

# Industry developments

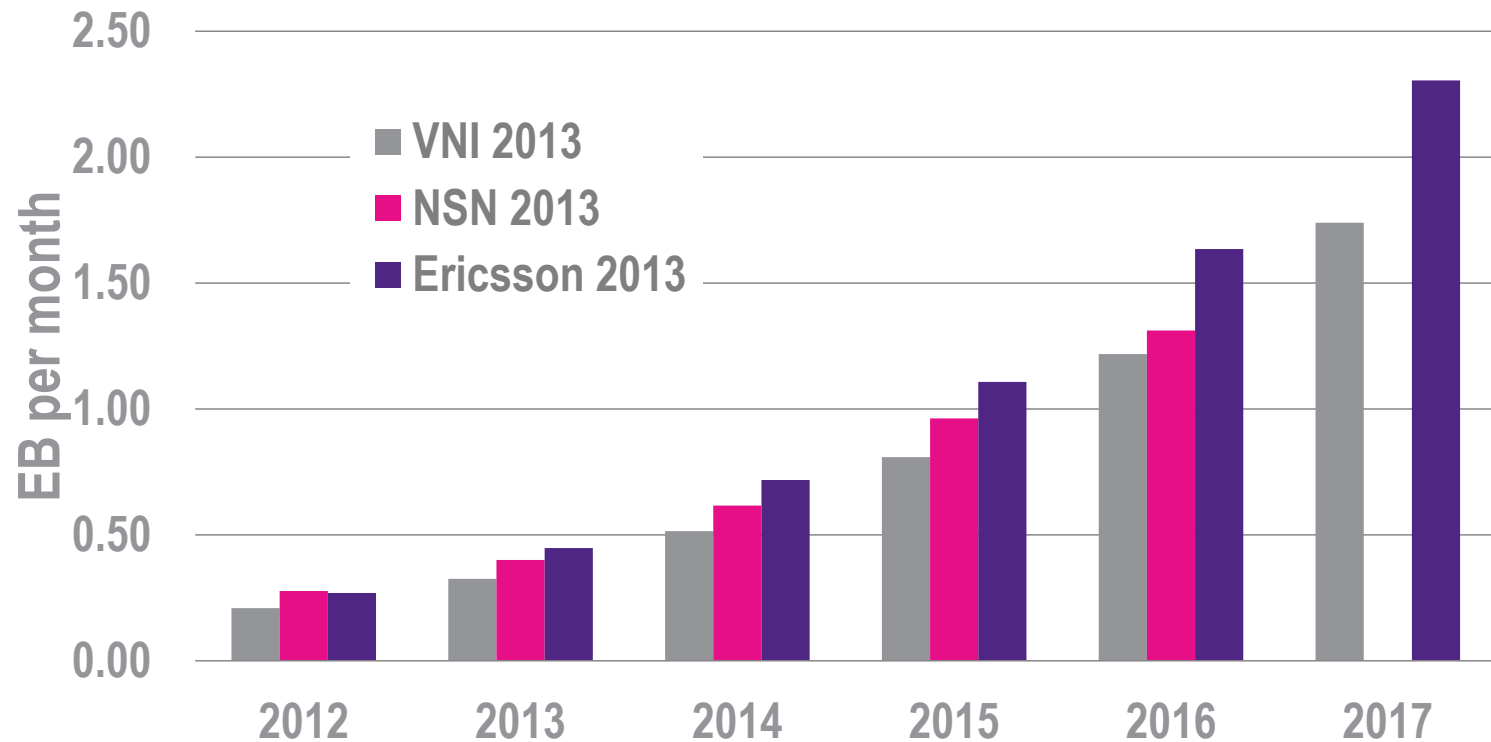
**Tony Lavender**  
**Mobile Infrastructure and Real Estate Conference**  
**London – 27<sup>th</sup> February 2014**

# Contents

- Growth forecasts
- Spectrum supply
- Public sector release programme
- Ofcom and spectrum management
- Small cells and heterogeneous networks
- Mobile cloud

# Growth forecasts (1)

## CEPT mobile data traffic

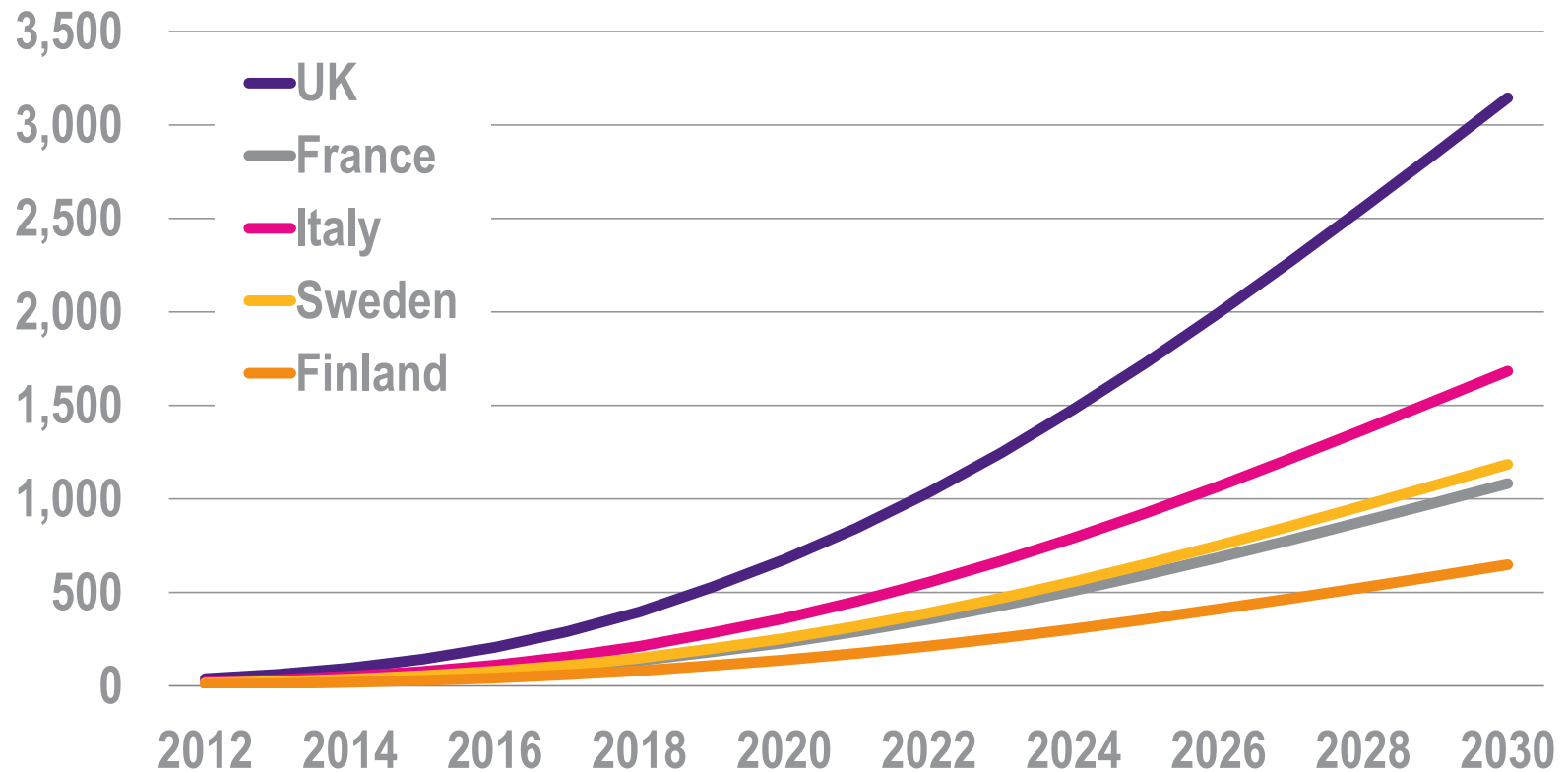


Estimated by assuming that relevant CEE represents the same percentage of Western Europe traffic as in Cisco VNI 2013

Source: Cisco, Ericsson, NSN, Plum Analysis

# Growth forecasts (2)

## Traffic projections (PB/month)



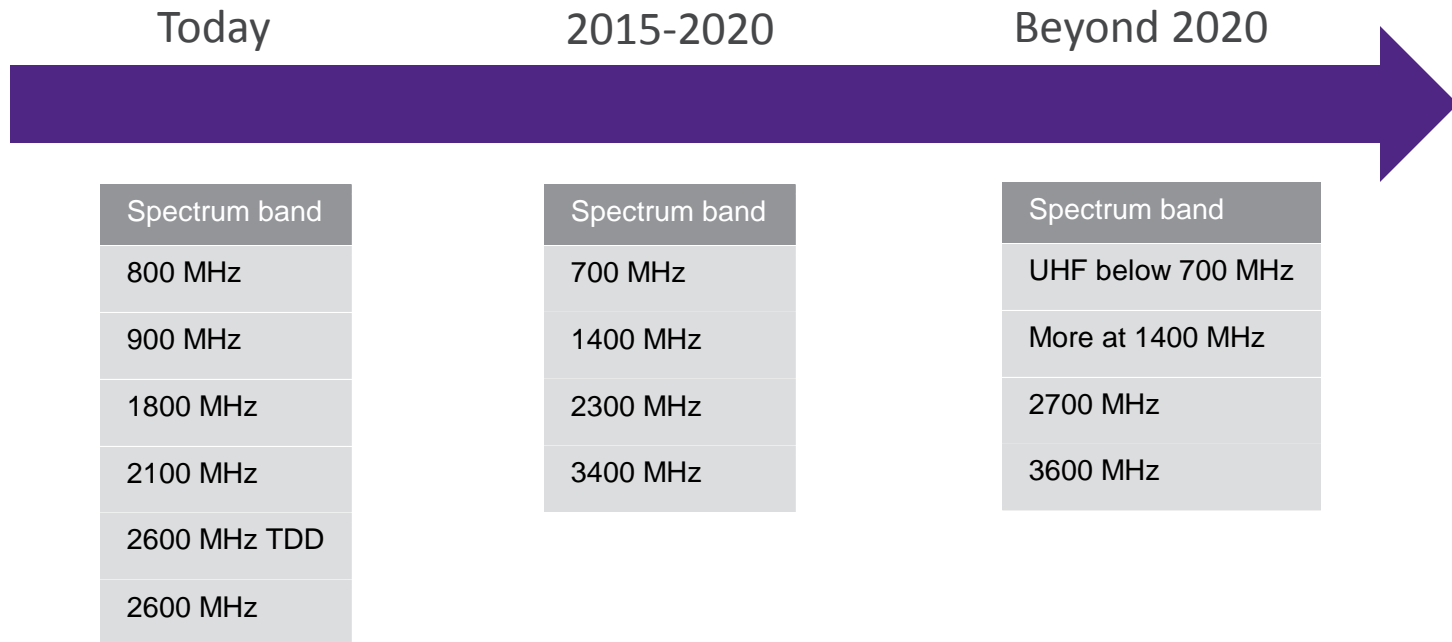
Source: Cisco, NRA, Plum Analysis

# Traffic growth

- Traffic growth / need for more capacity can be addressed with
  - More spectrum
  - More efficient network design (e.g. more cells)
  - More effective technology (e.g. 4G)
  - In practice a combination of all of these
- Traffic growth has implications beyond the RAN
  - Backhaul needs to support capacity requirements (and changing network topologies)
  - Use of network sharing continues to grow
  - Mix of fibre and high capacity radio

# Spectrum supply

## Licensed



## Unlicensed

Spectrum band
5 GHz (Wi-Fi)

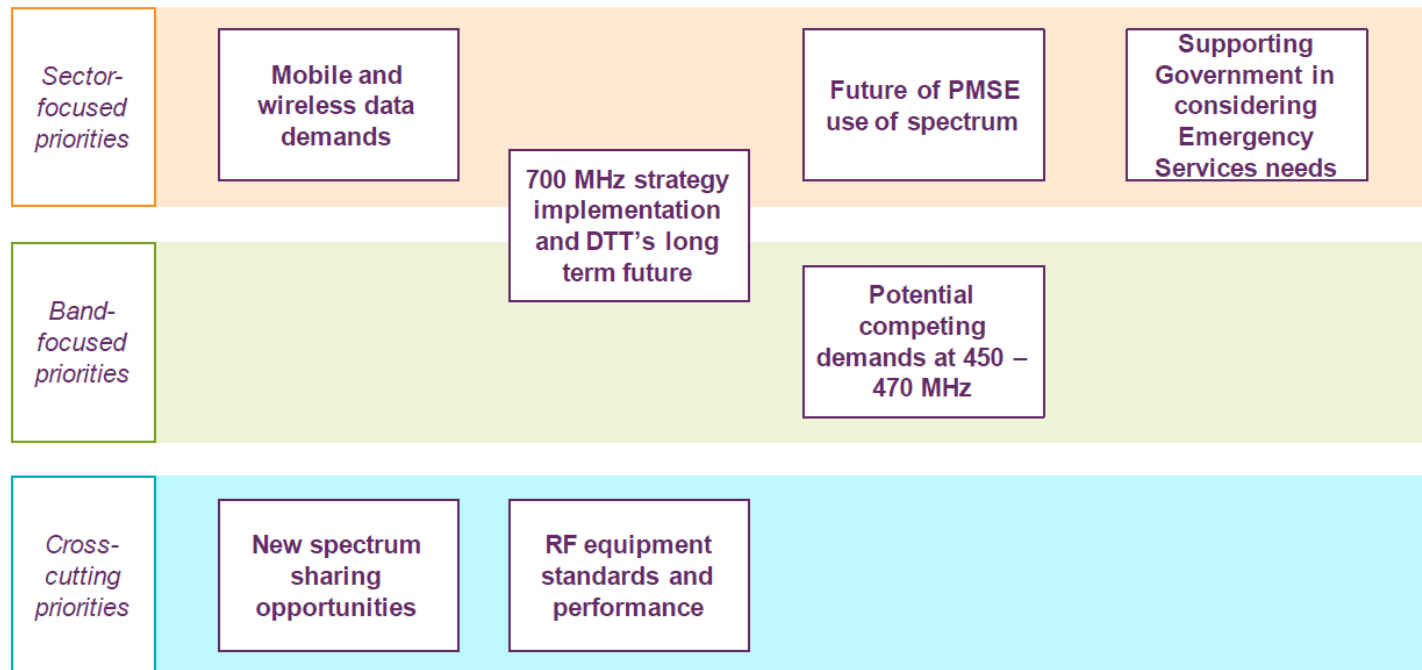
Decisions at WRC15 and WRC 18 and through European Commission

# Public sector release programme

- Release of 190 MHz of MOD spectrum at 2.3 GHz and 3.4 GHz
  - TDD band plan
- The award was originally being run by MOD but now being run by Ofcom
  - Consultation / call for inputs (October 2013)
  - Subsequent consultation (February 2014) on technical coexistence
- The 2.3 GHz band is being harmonised in Europe and it is already appearing on devices elsewhere in the world
- The 3.4 GHz band is allocated by the ITU for fixed, mobile, fixed satellite and radio location
  - Decision 2008/411/EC and now looking at amendment to original technical conditions

# Ofcom and spectrum management

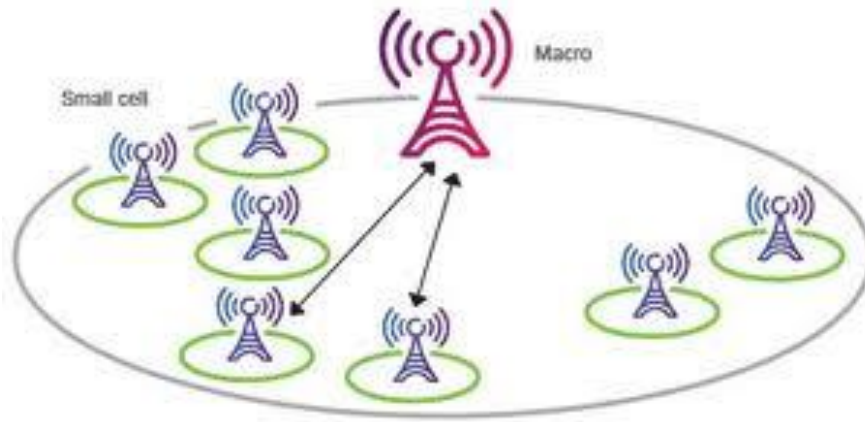
- Ofcom published its consultation on Spectrum Management for the next 10 Years in October 2013
  - Attempts to identify the issues (for all spectrum use managed by Ofcom) and to set some priorities (see figure below)
- Also Government is working on a national spectrum strategy (being run by DCMS) and a draft is expected in the spring



Source: Ofcom



# Small cells and heterogeneous networks



Source: Ericsson

- Mix of macro to small cells laid out to provide capacity where and when required
  - Macro cells for coverage
  - Small cells for traffic capacity
- Needs suitable spectrum
- Channel aggregation and other network developments plays role
  - LTE Advanced (LTE-A)
- Backhaul engineering
  - How close does fibre come to cells?
  - Use of high bandwidth radio backhaul
- Network management
  - Dynamic management of traffic, network resources and spectrum

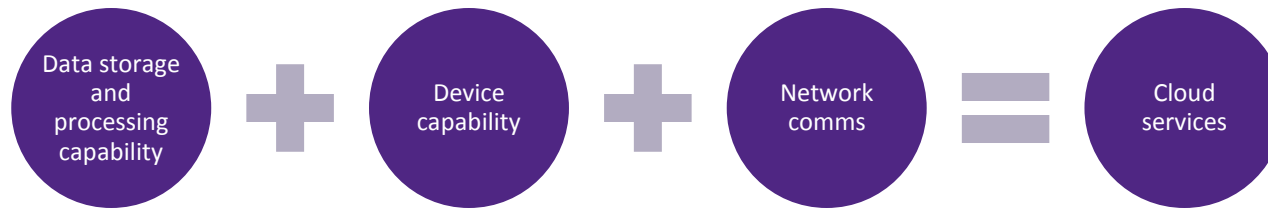
# And then comes 5G



- Already lots of discussion and programmes underway
- Moves even more to definition of a communications system rather than an air interface
  - Abstraction of applications and communications layers
  - Need for even more sophisticated network management
- Demand attentive networks
  - “Creating the perception of unlimited bandwidth in an untethered fibre-wireless world” – *Source: the IET*
- Realistically standards by 2020?

# Mobile cloud

- Most apps are supported by the cloud in some way



- Use of cloud for delivery of consumer and enterprise services is growing
  - Can either be hosted by the network operator or by third parties
- Service innovation taking place outside of the mobile network
  - New revenue and profit models
  - Challenges for network operators with traffic growth

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