6509: Statutory Framework.
 - PS/HS Bureau Seeks Comment on the Legal and Statutory Framework for NG911 – PS No. 10-255, PS No. 11-153, PS No. 12-333 – 11-13-2012



Technological Advisory Council

Machine to Machine Working Group



Table of contents

1. Approach
2. Top 3 Recommendations
3. Implementation Plan
4. Next Steps
5. Appendix



Friction Point Analysis Approach

Initiated survey of stakeholders in relevant sectors and targeted ~30 companies. To date the M2M TAC group has interviewed over a dozen companies and surveyed key issues impacting vertical opportunities: Regulator, Technical, Certification, Standards, Cost, and Others.

4/11

Develop Interview Material

5/30

Conduct Company Interviews

7/30

Consolidate and Summarize Findings

9/24

Preliminary Recommendations

10/9

CTIA Seminar

12/10

Top 3 Rec's

Participants

Company	Description	Vertical
Sprint	Network Operator	Multiple
Verizon	Network Operator	Multiple
KORE	MVNO	Multiple
Qualcomm	Devices and Platforms	Multiple
Nest	Solution Provider	Home Automation
Ultrastar	Solution Provider	Telematics
FATON	Devices	Energy
AT&T	Utility	Energy
Telcel	Solution Provider	Healthcare
Sempra Energy	Utility	Energy
Ericsson	HW and Platforms	Multiple
Google	Solution Provider	Multiple
AT&T	Network Operator	Multiple

Questions Asked

1. How do you define M2M?
2. What do you believe are the key verticals?
3. What are some inhibitors to M2M growth?
 - a. Regulatory (i.e. legacy regulations that inhibit M2M)
 - b. Standards
 - c. Technical
 - d. Security
 - e. Certification
 - f. Other
4. What do you think the FCC should do that could help remove some of these inhibitors or create a catalyst for M2M growth?

Preliminary Recommendations

1. Allocate shared spectrum to M2M
2. Create M2M Service Registration Database
3. Create a numbering and addressing plan
4. Add a M2M Center of Excellence in the FCC's Wireless Bureau
5. Faster certification process for M2M devices
6. Create a 2G sunset roadmap for migration to 3G / 4G
7. Consider seeding the market to spur M2M innovation

CTIA (MobileCon) Seminar

Agenda

1. Introduction: Shahid Ahmed, M2M TAC Chair and Senior Executive at Accenture
2. Guest Speaker: Henning Schulzrinne, CTO, FCC
3. Panels
 - Panel 1: Standards, Technology and Certification:
 - Panel 2: Business and Policy:
4. Guest Speaker: Martin Cooper, Chairman, Dyna, LLC and Member of the FCC TAC



Top 3 Recommendations

Top Recommendations (In order or priority)	Benefits	Key Features
2. Create an M2M Service Registration Database	<ul style="list-style-type: none"> • Interoperability, Roaming • Service Management 	<ul style="list-style-type: none"> • Establish broad requirements with Industry <ul style="list-style-type: none"> • Business • Technical • Policy
4. Add an M2M CoE in the FCC's Wireless Bureau	<ul style="list-style-type: none"> • Sustained focus on M2M 	<ul style="list-style-type: none"> • Develop requirements for COE <ul style="list-style-type: none"> • Best Practices • Research • Support • Oversight
5. Certification "Lite" for M2M devices	<ul style="list-style-type: none"> • Reduce certification complexity and speed to market • Ensures "Safe network" 	<ul style="list-style-type: none"> • Coordination with carriers to define app and HW certification across various network types • Create a streamlined network certification process for M2M devices



Recommendation 2: Create M2M Service Registration Database

- **Situation**
 - M2M is not measured adequately and there is little data available on what devices are in use. M2M devices are expected to grow exponentially with adoption of connected machines. There is also no easy way for M2M providers to use multiple networks or easily change networks.
- **Complication**
 - A registration database may increase the costs for implementation and perception of registration as a regulation may prevent cautious public/private investment.
 - Geo-location registration creates a bias towards devices that utilize infrastructure such as Cell Towers, GPS, or Wi-Fi.
- **Recommendation:**
 - Create a single secure nationwide (or regional) database administrator for M2M device registration similar to the local number portability (LNP) database administration.
 - The FCC will select a database administrator to provide an API. Companies can volunteer information without risking security of their networks.
- **Complexity to Implement**
 - **Short Term**



Recommendation 4: Add a M2M Center of Excellence in the FCC's Wireless Bureau

- **Situation**
 - M2M is not really represented at the FCC today as a separate industry.
 - The FCC has mentioned M2M but companies feel they have not provided enough input.
- **Complication**
 - A strong focus on M2M may create some fear in the industry that more regulations are coming for the M2M market and this might impact the growth of the M2M market.
- **Recommendation**
 - Organize a formal Center of Excellence within the FCC's Wireless Bureau to review this committee's recommendations in more depth.
 - Return to the companies we interviewed with potential solutions in hand.
 - Use the definition of M2M provided by this group to help inform the public.
 - Form a long-term committee and forum for M2M companies to contact the FCC.
- **Complexity to Implement**
 - **Short Term**



Recommendation 5: Faster certification process for M2M devices

- **Situation**
 - M2M device makers are challenged by varying regulations for regions and districts across the US and the rest of the world.
- **Complication**
 - The certification process is serial and companies cannot apply to FCC and FDA in parallel
 - Startups and device manufacturers lack the experience to develop radios & antennas that span multiple government organizations
- **Recommendation**
 - Create a Certification “Lite” process to reduce the cost and time to market a new device.
 - Allow carriers to deploy & test new devices on their network with Certification Lite.
 - Approve “Startup Districts” such as Silicon Valley & Austin to use Spectrum in a way to provide “Interference Tolerance” via registration.
 - Provide guidance tailored for M2M device manufacturers on the process for certifying a new device.
 - Request assistance from certification bodies, FDA, FAA, etc
- **Complexity to Implement**
 - **Short Term**



Preliminary - Implementation Timeline for Recommendations

Short Term: (6 to 12 months)

- #2 - Create M2M Service Registration Database Requirements
- #4 - Add a M2M Center of Excellence in the FCC's Wireless Bureau
- #5 - Faster certification process for M2M devices

Medium Term: (12 to 18 months)

- #3 - Create a numbering and addressing plan
- #6 – Create a 2G sunset roadmap for migration to 3G / 4G
- #7 (Implement) - Consider seeding the market to spur M2M innovation

Long Term (1): (18+ months)

- #1 - Allocate shared spectrum to M2M – **Dropping from the list**



Next Steps

1. Start work on top 3 recommendations
2. Develop an implementation plan with more detail around timing, dependencies, and level of effort



Appendix



Recommendation 1: Allocate shared spectrum to M2M

- **Situation**
 - The 2.4 Ghz unlicensed band is over crowded and even 5 Ghz is experiencing noise interferrance.
 - New standards abandon this spectrum, e.g. 802.11ac/ad do not operate on 2.4 Ghz.
 - 60 Ghz is too short and 1.2-3.1 Ghz is just right for mobile.
- **Complication**
 - When new spectrum is opened for unlicensed devices, it eventually becomes crowd.
 - Radar Interference Avoidance Schemes such as DFS for Wi-Fi on 5 GHz had mixed results: it avoids interference but was not always enforced/implemented.
- **Recommendation**
 - Allow spectrum sharing with Commercial and Military Radar systems operating at frequencies from 1.2 – 1.4 Ghz and 2.7- 3.1 Ghz.
 - Creating special rules for M2M creates a bias against other unlicensed uses.
 - Require interference avoidance AND geo-location database registration. (higher cost)
 - Coordinate with the EU's effort to prevent competing recommendations.
- **Complexity to implement**
 - **Long Term**



Recommendation 3: Create a numbering and addressing plan

- **Situation**
 - Currently there are tens of millions of devices latched onto 2G networks with IPv4 addresses in place. As IPv4 approaches depletion, the M2M ecosystem will be looking for a solution for a new addressing schemes for the millions of additional devices scheduled to hit the market.
- **Complication**
 - A solution is required soon before Carriers decide on their own proprietary solution making it even more complicated for M2M devices to be introduced in the market and have broad acceptance across carriers.
- **Recommendation**
 - Develop an IPv6 migration path for the near, medium, and long term to meet requirements for M2M fixed and mobile applications (On-Net, Off-Net (i.e. Roaming)).
- **Complexity to Implement**
 - **Medium Term**



Recommendation 6: Create a 2G sunset roadmap for migration to 3G / 4G

- **Situation**
 - National carriers have announced that they will be shutting down 2G existing wireless networks in the coming years. Some will be shut down as soon as 2016.
- **Complication**
 - Since there are tens of millions of 2G devices connected to these networks, existing devices will be forced to upgrade to 3G/4G modules. This will have a significant impact on the ROI for device manufactures who will be required to upgrade current device set. For many M2M players the 2G module prices have finally hit a point where they are seeing ROI (~\$20.00 per module). The module prices for 3G/4G prices are double and quadruple (~\$40.00 to ~\$80.00) in some cases.
- **Recommendation**
 - Create a 2G roadmap for transitioning from 2G to 3G/4G. This will allow current M2M 2G device OEMs to plan accordingly .
 - FCC recommended window of time supporting legacy 2G infrastructure with migration guidance to LTE with IPv6 addressing. The desired result being to return spectrum while upgrading infrastructure, eliminating legacy.
- **Complexity to Implement**
 - **Medium Term**



Recommendation 7: Consider seeding the market to spur M2M innovation

- **Situation**
 - Device OEMs report that moving to 3G/4G modules on a broad scale is a costly effort and believe with time and R&D the cost could come down. Carriers reported that the module cost is not coming down fast enough and this is having an impact on the market growth
- **Complication**
 - If nothing is done to help bring down the cost for the module set, this will have a direct impact on the ROI for Carriers who offer M2M services to their end users and who ultimately purchase the devices from the OEMs.
- **Recommendation**
 - Create a financial structure to entice software and hardware vendors to produce M2M modules at a low cost. Furthermore, providing new start ups/small businesses with financial incentives to create M2M modules at lower costs would aid in the effort to fuel the growth to the M2M market
- **Complexity to Implement**
 - **Medium Term**

