



February 13, 2008

Marlene H. Dortch, Secretary  
Federal Communications Commission  
Office of the Secretary  
445 12th Street, SW  
Washington, DC 20554

Re: ET Docket 04-186

Dear Ms. Dortch:

Pursuant to Section 1.1206(b)(2) of the Commission's Rules, this is to notify you that on February 12, 2008, Bruce Oberlies and the undersigned, of Motorola, met with Angela Giancarlo, legal advisor to Commissioner McDowell regarding the above captioned proceeding.

During the meeting we discussed the attached presentation related to use of television white space.

Pursuant to the Commission's Rules, one copy of this notice is being filed electronically with the Commission. If you require any additional information please contact the undersigned at (202) 371-6953.

Sincerely,

/s/ Steve B. Sharkey

Steve B. Sharkey, Senior Director  
Regulatory and Spectrum Policy

Cc: Angela Giancarlo

Attachment



# **Adopting a Successful TV Whitespace Regulatory Framework**

# Key Consideration for TVWS Implementation

## ■ Protect Incumbent Operations

- Licensed TV
- Licensed Part 90 operations in channels 14-20
- Ad hoc Part 74 auxiliary broadcast operations licensed by rule
- Authorized wireless microphones, to the extent possible

## ■ Meet User Needs

- Maximize spectrum access within necessary protection requirements
- Accommodate both enterprise business and consumer needs
- Enable fixed, mobile and portable use
- Minimize potential for interference to CATV wiring/set-top boxes for in-home TVWS uses

## ■ Enable “Future-Proof” TVWS Deployment

- Provide for mechanism to adjust deployed TVWS devices as environment changes and market gains real world experience

# Motorola's Multi-tiered Approach

- **Geolocation database – Access database to determine available channels and permissible operating parameters**
  - Highly reliable approach to protection – not susceptible to challenging RF environment
  - On going control of devices
  - Protection requirements can be modified over time if necessary
  - Third Party database facilitates control and rapid updates
- **Sensing**
  - Facilitates sharing among TVWS devices
  - Provides additional protection by sensing any transmissions not listed in database
- **Support for Beacon**
  - Provides real-time priority in limited area

# Two Tiers of Devices

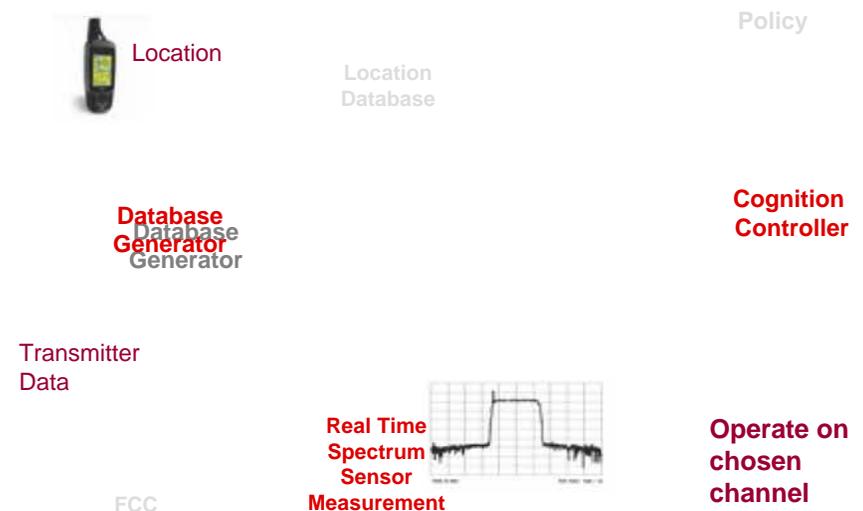
- **High Power devices**
  - Up to 4 Watts EIRP
  - Required to include Geolocation, Sensing and Beacon
  - Fixed, Mobile, Portable
  
- **Low Power devices**
  - 10 mW or less
  - Sensing and Beacon only
  - No operation on Chs. 14-20

# Geolocation Provides Protection of Incumbent Users

## How it Works (1):

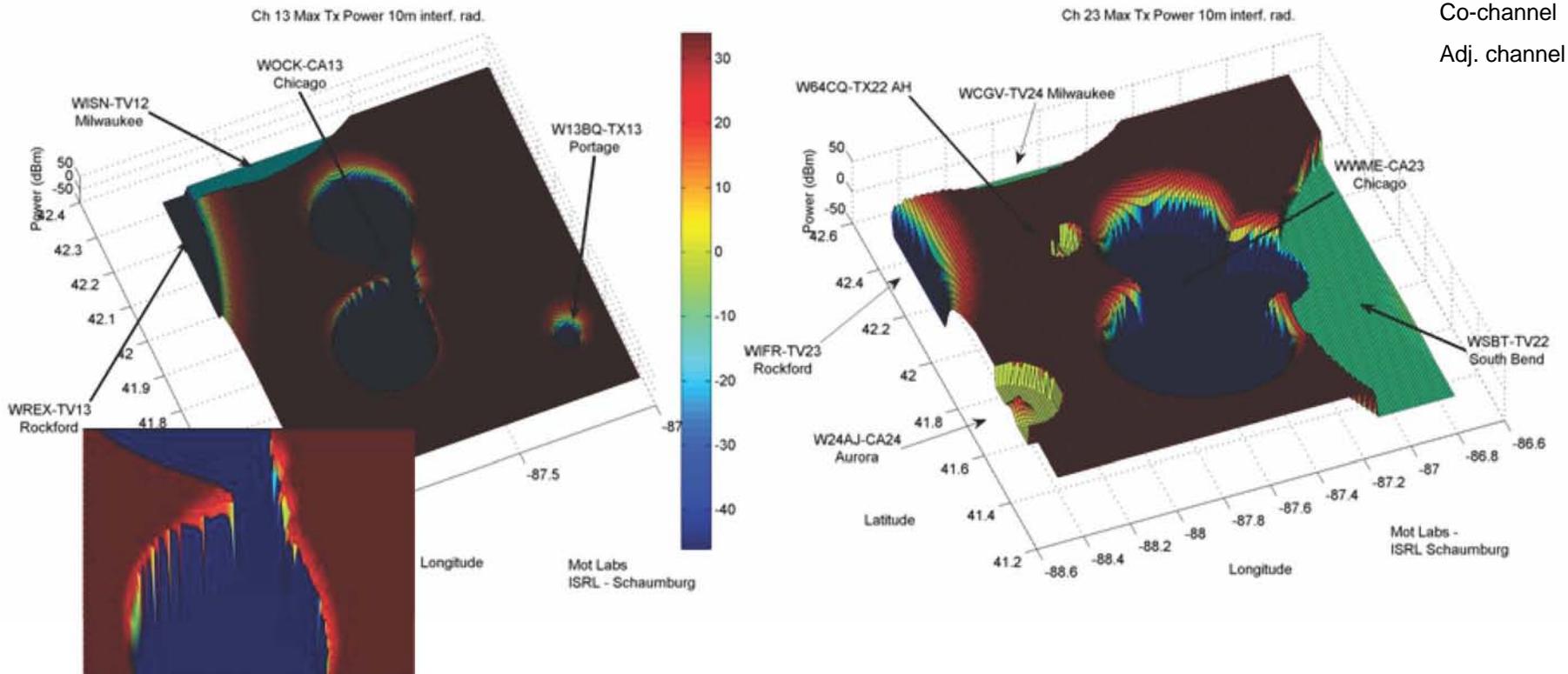
- TVWS Access Point (AP) determines location;
- TVWS AP runs Geolocation program to determine allowable channels and power;
- TVWS AP senses and selects the highest quality channel within the options allowed; and
- TVWS AP sends control signal and beacon to client device.

Geolocation program is loaded with protection parameters per rules. Can be updated to “Future Proof” devices.



# Geo-location Database Modeling Examples

## Max Allowed WSD EIRP vs. Lat-Long Coordinates

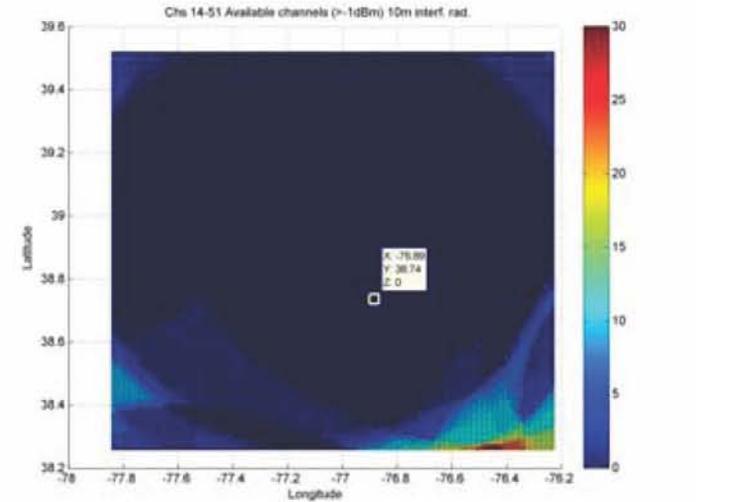
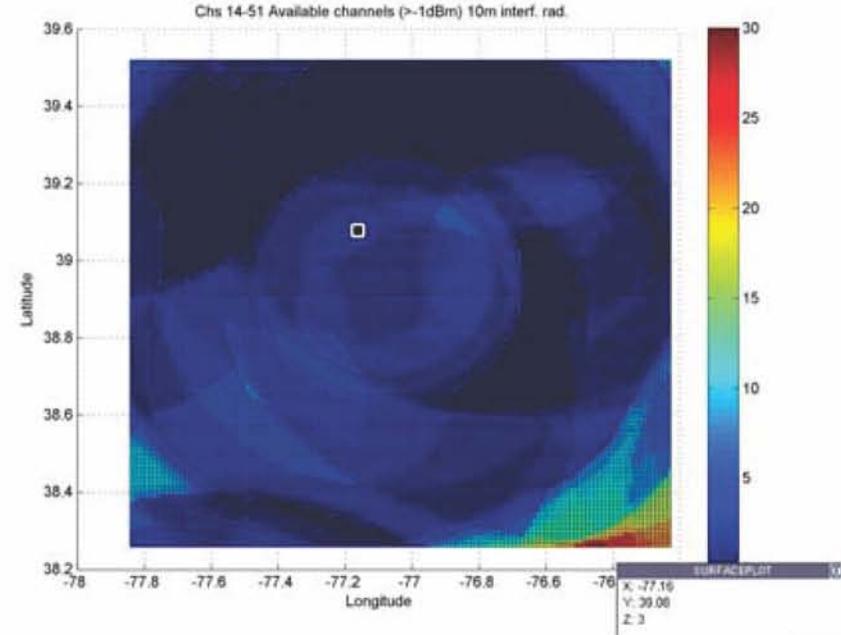
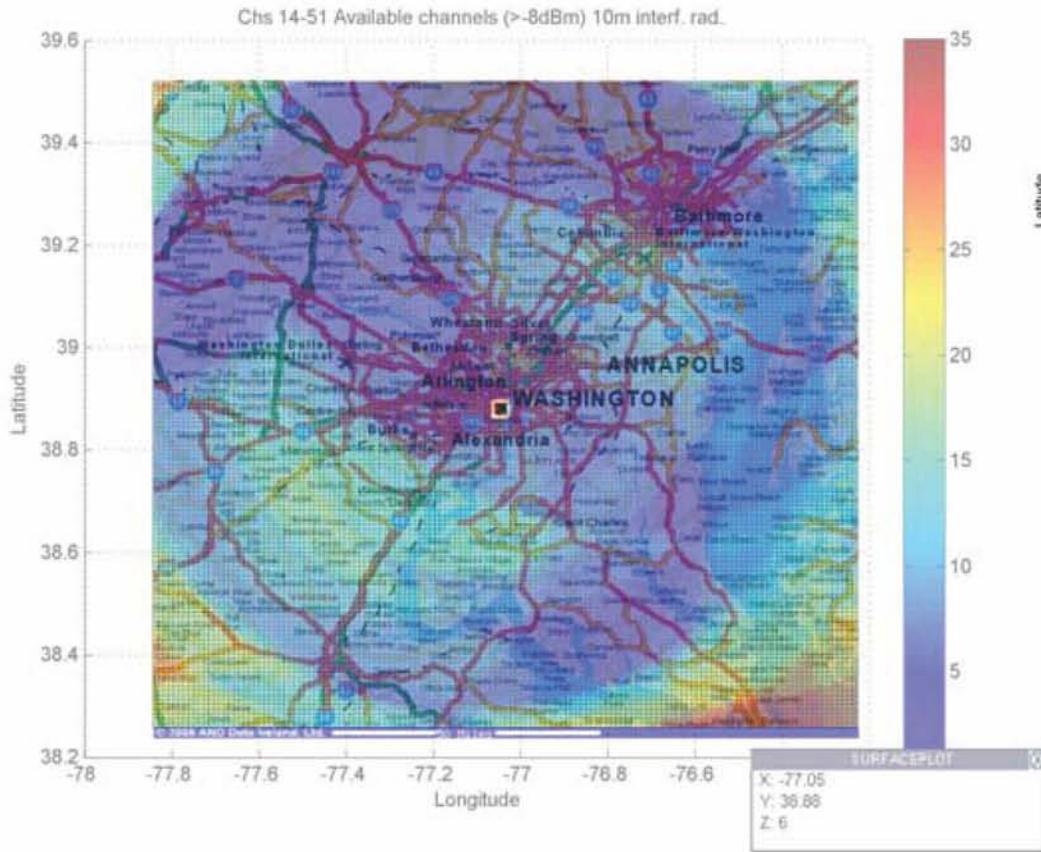


Co-channel  
Adj. channel

The charts show the **Max allowed EIRP versus location coordinate** for operation on TV channels 13 (left) and 23 (right) in the Chicago area

- The color code indicates the allowed EIRP in dBm to satisfy various co- and adjacent channel interference criteria, taking into account the different protection requirements for different classes of licensed stations – also includes nearest contour edge modeling (shown in magnified region)
- **Reddish-brown** indicates  $>+30$  dBm, dark blue  $<-45$  dBm (essentially unusable)

# DC Area Available TVWS channels



## Notes:

- Maps shown for *current* TV band allocations
- Do not include CP-MODs that are on the air
- (Upper right doesn't attempt use of LMR adj. channels)
- (Lower right does not allow use of TV adj. channels)

# Sample Motorola WSD GUI (including protection for all CP-MODs)

**MOTOROLA**  
*Intelligence everywhere™*

## Cognitive Radio

Log to File

**Geo-Location Data**    **NAD-27 Coords**

Latitude:

Longitude:

Channel Quality:

W-MIC Channel:

Active Channel: 49

DTV Channel: 21

<ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #008000; margin-right: 5px;"></span> Active Channel</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #ffff00; margin-right: 5px;"></span> Scanned Channel</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #800000; margin-right: 5px;"></span> Wi MIC Detected</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #cccccc; margin-right: 5px;"></span> Prohibited Channels</li> <li><b>#</b> Channel Priority</li> </ul>	<ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #ff8c00; margin-right: 5px;"></span> DT - Full Power DTV</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #d3d3d3; margin-right: 5px;"></span> LD - Low Power DTV</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #add8e6; margin-right: 5px;"></span> TV - Full Power NTSC</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #90ee90; margin-right: 5px;"></span> TX - TV Translator</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: #4169e1; margin-right: 5px;"></span> CA - Class A TV</li> </ul>
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**- DTV detected on channel 21 (100%)**

- Channels in the priority order are 49 25 23 46 21
- Max. Tx Pwr per Chnl (dBm) are -10 -13 -17 -29 -17

**- DTV detected on channel 21 (100%)**

- A Quiet Period Has Started.
- Channels in the priority order are 49 25 46 23 21
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- A Quiet Period Has Ended.

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14 15 16 17 18 19 20 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

TV DT    TV 5 TV 4 TV 3 TV DT DT DT DT TV TV DT DT DT DT    DT DT DT DT DT TV DT TV 2 DT DT 1 TV DT

**Note: Channels 33, 35, and 41 listed in CDBS as CP-MOD status – shown as protected here...**

# Recommendations

- **Adopt Multi-tiered Approach to Implementation**
- **Prohibit any devices without geolocation in CH 14-20**
  - Minimizes potential for interference to public safety and critical users
- **Provide for 3<sup>rd</sup> party administration of data base**
  - Allows Part 74 ad hoc operations and wireless mikes at major events to be added to database and protected for duration of event
  - Allows protection for unique situations (e.g. cable head ends receiving distant signals)
- **Require high power TVWS users to register and be added to database**
  - Enables greater integrity for unlicensed operations and provides record if interference did occur
- **Allow 4 watts power for fixed and mobile systems with geolocation**
  - Provides useful power level for both rural broadband and most enterprise environments
- **Low power 10 mW TVWS devices**
  - Facilitate in-home networking
  - Minimizes ingress of TVWS signals into CATV set-tops/wiring
- **Require all devices to include sensing**
  - Provides additional level of protection
  - Facilities sharing among devices
- **Require all devices to detect beacon signal**
  - Provides additional protection and control of TVWS devices
  - Enables protection for short term uses by incumbents or devices with higher regulatory priority