



# **FCC Rules for TV White Space Devices**

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**Note: Views expressed in this presentation are those  
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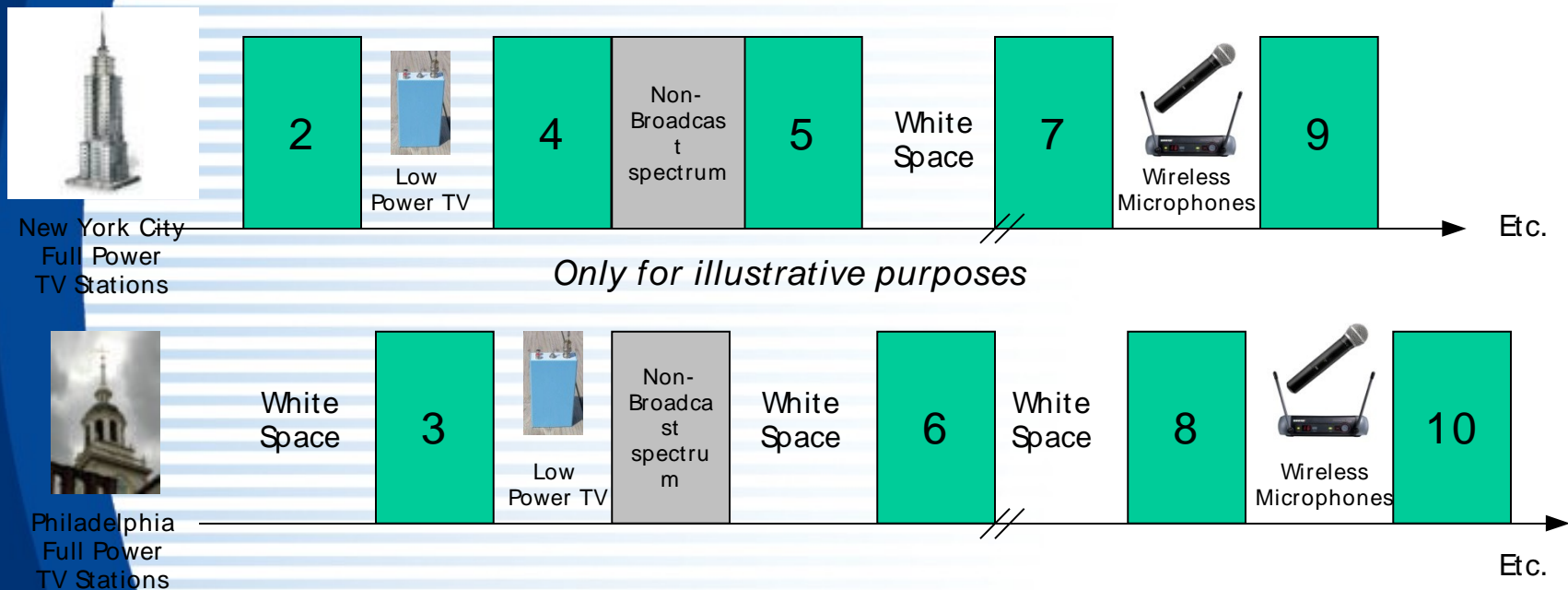
# A Long and Winding Road!

- ***Notice of Inquiry ET Dkt. 02-380*** - 12/11/2002
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- ***Notice of Proposed Rule Making ET Dkt. 04-186*** - 5/13/2004
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- ***First Report and Order and Further NPRM*** - 10/12/2006
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- ***Prototype Testing and Reports*** - 2007-2008
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- ***Second Report and Order*** - 11/4/2008
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- ***Second Memorandum Opinion and Order*** - 9/23/10
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# TV White Spaces

- TV channels are “allotted” to cities to serve the local area
- Other licensed and unlicensed services also operate in the TV bands
- “White Spaces” are the channels that are “unused” at any given location by licensed devices





# TV White Space Plan

- Allow operation of unlicensed devices on unused frequencies/channels in the TV bands
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- Provide protection for licensed services and some other s
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- Available channels identified through geo-location capability and database access



# Facilities to Be Protected

- Full power, low power, translator and Class A TV stations (also Canadian and Mexican stations in border areas)
- Low power broadcast auxiliary (mostly wireless mikes)
- Land mobile/CMRS (13 markets; public safety)
- Fixed broadcast auxiliary links
- Offshore radio telephone service (Gulf region)
- Certain radio astronomy sites
- Also must protect:
  - Unlicensed wireless mikes used at event venues
  - MVPD and low power TV receive sites
  - Channel 37 operations (thru emissions limits)







# Overview of Rules

- Two categories of devices: fixed and personal/portable devices
- To identify channels available for use, devices must:
  - 1) include a geolocation capability and
  - 2) provide their location to a database of protected radio services at which sends back a list of available channels at that location
- Database will be established and administered by third party operators
  - (Public Notice has been issued tentatively selecting nine database administrators and establishing process for commencing operation)
- Devices that use spectrum sensing to identify available channels allowed; separate rules and authorization path



# Fixed Devices

- Power limit: 4 Watts EIRP (one watt TPO)
- May operate on channels 2-51, except 3, 4 and 37
- May not operate on an adjacent channel
- Device checks database for available channels
- Must re-check with database daily





# Personal/Portable Devices

- Power limit: 100 mW except 40 mW on adjacent channels
- May operate on channels 21-51, except channel 37
- Mode I device obtains channels from a fixed or Mode II device
- Mode II device obtains channels from database (may contact database thru fixed device or Mode II device)
- Mode II devices re-check daily
- Mode I devices must contact, or receive a contact signal from, their fixed or Mode II device at least once per minute



*Mode 1: Portable device obtains location/channels from fixed device*



*Mode 2: Portable device uses its own geolocation/data base access capability*





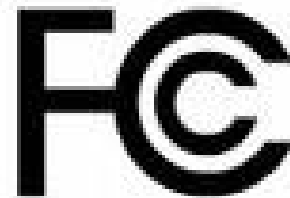
# Provisions for “Sensing-Only” Devices

- Will accept applications for certification of devices that rely on spectrum sensing alone to protect licensed services (no geolocation and database access); such devices will be subject to a much more rigorous laboratory and field tests that will be open to the public
- Must meet a “Proof of Performance” standard that they will not cause harmful interference
- FCC will invite public comment and the decision to grant such an application will be made at the Commission level



# Equipment Authorization

- TVBDs must be certificated by FCC Laboratory
- Sample must be submitted for testing
- TVBDs must:
  - Comply with technical rules
  - Demonstrate ability to perform geo-location and contact database for channel lists
  - Identify and demonstrate communications with the database(s) they will be capable of contacting





• Thanks!



# TVWS Spectrum Availability

- Available spectrum varies by location
- In rural areas many channels are available
- In big cities only a few channels may be available
- Examples of availability in UHF channels 21 – 51:

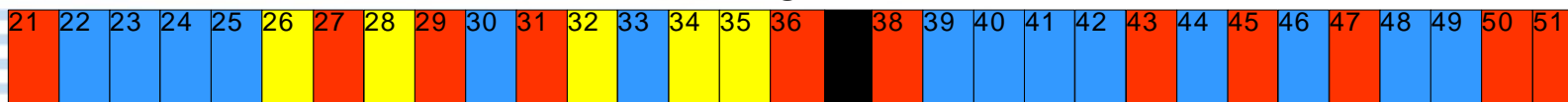
## New York



## Washington, DC



## Chicago



Full Service DTV  
Station



Low Power  
TV Station



Channel Open/  
Adjacent to TV



Channel Open/  
Not  
Adjacent to TV





# Protection for Wireless Microphones

- Locations where licensed wireless microphones are used can be registered in the database and will be protected
- Channels 2 – 20 will be restricted to fixed devices; many of these channels will be available for wireless microphones operating on an itinerant basis
- Two channels between 21 and 51 will be free of new unlicensed devices and therefore available for wireless microphones (these channels differ by location)
- Event venues where large numbers of unlicensed wireless microphones are used may be registered in the database





# Databases Functions

Databases must:

- Identify available channels at geographic locations provided by a TVBD
- Calculate available channels using database of protected services and protection criteria in the rules
- Maintain an accurate database of protected services; coordinate with other databases to ensure consistency
- All databases must provide the same list of channels for the same location
- Comply with security requirements
- Provide channels only to TVBDs with validate FCC IDs
- Register the ID and location of fixed TVBDs
- Be able to deny channel lists to a specific TVBD or model of TVBD at FCC request



# Data Base Administrators

- OET Public Notice selected all of the nine applicants to be data base managers - 11/25/10
- DBAs must now:
  - Show how they will comply with the rule changes in the *Second MO&O*
  - Participate in a working group on database consistency
  - Demonstrate they are using robust security
  - Be subject to a 45 day trial period of operation
  - Agree not to engage in discriminatory or anti-competitive practices
- DBAs may consolidate and file an updated proposal



# Security - Databases

## Databases:

- Must use secure protocols to ensure that interactions between the database and TVBDs are accurate and that unauthorized parties cannot alter the database or the list of available channels sent to a TVBD.
- Must verify that the FCC Identification number supplied by a fixed or personal/portable TVBD is for a certified device and may not provide channels for operation to an uncertified device.
- May distribute lists of available channels separate from contacts with TVBD for information purposes.





# Security – Devices

- TVBDs must be designed to obtain lists of available channels only from FCC authorized databases.
- TVBDs must use secure methods when contacting databases and other TVBDs regarding channel lists.



# Wireless Microphones

- Report and Order and Further NPRM - 10/14/10
- R&O: Removing mics from 700 MHz
- NPRM:
  - Proposed some expansion of Part 74
  - Proposed others operate under Part 15
  - Recognized interplay with TVWS

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