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GSMA

5G SPECTRUM POLICY CONSIDERATIONS

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5G SPECTRUM POLICY CONSIDERATIONS

Creating a sustainable future for mobile broadband

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AGENDA



The rise of mobile broadband

What is 5G?

5G spectrum policy considerations



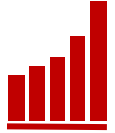
WHAT IS 5G?



NO FORMAL DEFINITION AGREED - THERE ARE TWO SLIGHTLY DIFFERENT VISIONS

- 1. Service level upgrade:** Extremely reliable, near universal coverage, high speed mobile broadband that can cost effectively support growing traffic (especially video) and better support low-power IoT
Uses 2G, 3G, 4G & potentially others
- 2. Generationalist level upgrade:** Achieves *much* higher data rates, lower latency and ubiquitous connectivity. Few applications require all these demands (e.g. virtual reality, tactile internet and autonomous/connected cars)
As with traditional generation upgrades it exclusively uses next-generation radio access technology

5G PERFORMANCE – TECHNICAL TARGETS AND CHALLENGES



Higher Speed

>10G_{bps}
30x 4G



More Connections

1,000k/km²
100x 4G



Lower Latency

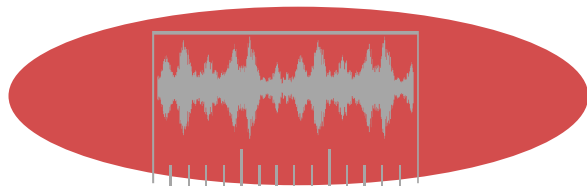
~1ms
1/10th of 4G



Network Slicing

Multiple Virtual Networks
Mobile Broadband and Verticals

New Spectrum



Higher bands to meet demands of speed and capacity, ability to aggregate all bands

New Air Interface



To support mass connectivity and increase spectral efficiency

New Architecture

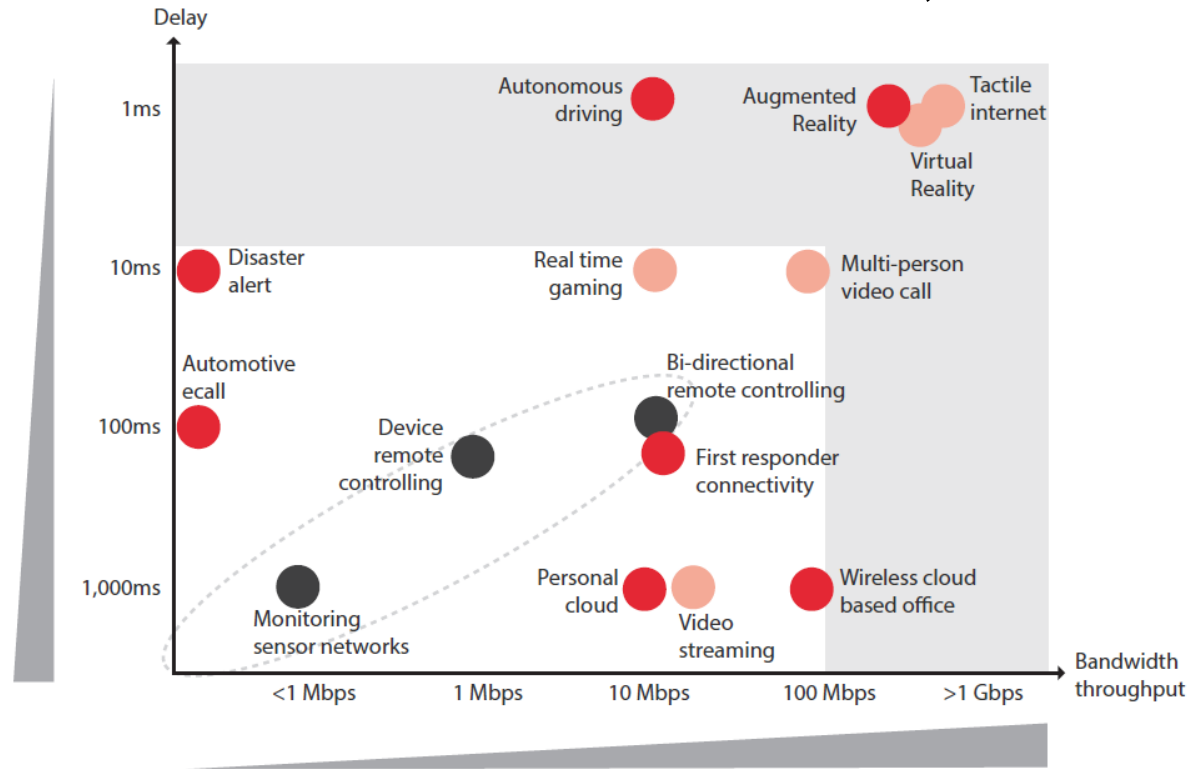


One Physical Network (hard) supporting Multiple Virtualised Networks (soft)

WHAT DO WE NEED 5G FOR?



5G LOOKS TO ENABLE NEW APPLICATIONS, BUSINESS MODELS, AND EVEN INDUSTRIES



- Services that can be delivered by legacy networks
- Services that could be enabled by 5G
- Fixed
- Nomadic
- On the go
- M2M connectivity



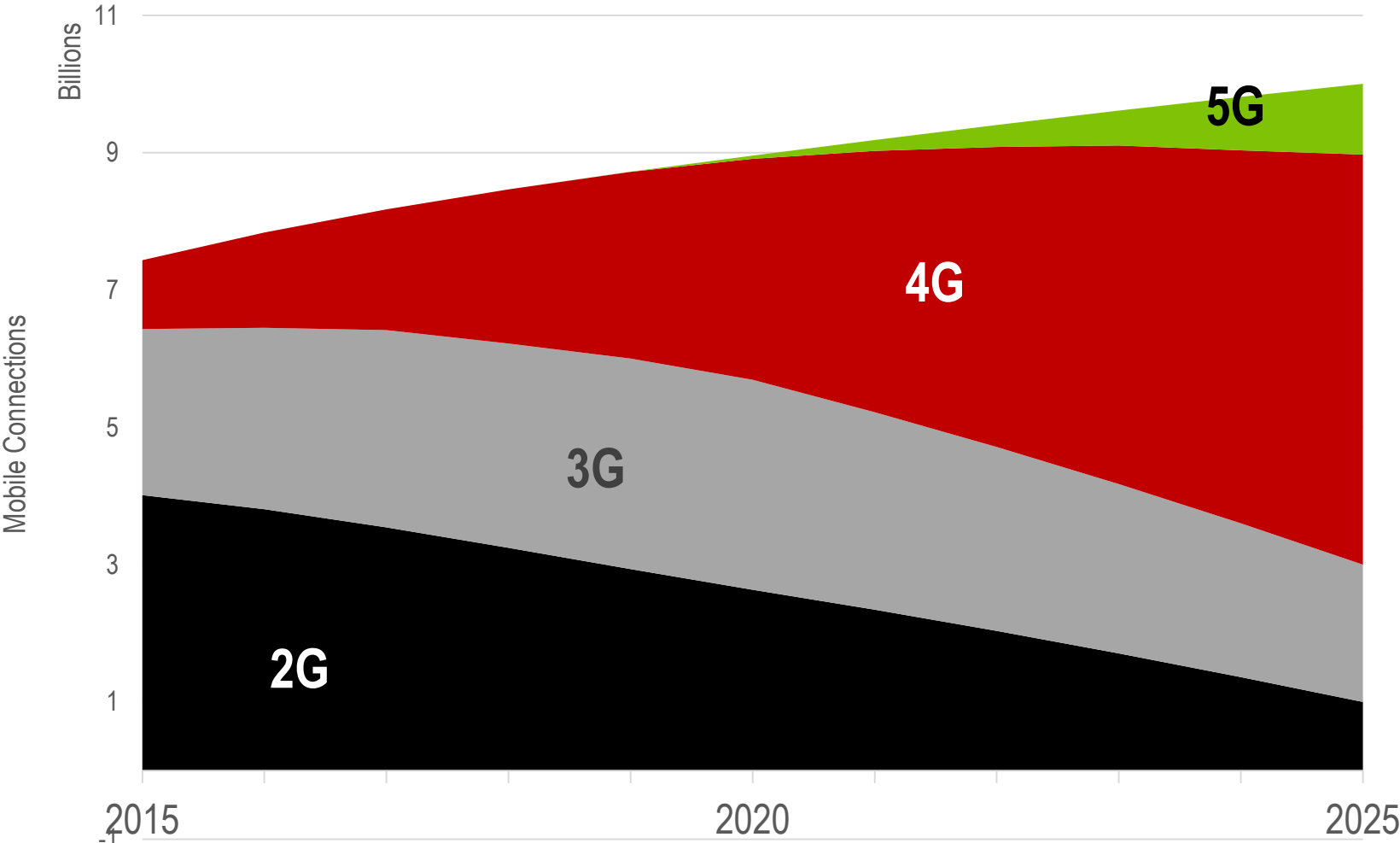
GSMA Intelligence

ANALYSIS
 Understanding 5G:
 Perspectives on future
 technological advancements
 in mobile

December 2014

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POTENTIAL 5G UPTAKE



- ❖ \$1.7 Trillion invested in 2G/3G/4G networks 2012-2020
- ❖ Cost to sustain 3-4 networks, drives decommissioning plans
- ❖ Does not include Internet of Things >25Bn connections in 2020

Note: This is for *illustration only* and is not the GSMA's definitive forecast for 5G. The trend assumes that in the first 7 years, 5G connections will grow at same rate as 3G

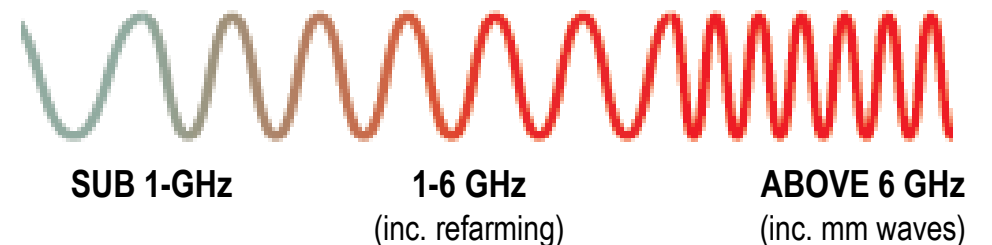
WHAT ARE THE 5G SPECTRUM POLICY CONSIDERATIONS?



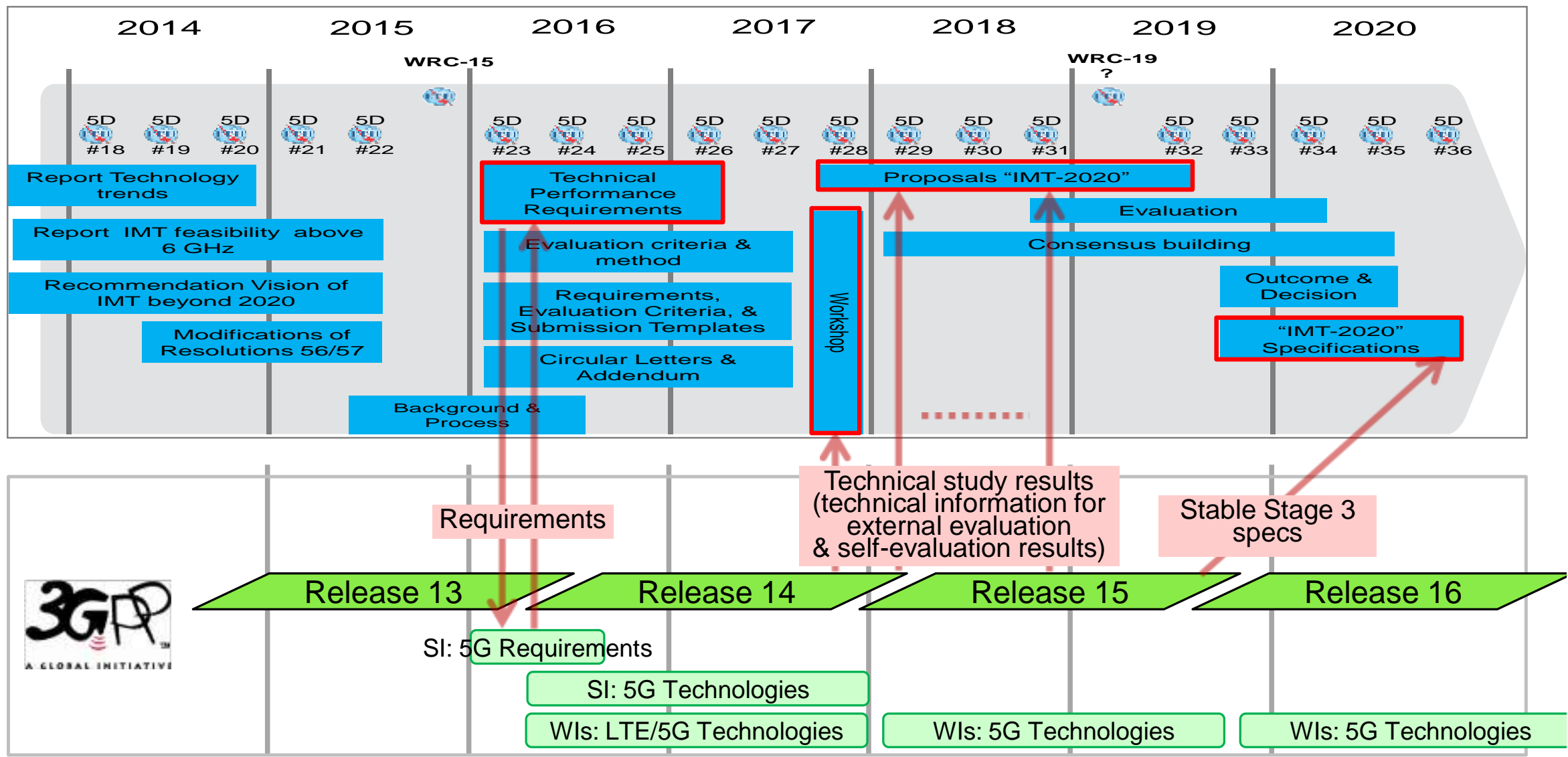
NO CLEAR AGREEMENT ON 5G SO IMPOSSIBLE TO ACCURATELY PREDICT SPECTRUM NEEDS, BUT...

- **Spectrum discussions need to begin given long timeframe to free spectrum**
 - Agreeing a dedicated WRC-19 agenda item at WRC-15 (through Agenda Item 10) will be a vital first step
 - National regulators and regional ITU groups need to support a mobile agenda item for WRC-19
 - Governments must not be distracted from identifying additional harmonised mobile broadband (IMT) spectrum at WRC-15
- **5G likely to require significant additional capacity spectrum**
 - Spectrum above 6GHz is a good target as very wide bandwidths are more commonly available
 - 1-6GHz (inc. refarmed IMT spectrum) provide capacity but can also cover wider areas and suit macro base station use cases
- **5G will require coverage spectrum to provide nationwide services, not just urban hotspots**
 - Sub-1GHz spectrum is vital for digital inclusion, in-building penetration and also low-power Internet of Things applications
- **Wider range of mobile licensing regimes are possible with 5G**
 - Exclusive licensing: Essential to guarantee QoS and encourage network investment
 - Flexible shared licensing: Higher 5G frequency ranges suit sharing as small coverage areas mean more manageable interference

**FREQUENCY RANGES
TO BE EXPLORED FOR 5G**



WHAT IS THE 3GPP AND ITU-R TIMELINE?



THANK YOU

