



**Asia-Pacific  
Economic Cooperation**

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**2015/SOM2/TEL51/DSG/WKSP1/002**

Session 1

## **TV White Space Regulatory Framework**

Submitted by: Singapore



**APEC**  
PHILIPPINES  
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**Getting Connected: TV White Space Workshop  
Boracay, Philippines  
12 May 2015**



# TV White Space Regulatory Framework

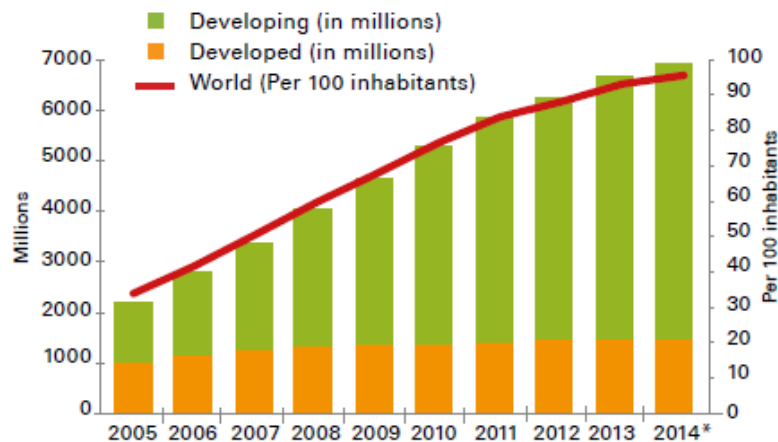
# 1

## Introduction to TVWS Technology

# Spectrum Projections and Demand

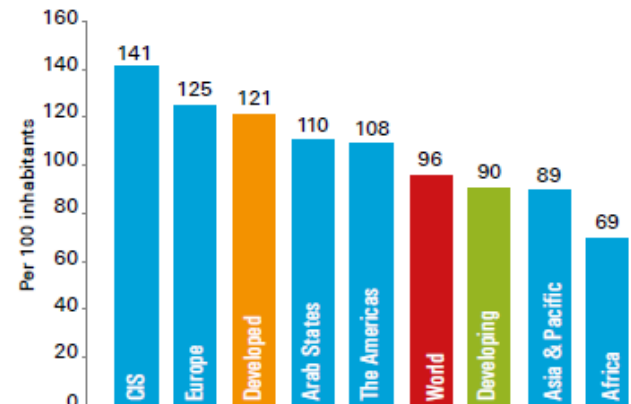
- Projections of mobile global data traffic indicates that there will be multi-fold increase in the next five years
- Demand for spectrum is easily outstripping supply, with the proliferation of mobile broadband

Mobile-cellular subscriptions, total and per 100 inhabitants, 2005-2014\*, and by region, 2014\*



Note: \* Estimate

Source: ITU World Telecommunication/ICT Indicators database



# New Approaches to Spectrum Usage



## Dynamic Spectrum Access

Optimise and enable access to under-utilised spectrum

### Utilisation

Exclusive



Shared  
(temporal & spatial)

### Regulation

Licensed



Unlicensed

### Allocation

Static



Dynamic

# Benefits and Applications of TV White Space Technology



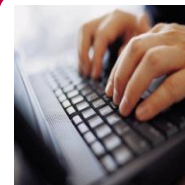
## Environment

- Remote environment monitoring
- Remote waste management



## Smart Metering

- Utilities management
- Automated meter reading



## Wireless Broadband

- Extend WiFi connectivity
- Rural broadband



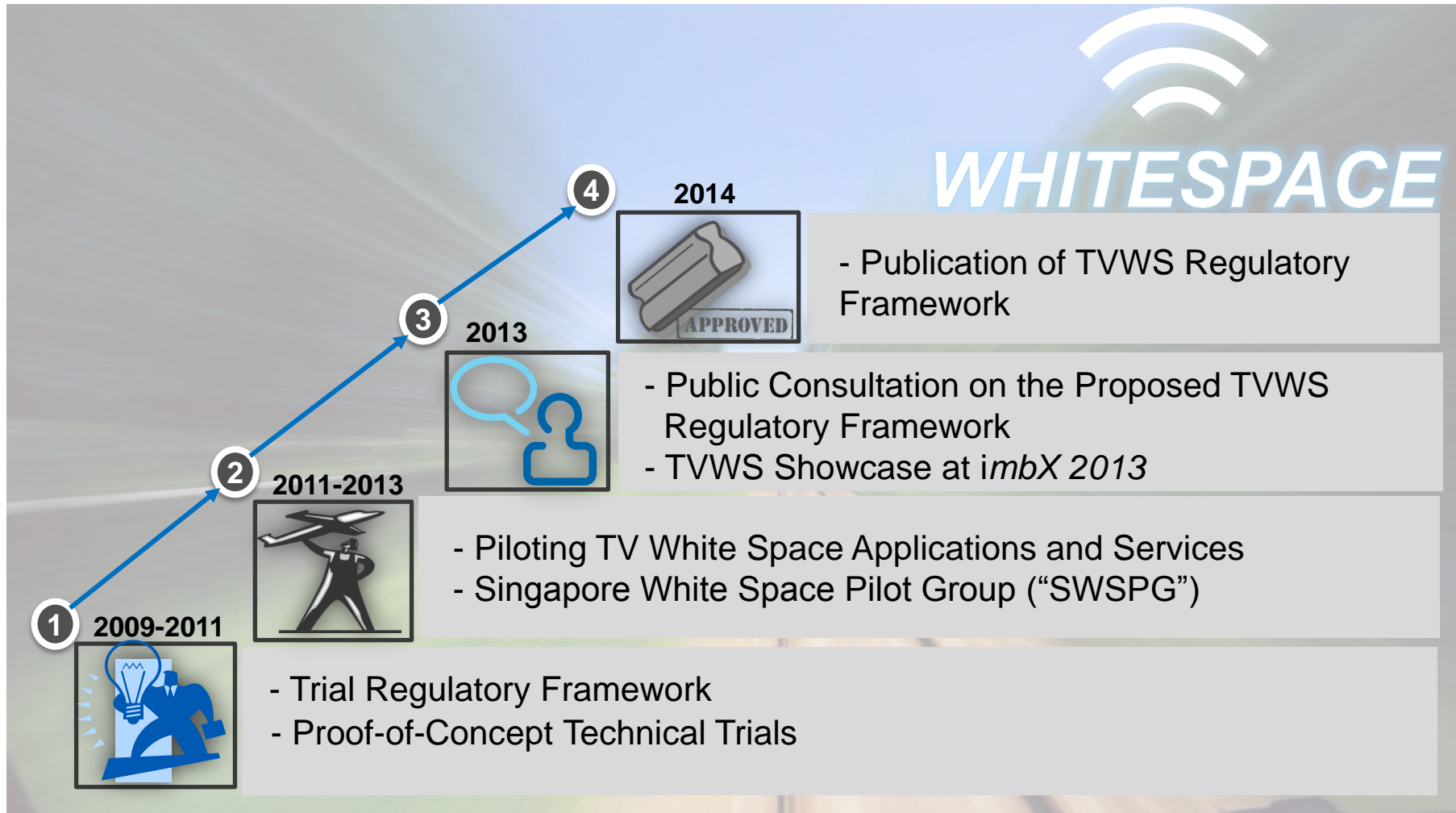
## Machine to Machine

- Internet of Things
- Telemetry and data acquisition

# 2

## IDA's Roadmap for TV White Space Technology

# IDA's Roadmap for TV White Space





# TVWS Pilot Deployments in Singapore



**Wireless Backhaul  
connectivity  
@ Sentosa**



**Wireless Backhaul  
connectivity  
@ SICC**



**Public Wi-Fi & Surveillance  
@ Gardens by the Bay**



**Wireless Video  
Surveillance  
@ Singapore**



**Smart Metering  
@ NUS U-Town**



**Sensor Network  
@ HDB  
(GreenPrint)**

Source: Institute of Infocomm Research (I2R)

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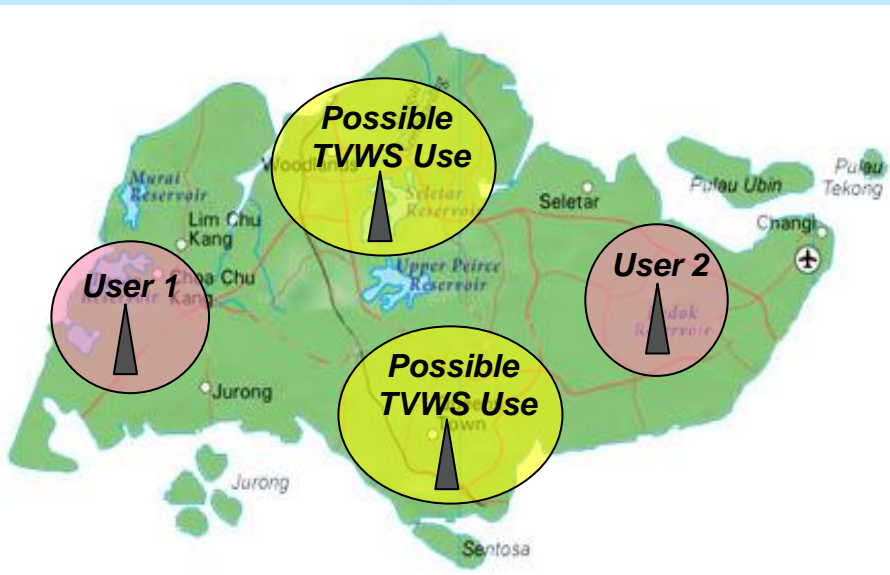
## Highlights of the TVWS Regulatory Framework

# Harnessing Under-utilised Spectrum

- 24 channels in the TV broadcast bands will be made available for TVWS operations in Singapore (~180MHz of spectrum)

## Where is the TVWS Spectrum?:

IDA will make available parts of the VHF spectrum (174 MHz and 230 MHz), and the UHF spectrum (470 MHz and 806 MHz) for TVWS operations.



These two spectrum bands are not fully utilised at all times and in all locations.

As such these under-utilised spectrum could potentially be re-deployed for other wireless services

# Licence Exemption- Lowering cost barrier

- Operation of White Space Devices (“WSD”) are exempted from licensing, provided that the WSD conforms to IDA’s technical specification

## Benefits for the Industry

- A licence-exempt approach will allow users to explore a range of business models, lower cost for users and enable innovative services to flourish
- Examples of wireless services that are currently operating on a licence exempt basis:

### Communications & Broadband Access



### Wireless Microphones



### Medical Telemetry



# Dynamic Allocation of Spectrum

- The geolocation database approach will be the mandated method for White Space Devices to access the TVWS spectrum

## How TVWS Technology Operates:

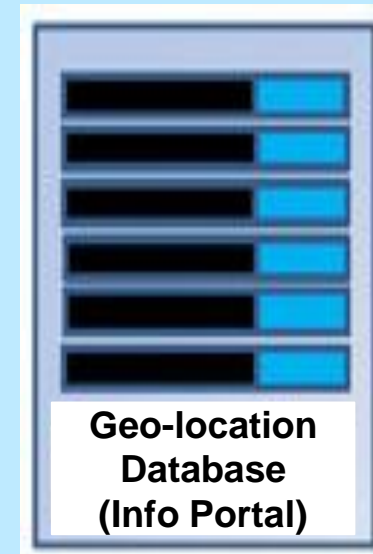


White Space  
Devices  
("WSD")

This is my location,  
what are the  
channels available?



Channel 27 and 28 are  
available at your  
location



# Light-Touch and Innovative Regulations



## Business Freedom and Opportunities

- Businesses are able to deploy their own wireless networks without the need for costly spectrum licences



## Encourage Innovative Solutions

- Potential deluge of new technological and business model innovation that will benefit both industry and consumers



## Technology Start-ups

- Creating greenfield opportunities for small medium enterprises (SMEs) and start-ups

# Thank You