

## Fuelling the 5G future: understanding and delivering the spectrum requirements

Tim Miller 2nd Annual Asia Pacific Spectrum Management Conference 26 April 2016

### Agenda

- What is 5G?
- How much spectrum does it need?
- Outcomes from WRC-15
- Needs for WRC-19

# What is 5G?





### Not-quite-4G





# How much spectrum do we need?

### Ever-growing demand is assured



### ... but predictions are difficult



### Different services have different needs



### Forecasts need to change

- Relative usage of different services will define mix of technologies
- Defining spectrum needs will need disaggregated demand forecasts
- How will people use their connection in 2030?

- 5G devices may adjust technology use based on service use
  - · Models will need to do the same
  - The 5GIC is working on algorithms and rules to govern this



# Outcomes from WRC-15

### Spectrum identified for 5G



- Other bands were allocated for IMT in general
  - LTE and SDL may use these before 5G is commissioned
- UHF below 700 MHz will not be reallocated before WRC-23 in R1
- Studies are looking at how highfrequency bands can be bounced around buildings
  - There is limited in-building penetration
  - Are we relying on picocells or ubiquitous WiFi?

### Developments since WRC-15

Korea, Japan and the US are starting to use 28GHz EU members are discussing sub-700MHz MENA countries delaying analogue TV switch-off

SSA delaying spectrum awards

# AWS spreading in South America

#### Is spectrum harmonisation a dying art?

- Korea wants to use a 5G network at the Winter Olympics in 2018 but that will be a prototype at best
- Japan hopes to launch 5G in early 2020

# Needs for WRC-19

### Spectrum planning in uncertain climates

#### WRC-19 is too late

- Study groups need to identify spectrum soon, ready for ratification
- Service demand modelling needs to identify how it will be used
- A wide portfolio of spectrum is needed
  - Long-range spectrum 600MHz needs to be discussed
  - Satellite capacity
  - Dedicated HAPs spectrum
  - Increased unlicensed spectrum for handoff maybe with LSA-U or LSA-LAA

# Agenda

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#### Spectrum to connect the future network society

•Håkan Ohlsén, Director, Spectrum and Radio Technology Strategy, Ericsson

### The approach to 5G in Korea

•Dr Kyungmee Kim, Director of Technial Regulation Division, National Radio Research Agency (RRA)

### The role of satellite in delivering a 5G future

•Gerry Oberst, Senior Vice President, Global Regulatory and Governmental Strategy, SES

### Collaborating to drive 5G

•Scarlett Han, China Mobile International Limited, China Mobile Research Institute

#### Intel's Perspective on 5G Spectrum and Technology

•Shawn Covell, VP Platform Engineering Group, Intel **Panel discussion**