

Spectrum Sharing – Policy R&D

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Where's the Wireless Broadband?

- More spectrum *is* an answer for more broadband
 - Microcells (increase “tower” density), greater spectral efficiency; 4G substitutes for cable
- Wireless BB likely to support ≥ 4 suppliers
 - More competition to wireline BB
- But we are (sort of) out of spectrum
- Aha! The Feds have it all (or at least $>50\%$ suitable for BB).

So How Can We Get That Fed Spectrum For Commercial BB?

- All agree: Fed use wildly inefficient
- But Feds certainly don't want to give it up!
 - After all, it's free
- Solution (says PCAST): *Sharing*
- But (says PCAST) Feds don't wanna share
 - Propose elaborate regulatory structure
 - With enough supervising agencies, everyone will play nice, right?
 - Even propose a new spectrum currency!

Can Sharing Work?

- Exclusive rights: owners wholesale spectrum to others (MVNOs), among many other solutions
- Feds often share between agencies
- Low power works fine (Wi-Fi, cordless phones, garage door openers; simple fixes)
 - Wi-Fi “shares” with military radar (DFS)
- High power not so much; technology (such as cognitive radio) still years from deployment
 - White space sharing a good example

Sharing Can Work...Sometimes

- Technical limitations for high powered use
 - White space a good (but simple) testbed
- Sharing can work...when all parties want it to work
 - And the Feds really don't want it to work
 - Regulatory “command and control” solution?
 - Ersatz currency?
- What are institutional constraints?
 - Both PCAST and OMB suggest at least a decade to achieve operational sharing, if achievable at all.

What Research Is Needed?

- Realistic technology forecasts
 - When will cognitive radios be in Radio Shack?
- Sharing is a complex structure of property rights for users; how do property rights affect if and how spectrum can be used?
- Can Federal users be incentivized to share? How?
- Key: **Empirical Data!** And way better theory re: sharing
 - Enough with the arm-waving
- We need BB spectrum now!
 - What can be accomplished in 2-4 years?