

The First Commercial Deployment of TV White Space Networks: Experiences from Around the World

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Microsoft's Perspective on Connectivity

Microsoft is making big bets on cloud-first and mobile-first experiences . . .

"The cloud is how *a* device becomes *your* device. And the cloud is how your *device* becomes part of your *life*, by **connecting** to all the people, information and experiences that matter to you. And for us, the cloud is also how a tablet becomes a useful and powerful tool."

"Simply put, our vision is to deliver the best **cloud-connected** experience on every device."

-[Satya Nadella, Official Microsoft Blog](#) (March 27, 2014)

Microsoft Wants Wireless Connectivity to Be . . .

Ubiquitous

Available Where and
When Needed

Affordable

Declining Pricing
that Reflects
Efficiency Gains

Robust

Supporting High-
Capacity & Low-
Latency Applications

Enabling Emerging Experiences Around Meetings, Wearables, Internet of Things, etc.

Range & Propagation as a Game Changer



White Spaces
transmissions
travel farther

EXTENDS TO 10 KMS

TV White Space Technologies Can Open Up New Opportunities

- TV white space spectrum (unused UHF channels) is a global band and is available today on an unlicensed (*i.e.*, free and open access) basis in the U.S., Canada, UK & Singapore. No use case or geographical limitations.
- Provides 3-4x the range and 9-16x the coverage of current 2.4 GHz Wi-Fi (40 mWatts). Multi-kilometer range at higher power (up to 4 Watts EIRP and potentially higher).
 - Can complement 2.4 and 5 GHz Wi-Fi. 5 GHz Wi-Fi quadruples throughput; TV white spaces quadruples range.
- Can reduce the cost of deploying wireless networks, enabling new business models and differentiation.
- Enabled applications include broadband access, increased wireless data offload, enhanced indoor media distribution, better outdoor hotspot coverage, and M2M sensor networks.

Global Trials, Pilots & Deployments

MSFT Supported Pilot Projects: Current Snapshot

Commercial Scale is the Next Step



67 K-12 Schools Being Connected

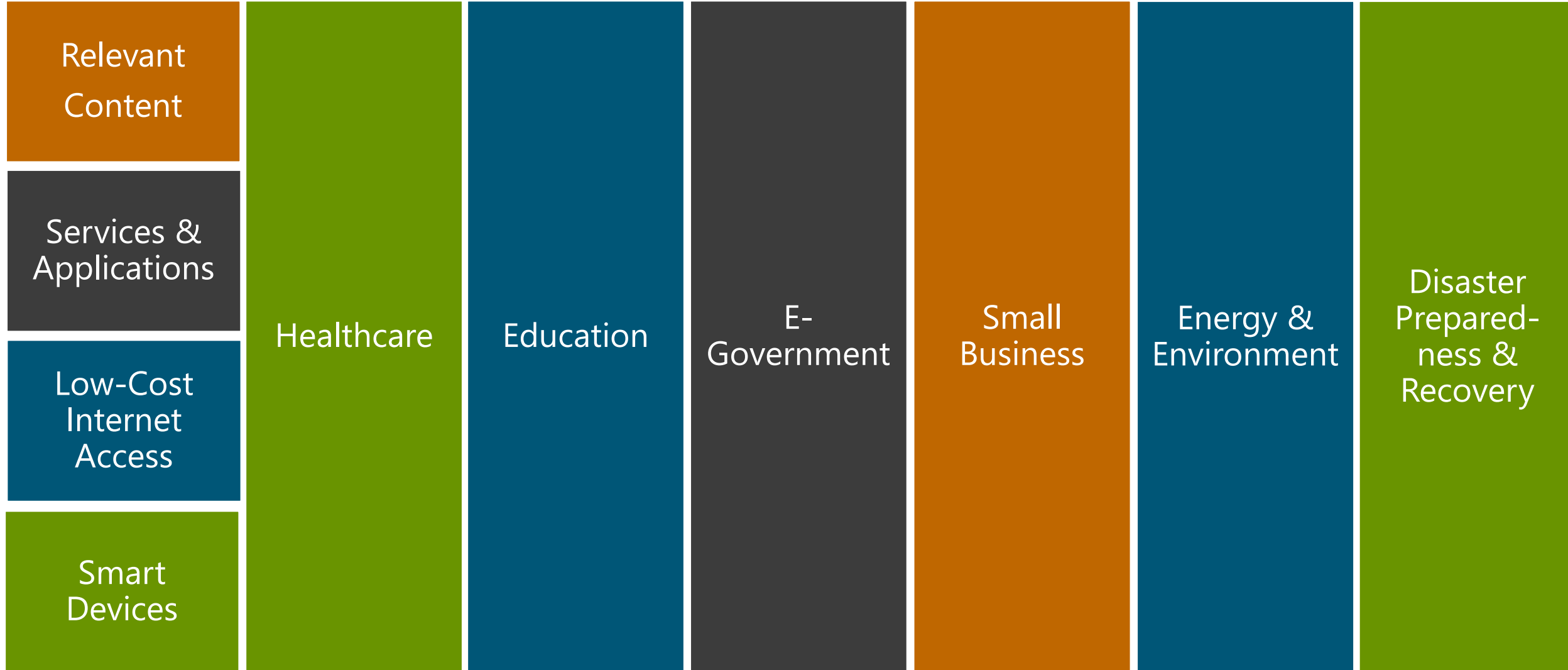
36,000 K-12 Students Being Connected

6 University Campuses Being Connected

38,500 University Students Getting MSFT Devices & Services

200,000+ Population Under Coverage

Identification of Shared Goals



Ghana Djungle Wi-Fi Commercial Deployment

Collaboration between SpectraLink Wireless, Microsoft, and Facebook.

6Harmonics TVWS base stations deliver PTMP high-speed Internet access to students and staff at Koforidua Polytechnic and surrounding areas.

Djungle Wi-Fi Unlimited Daily and Monthly Internet Access Plans, Microsoft Office 365, Microsoft Virtual Academy, Zero Interest Loans on Device Purchasing.



Operating under a commercial license from the Ghanaian National Communications Authority.

Lessons Learned from Pilot Projects

Key Lessons Learned from Pilot Projects

- TV White Space Technology Can Help Reduce the Cost of Broadband Deployments – It Works! (this is not just a science experiment)
 - This is a great building block technology
- CPE Pricing Remains a Barrier to Scale Deployments
 - Investment & standardization are key to enabling use cases
- Finding Motivated and Competent Private & Public Sector Partners is Key
 - Network operators need to share the vision
- Access to Financing Remains a Challenge in Emerging Markets
 - Donor funding, universal service funding, development banks are key
- Regulation is the Most Critical Piece to Unlocking This Opportunity
 - Regulators need to open up more frequencies for spectrum sharing (example of US FCC & NTIA in UHF, 3.5 GHz, 5 GHz . . .)
 - The lead pack of regulators should mentor the fast followers

Summary

TV white spaces will enable new business models making access more affordable

Governments can improve education, healthcare, e-government, small business empowerment & social inclusion

Policymakers should think differently about spectrum allocation and regulation

Links to further information

More about TVWS technology

<http://research.microsoft.com/en-us/projects/spectrum/default.aspx>

The Dynamic Spectrum Alliance

<http://www.dynamicspectrumalliance.org/>

Microsoft projects

<http://research.microsoft.com/en-us/projects/spectrum/pilots.aspx>

