



Broadcasters are Broadband

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# How Did This Fight Start?

- ◆ **The National Broadband Plan calls for more spectrum for wireless services.**
- ◆ **Objectives:**
  - **Increase wireless service capacity to meet burgeoning demand.**
  - **Allow universal service to broadband for education, health care, employment.**
  - **Obtain revenue for the Treasury.**
- ◆ **Premise:**
  - **Not enough people watch TV over-the-air to justify the amount of spectrum devoted to that service.**

# **The Old Broadcast TV CPM Advertising Business Model is Past Due for Evolution**

- ◆ **Lack of universal cable coverage, especially for Class A and LPTV.**
- ◆ **Major network stations rely largely on cable carriage to support their primary revenue source; LPTV, Translators and Class A stations do not.**
- ◆ **Competing advertising media are proliferating, and OTA TV cannot deliver the analytics of the Internet, cable or cellular based ad services.**
- ◆ **Generation Y cannot distinguish between delivery platforms and have rarely heard of an antenna.**

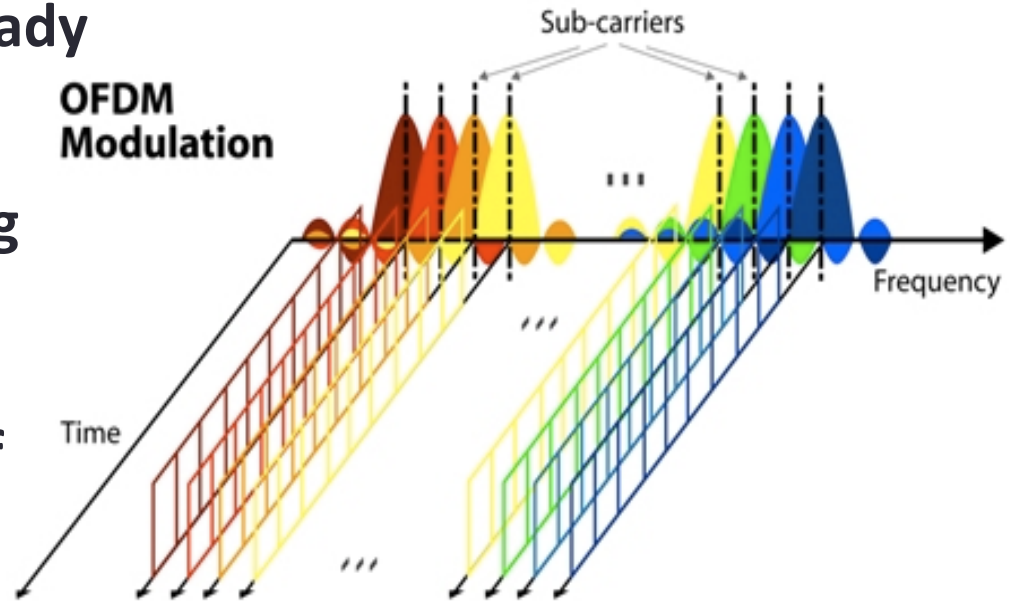
# US: Television Broadcasting Is Saddled with an Aging Technology

- ◆ The ATSC 8VSB technology is two decades old.
- ◆ TV receivers are still being manufactured with only MPEG2 decoders.
- ◆ The ATSC-MH Mobile technology has abysmal spectral efficiency.
- ◆ DTS system technology has not yet been implemented.
- ◆ No viable two-way capability is possible due to our constraints in exploiting the frequency domain.



# Them: Wireless Technology is Advancing Rapidly

- ◆ Mobile wireless is already on its 4<sup>th</sup> generation.
- ◆ Television broadcasting cannot stand still and continue to survive in the face of this pace of change and progress.
- ◆ If our industry simply follows our old, long and slow process of consensual standards-setting and governmental approval, we will lose any chance of evolving to meet the new consumer demands for mobility and Internet broadband services.

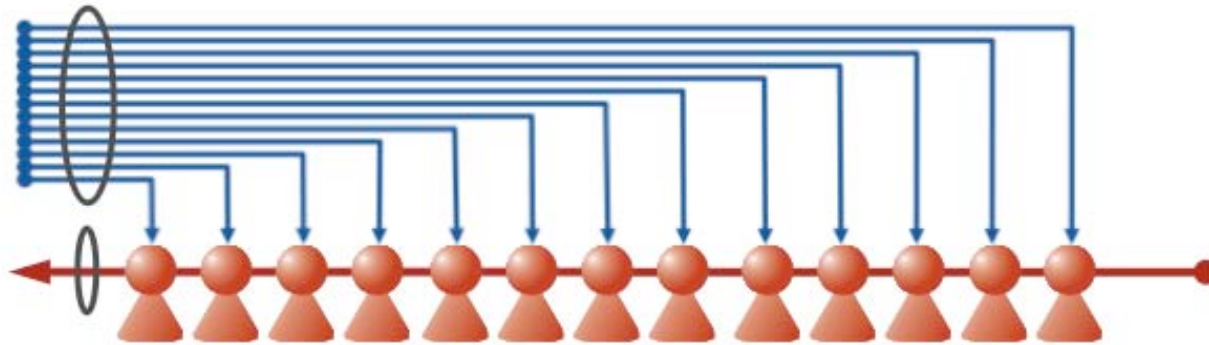


# Must-do List for Free OTA TV Broadcaster Survival

- ◆ Leverage the enormous utility value of our wireless capability - Provide robust and efficient mobile reception.
- ◆ Increase channel capacity – 50 video and Internet streams per channel, not just 4 or 6 MPEG-2 feeds.
- ◆ Deliver non-video broadband IP content to any platform.
- ◆ Offer customer-originated content and hosting services.
- ◆ Fight back by providing the missing one-to-many IP services not presently part of the Internet. Trying to solve the unicast capacity shortage by reclaiming the broadcast spectrum for the cellular operators will absolutely NOT SOLVE THE BROAD-BAND SCARCITY “CRISIS”.

# Adding Broadcasting Efficiency to the Unicast Internet

Unicast



Broadcast

- ◆ OTT video demand will crush the unicast access networks.
- ◆ A broadcast addition to the ISP networks will solve the looming bandwidth crisis.
- ◆ We have an architecture problem, not a spectrum crisis!



*The Unicast Bottleneck Challenge*

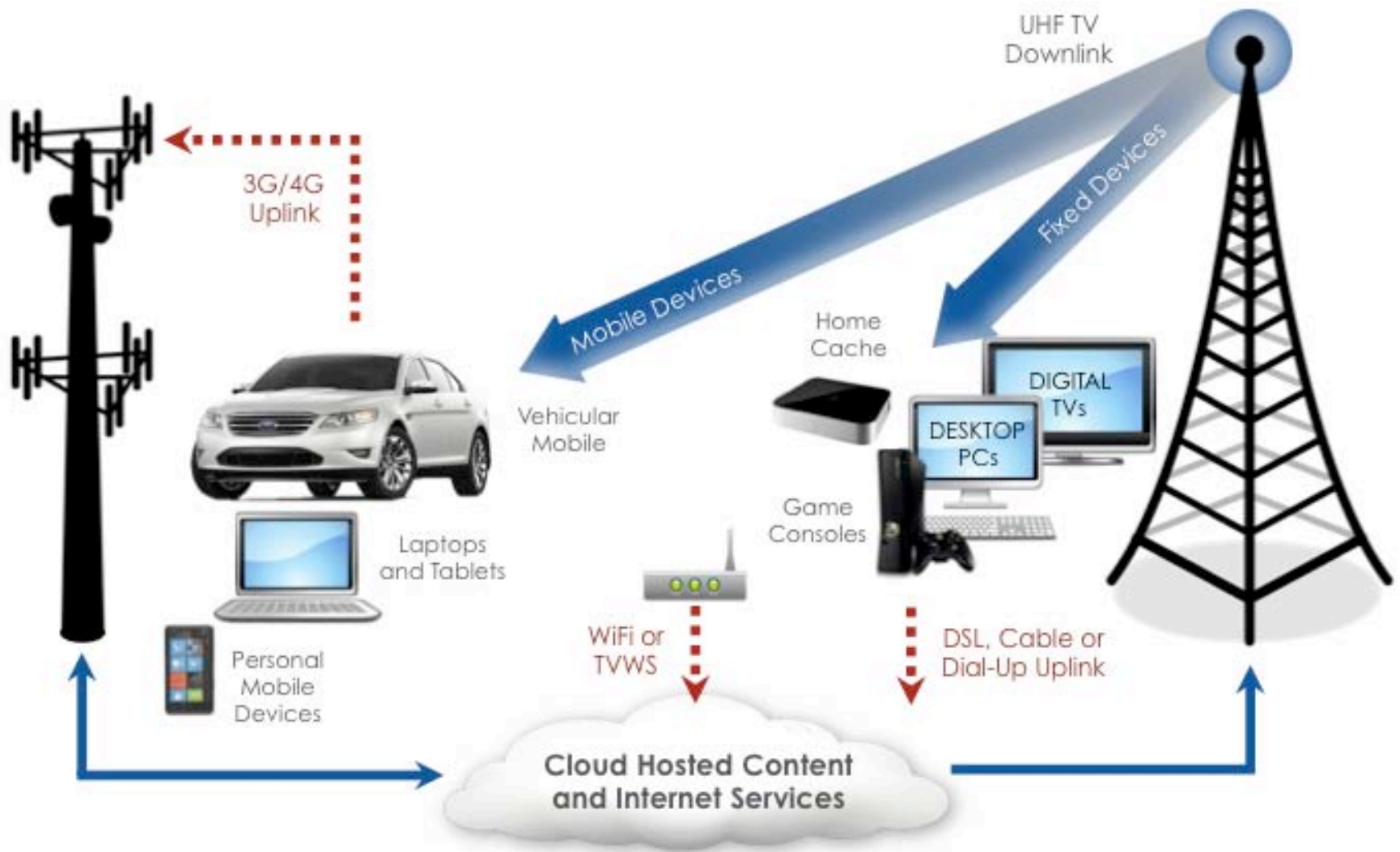


# The Spectrum Evolution Proposal

- ◆ **Allow broadcasters to choose their own modulation standard, as long as they do not interfere with existing TV channels; Same treatment as given to all cellular licensees.**
- ◆ **Allow broadcasters to provide diverse services, including subscription services, while also continuing to provide free broadcast programming.**
- ◆ **Let the marketplace and the broadcasters decide how much of their individual capacity to devote to each potential service, and at what resolution or application.**
- ◆ **Enhance the unique role that broadcasters play in emergencies, supporting public safety agencies and alerts - dynamically and on-demand.**



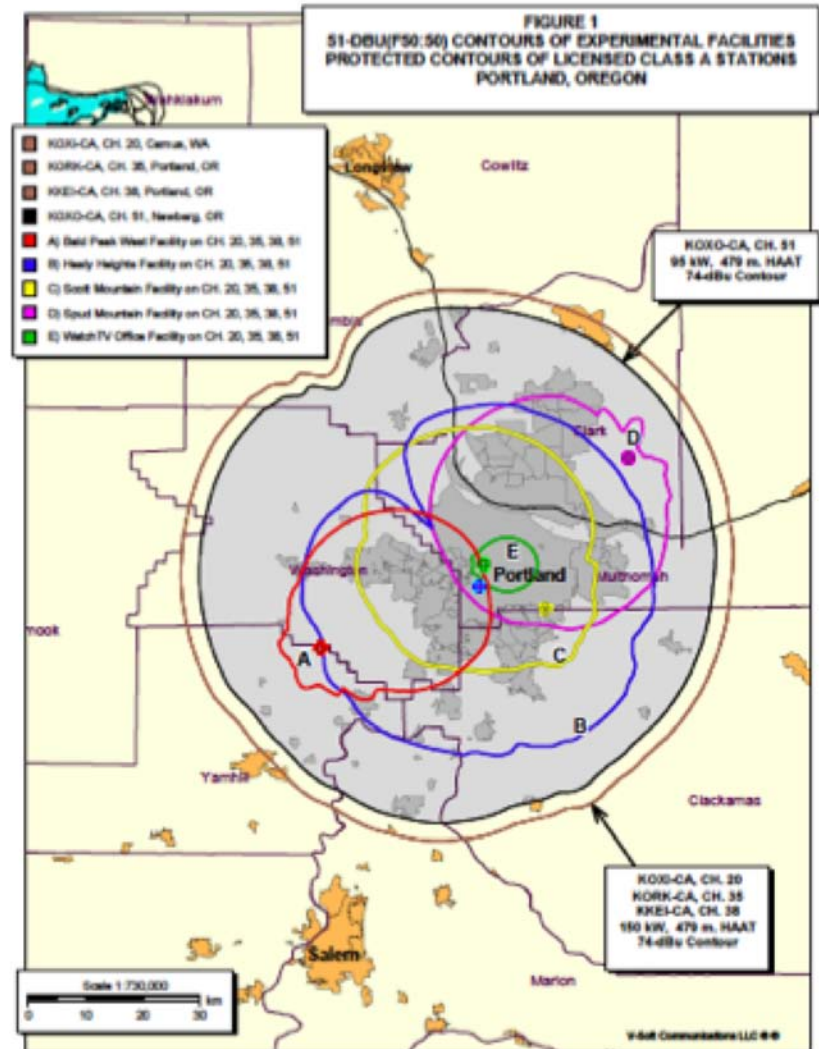
# Hybrid Interactive Architecture



# The WatchTV Spectrum Lab

## An Unprecedented Denial by the FCC

- ◆ This is the proposal for which the FCC refused to grant an experimental license to demonstrate both non-interference by OFDM systems with legacy ATSC channels, and the potential of new business models and services.
- ◆ We seek the participation of other broadcasters and WISPs who may want to investigate new hybrid architectures.
- ◆ This represents four six MHz channels covering 2.2 million POPs.



# PORTLAND ATSC-MH TEST RESULTS

## What We Learned Under Our First Experimental License

- ◆ Performance of available mobile/hand held receivers was disappointingly inconsistent.
- ◆ M/H encoding provides significant improvement over standard ATSC re co-channel interference ratios and SNR, but improvement achieved at the expense of significant available bandwidth reduction.
- ◆ At the mixed rate settings used, (P:48,  $\frac{1}{2}$ ,  $\frac{1}{4}$ ,  $\frac{1}{4}$ ,  $\frac{1}{4}$  ), efficiency of the M/H signal is 26.5% expressed as the ratio of Payload Data Rate ("PDR") to Main Data Rate Loss ("MDRL").
- ◆ For 7.334 Mbps of available ATSC bandwidth used, true usable data rate is only 1.946 Mbps.
- ◆ Even at lowest code rates of P:48,  $\frac{1}{2}$ ,  $\frac{1}{2}$ ,  $\frac{1}{2}$ ,  $\frac{1}{2}$ , efficiency reaches only 34.5%, yielding 2.528 Mbps usable data rate, consuming 7.334 Mbps of ATSC bandwidth, far less robust in error correction.
- ◆ The ATSC standard, even with the A/153 enhancement, does not provide anywhere near contemporary equivalents of efficient spectrum use.
- ◆ Horizontally polarized signals do not penetrate buildings sufficiently at moderate transmitter power levels or provide uniform coverage, so additional experimentation is needed with circular/elliptical polarization.

# **Constraints on Technology Innovation and the Free Market**

- ◆ **FCC insists on crippling broadcasters with a mandated and obsolete wireless technical standard.**
- ◆ **Thus blocking broadcasters from providing viable competition.**
- ◆ **Spectrum resource allocation is determined by Government officials, not the public demand in a free private marketplace.**
- ◆ **Consumer choice is being limited by over-regulation.**

# How We Can Do It

- ◆ Cellularized transmission plant (Single frequency and multi-frequency DTS) allowing the efficiency of frequency re-use.
- ◆ Multi-frequency and multi-application networks, multiplying the capacity and business model alternatives for a given bandwidth.
- ◆ OFDMA or other improved modulation schemes.
  - Example: CMMB, deployed in over 300 cities in China.
    - 6 MHz chip is imminent.
    - All major global handset manufacturers already have CMMB 3G and 4G integrated devices.
- ◆ Retain, or even expand, the ancillary services fee, to ensure revenue to the Government as an offset to their lust for new wireless auction revenues.
- ◆ Offer free or low-cost ISP and non-broadcast service options.

# The LPTV Spectrum Footprint

## Use It or Lose It



# What About Uniform Technical Standards?

- ◆ The need for uniform standards is overstated in a software defined future. Adaptability and flexibility are key to our evolution.
- ◆ The important things are:
  - Avoid obsoleting consumer receivers.
  - Do not compel broadcasters to buy new transmission equipment if they choose not to.
- ◆ Broadcasters must maintain a free broadcast / public service component to avoid a statutory requirement to auction the spectrum.
- ◆ The FCC has already eroded the All-Channel Receiver Act by allowing mobile-only DTV receivers and allowing analog tuners to be taken out of TiVOs.
- ◆ Standards conversion is much easier in an all-digital world than using an analog receiver. Next generation converter boxes could be cheap enough for broadcasters to give them away as a means of participating in subscription based services.

# What is Wrong with the FCC's Approach?

- ◆ Value judgment about the comparative benefits of broadcasting vs. wireless.
- ◆ Picks winners and losers instead of letting everyone compete in broadband.
- ◆ Favors large corporations
- ◆ Little concern about resource concentration
- ◆ Focus on competition on only the consumer side, not the provider side
- ◆ Ignores the fact that small businesses have a much better track record of creating jobs, while large corporations concentrate on “efficiencies” that reduce or outsource jobs.
- ◆ Fails to recognize that the one-to-one model must be abandoned for distributing commonly-requested content (*e.g.*, Netflix).
- ◆ Too much emphasis on auction revenue, as the maximum amount likely to be realized, will fund the national deficit for only a few days, and the opportunity for a continuing revenue stream will be foreclosed.



# **The FCC Will NOT Accomplish Its Objectives**

- (1) Diverse and affordable broadband offerings for the public.**
- (2) Promotion of technology innovation.**
- (3) Early broadband deployment in rural areas.**
- (4) Minimizing the need for rural and low income subsidies.**
- (5) Job creation.**
- (6) Recurring revenues for deficit reduction.**

# **FCC Auction Revenue Projections are Illusory**

- ◆ **Not enough detail available for the potential “voluntary, incentive” auction participants to make rational decisions.**
- ◆ **Broadcaster participation will be voluntary; many broadcasters will elect to not participate.**
- ◆ **Victims of the anticipated repacking will have no choice, that is not very voluntary!**
- ◆ **Reserve prices will be set by auction market, not broadcast market.**

# The Treasury Will be Short-Changed

- ◆ Auction revenues will be one-time only.
- ◆ Receipts from the putative auction will be disappointingly small.
- ◆ Contrast a one time sale with perpetual ancillary service revenues.
  - Continue forever.
  - Revenue based, so they do not stifle start-ups.
  - Can be adjusted as needed.

# **Known Undesirable Consequences**

- ◆ **Concentration of spectrum in the hands of the wealthiest wireless corporations.**
- ◆ **Duopoly or triopoly will drive up prices.**
- ◆ **Loss of innovation by new competitors.**
- ◆ **Loss of entry opportunities for minorities and small businesses, who could compete and drive prices down, while creating new jobs.**
- ◆ **Significant damage to “localism”.**

# Rural Deployment Under the FCC Plan Will Only Happen With Government Subsidies

- ◆ AT&T told FCC recently it will extend advanced LTE services to only 20% of the land area of the United States.
- ◆ Even if AT&T covers “97% of all Americans” at it claims it can do, that will encompass only 55% of the land area.
- ◆ CTIA/CostQuest Study says \$21 billion needed to secure ubiquitous mobile broadband. 165 million Americans do not have access to LTE or WiMax.
- ◆ *Broadcasters in contrast, live and operate in local communities of all sizes, look out for local needs, hire local workers, and build with private capital.*

# The FCC Plan Will Take Too Long

- ◆ Legislation
- ◆ Rulemaking
- ◆ Litigation
- ◆ Auction Design
- ◆ Auction Execution
- ◆ Build-out (or Warehousing)

**Done in 2021?**

# Conclusion

We now live in a world with an insatiable desire for more and better technologies and the services those technologies provide.

Gone are the days where broadcasters could sit back and assume they had a decade or more before they would be required to innovate, outside of the video production and advertising analytics component of their business.

Broadcasters must recognize this new cadence and keep pace with the continuous cycle of improvement and change.

One thing is certain . . . *Until the services provided by U.S. broadcasters become truly relevant in the DAILY LIVES of the average American citizen,* broadcast spectrum will remain in the cross hairs of the wireless operators.

Let us hope broadcasters will soon find a viable way to return fire!

For more information, please visit:  
[www.spectrumevolution.org](http://www.spectrumevolution.org)

**Thank You**

