HARNESSING TV WHITE SPACES TO CONNECT THE UNCONNECTED

D S A
DYNAMIC · SPECTRUM · ALLIANCE

The connectivity gap

INTERNET CONNECTIVITY is key to digital inclusion and transformation.

DIGITAL INCLUSION is key to economic growth and societal development.

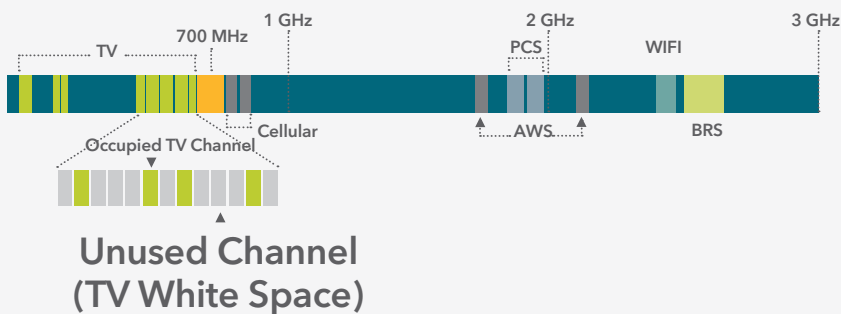BUT **ALMOST HALF** of the world´s population is still not connected.

Coverage is unequal and there is a digital divide between cities and rural areas and between regions of the world.

Television White Space (TVWS) spectrum

High-power TV broadcast transmitters are often concentrated at a single site in a geographic area and need to leave empty channels between transmitters to avoid interference.

Known as TV white spaces (TVWS), these buffer zones can be used to provide cost-effective broadband services and Internet of Things (IoT) connectivity that help drive digital inclusion.

TV   700 MHz   1 GHz   2 GHz   3 GHz
PCS   WIFI
Cellular   Occupied TV Channel   AWS   BRS

Unused Channel (TV White Space)

ADVANTAGES

- ✓ Longer range and greater coverage area
- ✓ Greater obstacle penetration in difficult terrain
- ✓ Non-line of sight operation available
- ✓ Global spectrum bands – allows for global economies of scale

Source: Federal Communication Commission, US

How it works

Dynamic Spectrum Access (DSA) technology and techniques make it possible to deploy broadband access services in TVWS spectrum without interfering with existing broadcast and other incumbent services.

DSA allows a White Space Device (WSD) to:

- Evaluate radio frequency environment
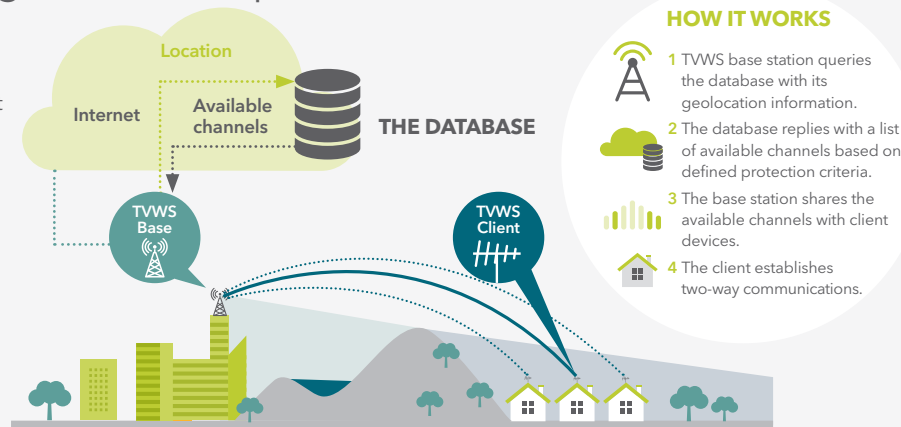- Determine which frequencies are available for use without interfering with other services
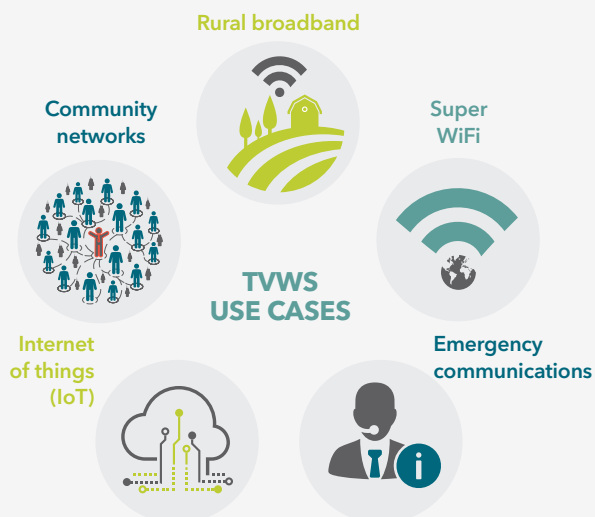- Operate in those frequencies and adapt or cease operations if the environment changes

The importance of geolocation spectrum database

Frequencies are dynamically accessed in real time based on the usage in a geographic area by a set of incumbent users, including TV broadcast and wireless microphones.

TVWS radios are coordinated by a geolocation spectrum database, which calculates the availability of unused TV channels at a given location based on interference protection criteria defined by the regulator.

Location

Internet

Available channels

THE DATABASE

TVWS Base

TVWS Client

HOW IT WORKS

1 TVWS base station queries the database with its geolocation information.

2 The database replies with a list of available channels based on defined protection criteria.

3 The base station shares the available channels with client devices.

4 The client establishes two-way communications.

TVWS technology is proven and enables multiple use cases

Rural broadband

Community networks

Super WiFi

TVWS USE CASES

Internet of things (IoT)

Emergency communications

✓ Licence-exempt broadband services in TVWS are already up and running, regulatory frameworks are in place, the technology is proven, standards exist, radios have been certified, and commercial deployments are underway.

✓ Use of TV White Spaces can be authorized by any national regulatory agency as long as its rules are consistent with the ITU Radio Regulations.

Key roles for governments and regulators

With technology now proven and demand for cloud services growing rapidly, the adoption of TVWS is poised to accelerate. Dynamic Spectrum Access (DSA) principles and techniques are being employed across multiple spectrum bands to improve utilization. Governments and regulators have a key role to play in realising the full potential of DSA. Enabling TVWS can be the first step.

ALLOWING SHARED ACCESS TO TVWS SPECTRUM

Allow license-exempt access to TVWS through dynamic sharing to improve broadband connectivity for all citizens independent of their locations.

ENABLING REGULATORY FRAMEWORK

Introduce a harmonised regulatory framework, based on existing best-practice, such as the Dynamic Spectrum Alliance model rules[1], to unlock the TVWS opportunity.

ENCOURAGING INNOVATIVE BUSINESS MODELS

Allow and encourage innovative business models required to deliver cost-effective internet access in underserved areas using TVWS.

[1] http://dynamicspectrumalliance.org/