SPECTRUM

THE FUNDAMENTAL ELEMENT OF MOBILE

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Spectrum Roadmap: Why It Matters

A spectrum roadmap is essential to ensure there is enough spectrum to meet surging demand for mobile services

- Increasing pace of mobile technology evolution and the decreasing cycle time for new technology demand increased agility in spectrum management and planning framework

- Balance the time to relocate the incumbents against the costs of delaying the introduction of new technologies – trade-offs

- Allocate spectrum for new uses in advance of the technology becoming available so that operators have time for planning, capital expenditure and implementation

A spectrum roadmap helps

- Government forecasts future trends, manage its work and risks, secure political messages;
- Industry with increased certainty about the government's future allocation, renewal plans and management of radio spectrum.
- Inform incumbent and adjacent users of the latest developments (including gov spectrum users)
- Historic trail

Key Themes

Key themes for a spectrum roadmap

- Emerging challenges and opportunities to radio spectrum management framework and approach, at least 3 – 5 years into the future

- Identify future technological trends and drivers, and assess their impact on spectrum policy and planning

- Spectrum management work projects and programme planned to address the identified challenges and opportunities

- A roadmap is an evolving document, to be reviewed and updated regularly (annual review is recommended)

Some key challenges to address

- What spectrum will be available and when:
  - To plan what spectrum operators need to invest in over the near-to-long term to meet rapidly growing data demand (this should encompass coverage & capacity bands, existing and future bands)

- Regulatory certainty:
  - e.g. allocation methodologies, renewal procedure, projects and programme

- Licensing regime:
  - e.g. refarming, resource pricing, spectrum sharing

- Harmonised future spectrum:
  - To reduce equipment costs, limit interference and enable roaming

Roadmap example: The European Union

EU bodies are active in promoting a common roadmap for spectrum release across Europe

4G Spectrum Roadmap

- In 2012, European Parliament adopted "Radio Spectrum Policy Programme" (RSPP):
    - 900, 1800 and 2600 MHz to be allocated for high speed electronic communication services by end-2012
    - 800 MHz band to be reallocated for high speed electronic communication services by 1 January, 2013
    - At least 1200 MHz of spectrum to be identified for wireless data

EU monitors member state performance Although only 12 of 28 met original deadline, almost all were compliant by end-2013

5G Developments

- In 2016, the RSPG released plans to harmonise availability of spectrum for 5G services:
    - 3400-3800 MHz identified as primary band for the introduction of 5G
    - 700 MHz band, already harmonised in Europe, identified as 5G coverage band
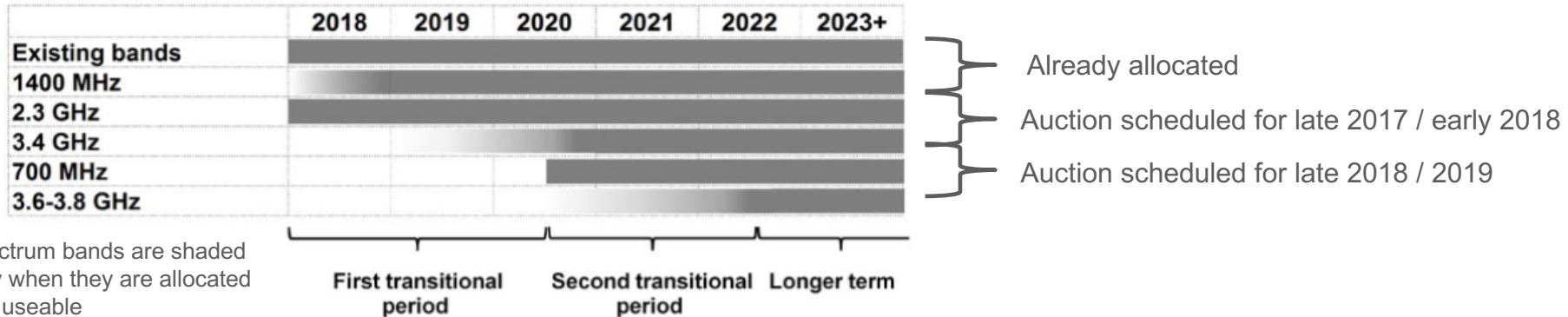   - Availability of Millimeter wave spectrum under discussion

The EU 5G roadmap is still in its infancy but already there is an emerging consensus around the relevant bands

Roadmap example: UK plans for 4G and 5G spectrum

- Ofcom regularly releases information on its website and runs consultations concerning the release of new spectrum
- For example:
  - as part of the consultation process for the upcoming 2.3 & 3.4 GHZ Award, Ofcom released a timeline for availability of mobile spectrum in the 700 MHz and 3.6-3.8 GHz bands
  - in 2017, it consulted on clearing the 3.6 GHz band and has issued notices to fixed link operators to clear the band within 5 years

UK Mobile Spectrum Roadmap

	2018	2019	2020	2021	2022	2023+	
Existing bands							Already allocated
1400 MHz							
2.3 GHz							Auction scheduled for late 2017 / early 2018
3.4 GHz							
700 MHz							Auction scheduled for late 2018 / 2019
3.6-3.8 GHz							

First transitional period | Second transitional period | Longer term

Spectrum bands are shaded grey when they are allocated and useable

Source: Ofcom, Statement: Award of 2.3 and 3.4 GHz spectrum bands: Competition issues and auction regulations, 11 July 2017.

Spectrum Roadmap Examples

- **Australia**
    - A Five-year Spectrum Outlook 2017 — 2021 is under public consultation until 18th of December 2017
    - Outline the ACMA's assessment of the demand for different parts of the radio spectrum;
    - http://www.acma.gov.au/Industry/Spectrum/Spectrum-projects/5-Year-Spectrum-Outlook

- **New Zealand**
    - Released its Radio Spectrum Five Year Outlook 2017 — 2021
    - Stimulated the discussion about the uses of radio spectrum;
    - To update and refine the radio spectrum management framework to make it more responsive and effective;
    - https://www.rsm.govt.nz/online-services-resources/publications/annual-reports-and-business-plans

How to get there ?

- Policymakers should work in partnership with all stakeholders to define and refine the roadmap

National 5G Task Force Established

15 DEC 2018

The Malaysian Communications and Multimedia Commission has established a national 5G Task Force in November 2018 to study and recommend a holistic strategy for 5G deployment in Malaysia. A collaborative effort with relevant stakeholders, the Task Force comprise members from the private sector, Ministries and agencies representing the demand and supply side of the ecosystem.

The Task Force is expected to complete its study and produce a final report for the Malaysian Communications and Multimedia Commission and Minister of Communications and Multimedia by September 2019.
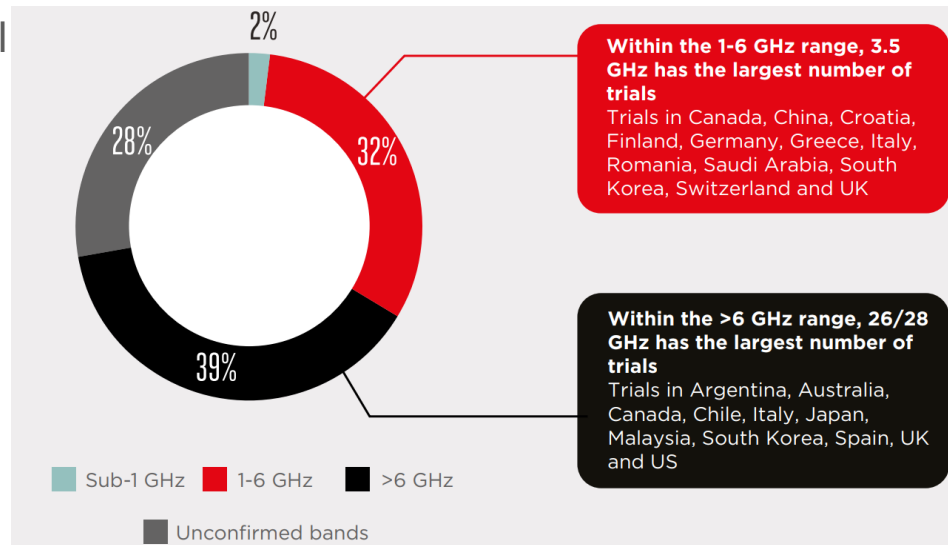
Need for spectrum roadmaps in APAC
Example: C-Band spectrum in ASEAN countries

- 5G is predicted to provide important social and economic benefits globally

- Target spectrum ranges for first 5G networks include primarily C-Band (aka 3.5 GHz) and millimetre-wave spectrum

- C-Band is a 5G pioneer band, set to provide a compromise between capacity and metro coverage (deployment costs benefits), key for the development of 5G

- C-Band incumbency issues in ASEAN countries

2%

32%

28%

39%

Within the 1-6 GHz range, 3.5 GHz has the largest number of trials
Trials in Canada, China, Croatia, Finland, Germany, Greece, Italy, Romania, Saudi Arabia, South Korea, Switzerland and UK

Within the >6 GHz range, 26/28 GHz has the largest number of trials
Trials in Argentina, Australia, Canada, Chile, Italy, Japan, Malaysia, South Korea, Spain, UK and US

Sub-1 GHz   1-6 GHz   >6 GHz

Unconfirmed bands

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Need for spectrum roadmaps in APAC
Example: C-Band spectrum in ASEAN countries

- Some regulators in the ASEAN region are taking steps to refarm C-band but the large majority are in a difficult position to make refarming commitments for the full 3.4-3.8 GHz range

- Portions of 3.3-3.7 GHz have been identified in all regions except ASEAN and Pacific Islands (footnotes apply in region 3)

- Potential use of some portions of C-band is being considered but the large majority of ASEAN regulators is yet to make commitments

- Regulators are considering ways to enable access to this spectrum but are challenged by related licensing expiry dates of incumbents

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Need for spectrum roadmaps in APAC
Example: C-Band spectrum in ASEAN countries

- Some ASEAN countries (Laos, Vietnam) only have access to 3.4-3.7 for their FSS. They are open to 5G trials in 3.3-3.4 and above 3.7GHz

- Tuning range concept is more widely understood

- Some ASEAN countries do not have access to the 2.6GHz band, and are now more aware of upcoming capacity crunch (Indonesia, Thailand)

- Prompt 5G adoption is now a growing national aspiration across the region (i.e. Thailand)

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Need for spectrum roadmaps in APAC
Example: C-Band spectrum in ASEAN countries. Recommendations

- Since C band spectrum uptake for 5G is growing rapidly, countries need to consider the long-term implications of not having access to this band in mid-range spectrum

- Spectrum roadmaps for ASEAN in C band can assist regulators and industry in identifying the key issues (expiry dates, moratoriums, refarming plans) that could best address transitional needs

- Roadmaps could consider long-term access plans as well as short and medium term options

- Cross-border implications should also be considered in C band roadmaps in ASEAN

- GSMA has released several technical and economic benefit studies of C-Band use for mobile broadband (leading to WRC-15)

https://www.gsma.com/spectrum/wp-content/uploads/2014/11/GSMA.-Frontier-report-on-Economic-assessment-of-C-band-re-allocation-2014.pdf

https://www.gsma.com/spectrum/wp-content/uploads/2015/10/GSMA_C-Band_Report.pdf

https://www.gsma.com/newsroom/press-release/new-gsma-report-reveals-economic-benefits-of-c-band-spectrum-for-mobile-broadband/

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