

Dynamic Spectrum Sharing & TVWS across the Globe



Prof. H Sama Nwana, Executive Director
WinnComm 2015, San Diego, CA, March 2015

About the Dynamic Spectrum Alliance

The Dynamic Spectrum Alliance is a global organization advocating for laws and regulations that will lead to more efficient and effective spectrum utilization.

The Dynamic Spectrum Alliance members are working to create innovative solutions that will increase the amount of available spectrum to the benefit of consumers and businesses alike.

The Dynamic Spectrum Alliance has developed model rules that can be used by regulators in adopting license-exempt rules for TV white space access. Available at: www.dynamicspectrumalliance.org/submissions.html.

The Dynamic Spectrum Alliance (est. 4Q2013): Promoting Spectrum Sharing Regulations Globally



6Harmonics

ADAPTRUM

AirTies

aruba
NETWORKS

ATDI
advanced radiocommunications



Aviacomm



CANADIAN SPECTRUM
POLICY RESEARCH

CARLSON
WIRELESS TECHNOLOGIES



臺灣大學電信研究中心
Communication Research Center, NTU



CSIR
our future through science

CTVR / the telecommunications
research centre



Google



財團法人資訊工業策進會
INSTITUTE FOR INFORMATION INDUSTRY

INTERDIGITAL

MBC
PACIFIC-BRITISH COLUMBIA
COMMUNITIES CORPORATION

MEDIATEK

Microsoft



muRata
INNOVATOR IN ELECTRONICS



NSRC
Network Startup Resource Center

RELAYSERVICES

Saankhya Labs

sky

SpectraLink
Wireless



SSC

University of
Strathclyde
USA Foundation

TENET
Tertiary Education and
Research Network of South Africa

TOYOTA
INFO TECHNOLOGY
CENTER CO., LTD.

uhuruone

University of Colorado
Boulder | Colorado Springs | Denver | Anschutz Medical Campus

THE UNIVERSITY of York

WaveTek

- Close the Digital Divide
 - Support technical, regulatory, and business model innovations that make wireless broadband access more affordable for people around the world
- Enabling the Internet of Things
 - Support spectrum policies that can enable the burgeoning Internet of Things
 - Increasing efficiency and improving quality of life
- Alleviating the “Spectrum Crunch”
 - Support changing regulatory policies that create artificial spectrum scarcity
 - Replace them with policies that will increase available bandwidth, reduce costs, and increase consumer choice
 - <http://www.dynamicspectrumalliance.org>

DSA technology is real and is already starting to help meet real needs – shown in Ofcom's UK Pilot & rule making

Ofcom Pilot in Glasgow shows DSA's power to fill broadband not-spots and power M2M applications



- Investment by silicon majors such as Mediatek in developing products complying with the new IEEE 802.11af standard alongside real products from start-ups such as 6Harmonics, Adaptrum and Carlson
- BT's [large scale pilot deployment in Milton Keynes](#) (UK) demonstrates the value it sees in DSA for M2M applications
- Others have deployed white space networks enabling diverse applications: flood detection, Wi-Fi on ferries, traffic management along a busy route and tracking of endangered animals

And in emerging markets as well...

- TVWS is used to provide Internet service to the Meltwater Entrepreneurial School of Technology – empowering the next wave of African ICT entrepreneurs.
- TVWS backhaul was used for WiFi access at the DSA Global Summit in Accra.
- TVWS-tests completed in Accra, showing no interference when transmitting on a channel between two live TV channels.



Ghana has allowed TV Whitespace based broadband from January 2015

Spectra Wireless, Microsoft launch Africa's first commercial 'white space' network

28 Jan 2015



US technology giant Microsoft has launched what it claims is Africa's first commercial broadband network utilising 'white space' broadcast frequencies in Ghana, via its 4Afrika initiative. In partnership with SpectraLink Wireless – and in the wake of successful white space pilot tests at universities in Koforidua, Ghana, from May 2014 – the new network will offer students affordable, high speed internet bundles and zero-interest loans in partnership with UT Bank for the purchase of eligible internet-enabled Microsoft, Lenovo, Dell and HP devices. Data packages start from GHS2 (USD0.6) for 24 hours access.

Professor H Nwana, executive director of the Dynamic Spectrum Alliance, of which Microsoft and Spectra Wireless' parent company are both members, commented: 'Having overseen TV white space (TVWS) trials in the UK at Ofcom, I am truly delighted to see Spectra Wireless and Microsoft's move to make TVWS-based broadband a commercial reality in Ghana, a first in Africa. I applaud the Ghanaian regulator, the National Communications Authority (NCA), in granting a commercial licence, which allows use of TV frequencies on a secondary basis as long as TV is not interfered with. This would drive up spectrum efficiency of TV bands in Ghana, and I hope other countries learn from NCA's decision.'

Standardisation is moving forwards

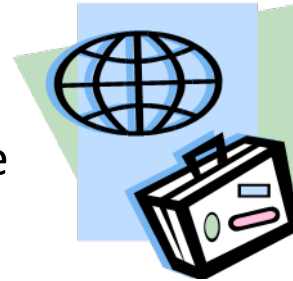
- The excellent work that has been done by FCC, Ofcom and CEPT, has given industry confidence to invest in creating standards
- In ETSI (BRAN) [EN 301 598 V1.0.0](#) (2013-07) – defining WSD requirements for licence exemption
- IEEE 802.11af is a key addition to the Wi-Fi family, adding powerful coverage ability
- The IETF has laid down PAWS – a global standard protocol for white space devices to talk with geolocation databases
- Other developments around the DSA opportunity include: 802.19, 802.22 and ECMA 392
- Weightless is a new standard being developed by industry, to meet the needs of M2M/IoT applications

TV White Spaces Regulatory Overview

- **United States** – TVWS is permitted in the US. The Federal Communications Commission has launched a new proceeding to ensure nationwide availability and to increase flexibility (adjacent channels, higher power, higher towers, co-channel flexibility, etc.)
- **Canada** – Industry Canada has released regulations similar to those available in the United States, with some minor differences (RRBS and wireless mics).
- **United Kingdom** – Ofcom released its decision to implement TVWS regulations in 2015. The first databases have already been authorized. And, the first radios are in type approval.
- **Singapore** – The Infocomm Development Authority (IDA) released its decision to implement TVWS regulations with implementation in 2015.
- **Finland** – The government has authorized legislation permitting access to TV white spaces, but is yet to develop implementing regulation.
- **Malawi** – The Malawi Communications Regulatory Authority has launched a proceeding to permit access to the TV white spaces in 2015. A decision is expected soon.
- **South Africa** – The Independent Communications Authority of South Africa is expected to issue a draft opinion proposing license-exempt access to TV white spaces.
- **The Philippines** – The National Telecommunications Commission (NTC) is soon expected to release a Memorandum Opinion allowing access to TVWS for public sector verticals.
- **New Zealand** – The Ministry has opened a consultation on issuing trial licenses in 2015.
- Pre-regulation pilots and deployments authorized and/or underway in many countries: **Bhutan, Botswana, Cote d'Ivoire, Ghana, Indonesia, Japan, Kenya, Morocco, Namibia, Nigeria, the Philippines, South Korea, Tanzania, Taiwan, Uruguay.**

Geolocation databases is proven “best practice” and create safe innovation opportunities

- Coordinating spectrum use through a database brings unprecedented flexibility for regulators
- Geolocation databases provide:
 - Reassurance to licensees
 - Predictable capacity to white space device users
 - Flexibility for regulators to evolve the regulation as experience grows
 - A simple means of re-organising bands to enable e.g. clearance of a new harmonised band



- Regulators no longer need to assume the worst case, so LE applications can deliver greater value
- Geolocation databases can enable global market benefits:
 - Coping with fragmentation and flex as nations work towards harmonised bands
 - Providing a simpler way of dealing with inevitable variations in spectrum availability and policy between nations
- Geolocation databases provide a dynamic management capability which facilitates rapid adaption to market needs (e.g. special events) and facilitates enforcements

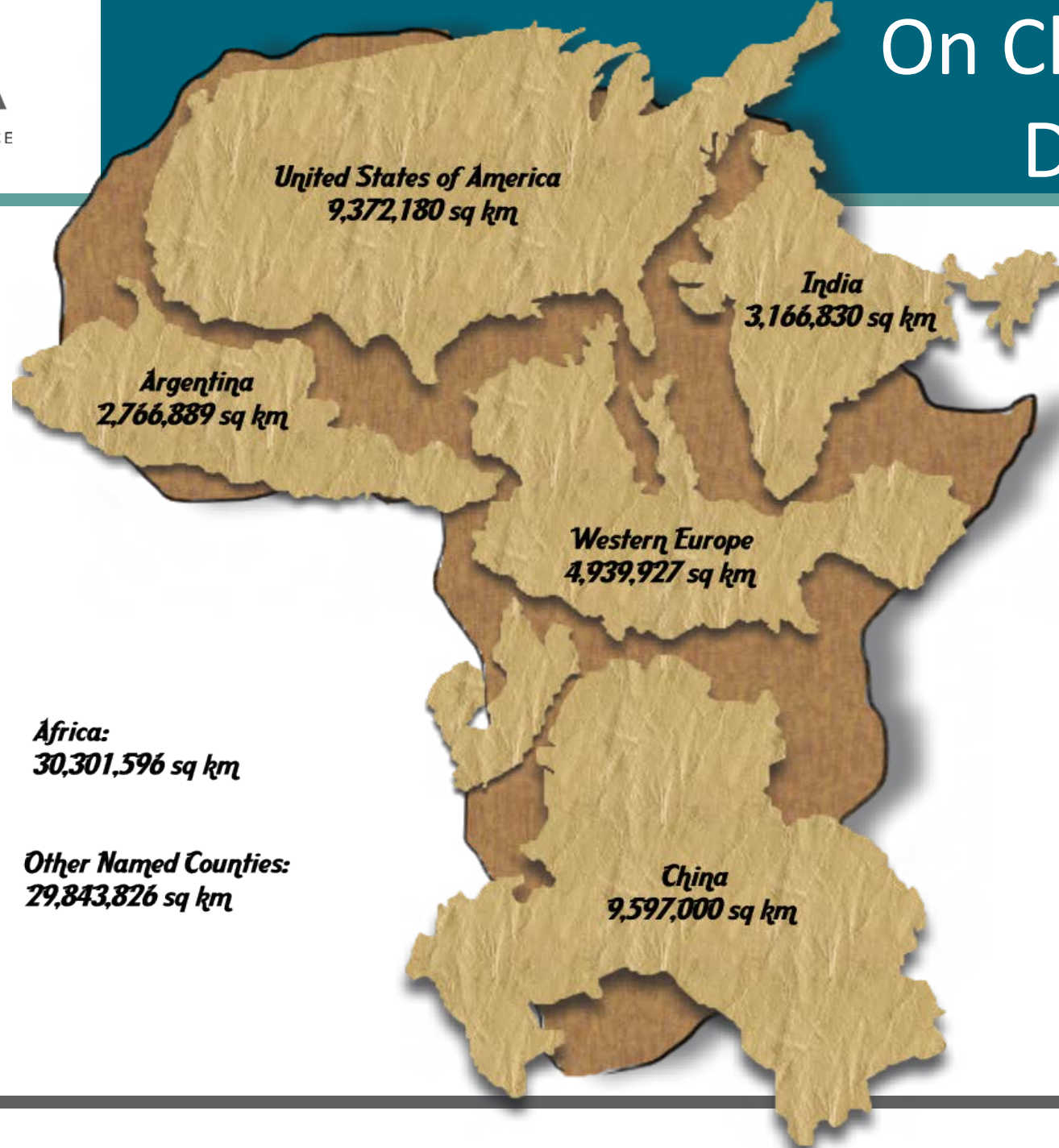
Regulators can move forward with enabling legislation and/or regulations . . .

"The ITU World Radiocommunication Conference of 2012 concluded that the current international regulatory framework can accommodate software defined radio and cognitive radio systems, hence dynamic spectrum access, without being changed. The development of systems implementing this concept, such as TV white spaces, is therefore essentially in the hands of national regulators in each country."

François Rancy, Director, ITU Radiocommunication Bureau

[ITU Radiocommunication Seminar for Arab Countries, RRS13-Arab Tunis, Tunisia on December 13, 2013]

On Closing the Digital Divide: Africa



- ✓ Dynamic Spectrum Access Technology & regulations is real and working worldwide
- ✓ TVWS is one first foray into dynamic spectrum access: Low frequency spectrum in TV bands is vital for access (and affordability) in most markets and for M2M/IoT in developed ones
- ✓ Dynamic Spectrum Access is key for spectrum sharing: just logical to meet 1000x in addition to (i) More efficiency, i.e. more bits per hertz, 5G (ii) more Hertz (iii) more densification, i.e. more places to use hertz
- ✓ Spectrum sharing will work in other bands: 2.3GHz, 3.6-4.0 GHz, 5GHz, etc.
- ✓ More license-exempt spectrum and more Wi-Fi is key too
- ✓ Standards are emerging (802.11af, 802.22, IETF PAWs, ETSI, etc)
- ✓ The FCC's role (and Ofcom's in the UK) so far have been key to other markets – and economies of scales of devices would accrue USA/UK too

The Dynamic Spectrum Alliance Global Summit 2015 in Manila, Philippines – Come join us in Manila – 6th to 8th May 2015

[Home](#)[Members](#)[Pilots](#)[Regulations](#)[Global Summit](#)[Join the Alliance](#)[Resources](#)[News](#)[Blog](#)[Events](#)[FAQ](#)

Dynamic Spectrum Alliance Global Summit

Manila, Philippines

May 6-8, 2015

[About](#)[Agenda](#)[Registration & Travel](#)[Sponsors & Co-Host](#)[Register](#)

Making dynamic spectrum access increasingly real in 2015! Summit aims to drive regulations forward to build on global successes already achieved as regulators across the world explore different ways to efficiently use spectrum