

# Development of TV White Space Technology

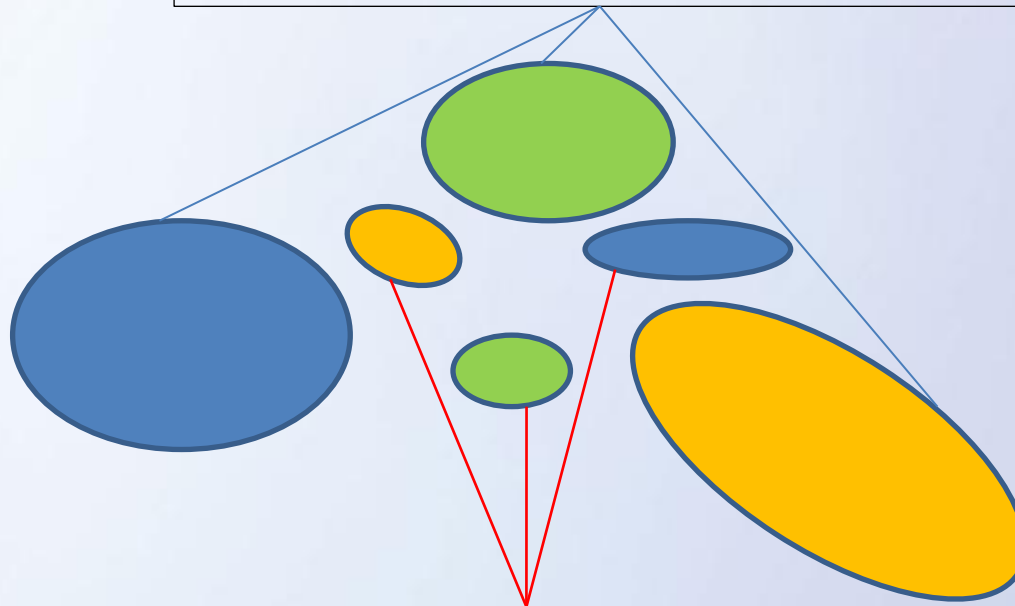
Telecommunications Regulatory Affairs Advisory Committee  
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# What is TVWS?

- In traditional radio planning, coverage areas of co-channel TV broadcasting stations are geographically separated so as to avoid radio interference
- “TVWS” or “TVWS spectrum” generally refers to those TV channels that are not being used for TV broadcasting at certain locations at all times

# Concept of TVWS

High power TV stations using different frequencies to provide territory-wide coverage

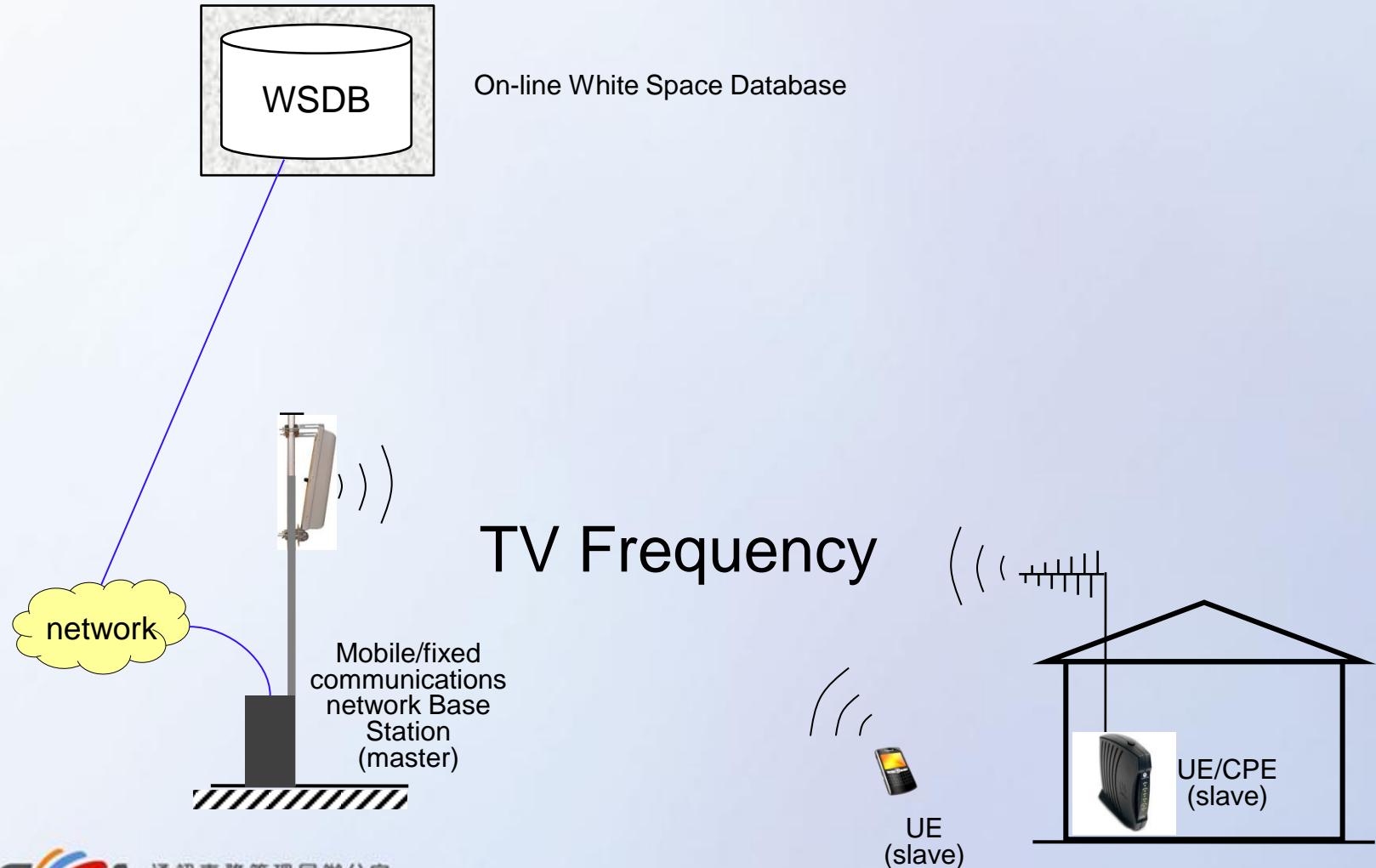


The same frequencies can be re-used by other low power applications in between the TV coverage areas

# Development on TVWS

- Ever growing demand for spectrum for telecommunications services drive the needs to explore ways to make more efficient and optimal use of the spectrum
- Some countries are exploring the use of TVWS at particular locations for low power applications, such as wireless broadband Internet access & machine-to-machine (M2M) applications

# Typical TVWS System Configuration



# Typical TVWS Operation (1)

- TVWS devices are categorised as master or slave devices
- Master devices
  - A base station / access point of a communications network
- Slave devices
  - Customer equipment, e.g. tablet
  - Will listen to a master device and communicate with the master device using the TV channel as specified by the master device

# Typical TVWS Operation (2)

- White Space Database (WSDB)
  - An on-line database with intelligence capable of determining service areas of any existing TV stations
    - the key for TVWS implementation
  - Master TVWS devices shall query WSDB from time to time to obtain a list of available TV channels for use in a particular location without causing interference to TV services in the vicinity
  - Effectively control the use of TV channels by TVWS devices on a dynamic basis
    - With updates of the WSDB, TV channels that are available for use at a particular location may vary from time to time

# Potential Applications of TVWS

- The following applications are being explored or on trials in some countries –
  - Rural broadband service
  - Hot-spots (similar to WiFi hot-spots)
  - M2M applications (e.g. smart metering)



# Worldwide Development (1)

- Regulatory Framework for TVWS
  - **The US** – Federal Communications Commission (FCC) has adopted a licence-exempted regulatory framework and a certification scheme for TVWS devices since 2010
  - **The UK** – Office of Communications (Ofcom) put forward a proposed framework of TVWS technology including the technical details for implementation in 2013 i.e. pilots in progress
  - **Singapore** – with regard to a public consultation launched in June 2013, Infocomm Development Authority (IDA) issued a decision paper on the regulatory framework of TVWS in June 2014 i.e. licence-exempted framework
  - **New Zealand** – Radio Spectrum Management (RSM) has conducted a consultation on an interim licensing arrangement for the use of TVWS devices in September 2014

# Worldwide Development (2)

- Availability of TVWS Equipment/Devices
  - TVWS broadband radio solution developed by certain equipment vendor can offer data rate over 10 Mbps and support non-line-of-sight communications
    - TVWS equipment have been approved by FCC for use in the US
  - TVWS devices are yet to appear in the mass market for the meanwhile

# Hong Kong Situation

- TV Channel Utilization
  - All 42 TV channels (8 MHz bandwidth per channel) in the 470 – 806 MHz band have been assigned for terrestrial TV broadcasting and mobile TV services
  - Mainland is also sharing the same TV band for terrestrial TV broadcasting
  - TV signals from Guangdong transmitting stations may spillover into Hong Kong and vice versa
    - Frequency coordination with the Mainland authority will be needed for the use of TVWS in HK to avoid mutual radio interference

# OFCA's Preliminary Assessment

- OFCA has carried out a preliminary assessment
  - Estimating the potential availability of TVWS in outdoor areas of Hong Kong
  - Using a computer planning tools, taking into account terrain and building factors
- A TV channel will be available for TVWS at a particular location, if
  - the receivable signal power of co-channel TV signals is less than -114 dBm, and
  - the lower/upper adjacent channel(s) is/are not intended for TV reception in the same area

# Results of OFCA's Study

- Only a small number of TV channels in 470 – 806 MHz band might be available for TVWS in certain outdoor areas of Hong Kong
  - mainly in the New Territories and outlying islands
- TVWS may be used for indoor low power applications, e.g. in shopping malls and underground MTR stations.  
However,
  - Availability of TVWS enabled consumer equipment in the mass market is still unclear at this stage
  - Potential high cost in setting up and maintaining a WS database

# Way Forward

- OFCA will keep monitoring the development of TVWS consumer devices and overseas TVWS deployments

# Thank You