



National Public Safety Telecommunications Council

# ***Regulatory Activities***

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## ***NPSTC Technical Version November 2004***

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# ***Regulatory Topics***

- **800 MHz Rebanding**
- **Public Safety Spectrum**
- **DTV Transition**
- **Wireless Infrastructure and Siting Issues**
- **Spectrum Efficient Communications**
- **Application of Spectrum Policy Task Force Initiatives**
- **Border Issues**
- **Policy Issues**

# *800 MHz Rebanding*

# ***WT 02-55: 800 MHz Interference***

- Nextel and Verizon have made a truce
  - Nextel and Verizon have subsequently buried the hatchet over legal action on the rights and use of the words “Push-to-talk”, “PTT”, and “Push”
  - Verizon has agreed to give up their challenge of Nextel being awarded 10 MHz of spectrum at 1.9 GHz
- Government Accountability Office (GAO) issued an opinion on the legality of the 800 MHz interference issue at the request of Senator Frank Lautenberg
  - The GAO opinion was the Commission’s actions were legal
  - The issue of whether the Commission’s exercise of authority under the Communications Act was done with a balance of policies, powers, and constraints is a matter left for Congress to consider

# ***WT 02-55: 800 MHz Interference***

- **Since the August 6, 2004 issuance of the plan for Improving Public Safety Communications in the 800 MHz Band**
  - **Three Erratum issued by the FCC,**
  - **Numerous ex parte submissions by Nextel and others, and**
  - **FCC requested Comments on ex parte submissions**

# ***WT 02-55: 800 MHz Interference***

- Three Erratum released by the Commission
  - First Erratum September 10, 2004
    - Corrected omissions , resolved ambiguities, added footnotes, and resolved a conflict in Appendix C between the text and the Order
  - Second Erratum October 6, 2004
    - Correction of inconsistent language, typographical errors, and amendment of Appendix C and G
  - Third Erratum October 29, 2004
    - Corrected erroneous language, cross-reference, and typographical errors in Appendix C,

# ***WT 02-55: 800 MHz Interference***

- Ex parte submissions
  - Nextel: Concern over Letter of Credit (LOC) dispersal, interference abatement during transition, scheduling, retuning costs, and procedural matters.
  - Others: Pro/con relaxing interference mitigation rules during transition, and against freezing 900 MHz licensing.

# ***WT 02-55: 800 MHz Interference***

- Commission issues public notice October 22, 2004
  - Seeking comments on ex parte presentations
    - Nextel and others
  - Extending certain deadlines regarding the 800 MHz public safety interference proceeding WT Docket No 02-55
    - Deadlines in Paragraphs 342, 344, 345, 346 and 352
  - Comment period is 10 days after publication in the Federal Register
    - Not as of 11-16-04

# ***WT 02-55: 800 MHz Interference***

- **Issues**

- **No plan in Report and Order to deal with Canadian and Mexican border issues**
- **Will the Commission adopt relaxed protection during the transition?**
  - **-85 dBm (Portable) and -88 dBm (mobile), but**
  - **Greater than or equal to -101 dBm (portable) and -104 dBm (mobile)**
  - **C/I+N ratio of 17 dB for 800 MHz Public Safety FM LMR systems**
- **Nextel has not yet approved the plan**

# *Public Safety Spectrum*

# ***WT 00-32:***

## ***4.9 GHz Public Safety Spectrum***

- On November 9, 2004 the Commission adopted a Memorandum Opinion & Order (MO&O) on WT 00-32/FCC 04-265
- Grant of the NPSTC petition in part by adopting
  - New 4.9 GHz emission masks – one for high power operations (the DSRC-C mask) , and one for low power operations (the DSRC-A mask).
  - Typo/erratta
- Acceptance of 20 dBm breakpoint
  - Decision grounded on the fact that even consumer equipment in this frequency range (5.4 GHz UNII) is relatively tolerant of interference
  - Power level strikes a reasonable balance between interference avoidance and 4.9 GHz equipment affordability
- Reaffirmed decisions in the Third R&O
  - Not to adopt a technology standard,
  - Not to make regional planning mandatory in the 4.9 GHz band

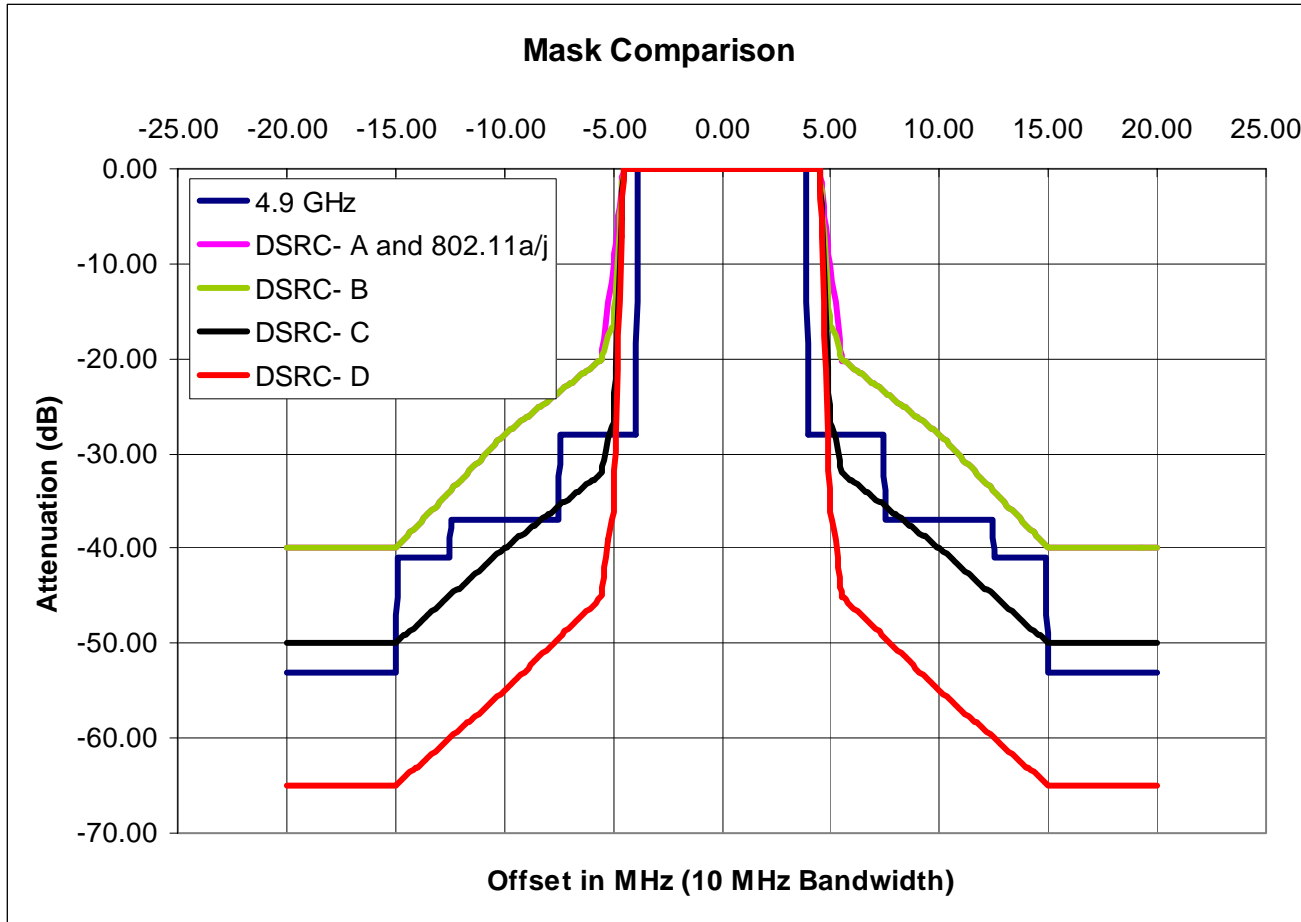
# ***WT 00-32:***

## ***4.9 GHz Public Safety Spectrum***

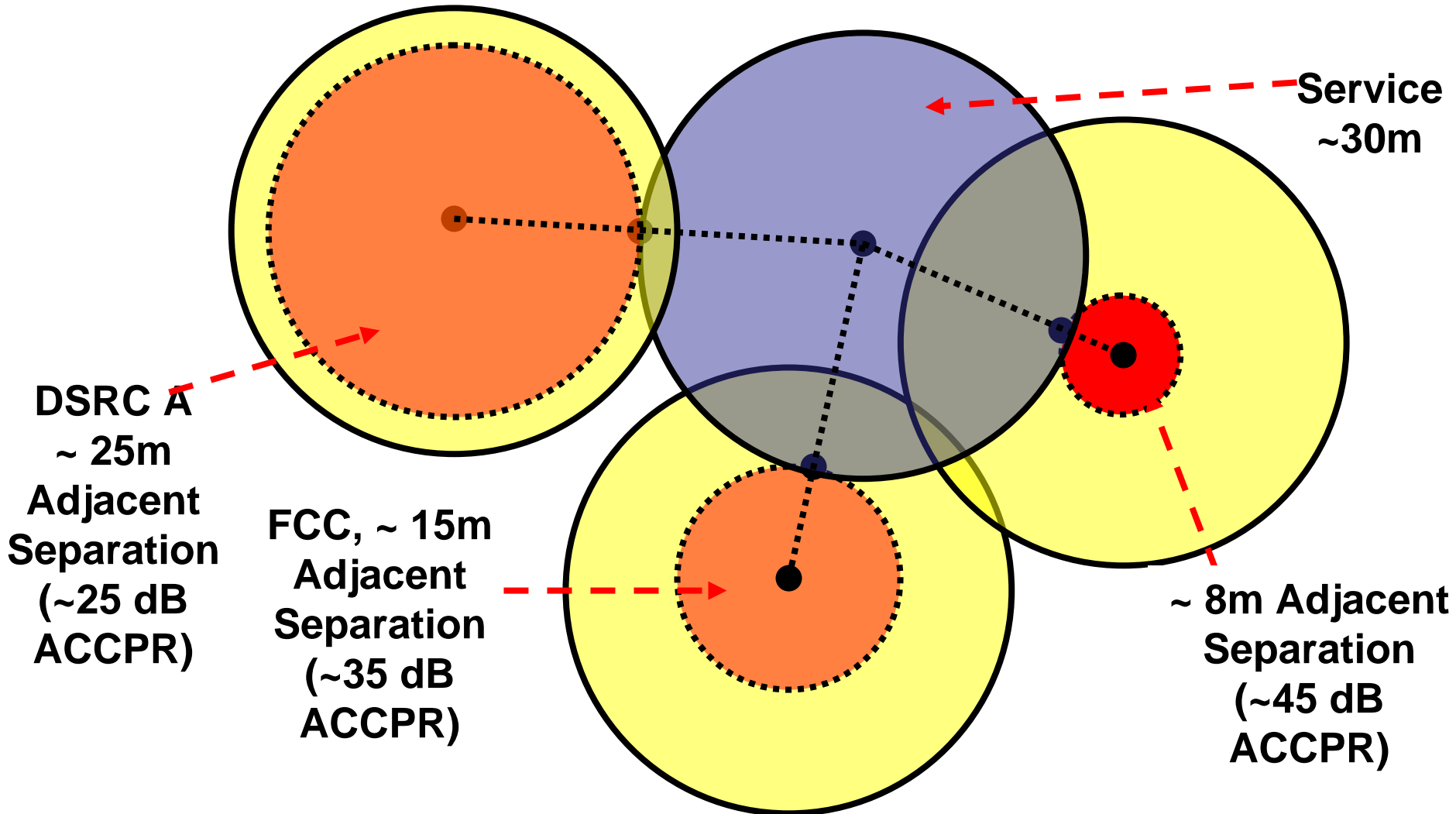
- **Two recent notable submissions instrumental in achieving partial acceptance of NPSTC petition**
  - **NPSTC filed a petition for reconsideration on 7/30/04**
    - **Adoption of industry standard emission mask**
    - **Adopt clear path towards minimal technology standards to promote interference free operations and interoperability**
    - **Mandate adherence to regional plans**
    - **Provide intra and inter regional dispute resolution**
  - **NPSTC filed scenario on 8/19/04 with the Commission**
    - **operational deployment of 4.9 GHz at the scene of a severe incident**
    - **Monumental work dispelled interference claims under severely loaded conditions**

# 4.9 GHz FCC Mask Comparison

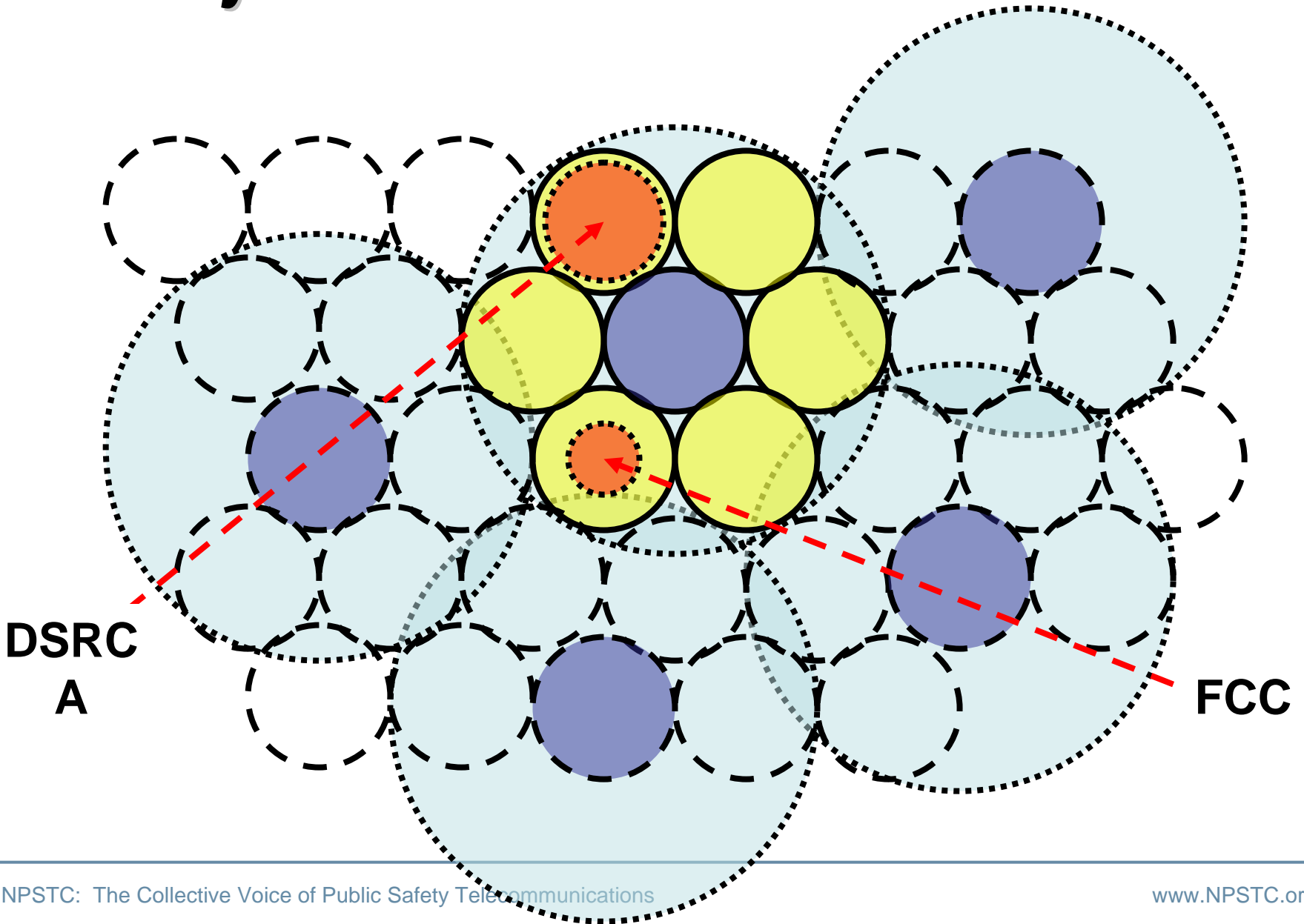
## -existing standards



# Adjacent Channel Reuse Effects



# Adjacent Channel Reuse Effects



# ***WT 00-32:***

## ***4.9 GHz Public Safety Spectrum***

- **Most Recent NPSTC activity (Currently in Draft status) analyzes channel usage and dispels fears over**
- **Preparation of an operational scenario for the FCC which demonstrates many important characteristics of 4.9 GHz utilization, including its**
  - **Role as a support resource for public safety,**
  - **How multiple frequency band resources (including 4.9 GHz) work together to meet public safety's operational objectives,**
  - **What types of applications 4.9 GHz will be used for,**
  - **The physical limitations and propagations characteristics of the 4.9 GHz band, and**
  - **How technology is used to solve some of the propagation constraints inherent to the use of 4.9 GHz.**

# ***WT 00-32:***

## ***4.9 GHz Public Safety Spectrum***

- **The FCC has asked NPSTC for further clarification, and more detailed modeling of the effects that the different emissions masks have upon real life operational scenarios**
- **In order to demonstrate the operational effects of 4.9 GHz Mask selection on public safety operations, a very complex scenario was developed which was loosely based upon a scenario presented in the SAFECOM *Statement of Requirements for Public Safety Wireless Communications and Interoperability* with certain factors modified to make this example particularly stressing in terms of operational spectrum management.**
- **As requested by the Wireless Bureau of the FCC, several elements were incorporated in the modified scenario:**
  - **Operational examples of typical public safety applications.**
  - **Operational examples of “*Mission Critical*” public safety applications.**
  - **Operational examples “Worst Case” incident management practices, such as locating tactical Access Points (AP’s) in close proximity, and not managing or considering adjacent channel interference effects at all.**
  - **Detailed propagation modeling or real life situations, with worst case effects.**
  - **Detailed assessment of packet data transfer effects and packet collisions.**

# ***WT 00-32:***

## ***4.9 GHz Public Safety Spectrum***

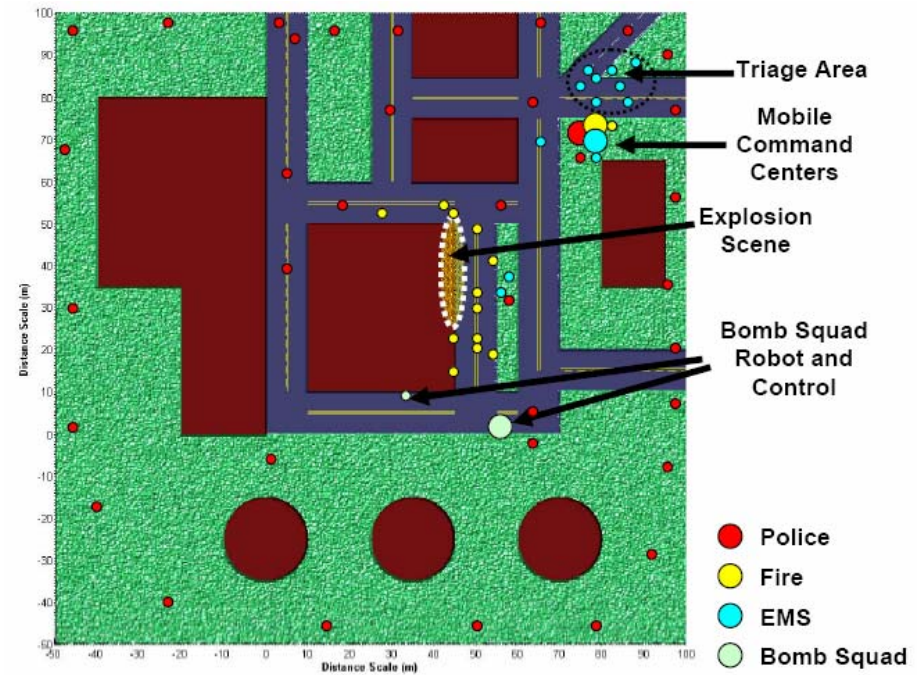
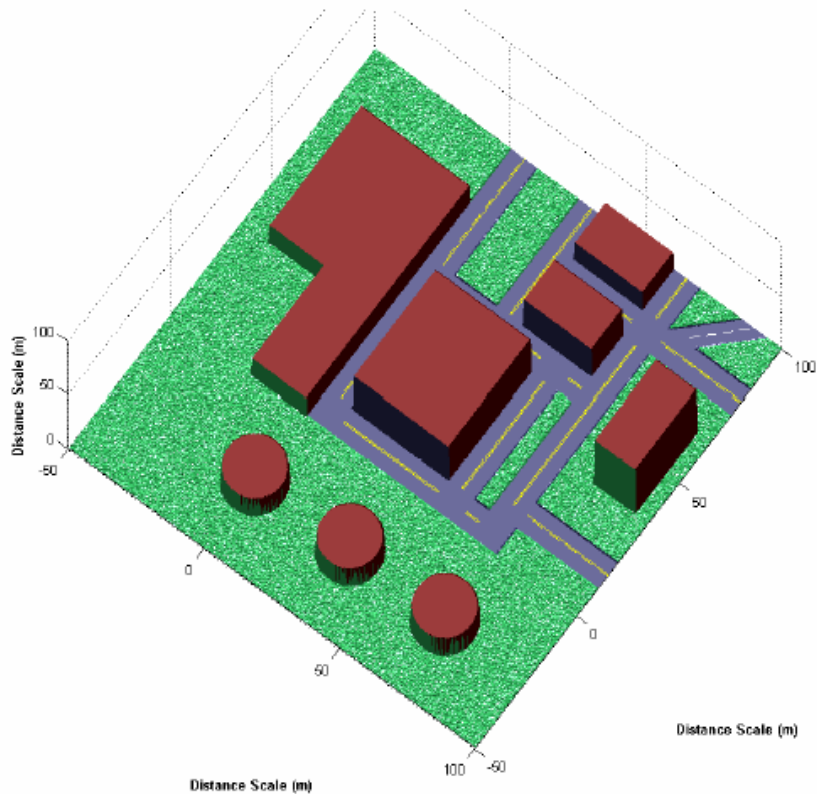
- Technical parameters used in the study for 4.9 GHz wireless devices where as follows:
  - All access points and mobile (i.e. not backhaul) devices operate at on 10 MHz channels, utilizing standard IEEE 802.11j technologies (NOTE, both Mask A and mask C were considered, although Mask C is not a COTS implementation of this standard)
  - All mobile (i.e. not backhaul) devices operate at transmitter power levels of 20 dBm
  - Antennas gains minus line losses are: 0 dBi (mobile units), 6 dBi (APs), and 12 dBi (Bomb Squad Robot Links)
- Users
  - Police (35 Active Mobile Data Units on Scene)
  - Fire (13 Active Mobile Data Units on Scene)
  - EMS (12 Active Mobile Data Units on Scene)
  - Special Operations - Bomb Squad (1 Active Mobile Data Unit on Scene)

# **WT 00-32:**

## **4.9 GHz Public Safety Spectrum**

User	Destination	Traffic Content	Estimated worst case physical layer throughput requirement
Police	AP/Incident Command to Units	PDA-based applications that include text messaging and the display of on scene maps that show the geo-location of all other police units	1,000 KB/hour/unit
Police	Perimeter Units to AP/Incident Command	<ol style="list-style-type: none"> <li>1. Photographs of crowds and individuals in the vicinity of the perimeter. These are sent to Federal Government databases via the mobile command unit's back haul links for image recognition analyses against those known to be associated with terrorist activities</li> <li>2. Geo-location Information</li> </ol>	<ol style="list-style-type: none"> <li>1. 6,000 KB/hour/unit, corresponding to six (6) high resolution JPEG images</li> <li>2. 500 KB/hour/unit</li> </ol>
Fire	AP/Incident Command to Units	Head up display-based applications that include text messaging, the display of on-scene maps that show the geo-location of all other fire units, and periodically updated infra-red (IR) imagery of affected buildings showing possible ignition/combustion activities	5,000 KB/hour/unit
Fire	Perimeter Units to AP/Incident Command	<ol style="list-style-type: none"> <li>1. Tactical images and video on demand</li> <li>2. Geo-location Information</li> <li>3. Unit "health" status that included vital signs, oxygen supplies, and Ambient temperature</li> </ol>	<ol style="list-style-type: none"> <li>1. 50,000 KB/hour/unit</li> <li>2. 500 KB/hour/unit</li> <li>3. 500 KB/hour/unit</li> </ol>
EMS	AP/Incident Command to Units	Head up display-based applications that include text messaging, and vital signs	5,000 KB/hour/unit
EMS	Perimeter Units to AP/Incident Command	<ol style="list-style-type: none"> <li>1. Telemedicine images and video on demand</li> <li>2. Patient and triage "health" status that includes vital signs, medicinal and blood supplies</li> </ol>	<ol style="list-style-type: none"> <li>1. 50,000 KB/hour/unit</li> <li>2. 5,000 KB/hour/unit</li> </ol>
Special Operations Bomb Squad	AP/Incident Command to Robot Unit	Control information	50,000 KB/hour/unit
Special Operations Bomb Squad	Perimeter Units to AP/Incident Command	Video Information for robot control	225,000 KB/hour/unit, corresponding to full-cycle use of a 500 kbps compressed video feed

# WT 00-32: 4.9 GHz Public Safety Spectrum



# ***WT 00-32:***

## ***4.9 GHz Public Safety Spectrum***

- **Conclusions**
  - The standard technologies used to support the first responder operations can support this extremely complex and stressing incident without any noticeable degradation of Quality of Service (QoS) to the end users at the scene.
  - In this scenario, only 4 to 28 % of the channel capacity resources are utilized by the user applications.
  - Not only does significant capacity reserves exist over and above the user's needs (even with 65 simultaneous users operating continuously), but the RF and packet collision environment realities indicate that there is no effect whatsoever on the operation of mission critical applications, with less than a 6% degradation in overall data rates due to adjacent channel effects – and with no incident spectrum management considerations given to circumvent this effect.
  - Selecting and mandate of a stricter emissions mask than that represented by standard 802.11/j technologies will only serve to limit the gains that would otherwise be afforded by market driven forces.

# 4.9 GHz Standards Work

- NPSTC/AGILE Standards-based work in progress
  - DSRC (IEEE WAVE)
  - TIA
  - IETF MANET/Mesh, IPv6
  - IEEE802
    - 802.11a/j (OFDM), h (power control and dynamic Channel Selection), e (QoS and priority), I (security)
    - 802.20 (fading away?) and 802.16 (wide area interconnect) and .16e (MAN with Mobility), OFDMA

# ***DA 04-1021***

## ***Access Spectrum Waiver Request***

- **Background**
  - Access Spectrum request for waiver of Section 27.60 of the Commission's Rules, 47 C.F.R. § 27.60 to enable operation of a multi-channel trunked system in the 700 MHz band on frequency assignments which are adjacent to KZJL TV and within this stations Grade B contour
- **NPSTC Filing**
  - Comments in support of granting waiver
  - We also provided supporting technical documentation to validate our request for examining existing rules in *Annex-A* of our filing, as well as values that could be utilized in an "engineering study"

# ***DA 04-1021***

## ***Access Spectrum Waiver Request***

- **FCC Granted waiver to Access Spectrum on August 12, 2004 with conditions:**
  - **Access Spectrum must operate in accordance with technical parameters set forth in its FCC Form 601 and accompanying engineering showing;**
  - **Access Spectrum shall provide KZJL, before commencing any operations, with a contact number to receive reports of any interference;**
  - **Access Spectrum shall remedy or report to the FCC any and all cases of reported interference within five business days;**
  - **Access Spectrum shall remedy any and all interference at its sole expense;**
  - **mobile-to-mobile operations on Channel 60 are prohibited; and**
  - **Access Spectrum shall be required to protect KZJL's facilities as set forth in KZJL's current construction permit (BMPCT-20021107AAA).**
- **Waiver presents itself as a precedent – to help the public safety community access 700 MHz spectrum during the DTV transition**

# ***03-122: Additional 255 MHz of 5 GHz Spectrum***

- **R&O issued (November 2003)**
- **For us, another 255 MHz of spectrum available to augment UNII and 4.9 GHz PS spectrum resources**
- **Requires some mandatory Functionality (protect DoD)**
  - **DFS, Dynamic Frequency Selection (sniff sniff)**
  - **TPC, Transmit Power Control**
- **This will accelerate the availability of these functionalities in 802.11a-based products**
  - **Good for us**
- **Most people in industry think that full 4.9-5.9 GHz world radios will be the norm**
- **Will stay on this, and flag any necessary action**

# ***01-90: 5.9 GHz ITS***

- **Recent R&O**
- **Eligibles**
  - **Public Safety (primarily)?**
  - **Non-Public Safety (will benefit PS)**
- **Non-Exclusive Geographic Licensing (RSU Registration) of entire 70 MHz (simto 4.9 GHz)**
- **Coordination with NTIA for Government Interference Avoidance**
- **Deferred Coordination Decision with FSS**
- **Accepted DSRC (ASTM) as Standard**

# *DTV Transition*

# ***MB 03-15: DTV Transition***

- **The FCC released (01/27) a Notice of Proposed Rulemaking (NPRM) that Reviews the DTV Transition**
- **Comments still appearing as of 11/01/04**
- **They requested whether any “adjustments” need to be made to ease/accelerate the transition**
- **They are also looking for comment on whether interference protection rules need to be modified**
  - **Including Interference from Public Safety 700 MHz Operations**
- **US House Subcommittee on Telecommunications and the Internet held a hearing on June 2, 2004 – Advancing the DTV Transition: An Examination of the FCC Media Bureau Proposal**

# ***MB 03-15: DTV Transition – NYS Comments***

- **Maximize Availability/Sharing – Minimize Interference**
  - **In-core early transition/”swaps”**
    - **Re-examination/relaxation of Taboo restrictions**
  - **Replication**
    - **Continue to protect only realistic parameters**
    - **Set drop dead date for service replication**
  - **Engineering Studies**
    - **Multiple recommendations for better defining parameters, and maximizing availability while minimizing interference**
  - **End of the Analog Era**
    - **How to measure/define success**

# ***MB 03-15: DTV Transition – NYS Comments***

- **Strongly supported by NPSTC and PSWN**
- **Support in general by APCO**
- **Opposition from NAB et al**
- **We have the door open with OET, we need to go in before it closes.**
- **Could allow for earlier 700 availability**

# ***MB 03-15 (RM 9832, FCC 04-220)***

## ***TV Transition Report and Order***

- Established rules to allow for the digital conversion of low power TV (“LPTV”) and TV translator stations, released September 9, 2004
- The following types of stations are affected by the Order:
  - **LPTV (low power television) stations:** LPTV stations rebroadcast TV signals and originate programming in any amount. Approximately 2,100 LPTV stations serve rural communities and discrete communities in urban areas. Many provide the community’s only local news, weather, and public affairs programming.
  - **TV translator stations:** A TV translator station simultaneously rebroadcasts the programs of a full-service TV broadcast station. Translator stations typically serve communities that cannot receive the signals of free, over-the-air TV stations due to large geographic separations or intervening terrain. Most of the 4,700 licensed TV translator stations are in the western mountainous states.
  - **Class A TV stations:** Class A TV stations are LPTV stations that qualify under the Community Broadcasters Protection Act for interference protection rights. They must satisfy requirements for minimum operating hours and amounts of locally produced programming, and comply with the service rules for TV broadcast stations.

# ***MB 03-15 (RM 9832, FCC 04-220)***

## ***TV Transition Report and Order***

- LPTV, TV translator, and Class A stations are required to convert to digital operation, but the Commission has discretion to set the date by which analog operations of these stations must cease.
- The Order states that the Commission will seek to hasten their transition to digital service and will work toward the goal of achieving an end-date at, or soon after, the end date of the full-power transition.
- The final transition date of these stations will be considered in the Commission's Third DTV periodic review proceeding
- Existing LPTV and TV translator stations may convert to digital operations ("flash cut") on their current channel
- Applicants for operations on channels 52-69 must notify potentially affected commercial wireless and public safety licensees before filing their applications. Additionally, applicants proposing to flash-cut to digital on channels allocated for public safety use (channels 63, 64, 68 and 69) are required to coordinate with regional and state entities representing potentially affected public safety licensees

# ***MB 03-15 (RM 9832, FCC 04-220)***

## ***TV Transition Report and Order***

- All digital LPTV and TV translator stations will operate on a secondary, non-interfering basis with respect to primary services, including the commercial wireless and public safety services.
- The Order adopts for digital stations in the LPTV service the protected contour values for digital Class A stations.
- For digital stations in the LPTV and Class A services, the Order replaces the current contour protection methodology with the DTV interference prediction methodology.

Source: [http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/DOC-251978A1.doc](http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-251978A1.doc)

# ***MB 03-185:***

## ***Amendment of Parts 73 and 74 of the Commission's Rules to Establish Rules for Digital Low Power TV***

- **Amendment of Parts 73 and 74 of the Commission's Rules to Establish Rules for Digital Low Power Television, Television Translator, and Television Booster Stations and to Amend Rules for Digital Class A Television Stations**
- **Issues**
  - **Should TV channels 60-69 (746-806 MHz) should be made available during the DTV transition for new digital LPTV and translator stations and/or digital conversions of existing analog stations?**
  - **Are the two out-of-band emission masks adequate to protect aeronautical and ground-based Radio Navigation Satellite Services (RNSS) receivers from digital low power TV harmonics?**
  - **Should use of multiple emission masks with differing performance requirements and cost be permitted and should they be extended to digital stations in Class A service?**
    - **Do these masks go far enough?**
    - **Class A stations have protection?**
- **NOTE RECENT ANALOG APPLICATIONS!**
- **Filing window – closed**

# ***MB 03-185:***

## ***Amendment of Parts 73 and 74 of the Commission's Rules to Establish Rules for Digital Low Power TV (Report & Order)***

- **Class A stations operating on digital companion channels will not be entitled to protection during the transition period**
- **Operation outside of “core” channels 2-51 will be permitted however operation on channels 52-69 will be on a non-interfering basis - Interfering stations will be shut down immediately**
- **LPTV and TV Translators on channels 52-59 may flash-cut to Digital operation**
- **Companion operation on Channels 60-69 is not allowed**
- **Channel 52-59 applicants must notify public safety and commercial wireless users**
- **Stations electing to flash-cut on channels 63/64 and 68/69 must coordinate with regional and state public safety licensees**

# *Wireless Infrastructure and Siting Issues*

# ***WT 03-128:***

## ***NATIONAL HISTORIC PRESERVATION ACT REVIEW***

- **The FCC released a NOI on Nationwide programmatic agreement regarding the section 106 National Historic Preservation Act review process (04/23/03)**
- **Intent of the programmatic agreement is to streamline the review process for communication facilities under the national historic preservation act.**
- **Major issues of infrastructure provider comments concerns include**
  - **Whether the FCC possesses the Authority to apply such rules**
  - **Tower registration would constitute a federal undertaking**
  - **Each action would constitute a Section 106 process**
  - **Firm Timelines have not been established**
  - **There should be exclusions to Section 106 review**
  - **No Limit on the number of parties involved in an action**
  - **Need to better define and assess visual impacts**

# ***Nationwide Programmatic Agreement 03-128 (FCC 04-222) as of 9/10/04***

- Action by the Commission on September 9, 2004, by *Report and Order* in WT Docket No. 03-128 (FCC 04-222)
- FCC Adopted measures to streamline and tailor the review process for communications towers and other Commission-licensed facilities under the National Historic Preservation Act (“NHPA”)
- Order released October 5, 2004
- Industry expected to appeal the decision
  - CTIA board voted October 27, 2004 to appeal the rules

# ***Nationwide Programmatic Agreement 03-128 (FCC 04-222) as of 9/10/04***

- Key Elements
  - Describing standards for identifying historic properties that may be affected by an undertaking and assessing effects on those properties, including a streamlined process for identifying eligible properties not listed on the National Register that may incur visual effects;
  - Prescribing procedures including enforceable deadlines for SHPO and Commission review;
  - Providing forms designed to standardize filings to SHPOs;
  - Outlining procedures for communicating with federally recognized Indian tribes and Native Hawaiian Organizations in order to ensure protection of historic properties to which tribes and Native Hawaiian Organizations attach religious or cultural significance; and
  - Establishing categories of “undertakings” that are excluded from the Section 106 review process. These exclusions include: enhancements to existing towers; replacement and temporary towers; certain towers constructed on industrial and commercial properties or in utility corridor rights-of-way; and construction in areas designated by a SHPO.

# ***WT 03-187:***

## ***Effects of Communications Towers on Migratory Birds***

- **Commission initiated a Notice of Inquiry (NOI) to gather comment and information on the impact that communications towers may have on migratory birds (8/03/03)**
- **Inquiry designed to gather comments on scientific research and other related data relevant to migratory bird collisions with towers and whether such research would support changes within the structure of current rules and processes related to migratory birds**
- **What could be the outcome of this NOI?**
  - **Nothing if it proves fruitless, or**
  - **NPRM on including threats to regulatory birds being made part of environmental assessment, or**
  - **Modifications to height and lighting**
- **Filing window – closed**

# *Spectrum Efficient Communications*

# ***WT 00-230: Secondary Markets (FCC 04-167)***

- Released September 2, 2004
- In the 2<sup>nd</sup> Report and Order the Commission wishes to
  - Adopt immediate approval procedures for certain categories of *de facto* transfer spectrum leasing arrangements
  - Further streamline the process of short-term *de facto* transfer leases by replacing the Special Temporary Authority (STA) with new immediate approval procedures,
  - Streamline certain categories of spectrum manager leasing
  - Extend leasing policies to additional Wireless Radio Services such as
    - Public Safety (so long as spectrum is leased to entities providing communications support to public safety operations), Automated Maritime Telecommunications Systems (AMTS) services, and Multichannel Video Distribution and Data Service (MVDDS)
  - Clarify spectrum leasing policies with regard to designated entity and entrepreneur licensees

# ***WT 00-230: Secondary Markets (FCC 04-167)***

Continued,

- Clarify existing policies with regard to use of “smart” or “opportunistic devices”
- Establish a new type of secondary market arrangement that facilitates the development of “private commons” in licensed wireless radio spectrum
- Adopt immediate approval procedures for certain categories of license assignments and transfers of control
- Extend policies for streamlined processing of license assignments and transfers of control to all of the Wireless Radio Services regulated by the WTB
- In the order on Reconsideration five petitions for reconsideration are considered with regard to the Report and Order
- In the 2<sup>nd</sup> Further Notice of Proposed Rulemaking the Commission seeks comment on development of secondary markets in spectrum usage rights
  - in particular on policies that would further enhance the development of advanced technologies (presumably opportunistic devices)
- Outgrowth of policies formulated by the Spectrum Policy Task Force
- Comment date extended to 1/17/05, Reply Comments 2/17/05

# ***WT 99-87: Narrowbanding below 512 MHz***

- **The FCC released the 2<sup>nd</sup> R&O/2<sup>nd</sup> FNPRM On Narrowbanding below 512 MHz (02/25)**
- **Summary**
  - **Prohibits new applications or service area expansion for legacy operations, on 25 kHz channels, beginning 6 months after Register Publication (Still Pending as of 04/25)**
  - **Prohibit equipment certification for 25 kHz equipment after 01/01/05 (one voice path per 25 kHz), and manufacture/import after 01/01/08.**
  - **Imposes deadlines for migration to 12.5 kHz technology for PLMRS systems operating in 150-174 and 421-512 MHz bands**
    - **01/01/13, for non-PS**
    - **01/01/18, for PS**
- **Numerous of petitions for reconsideration were filed**

# ***WT 99-87: Narrowbanding below 512 MHz***

- APCO and NPSTC petition for Stay of implementation date filed 8/29/03
- APCO Petition for Reconsideration filed 8/18/03
  - Broad support by public safety entities
- Petition for recon proposes
  - Public Safety licenses must be able to expand existing systems with compatible equipment
  - Restrictions on new applications must not inhibit interoperability
  - Restrictions on equipment certification, manufacturing, and importation should coincide with restrictions on licenses
  - The Commission must permit 25 kHz bandwidth operation for mobile data and equivalent voice paths

# ***WT 99-87: Narrowbanding below 512 MHz***

- Petition for Stay Granted to all four petitions for reconsideration (FCC 03-306) submitted by
  - IPMobileNet, Inc. on August 11,2003;
  - American Association of Railroads on August 18,2003
  - American Petroleum Institute and the Untied Telecom Council on August 18,2003
  - Association of Public-Safety Communications Officials-International, Inc., the International Association of Fire Chiefs, Inc., the International Municipal Signal, Association, the International Association of Chiefs of Police, the Major Cities Chiefs Association, the National Sheriffs' Association, the Major County Sheriffs' Association, and the National Public Safety Telecommunications Council on August 29,2003
- Adopted 12/1/03, posted 12/3/03
- Synopsis of petitions are posted various NPSTC newsgroups

# ***WT 99-87: Narrowbanding below 512 MHz***

- More Petitions submitted over the summer
  - Petition to defer enforcement of section 90.203(j)(5) of the Commission's rules until January 2005
    - One submitted by EFJohnson Company, Kenwood U.S.A. Corporation, and Motorola, Inc. on 7/14/04
    - Another by Ritron Inc. on 7/29/04
  - Urges Commission defer enforcement of Section 90.203(j)(5)2 of the Commission's rules, which requires new applications for equipment authorizations in the 150-174 MHz ("150 MHz") and 421-512 MHz ("450 MHz") bands (collectively, "Refarming bands") submitted on or after January 1, 2005 to specify 6.25 kHz capability.

# *Application of Spectrum Policy Task Force Initiatives*

# ***ET 02-135: Spectrum Policy TF Recommendations***

- Deals with the recommendations provided to the FCC from its Spectrum Policy Task Force (SPTF)
- Comments still appearing in as of 10/25/04.
- Also has many excellent recommendations
- Responsible for producing numerous NPRMs over the past two years
  - Interference Temperature ET 03-237 (NOI and NPRM),
  - Cognitive Radio ET 03-108 (NPRM),
  - Broadband over power lines (R&O) ET 04-37/FCC 04-245,
  - Spectrum sharing initiatives in vacant TV channels (NPRM) ET 04-186
  - Secondary Markets WT 00-230 (2<sup>nd</sup> R&O, O-on-R, and 2<sup>nd</sup> FNPRM)

# ***ET 02-135: SPTF in Action***

- **Within One Year of it's inception we have action in may areas:**
  - **Increasing Access to Spectrum Through Secondary Markets**
  - **Authorizes spectrum leasing in broad array of wireless radio services – including Public Safety**
  - **Adopts streamlined processing for certain categories of license transfer and assignment applications;**
  - **Seek further comment on additional steps to improve the functioning of secondary markets, and to facilitate access to spectrum by new technologies that make “opportunistic” use of licensed but unused spectrum.**

# ***ET 02-135: SPTF in Action***

- **More...Additional Spectrum for Unlicensed Devices**
  - **Ultra-wideband Communications Systems (3.1- 10.6 GHz): 2002 decision affirmed on reconsideration.**
  - **Below 900 MHz and in 3 GHz Bands: December 2002 Notice of Inquiry attracted over 100 formal comments.**
  - **5 GHz (U- NII), Final rules Adopted Nov 2003**
  - **90 GHz: Unlicensed rules Adopted (with licensing rules) October 2003**
  - **2.5 GHz (MDS/ ITFS), April 2003 NPRM sought comment on unlicensed use of unused ITFS spectrum and spectrum underlays.**
  - **Improving Access to Spectrum in Rural Areas: Notice of Inquiry issued December 2002, Notice of Proposed Rulemaking adopted October 2003**

# ***ET 02-135: SPTF in Action***

- **More...Other Areas**

- **Receiver Interference Immunity Performance Specifications: Notice of Inquiry issued March 2003**
- **Interference Temperature Metric: NOI and NPRM Nov 2003**
- **Cognitive Radio Technologies: Public workshop held May 2003: NPRM on advanced antenna technologies adopted Sept. 2003**
- **Cognitive Radio NPRM December 2003**
- **Streamlining Satellite Space Station and Earth Station Licensing: Space Station R&O/FNPRM adopted July 2003**
- **4.9 GHz (Public Safety), Final rules adopted May 2003.**
- **70- 90 GHz (Broadband, Pencil-Beam Communications), Final rules adopted October 2003.**

# ***ET 02-135: SPTF in Action***

- **More...Band Specific**

- **2.5 GHz Wireless Broadband (MDS/ ITFS), Proposed rules adopted March 2003.**
- **Advanced Wireless Services (3G), Service/ Auction Rules Adopted October 2003, Additional spectrum allocations proposed.**
- **800 MHz (Public Safety), Proposed rules adopted March 2002, additional analysis and comments 2003.**
- **DTV Periodic Review (Distributed Transmission Technologies), Notice January 2003**
- **Broadband over power lines, Notice February 2004**
- **Review of Part 15 Rules, 3<sup>rd</sup> R&O April 2004**
- **More unlicensed spectrum in 3650-3700 MHz band and below 900 MHz in vacant TV channels, Notice June 2004**

# ***ET 02-135: SPTF in Action***

- **More...Coming Up**
  - Rural NOI to Rural NPRM to Report & Order
  - Secondary Markets FNPRM to 2<sup>nd</sup> Report & Order
  - Unlicensed NOI to NPRM to Report & Order(s)
  - Receiver Specifications NOI to Constructive Record to TBD
  - Interference Temperature NOI to Constructive Record to TBD
  - Cognitive Radio Technologies Proceeding, Transitioning to Newer Policy Models & Improving Access, Band- by- band, service- by- service
  - Streamlining and Harmonization of Antiquated Service Rules
    - Consideration and Application of Task Force Principles and Concepts, Plus Other Innovative Approaches
    - Spectrum Audits and Auctions

## ***ET 04-37:***

# ***Broadband Over Power Lines Report & Order***

- **Commission proceeded with the adoption of rules for the deployment of Access Broadband over Power Line (Access BPL) technology at their October 14, 2004 open meeting**
- **What is in R&O**
  - **Sets forth rules imposing new technical requirements on BPL devices, such as the capability to avoid using any specific frequency and to remotely adjust or shut down any unit;**
  - **Establishes “excluded frequency bands” within which BPL must avoid operating entirely to protect aeronautical and aircraft receivers communications; and establishes “exclusion zones” in locations close to sensitive operations, such as coast guard or radio astronomy stations, within which BPL must avoid operating on certain frequencies;**

# ***ET 04-37: Broadband Over Power Lines Report & Order***

- **What is in the R&O (Cont.)**
  - Establishes consultation requirements with public safety agencies, federal government sensitive stations, and aeronautical stations.
  - Establishes a publicly available Access BPL notification database to facilitate an organized approach to identification and resolution of harmful interference.
  - Changes the equipment authorization for Access BPL systems from verification to certification; and
  - Improves measurement procedures for all equipment that use RF energy to communicate over power lines.
- **What is not in the R&O**
  - Universal service, disabilities access, E911, pole attachments, competition protections, and, critically, how to handle the potential for cross-subsidization between regulated power businesses and unregulated communications businesses

# ***ET 04-37: Broadband Over Power Lines Report & Order***

- **Problems with order**
  - **Burden of resolving interference mitigation shifted from the operator to the licensee**
  - **The R&O requests licensees to locate “sensitive receiver antennas” as far as practically possible from power lines.**
  - **FCC admonished ARRL if members experience interference “such noise can often be avoided by carefully locating their antennas.”**
  - **ARRL weighing options**

# ***ET 03-104:***

## ***Broadband Over Power Lines***

- **History**
  - The FCC releases a NOI on using existing electrical power lines to provide broadband services to homes and offices (04/23)
- **NOI received a lot of attention**
  - Over 6000 submissions to date
- **Issues**
  - Proposed frequency range is from 2-80 MHz
  - Poses an immediate threat to HF through VHF-Low Band communications
  - May require relaxing of Part 15 rules when just the opposite may be necessary
    - Eroding Part 15 rules could have serious consequences and set a precedence for other bands
    - Part 15.209 section f (radiated emission limits), require measuring up to the 10<sup>th</sup> harmonic for spurious emission – 80 MHz x 10 = 800 MHz.
  - Will wide spread deployment have unintended consequences at short range on frequencies above 80 MHz?
    - Overhead power lines – on road coverage
    - Indoor power line carrier (PLC) modem – in building portable coverage
- **Japan did not adopt BPL at this time due to its interference potential**
- **Despite overwhelming opposition to BPL, FCC issues NPRM**

# ***ET 02-380: Unlicensed Spectrum***

- **The FCC released (12/30/02) a Notice of Inquiry (NOI) regarding expanded use of unlicensed devices on various frequency bands, including "unused" television channels.**
  - One offspring of 02-135
  - Filing activity seen as late as 6/7/04
- **Should such use should be prohibited from channels 14-20 (470-512 MHz) and 60-69 (700 MHz) where those channels are allocated for land mobile services ?**
  - Now being addressed in ET 04-186
  - Private Commons
- **SDR, Intel, Microsoft, 802.11 and others claim current technology allows for sharing**
  - 4.9 GHz Docket – FCC Does Not?
- **They are treating this too simplistically, we are really concerned about the hidden-node" and other, more complex issues.**
- **Also see two new NPRMs on CogRadio and use of vacant TV channels**

# ***ET 04-186:***

## ***Unlicensed Operation on Vacant TV Channels***

- **New proceeding originating from ET 02-380**
  - **ET 04-186/FCC 04-100**
  - **Unlicensed Operation in the TV Broadcast Bands, Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band**
  - **Comments due 7/28/04, Reply comments due 8/27/04**
- **TV channels 5-36 and 38-51 would be generally available for unlicensed operation and channels 14-20 would be available in most locations**
- **Commission proposes “to allow unlicensed devices to operate on channels 14-20, except in areas where a particular channel is used for TV services or PLMRS and CMRS operations”**
- **Devices not permitted on channels**
  - **2-4 (VCRs, Set Top Boxes, etc.)**
  - **37 (Radio astronomy), and**
  - **52-69 700 MHz spectrum for commercial and Public Safety**
- **Unlicensed devices would be required to incorporate “smart radio” features to identify the unused TV channels in the area where they are located**
- **Comment date 11/30/2004 and reply comments 12/30/04**

# ***ET 03-237:***

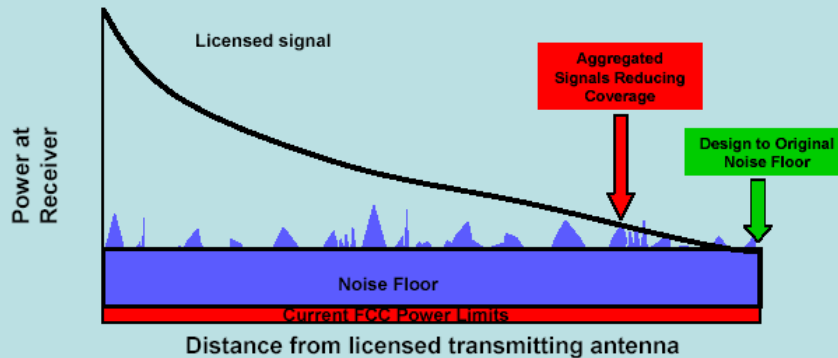
## ***NOI and NPRM Interference Temperature***

- **ET 03-237/FCC 03-289 Released 11/28/03**
- **Title: “Establishment of an Interference Temperature Metric to Quantify and Manage Interference and to Expand Available Unlicensed Operation in Certain Fixed, Mobile and Satellite Frequency Bands” NOI seeks comment on issues related to necessity and deployment of interference temperature model for managing interference**
- **NPRM seeks comments on various technical rules that establish procedures using the interference temperature model on a limited basis in a “testbed” band**
  - **6.525-6.700 GHz and 12.75-13.25 GHz bands**
- **NPRM also seeks comment on whether the possible introduction of unlicensed operation would have in the “testbed” bands on existing services.**
- **This type of policy has a lot of support at the FCC**
  - **Despite the widespread criticism from commentators**
- **We really need to watch this, and make sure it does not make its way in to PS bands**
  - **Institutionalization of interference limited designs - force increased siting density**
  - **Stifle innovative receiver designs**
- **Filing window – closed**

# ET 03-237: NOI and NPRM Interference Temperature

## Interference Avoidance

### Tolerance of Interference - Today



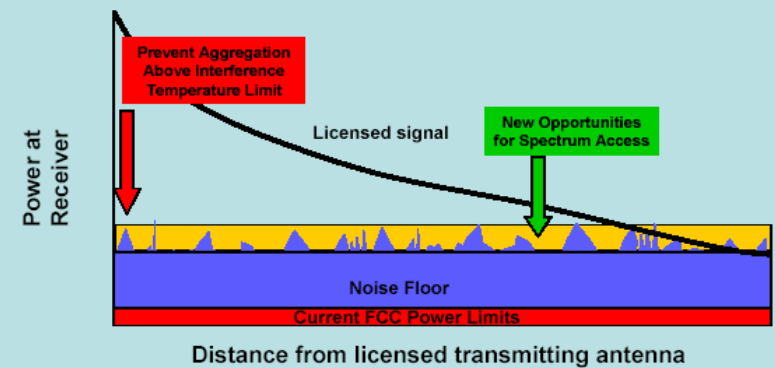
- License Holders Design System to Operate down to the Noise Floor
  - Any additional interfering signals (including aggregation of unlicensed devices) can cause degradation

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16

## Interference Avoidance

### Tolerance of Interference - Future

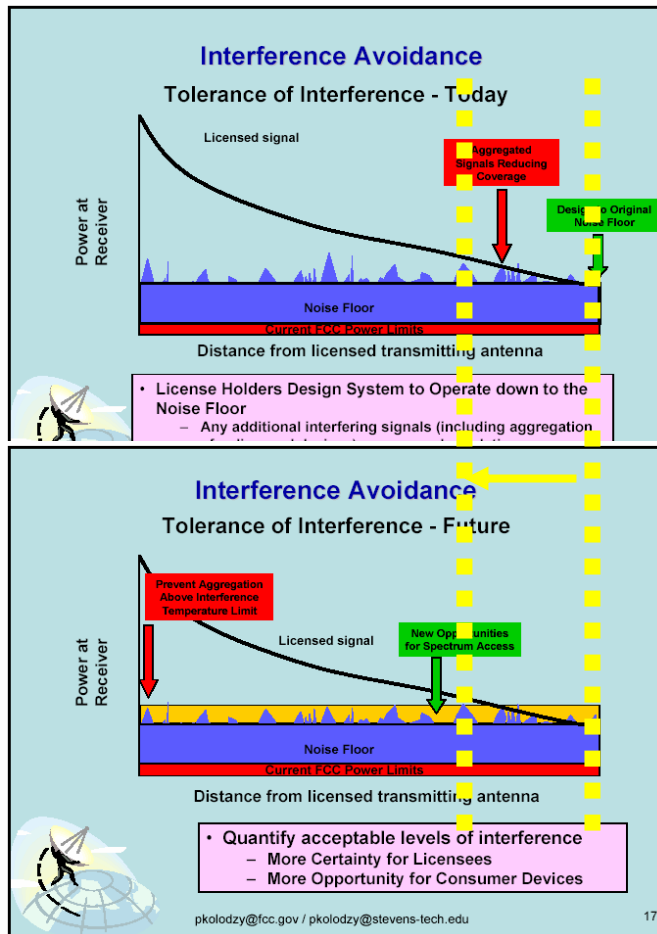


- Quantify acceptable levels of interference
  - More Certainty for Licensees
  - More Opportunity for Consumer Devices

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17

# ET 03-237: NOI and NPRM Interference Temperature



**NOTE:**

**RANGE REDUCTION  
INHERENT TO USE  
OF INT-TEMP AS A  
MANAGEMENT TOOL**

# ***ET 03-108: NPRM on Cognitive Radio***

- **ET 03-108/FCC 03-322 Released 12/30/03**
- **Title “Facilitating Opportunities for Flexible, Efficient, and Reliable Spectrum Use Employing Cognitive Radio Technologies Authorization and Use of Software Defined Radio”**
- **There is a lot of interest at the commission on this**
  - **2003 Workshop from OET (Steve Devine attended)**
- **We need to consider our view on this, but the definition of CogRadio is a little fuzzy**
  - **What is it to us?**
  - **Does it have to be SDR?**
- **One approach is for us to examine what we would like and what we do not like about “smart radios”**
  - **Interoperability enabler? We like this.**
  - **PS spectrum sharing w/other services? We do not like this.**
- **Need to make sure SDRF understands our concerns**
- **Filing window – closed**

# ***ET 03-65:***

## ***Receiver Standards***

- **The FCC has released a Notice of Inquiry (NOI), regarding interference immunity performance standards for radio receivers**
  - **Another offshoot of 02-135,**
  - **Should receiver standards be a tool for spectrum policy?**
- **The FCC in the SPTF saw this as a way to migrate toward “interference temperature”- based policies”**
- **Also need to ensure that fiscally-responsible noise limited designs can survive.**

# ***ET 03-65:***

## ***Receiver Standards***

### ***Points to Ponder***

- **Do we want these standards in place in order to ensure performance when procuring equipment?**
  - **Or will the increased cost and larger number of required transmitter sites make newer systems impossible to procure?**
- **How do we feel about highly sensitive radios (such as P25) being classified as "bad" because they maximize coverage through narrow bandwidths and low noise figure receiver components?**
- **How do we feel about "minimum signal" requirements based upon interference-limited environments?**
  - **At what point does this get too restrictive?**
- **Instead of requiring desired signals to be "high", should we be requiring that interference and OOB be kept "low"?**
- **How do we feel about the interference temperature concept? Should we fight to maintain the survival of "noise limited systems", or do we resign ourselves to the certainty of ever-increasing RF pollution levels?**

# ***ET 03-65: Receiver Standards - Comments***

- **Receiver standards**
  - Industry driven over government mandated standards
- **Graduated Class System**
  - Receiver and Transmitter SYSTEMS performance grading criteria
- **Class-Based Interference Resolution**
  - Performance-driven, and clear delineation of responsibility
- **Protection of Public Safety Spectrum**
  - Caution w/interference temp
  - No PS spectrum sharing
- **Consistent Labeling and Testing**
  - Everyone knows what their relative performance is
- **Protection of Currently licensed services**
  - No raise in overall Noise/OOBE
  - No relaxation of Part 15 rules

# ***ET 03-65:***

## ***Receiver Standards – Points to Consider***

- **Limiting In-band power, Impacts on System Design**
  - Noise limited systems must survive
  - Consider specifying OOB AND maximum in-band power (at receivers)
  - Uniform flux operations is one good approach
  - Lower RF pollution levels
- **Establishing higher receiver performance standards for public safety**
  - Generally a good idea, but should not be required
- **Band specific proposals for establishing technical standards**
  - Let a PS committee, like NCC/NPSTC, deal with these issues

# ***IB 02-10: Earth Stations on Board Vessels (ESVs)***

- **Released 11/24/03**
- **NPRM**
  - **“Procedures to Govern the Use of Satellite Earth Stations on Board Vessels in the 5925-6425 MHz and 3700-4200 MHz Bands and 14.0-14.5GHz 11.7-12.2 GHz Bands”**
  - **Implement United States the decision reached at the WRC-03**
- **ESVs pose Interference to**
  - **6 GHz Public Safety and Commercial microwave**
  - **States bordering federal waterways, and Great Lakes in danger**
- **FCC should enact Fixed Wireless Coalition’s recommendation of a 300 km buffer zone from coastline in 5925-6425 MHz band**
- **Comment window – closed**

# *Border Issues*

# ***US and Canadian 700 MHz Harmonization (DGTP-002-04)***

- In October 2004, Industry Canada released DGTP-002-04
  - Mobile Service Allocation Decision and Designation of Spectrum for Public Safety in the Frequency Band 746-806 MHz
- Highlights
  - Allocate the mobile service in the frequency band 746-806 MHz on a co-primary basis with the broadcasting service,
  - Designate some spectrum for public safety (TV Channels 63/68)
  - Protection of NTSC and DTV Broadcasting Operations from Public Safety Operations in TV Channels 63 and 68
  - Protection of Public Safety Operations in Televisions Channels 63 and 68 from NTSC and DTV Broadcasting Operations in Adjacent Channels
  - A Case for Interoperability - Fostering Equipment Standards For a Multiplicity of Equipment Manufacturers
  - Technical and Licensing Considerations

# ***US and Canadian 700 MHz Harmonization (DGTP-004-01)***

- **After years of effort, we are finally nearing a (half-band) harmonization solution with Canada at 700 MHz**
- **We are expecting the second phase of the Canadian Harmonization proceeding soon (anticipated ~1Q04)**
  - **Band Plan**
  - **International Sharing Agreements**
  - **Interoperability Standard development**
- **The FCC is working with IC on matters related to this**
- **Affected parties should continue to respond**
  - **Especially those in the NE and NW US, where 700 MHz operations in the Border area are essentially blocked.**

# *Policy Issues*

***NTIA Notice of Inquiry  
Docket No. 040127027-4027-01  
US Spectrum Policy for the 21<sup>st</sup> Century***

**In the Executive Memorandum on Spectrum Policy in the 21st Century signed by President George W. Bush on May 29, 2003, the Administration announced its commitment to develop and implement a modernized United States spectrum policy.**

**Pursuant to this commitment, the Secretary of Commerce is conducting a comprehensive review to develop recommendations for improving the United States' spectrum management policies regarding the organization, processes, and procedures affecting Federal government, State, local and private sector spectrum use.**

***NTIA Notice of Inquiry***  
***Docket No. 040127027–4027–01***  
***US Spectrum Policy for the 21<sup>st</sup> Century***

- **Comments fall in four main areas:**
  - **Facilitate a modernized and improved spectrum management system;**
  - **Facilitate policy changes to create incentives for more efficient and beneficial use of the spectrum and to provide a higher degree of predictability and certainty in the spectrum management process as it applies to incumbent users;**
  - **Develop policy tools to streamline the deployment of new and expanded services and technologies, while preserving national and homeland security, and public safety, and encouraging scientific research; and**
  - **Develop means to address the critical spectrum needs of national security, homeland security, public safety, Federal transportation infrastructure, and science.**
  
- **Comments are Due March 18, 2004**

***NTIA Notice of Inquiry***  
***Docket No. 040127027–4027–01***  
***US Spectrum Policy for the 21<sup>st</sup> Century***

- **Some thoughts:**

- Fair and accurate assessments of "Spectrum Efficiency" or better, "Spectrum Utilization". If these quantities are to be used to change or impact Spectrum policy, then they need to be better defined. Forcing people to narrowband based upon a inept "Spectrum Efficiency" metric is a bad idea
  
- Transition the modeling techniques used in spectrum management to more accurate methods in order to take out some of the slack inherent to current methods. More accurate techniques will not only allow better reuse, but also better protection. Right now, many areas are blocked by TV that realistically should not be.

***NTIA Notice of Inquiry***  
***Docket No. 040127027-4027-01***  
***US Spectrum Policy for the 21<sup>st</sup> Century***

- **Some thoughts:**

- Make sure that all licensed services that could possibly interfere with each other are effectively frequency coordinated together. If we knew everything about what Nextel was doing right now we would have been able to solve a lot of problems before the fact.
- Find ways to get Federal and non-Federal Spectrum Agencies to work together to enable greater sharing of Federal (and DoD) spectrum for first responders. We really need more spectrum at the high band VHF and lower UHF (400-500 MHz) bands.