
GSMA
6G Spectrum Needs
SPECTRUM for the benefit of billions

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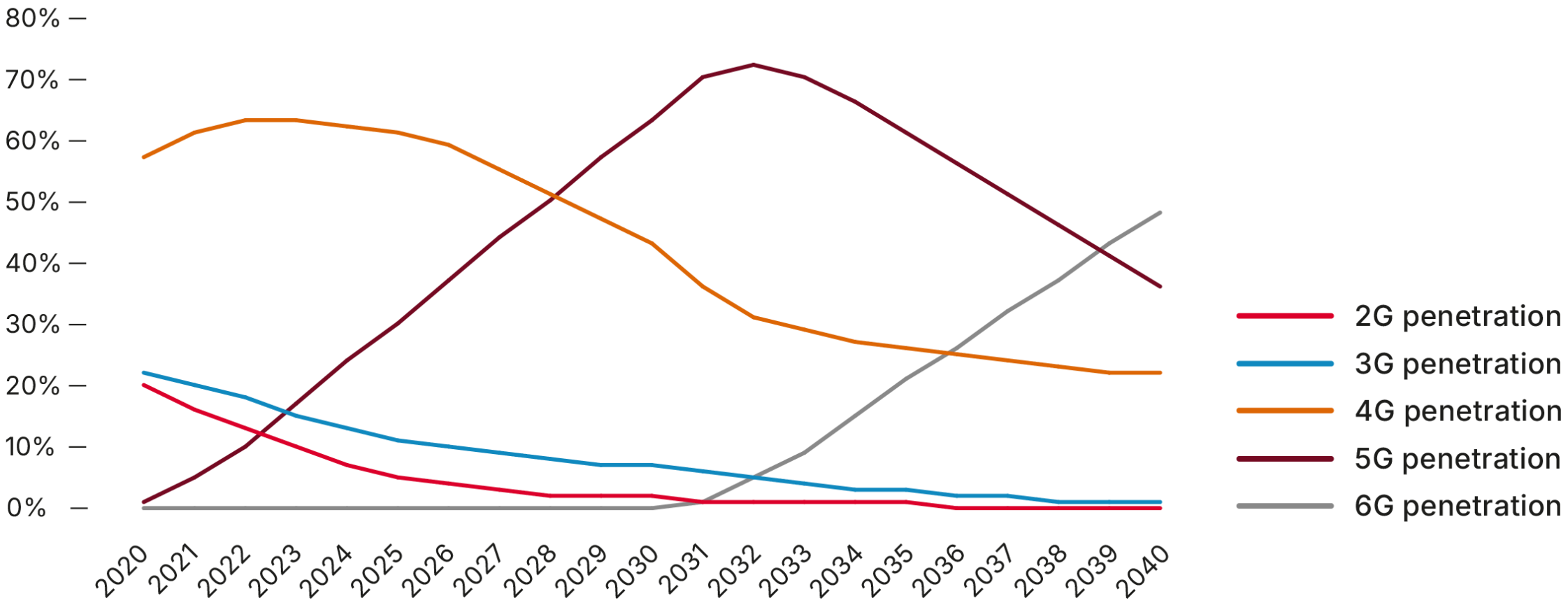
Spectrum Needs 2035-2040

SPECTRUM for the benefit of billions

Market penetration by technology, 2020–2040



Source: GSMA Intelligence

Applications

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1.

Tangibles

- MBB (Inc. Growing Video)
- FWA
- Enterprise digitalisation
- Some XR
- … AI

2.

Probables

- More XR
- More enterprise digitalisation – sensing, robotics, digital twins etc.
- Sensing
- …AI

3.

Disruptors

- Mass market, immersive XR
- Social holograms
- Holographic comms
- Massive sensing applications
- Widespread UAVs
- …AI

AI

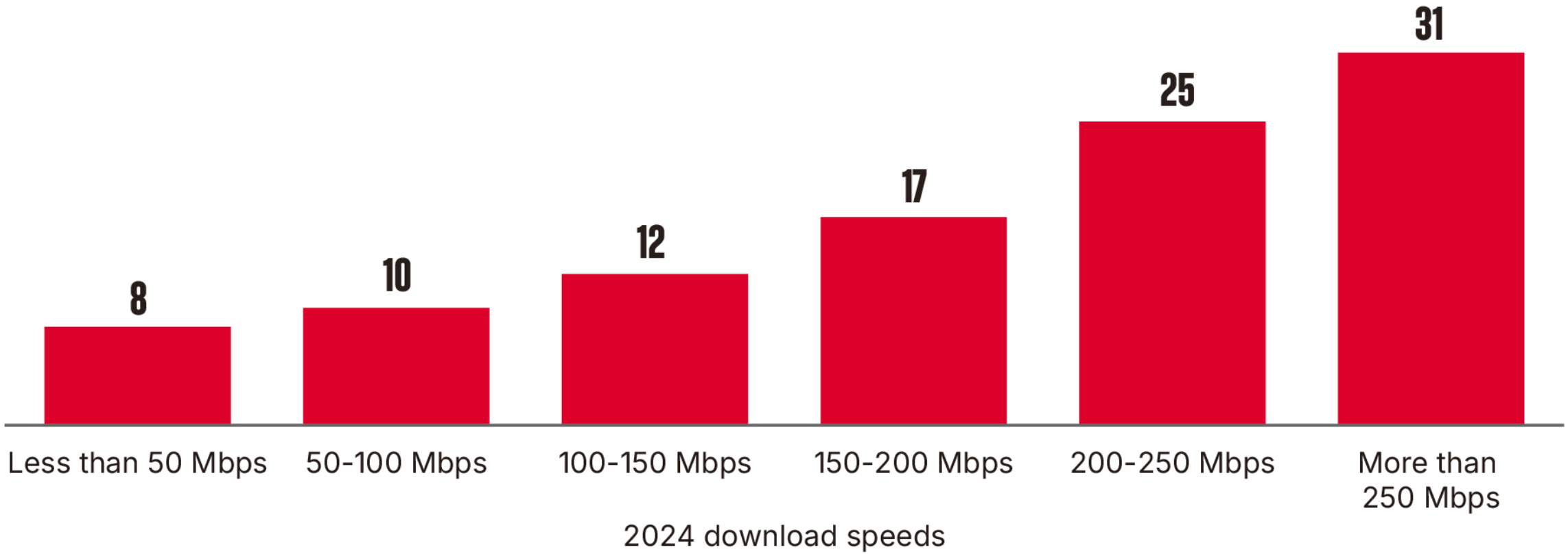
6G and AI will interact in two ways...

1. **AI enabled 6G –** AI-RAN will optimise resource management and increase efficiency (energy & data)

2. **6G enabled AI –** AI applications (e.g. genAI, gaming, video) will increase overall traffic including uplink requirements

Higher Speeds Drive Data Use

Data traffic per connection per month by download speed (Traffic per connection (GB/month))



Source: GSMA Intelligence analysis across all countries, based on Speedtest Intelligence® data provided by Ookla®

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1

Cities with over 50% of the world's urban population will be capacity-constrained by 2030 if mid-band spectrum remains at today's levels.

2

A global average of 2-3 GHz of total mid-band spectrum will be required in urban areas by 2035-2040; higher-demand countries will need 2.5-4 GHz in this period.

3

A harmonised spectrum roadmap that delivers the total mid-band spectrum requirements should be developed to enable operators to meet these capacity demands from 2030.

4

Regulators should seek to assign spectrum in 3.8-4.2 GHz and upper 6 GHz to mobile by around 2030 to meet demand and consider 4.4-4.99 GHz and 7-8 GHz beyond that.

SOUTH ASIA

Total mid-band spectrum needs:

Average: **2.1-3.2 GHz**

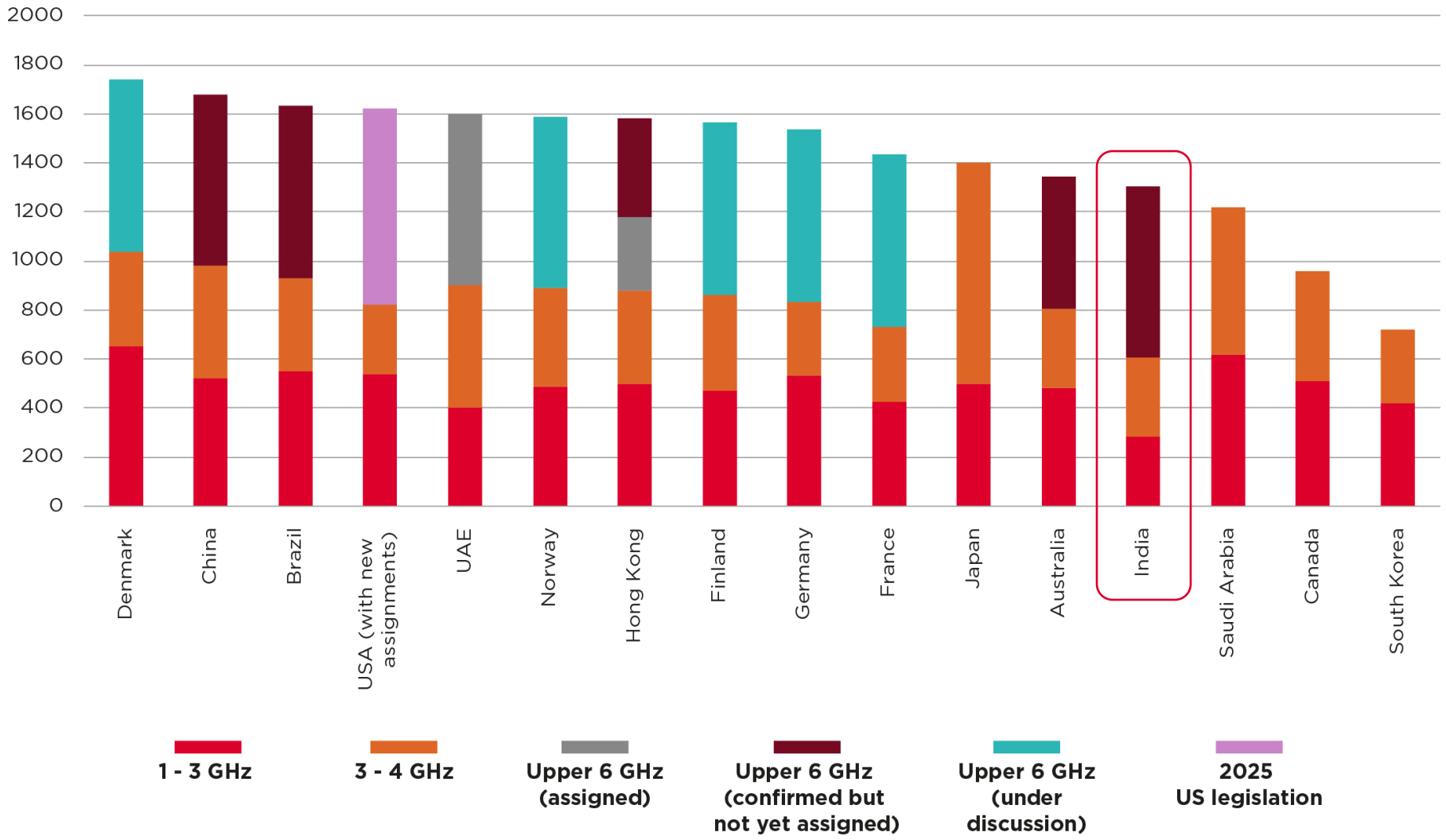
Top 50%*: **2.4-3.7 GHz**

2040 traffic per connection: **115-290** GB/month

2040 6G connections: **760 MILLION** (34% penetration)

2040 5G connections: **460 MILLION** (20% penetration)

Mid-Band Comparison



- European figures show maximum possible 6 GHz assignment of 700 MHz being considered by RSPG; minimum assignment being considered is 380 MHz

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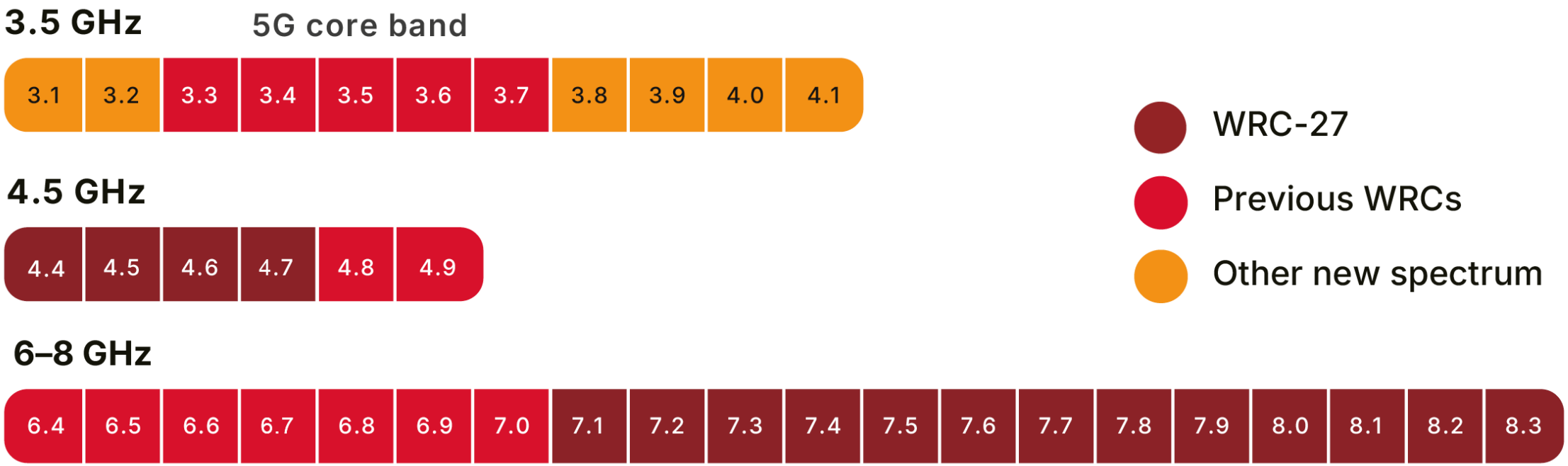
2035-2040

2-3 GHZ
Global average

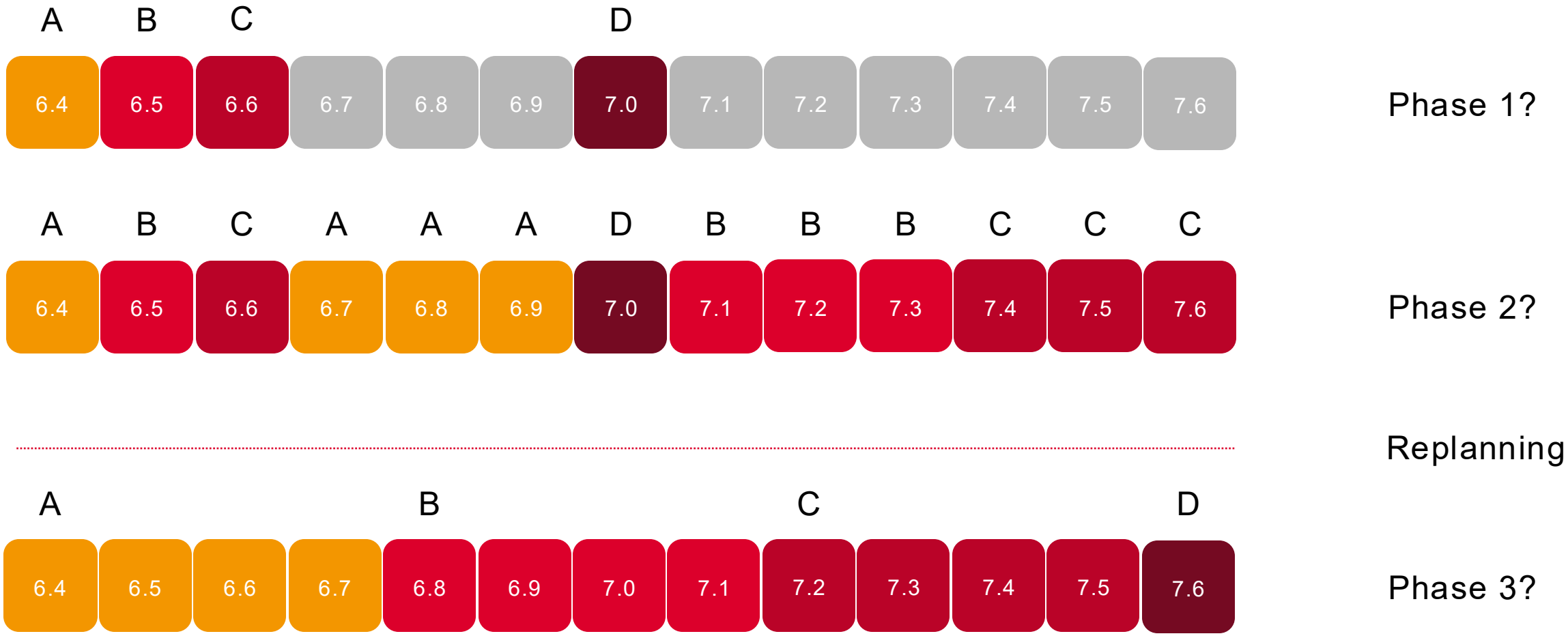
2.5-4 GHZ
Higher demand countries



Source: The GSMA

Phased availability in India 6-7 GHz

Can licensing be designed with 400 MHz per operator end-goal?

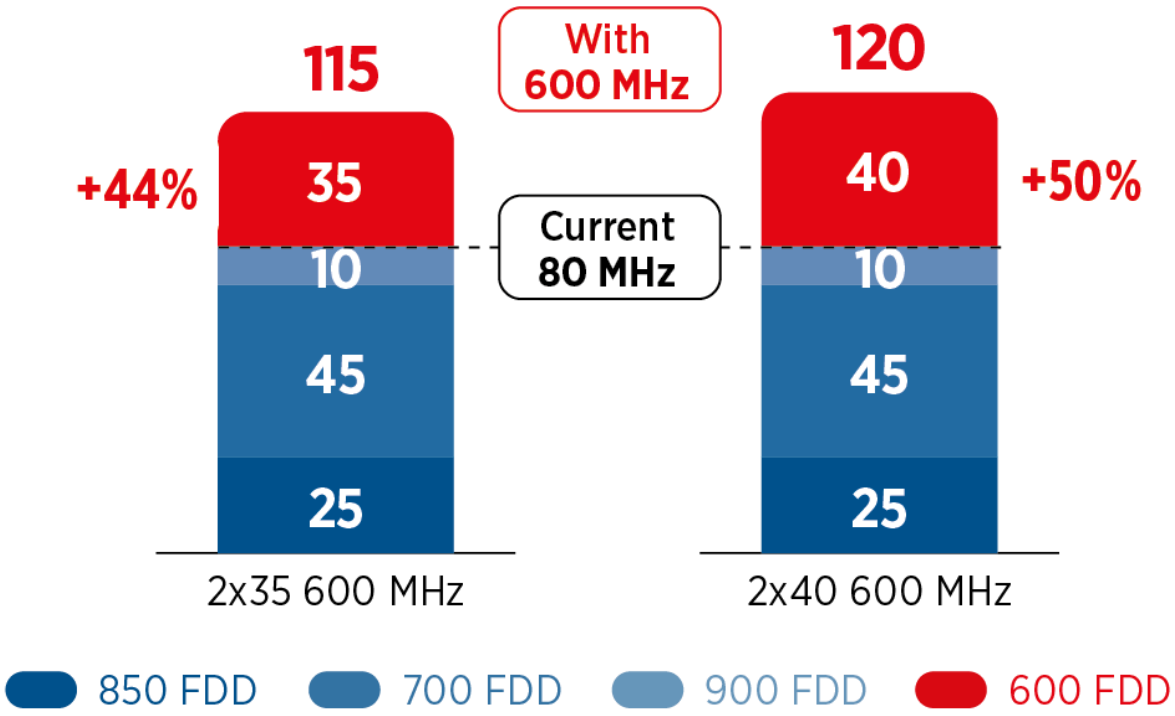


Spectrum for Complete 6G

6-8 GHz ➡ Capacity

600 MHz ➡ Coverage

Low Bands for 6G Coverage



Potential throughput increase in Region 2 (LatAm) and Region 3 (APAC) with 600 MHz

600 MHz could…

- Enable 6G coverage in rural areas
- Increase throughput
- Enhance digital inclusion
- Maximise spectral efficiency and cost-effectiveness with wider bands

The GSMA believes that mobile must deliver a forward-thinking, positive, and responsible 6G message that promotes long-term sustainability, value creation for enterprise and consumers, safeguards end-user outcomes and ensures mobile technology evolves in a coordinated way.