



Spectrum Management Activities at the FCC's Office of Engineering and Technology

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Office of Engineering and Technology



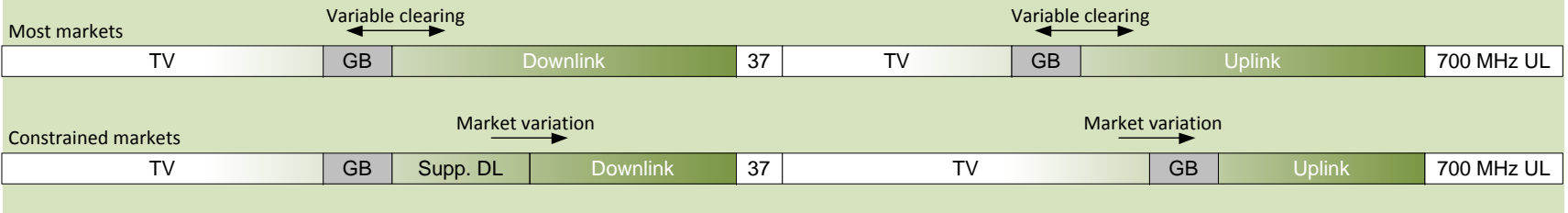
National Spectrum
Management Association
May 15, 2013

Note: The views expressed in this presentation are those of the author and may not necessarily represent the views of the Federal Communications Commission

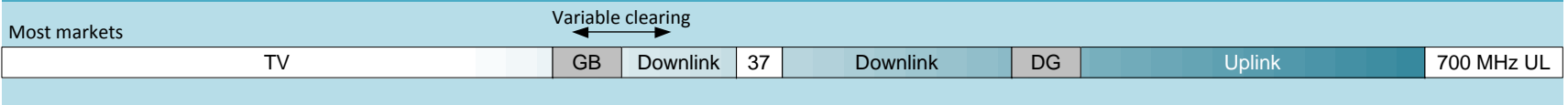
LEARN Program 600 MHz Band Plan Workshop Illustrations

512	524	536	548	560	572	584	596	608	614	626	638	650	662	674	686	698															
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	700 MHz UL

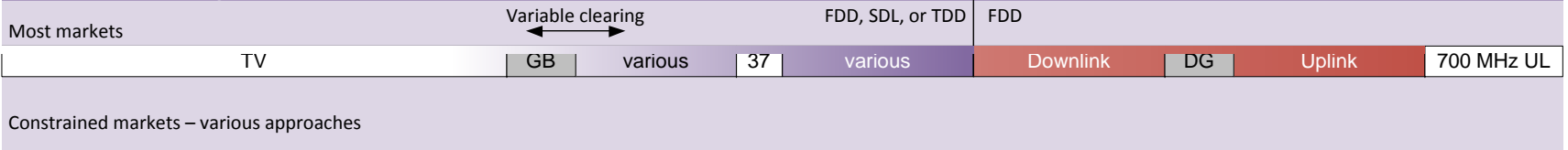
Down from 51 and 36



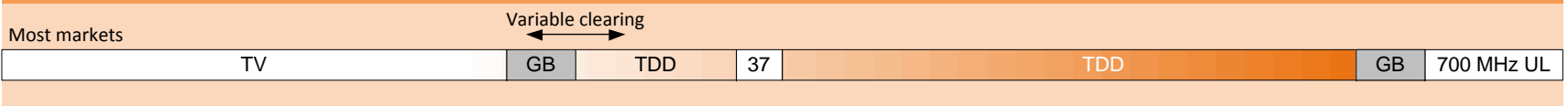
Down from 51



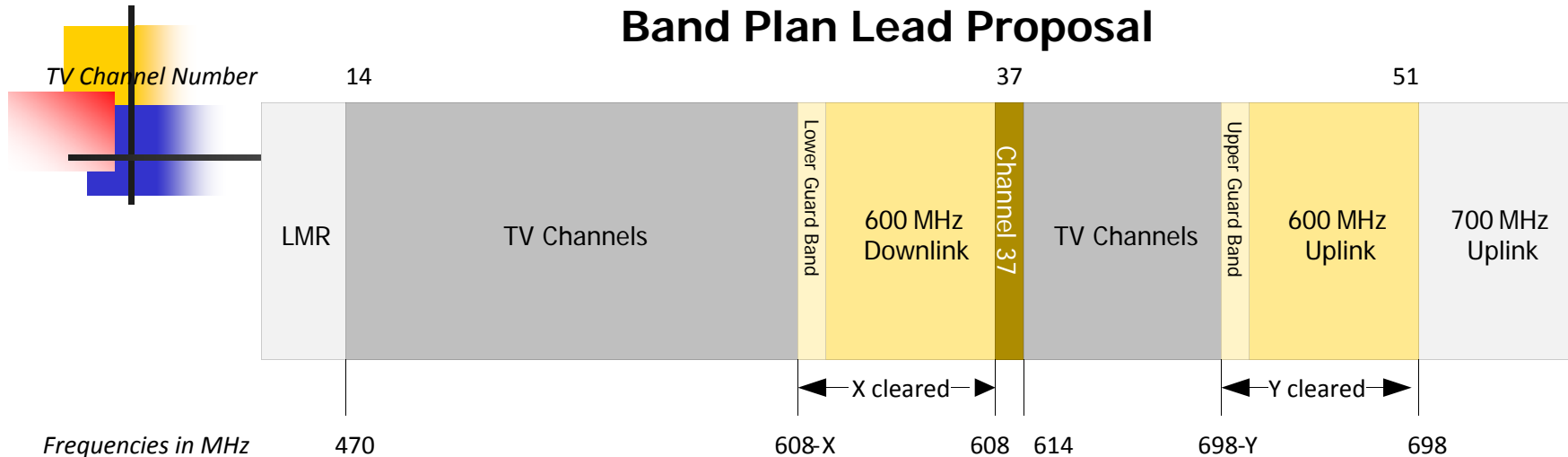
Down from 51 hybrid



Down from 51 TDD



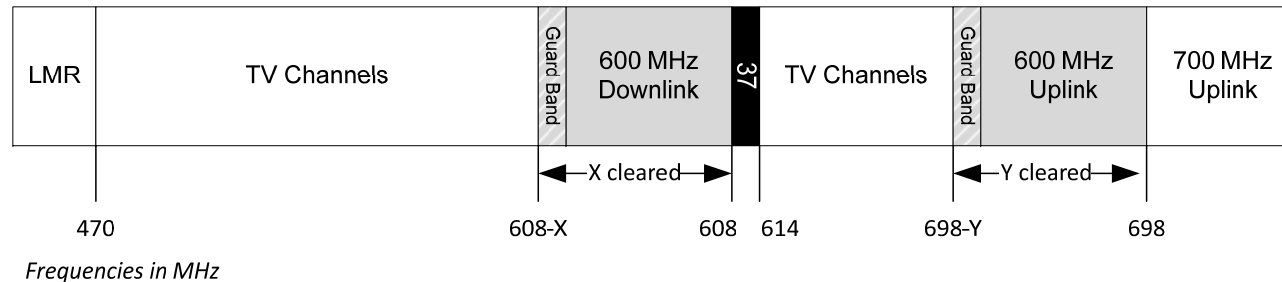
Incentive Auction NPRM (GN Docket 12-268)



- Amount of spectrum available is auction-dependent: "X cleared" (downlink) and "Y cleared" (uplink)
- Uplink located at ch. 51 (698 MHz) and expands downward
- Downlink located at ch. 36 (608 MHz) and expands downward
- 5 megahertz blocks proposed, paired wherever possible
- 6 megahertz guard bands proposed, available for unlicensed use

Channel 37 Proposals

- Channel 37 would continue to be available for WMTS and Radio Astronomy



- But, alternative approaches are considered too
 - Questions about relocation if a different band plan is adopted
 - What alternative spectrum is suitable for WMTS and RA operations
 - What is the effect on current equipment – redesign vs. retuning
 - What are cost estimates for relocation
 - How long would relocation take
 - Questions about potential sharing with unlicensed devices in channel 37
 - Using TV white spaces technology and protection scheme
 - What size protection zones are necessary

Progress on White Space in the TV Bands

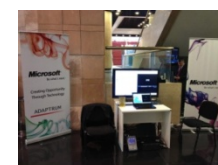
- Adopted final rules
- Approved the first devices
- Approved Spectrum Bridge and Telcordia data bases
- Approved initial deployments
- Rolled-out wireless microphone registration system
- Google and Key Bridge data bases completed public trial
- Now devices can now be deployed anywhere in the USA



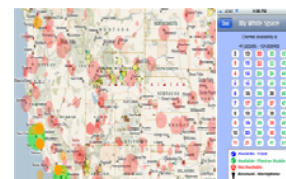
Meld



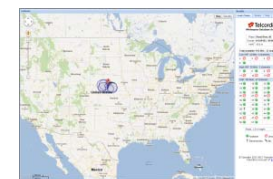
KTS



Adaptrum



Spectrum
Bridge



Telcordia



Wireless Cameras Cover Park
in Wilmington NC

Sharing White Space in Other Spectrum

- FCC Notice of Inquiry (NOI) asked how dynamic access can provide more intensive and efficient use of spectrum
- President's Council Of Advisors on Science and Technology (PCAST) Issued Report in August 2012: *Realizing the Full Potential of Government-Held Spectrum to Spur Economic Growth*
 - Recommended building upon the white space model for access to federal spectrum, particularly in the band 2700 – 3700 MHz
 - Can apply model for both licensed services and unlicensed devices
- Actions:
 - NTIA identified 3550 – 3650 MHz for wireless broadband services
 - Specified exclusion zones along coasts based on potential interference with Navy radars
 - NPRM adopted Dec. 12, 2012 builds on PCAST report and advanced sharing techniques



Figure 4-8. Terrain Dependent Exclusion Zone Distances for Shipborne Radar – 1



3.5 GHz NPRM (GN Docket No. 12-354)

- Would provide for small cells and other uses through data base access / dynamic spectrum access - - reduce exclusion zones
- Envisions three tiers of users, each with different rights and protections:
 - **First tier, Incumbent Access**, would include authorized federal users and grandfathered fixed satellite service licensees. Would be afforded protection from all other users in the 3.5 GHz Band.
 - **Second tier, Protected Access**, would include critical use facilities, such as hospitals, utilities, government facilities, and public safety entities that would be afforded quality-assured access to a portion of the 3.5 GHz Band in certain designated locations.
 - **The third tier, General Authorized Access**, would include all other users – including the general public – that would have the ability to operate in the 3.5 GHz Band subject to protections for Incumbent Access and Protected Access users.
- A spectrum access system, incorporating a geo-location enabled dynamic database, would govern access to the 3.5 GHz Band
- Supplemental proposal would include 3650 – 3700 MHz
- Comments 2/20/13; Replies 4/5/13; FCC workshop 3/13/13



4.9 GHz NPRM (WP Docket No. 07-100)

- Workshop early last year: 4.9 GHz (4940 – 4990 MHz) public safety spectrum is not heavily occupied
- NPRM invited comment on various approaches to increase use
- Specifically asked about sharing based on registration and data base access

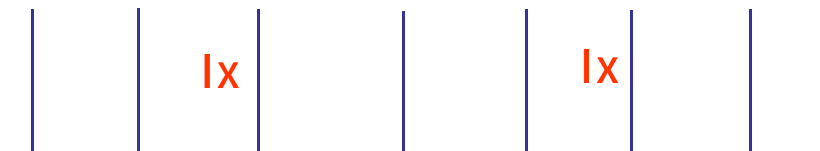


Sharing at 1755 – 1850 MHz

- NTIA released report on potential for reallocation of federal spectrum at 1755 – 1850 MHz for wireless broadband
- Challenges - - cost, complexity, time
- Strong support for increased sharing
- NTIA convened work groups under Commerce Spectrum Management Advisory Committee (CSMAC)
- FCC is participating in work groups
- T-Mobile granted experimental license on behalf of industry to perform sharing tests
- CSMAC continuing to study

Federal Incumbent Systems:

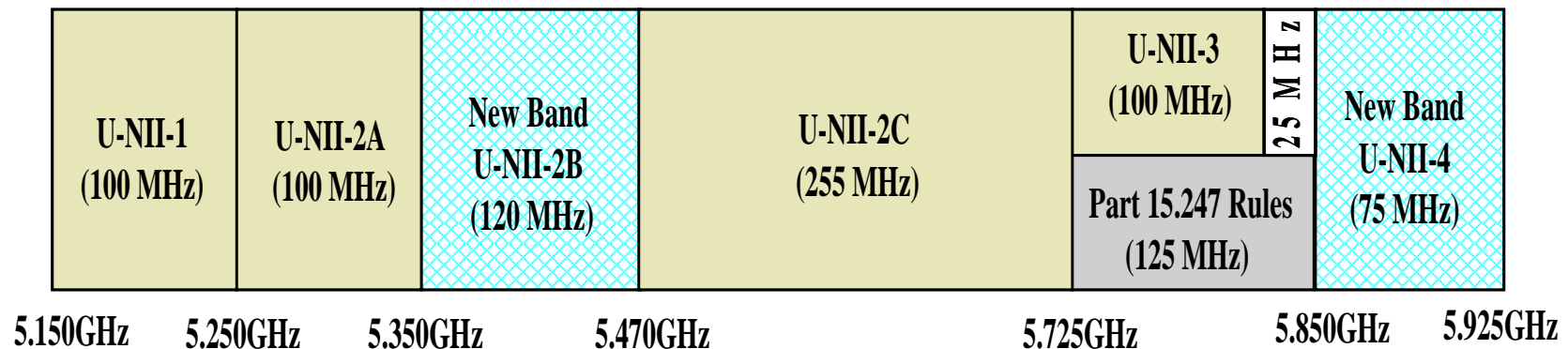
- Fixed Point-to Point Microwave
- Military Tactical Radio relay
- Air Combat Training System
- Precision Guided Munitions
- Tracking, Telemetry & Commanding
- Aeronautical Mobile Telemetry
- Video Surveillance
- Unmanned Aerial Systems
- Other Systems



In LTE data is divided among multiple “carriers” – OK if some lost

Proposal for Additional Spectrum for Unlicensed at 5 GHz (ET Docket 13-49)

- Existing Part 15 rules provide access to 555 MHz of spectrum for unlicensed use in the 5 GHz region
- U-NII-2A and U-NII-2C sharing with federal radars based on Dynamic Frequency Selection (DFS)
- Devices “listen” and perform processing to detect radars
- Jobs Act called for NTIA studies of access to add’l 195 MHz without interference to federal systems. First report Jan. 2013
- FCC issued NPRM on 2/20/13 proposing to add 195 MHz of spectrum predicated on outcome of studies



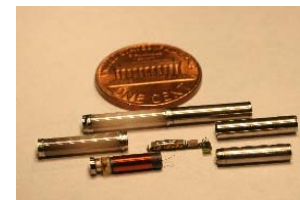
Proposal To Accommodate Commercial Space Launches & Federal Earth Stations

- NPRM Adopted 5/9/13
- Proposes to make non-Federal allocations in 3 bands to support commercial space launches:
 - 420-430 MHz - self-destruct signals for launches
 - 2200-2290 MHz – telemetry during launches
 - 5650-5925 MHz– radar tracking during launches
- Co-Primary Allocation of Fixed Satellite Service (FSS) for Federal Use: Federal earth stations can communicate with commercial satellites with interference protection
- Federal Use of Co-Primary Mobile Satellite Service (MSS) Allocation: Federal agencies can operate MSS satellites in a small (150 kHz) shared Federal/non-Federal band



FCC Actions For Medical Devices

- **Medical Device Radiocommunications Service (MedRadio), March 2009:** New service by expanding previous provisions for medical implant communications service.
- **Medical Micropower Networks (MMNs), November 2011:** Adopted rules to enable a new generation of wireless medical devices that can be used to restore functions to paralyzed limbs. MMNs are ultra-low power wideband networks consisting of transmitters implanted in the body that take the place of damaged nerves, restoring sensation and mobility.



FCC Actions For Medical Devices

- **Retinal Implants, November 2011:** OET granted a waiver to Second Sight Medical Products, Inc. of Section 15.209(a) of the Commission's rules to allow it to obtain FCC certification for and market its Argus II Retinal Prosthesis System which is a medical implant system designed to treat profoundly blind people.
- **Medical Body Area Networks (MBANs), May 2012:** Order to allocate spectrum for Medical Body Area Networks, making the U.S. the first country in the world to make spectrum available for this specific usage. MBANs are networks of wireless sensors which transmit data on a patient's vital health indicators to their doctor or hospital.





mHealth Task Force

- Task Force sparked via FCC held mHealth Summit (June 2012) bringing together academia, industry, and government to accelerate adoption of wireless health technologies.
 - Participants included senior executives and leaders from health technology companies, including established companies, startups, non-profits, hospital leaders, and government experts from the FCC, FDA, HHS, VA, CMS, and NIH.
 - The Co-chairs of this working group were Julian Goldman from Partners HealthCare, Robert Jarrin from Qualcomm, and Douglas Trauner from Health Analytic Services.
- In September 2012, the mHealth Task Force released its report and recommendations to the public.
 - The Report set the following five year goal: **For mHealth technology to become a routine medical best practice within five years.**

mHealth Task Force

- The FCC has taken action on nearly all of the mHealth Task Force recommendations, including:
 - Enable wireless test beds
 - Create the Health Care Connect Fund
 - Broadband Adoption Lifeline Pilot
 - Promote international spectrum usage for MBANs
 - Enhance FCC coordination with CMS
 - Improve interagency alignment, data sharing, and cooperation
 - Launch FCC.gov/health
 - **Matthew Quinn recently named Director of Healthcare Initiatives**





Federal Inter-Agency Cooperation

- In 2010, FCC and FDA entered unprecedented partnership:
 - Working together to ensure that communications-related medical innovations can swiftly and safely be brought to market
 - Formally signed MOU & Held joint public meeting
 - Meet regularly to discuss topics of mutual interest and ongoing consultation on a variety of issues
- FCC participates in National Institutes of Health mHealth Wireless Medical Technologies Working Group
- FDA Safety and Innovation Act (FDASIA) (Public Law 112-144):
 - FDA, FCC and ONC are tasked with creating a report proposing a strategy and recommendations for an appropriate risk-based regulatory framework for Health IT
 - Work Group held first meeting April 29, 2013



Receivers

- Jobs Act (Sec. 6408) called for study on receiver performance and spectrum efficiency
- The Comptroller General shall conduct a study to consider efforts to ensure transmissions systems are designed and operated so that reasonable use of adjacent spectrum does not compromise such systems. The study must consider:
 - The value of improving receiver performance
 - Operation of services in adjacent spectrum and narrowing guard bands
 - Role of manufacturers, licensees and government users with respect to transmissions and the use of adjacent spectrum
 - Feasibility of self-compliance
 - Value of the FCC and NTIA to establish requirements or standards for adjacent spectrum services.
- GAO report recommends the Commission consider small-scale pilot tests and other methods to collect information on the practical effects of various options for improving receiver performance.

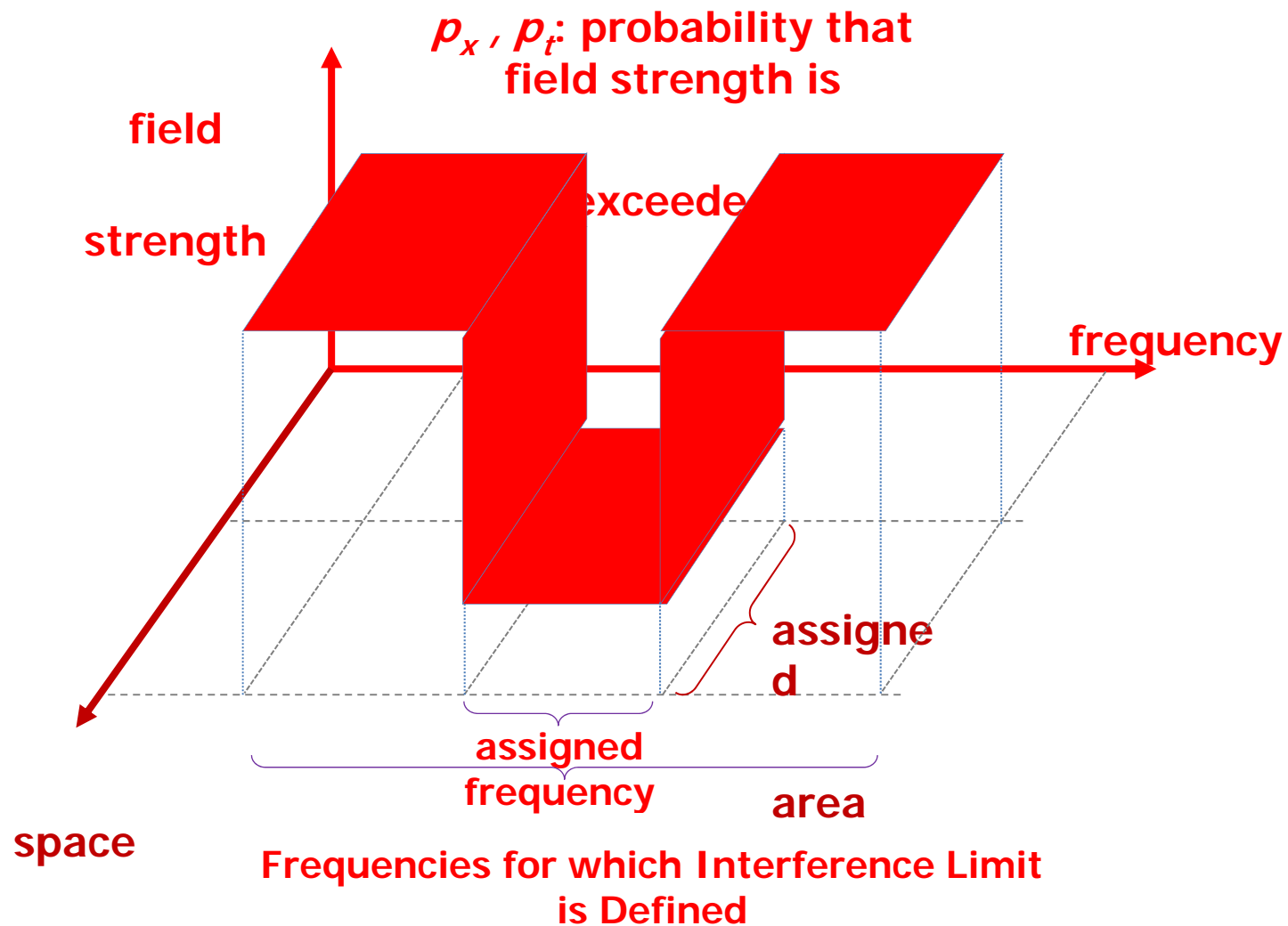


Technological Advisory Council Recommendations On Receivers

- TAC Actionable Recommendations for 2013
 - 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
 - Initiate Multi-Stakeholder (MSH) group(s) to develop Interference limits policy at one or more service boundaries, including current/future receiver performance levels
 - Implement web accessible receiver standards & voluntary receiver specification repository through FCC Dashboard

- OET Issued Public Notice on 4/22/13
 - Invites comment on TAC White Paper:
Interference Limits Policy – The use of harm claim thresholds to improve the interference tolerance of wireless systems
 - ET Docket 13-301: Comments due June 21; Replies due July 28

Interference Limits Policy Approach





Expansion of Experimental Licensing Program (ET Docket No. 10-236)

- New Rules adopted on 1/31/13 to revise and streamline provisions for experimenting, testing, and marketing radio frequency (RF) devices
- Continues to protect incumbent licensees from interference
- Greater flexibility to conduct research and development by permitting flexibility to adapt experiments within a broad range of parameters
- Created three types of Program Licenses:
 - ***Program experimental license***: This license will allow colleges, research laboratories, health care institutions, and manufacturers that have demonstrated experience in RF technology to conduct ongoing series of research experiments and tests
 - ***Medical testing license***: This license will be available to health care facilities with RF expertise to assess newly developed RF based medical devices for patient compatibility, electromagnetic compatibility and to conduct clinical trials at patients' homes or in other geographic areas that are not within the health care licensee's control
 - ***Compliance testing license***: This license will provide Commission-recognized laboratories the flexibility to undertake RF product compliance testing under the Commission's equipment authorization procedures
- Clarifies, simplifies, and expands rules for market trials - allows greater number of devices to enter U.S. for testing and evaluation purposes



Streamlining the FCC Equipment Authorization Program (ET Docket 13-44)

- Rule making initiated 2/12/13 focusing on Telecommunications Certification Body Obligations:
 - Refine & codify Permit but Ask (PBA) procedure
 - Clarify TCB obligations for post-grant checks
 - Require accreditation for all test labs
 - Recognize latest industry testing standards
- 2nd NPRM Planned later this year – Administrative Procedures:

Consider:

 - Merge different self-approval procedures
 - Modify permissive change and Software Defined Radio rules
 - Certify modular transmitters for licensed services



Other Topics

- Continue roll-out of various spectrum:
 - H block
 - AWS 3 +
- Progeny at 915 MHz
- Air-Ground @ 14 GHz
- Portable Electronic Devices (PEDs) aboard aircraft
- RF Exposure Proceeding
- And many other items . . .



Conclusion

- Have accomplished much in past year
 - WCS-SDARS completed
 - AWS-4
- Busy year ahead
- Encourage involvement from community