



# Broadcasting, Spectrum Sharing and Coexistence in the White Space Era

ISART Conference  
Spectrum Sharing Technologies  
Business Panel  
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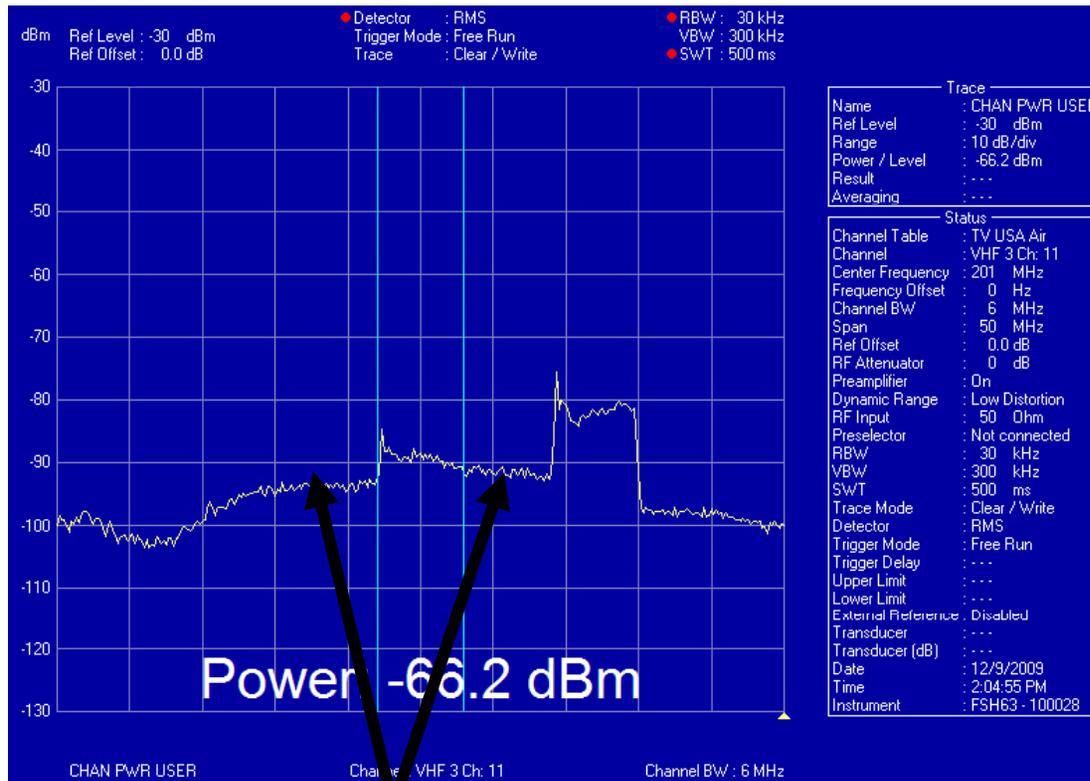
# Outline

- ▶ Reminder about the DTV transition effort
- ▶ Sharing the TV Spectrum
  - Traditional/Current Sharing
  - Unlicensed TV White Spaces
- ▶ Business/Innovation
  - DTV Mobile Activities and Status

# Some Facts to Keep in Mind

- ▶ June 12, 2009 DTV Transition freed 108 MHz for new services
- ▶ VHF indoor reception problems
  - Poor indoor VHF antennas
  - Interference from Part 15 devices
- ▶ Broadcasters have no control over DTV receivers or antennas used by consumers
  - Major educational effort

# Impact of Increase in Noise Floor (Part 15 Cordless Phone)



Broadband Noise from Cordless Phone Power Supply

- ▶ Increase in Noise Floor Degrades DTV Receiver and Prevents Reception
- ▶ Interference from Cordless Phone Power Supply Depicted
- ▶ No DTV Reception Despite Relatively Strong Signal Level (-66.2 dBm)

# TV Sharing Today

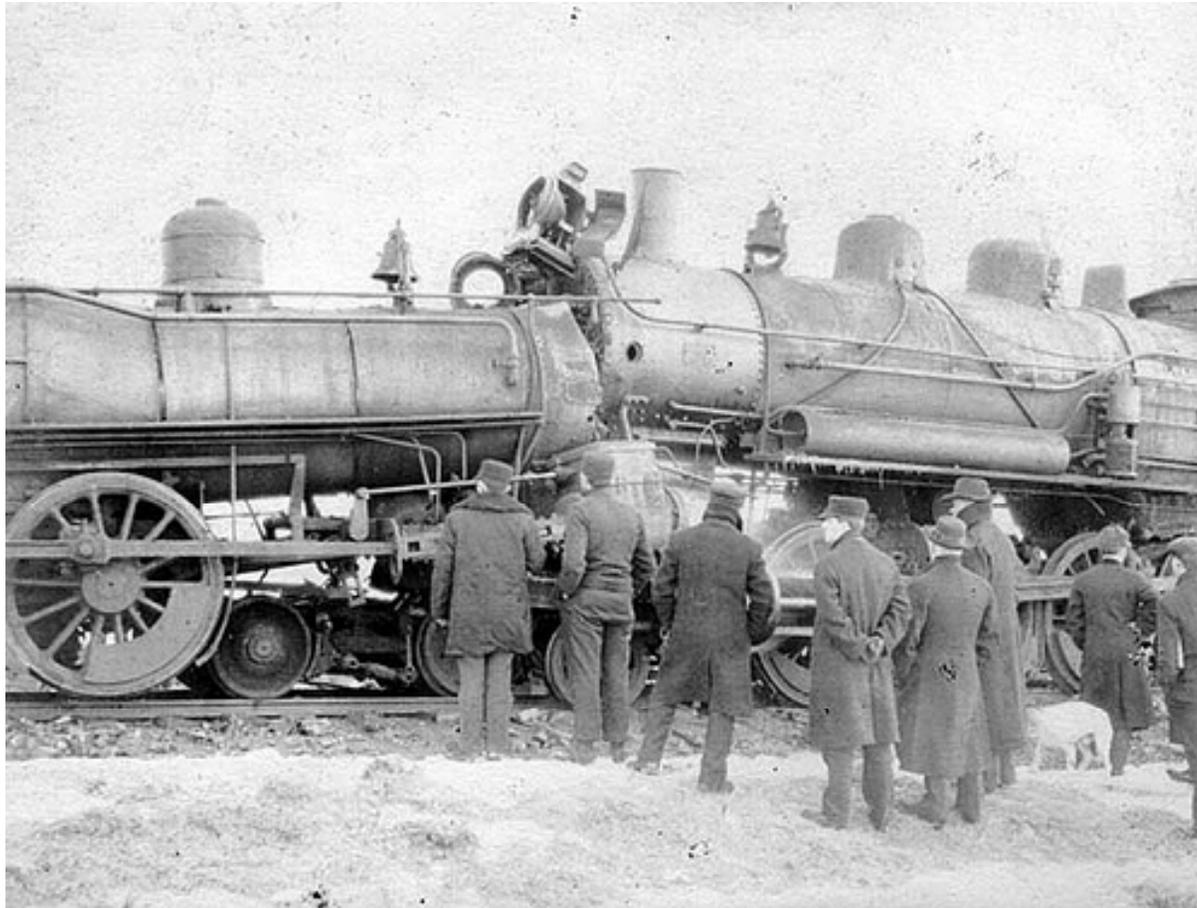
- ▶ Broadcasters and Land Mobile “share” TV spectrum in 13 Major Markets on a licensed basis
  - For example, TV channels 14, 15 and 16 are used for Land Mobile in New York metropolitan area and TV channels 19 and 20 are used in Philadelphia
  - Broadcasters and Public Safety have cooperated to provide additional channel in Los Angeles and New York

# TV Sharing Today

- ▶ Licensed Secondary Broadcast Auxiliary Use (Wireless Mics, Video Assist) also Share TV Spectrum
  - Uses include news gathering, sporting events, and political conventions
  - ESPN's Monday Night Football telecast uses as many as 155 frequencies
  - Local and other broadcast stations, local cable operations, NFL films also share TV frequencies
- ▶ Industry coordination mechanisms have been developed (technology plays a part but coordination still largely a “hands-on” process)

# TV White Spaces

# Sharing Possible But .....



“Torture numbers, and  
they'll confess to anything.”

— *Greg Easterbrook*

# What Needs to be Protected

## DTV Reception

- ▶ 35M NTIA coupons redeemed
- ▶ 50M converter boxes sold
- ▶ DTV reached 50% penetration and \$25B in sales in 2007



## Licensed Microphone Use

- ▶ Microphones used for programming production and ENG



## Mobile DTV



# Interference Protection

## FCC Adjacent Channel Interference Analysis

- ▶ FCC states that Unlicensed Personal/Portable WSDs will provide:
  - “adequate protection” for indoor DTV reception and
  - “marginal protection” for outdoor DTV reception
- ▶ FCC Outdoor Analysis has protection shortfall of 7 dB

# Interference Protection?

Value	FCC Analysis	Added Protection Required	Difference
D/U	-33 dB	-26 or -28 dB	5 - 7 dB
Antenna Discrimination	12 dB	0 to 5 dB	7-12 dB
Interference Distance	16 meters	10 meters	4 dB
Polarization Discrimination	3dB	0-3 dB	0-3 dB
<b>TOTAL</b>			<b>16 - 26 dB</b>

**ALSO MUST ADD 7 dB FCC SHORT FALL**

# Geolocation/Database Approach

*Crash programs fail because they are based on the theory that, with nine women pregnant, you can get a baby in a month.*

Werner von Braun

# Databases can contain errors

**ShowMyWhiteSpace - Search**

UPDATE: We continue to update the search tool to include the latest FCC TV broadcast license data. We have also generated new shape files for the broadcast coverage areas. These and other improvements will provide a more accurate set of results than was previously possible.

Search of One East 161 Street, Bronx, NY 10461 completed.

Search Results For:  
**One East 161 Street, Bronx, NY 10461**

Available Channels

2	12	22	32	42
3	13	23	33	43
4	14	24	34	44
5	15	25	35	45
6	16	26	36	46
7	17	27	37	47
8	18	28	38	48
9	19	29	39	49
10	20	30	40	50
11	21	31	41	51



[New Search](#) [View Full Map](#)

The traffic shown at the 8 MHz TV channels between channels 2 and 61 that are potentially available for secondary use by White Space routers (i.e. TV White Spaces or TVSDs).

- means your location is within the service area of a TV station or other licensed user and this channel cannot be used by a TVSD.
- means that this channel is vacant in your location, and can potentially be used by your TVSD.
- means that this channel is vacant in your location, and can potentially be used by your TVSD, but licensed portable devices may not be used on channels 2-6.
- means that this channel is in a major metropolitan area and reserved for wireless microphone use only.

Note that the latest FCC Report and Order describes different types of White Space devices. Not all of them are permitted to use every available channel. See the FCC website for more details on these devices, which is best of channels in particular class of White Space devices can use.

Disclaimer: The information provided is based on current data from the November 4, 2008 FCC Report and Order and the current TV Channel data provided by the FCC database. However, it may be impacted by the future voluntary registration of protected secondary users of those channels, such as wireless microphones. The information provided should be used as a guide and is not guaranteed to be accurate.

White Spaces Search Powered By Spectrum Analysts, Inc.

Database states ALL TV channels available at new Yankee stadium

# TV White Spaces

- ▶ MSTV supports sharing of TV band
  - Best Interest of all parties to do this right
- ▶ Rules need to protect DTV viewers and broadcasters' ability to provide new services
  - Not asking for extra protections
- ▶ Even “marginal protection” standard requires current combination of sensing and database approaches
  - Neither sensing or database approaches are sufficient alone at this time

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M O B I L E D T V

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M O B I L E D T V

- ▶ ATSC Standard (A/153) adopted
- ▶ Atlanta and Seattle model R&D stations on the air
- ▶ WRAL has begun first commercial deployment
- ▶ Consumer equipment from LG, Samsung, Dell, Kenwood, Visteon and others
- ▶ Broadcast equipment from Harris, Rhode Schwarz, Trevini available

# Open Mobile Video Coalition: More Than 875 TV Stations



6 Networks Involved ... 100M+ Homes Passed

# Mobile DTV Activities

- ▶ Washington Mobile DTV Consumer Showcase
  - May 3 to August 31
- ▶ Nine Washington DTV stations providing 24 channels of mobile TV programming
  - Includes non-traditional broadcast channels like MSNBC, Comedy Channel, Food Network
- ▶ 300 Sprint Phones with MobileDTV
  - Samsung “Moment” Android Phone
- ▶ 300 Dell Inspiron Netbooks
- ▶ Tests of other devices



# Mobile DTV Activities

- ▶ Detroit Automotive Launch – June 3
  - Stations *WDIV-TV* & *WXYZ-TV*
  - Demonstration of Mobile DTV in-vehicle applications and services
  
- ▶ CEA Line Show
  - Consumer devices shown

