



5G

5G Deployment Strategies for Europe

ITU Seminar: 5G Implementation in Europe and CIS – Budapest 2-4 July 2018

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5G Drivers

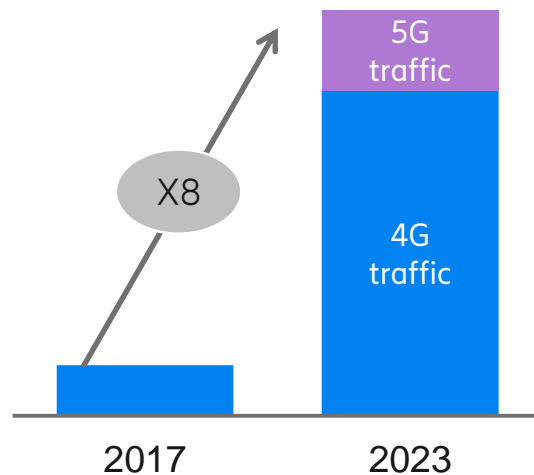


Enhanced Mobile Broadband

Improved Application Coverage, latency and setup times

Spectrum depletion on congested sites

Global mobile data forecast



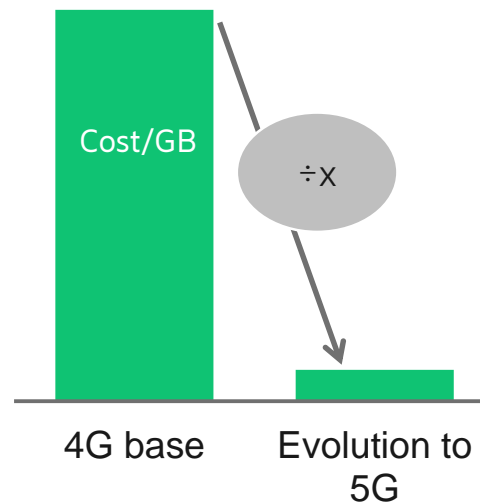
TCO efficiency

Spectrum and Energy efficiency, scalable capacity

Sharing of assets: RAN Sharing, NW slicing

Virtualization, Cloudification, Automation, simpler O&M

Relative capacity and cost-efficiency

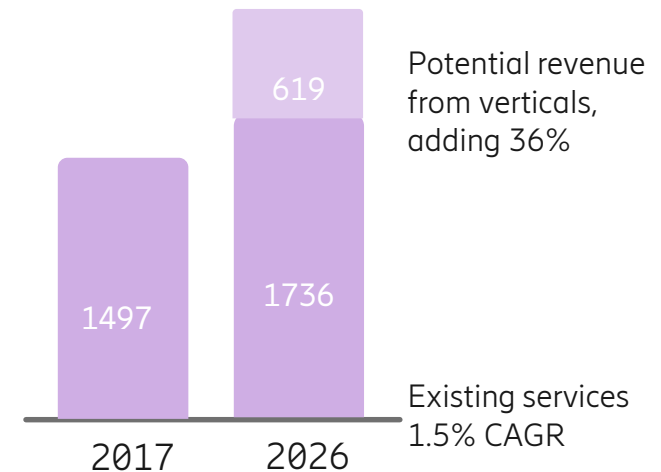


New revenue streams

Enable new use cases and innovation

Address Industry digitalization

Total service revenue potential for operators in 2026 (USD Billion)



Source: Ericsson Mobility Report

The 5G Business Case for eMBB

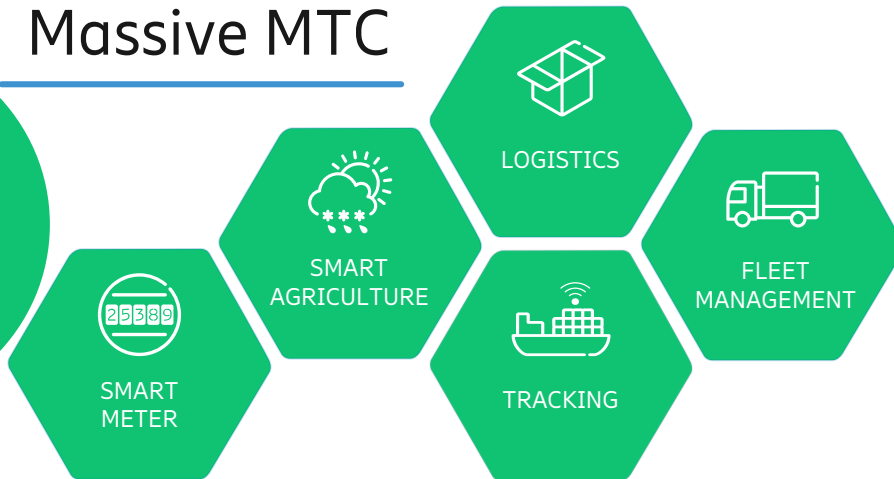
5G Business Potential

5G Use Cases



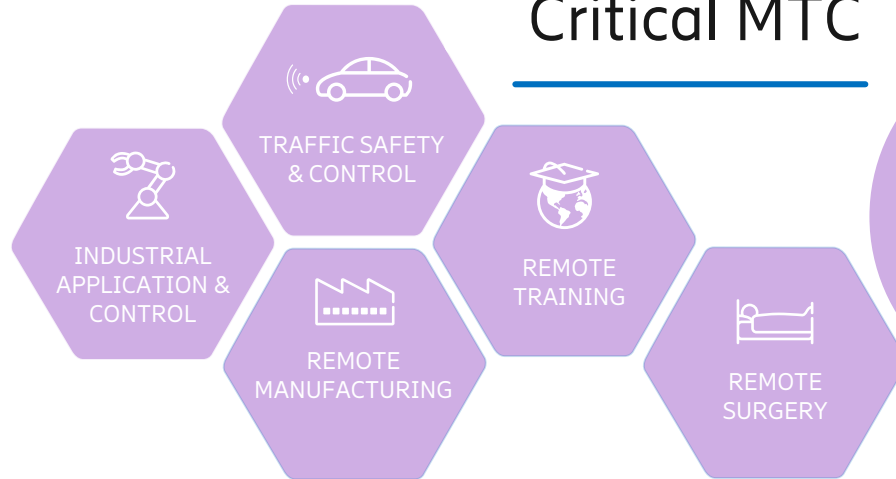
Massive MTC

- Very large # of device
- Very low device cost/power
- High density
- Wide coverage



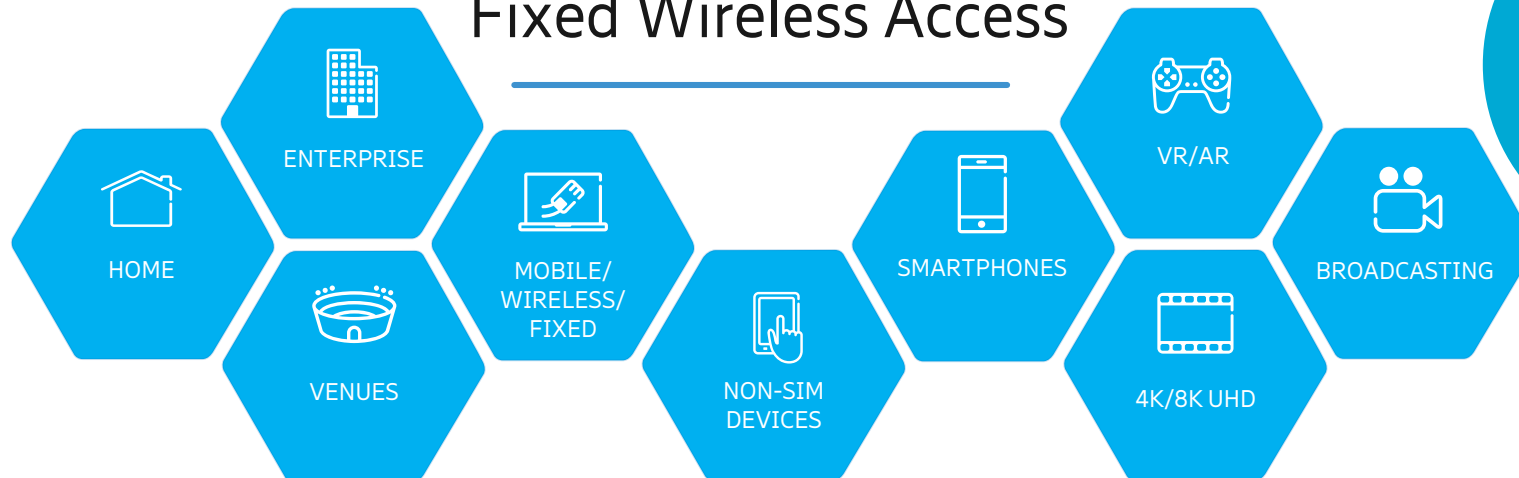
Critical MTC

- Very low latency
- Very high reliability and availability



Enhanced Mobile Broadband Fixed Wireless Access

- Very High Data Rate
- Very High Traffic Volumes
- Mobility



5G Spectrum Bands and Use Cases



High Band

Extreme capacity layer (eMBB, FWA, URLLC)

- Large spectrum bandwidth potentially available: very high capacity and data rates
- Limited coverage, partially compensated with Massive MIMO
- Latency <1ms RTT at 26GHz

Mid Band

Baseline capacity layer (eMBB, FWA, URLLC)

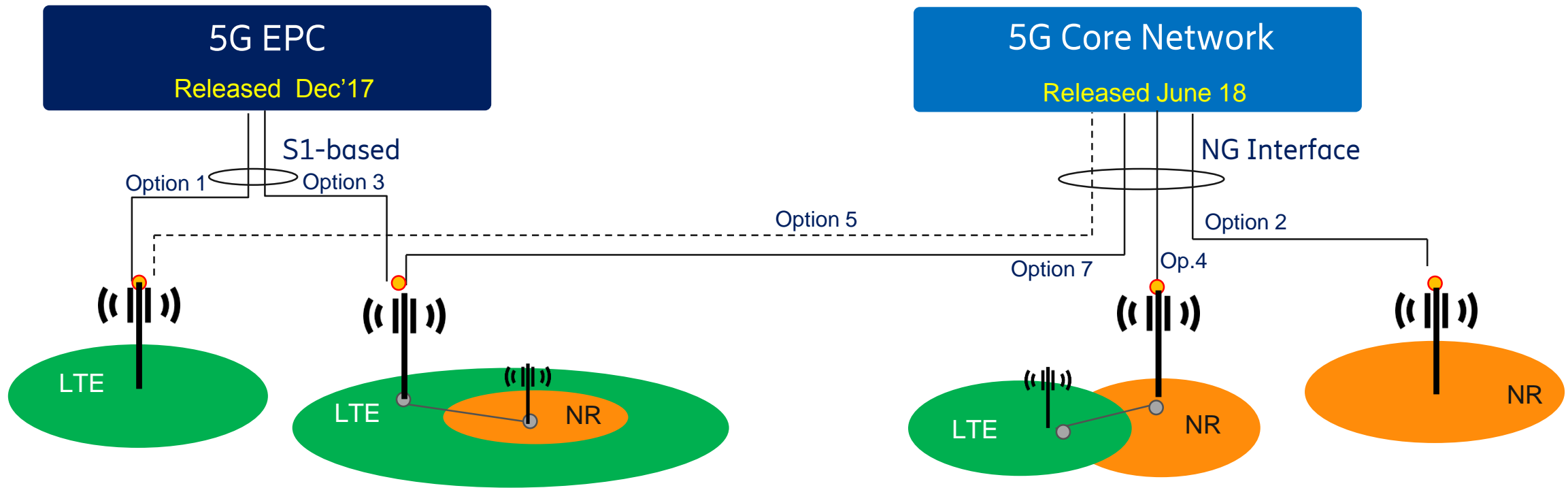
- Flexible for many uses case with higher throughput, wider spectrum, LTE refarming
- Latency: <3ms RTT at 3.5GHz

Low Band

Coverage layer (eMBB, Indoor, Massive IoT)

- Suitable for wide area coverage, deep indoor and mobility
- Data rates and capacity limited by spectrum bandwidth availability
- NR to provide shorter latency than in LTE-A

5G Architecture Options – 1st expected



- 1- Option 3 (Non Stand Alone)
- 2 - Option 2 (Stand-Alone)
- 3 - Option 4/7/5

Initial NR focus per region



North America



- Use Cases focus: FWA/eMBB
- Spectrum: High Band, Low Band 600MHz
- Architecture: Non Stand Alone
- Early Launches in 2018

Europe

- Use Case focus: Industrial Use Cases
- Spectrum: Mid-Band, Low band for coverage, High Band for capacity
- Architecture: Non Stand Alone



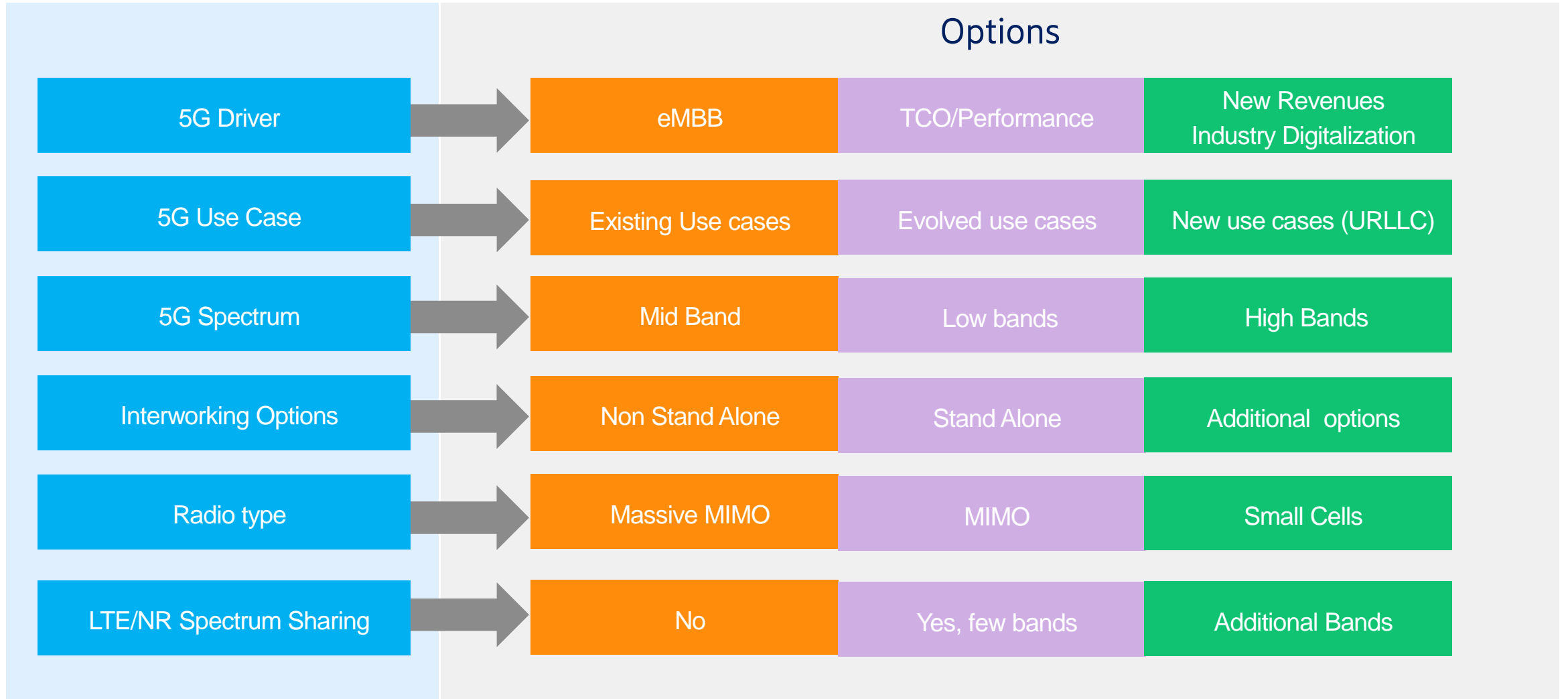
South America and Africa later

Asia



- Use Case Focus: eMBB
- Spectrum: initial focus generally on mid-band, with high-band as second wave
- Non Stand Alone, overall
- China taking lead in Stand-Alone deployment
- Australia and Korea early movers with 2018 launches
- China and Japan driving volumes in 2020 with large scale roll outs.

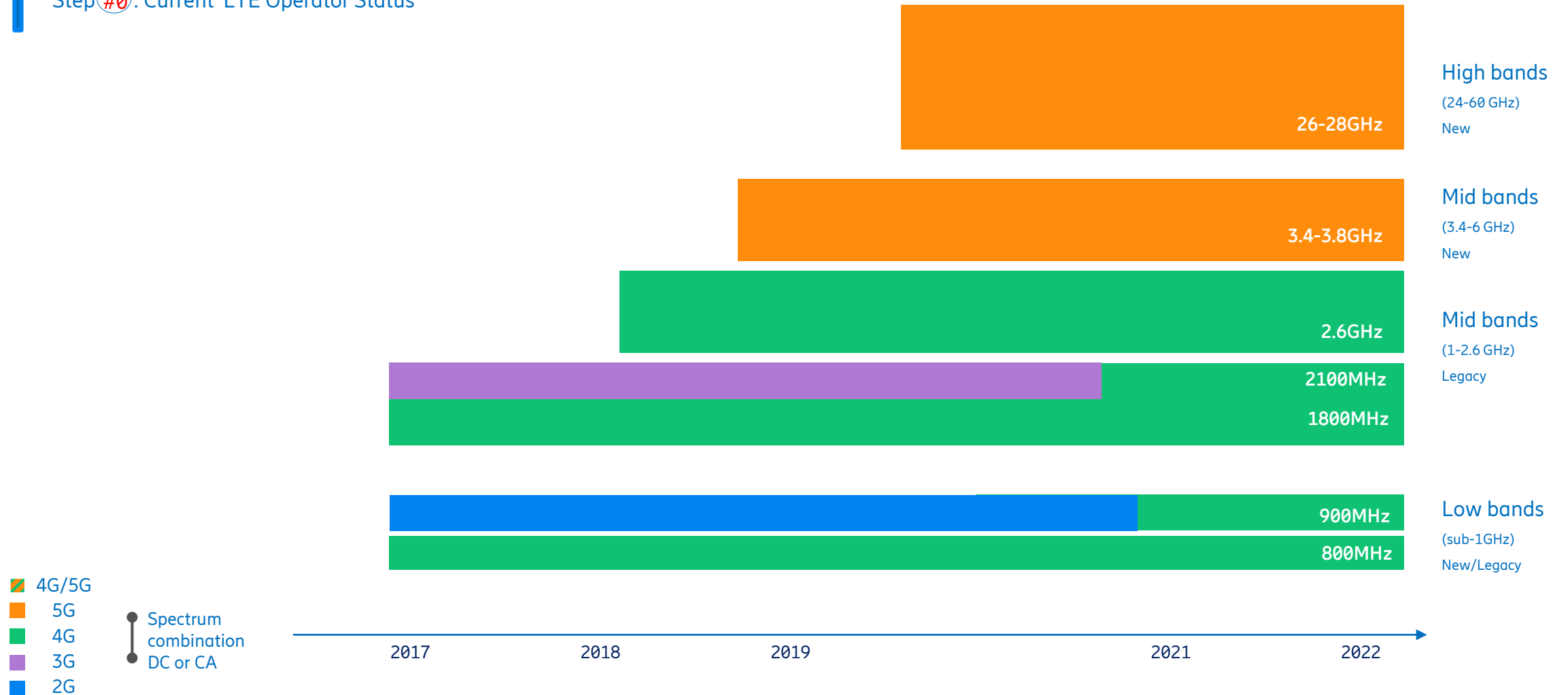
5G Options



5G Spectrum and Deployment, Europe



Step #0: Current LTE Operator Status



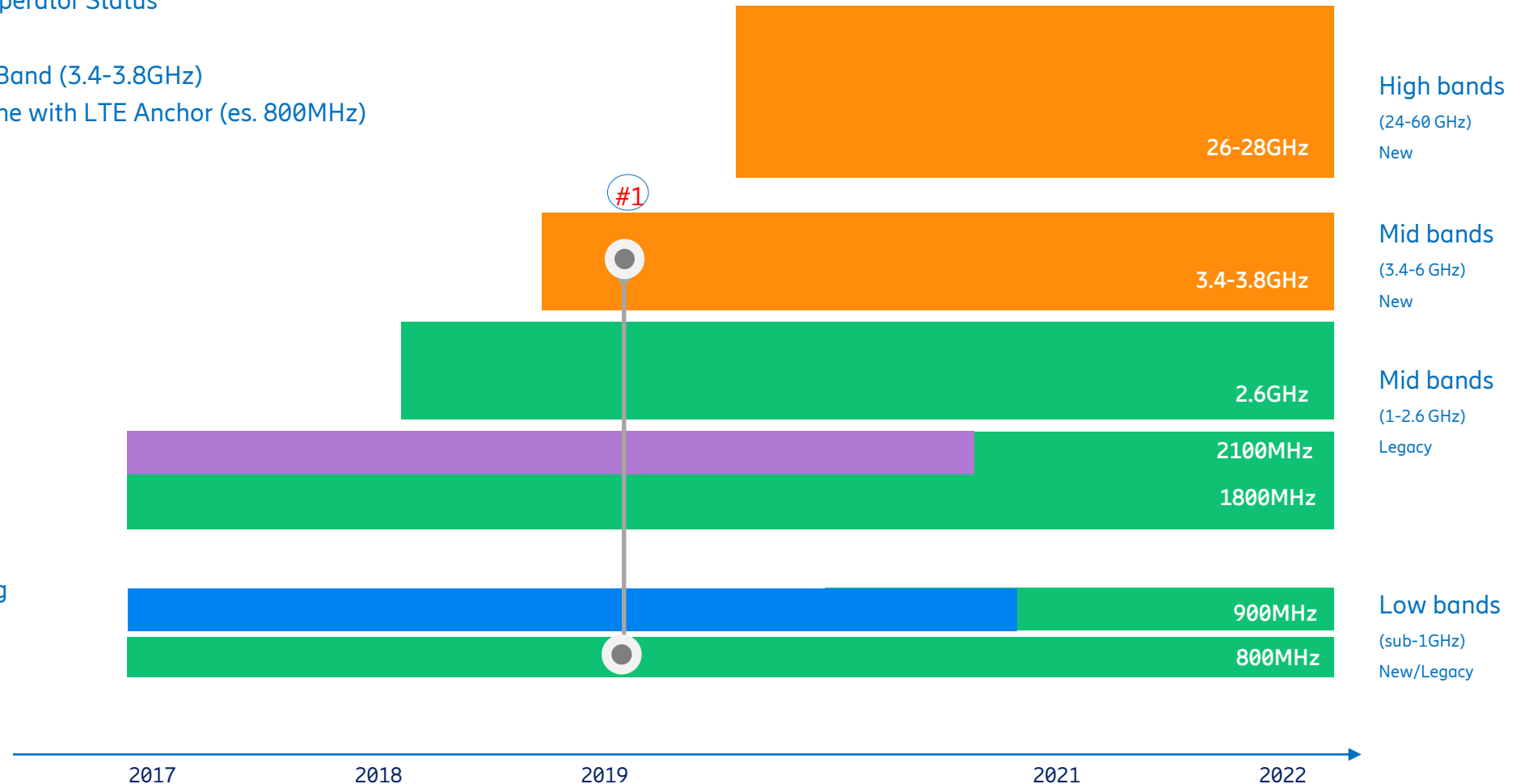
5G Spectrum and Deployment, Europe



Step #0: Current LTE Operator Status

Step #1: Add NR@Mid Band (3.4-3.8GHz)
 Option 3, Non Stand Alone with LTE Anchor (es. 800MHz)
 NR capacity focus.

Step :
 Critical IoT
 Additional NR Refarming
 Legacy sunset



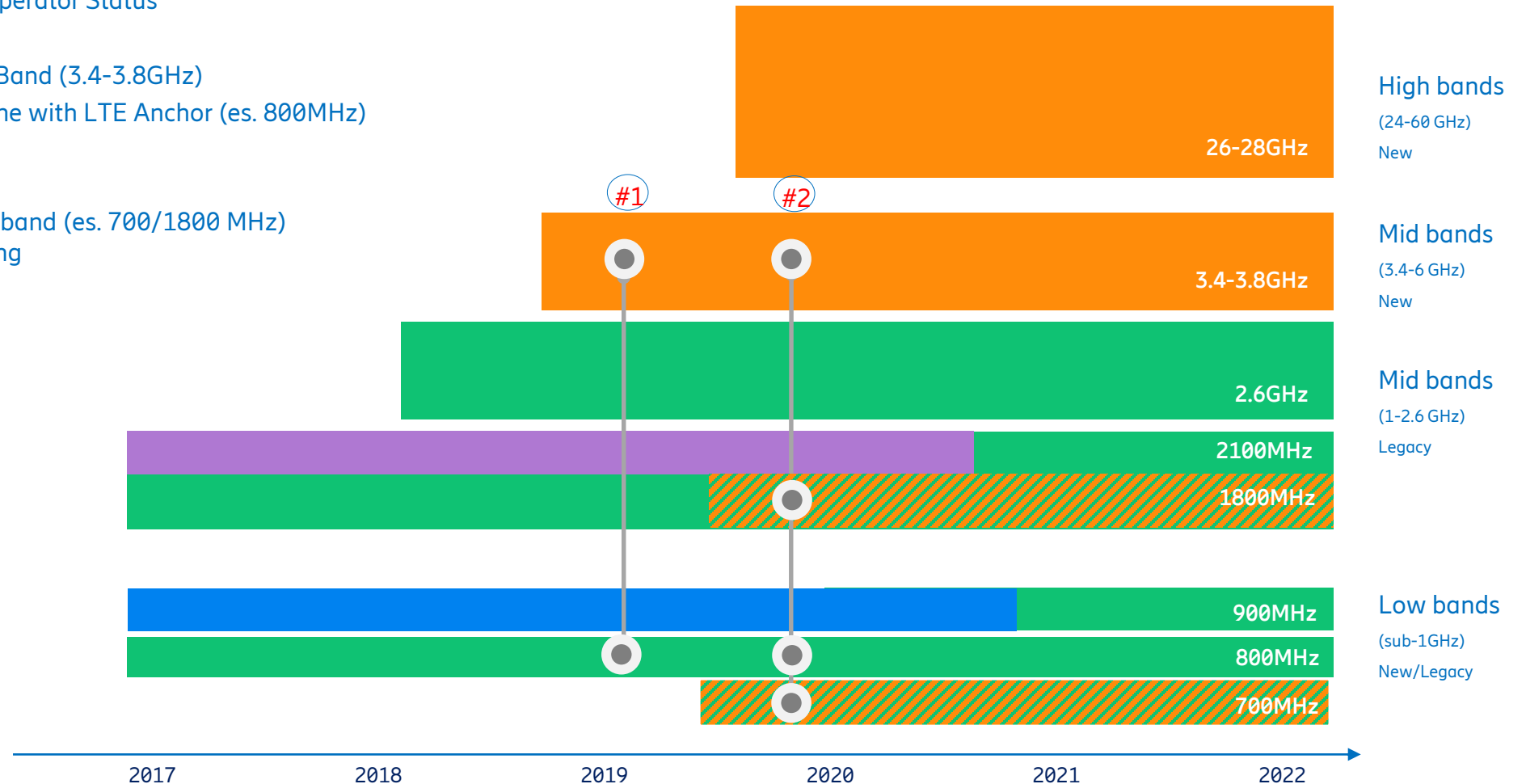
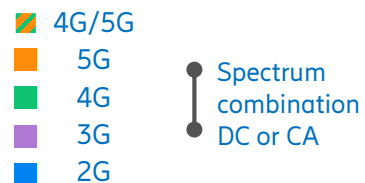
5G Spectrum and Deployment, Europe



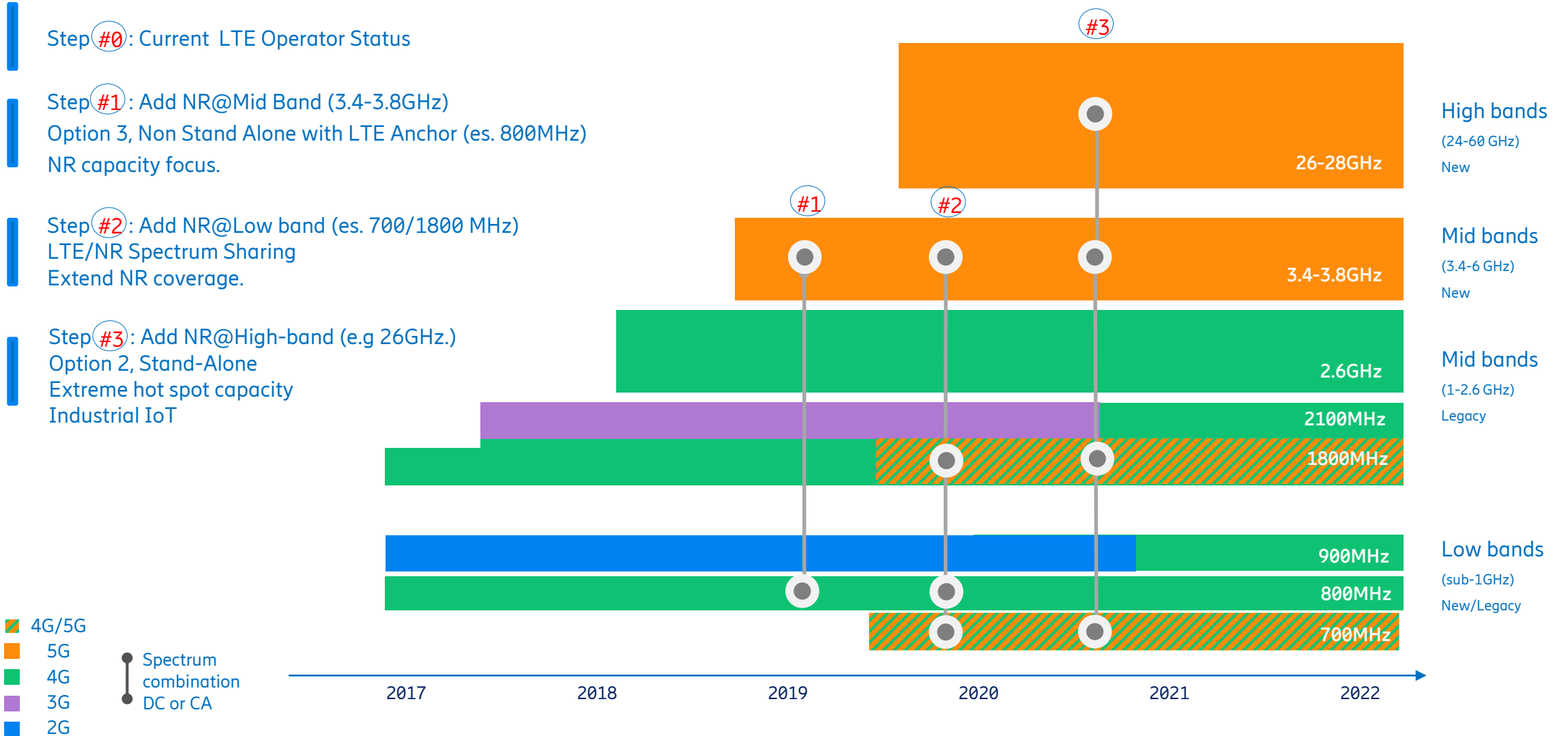
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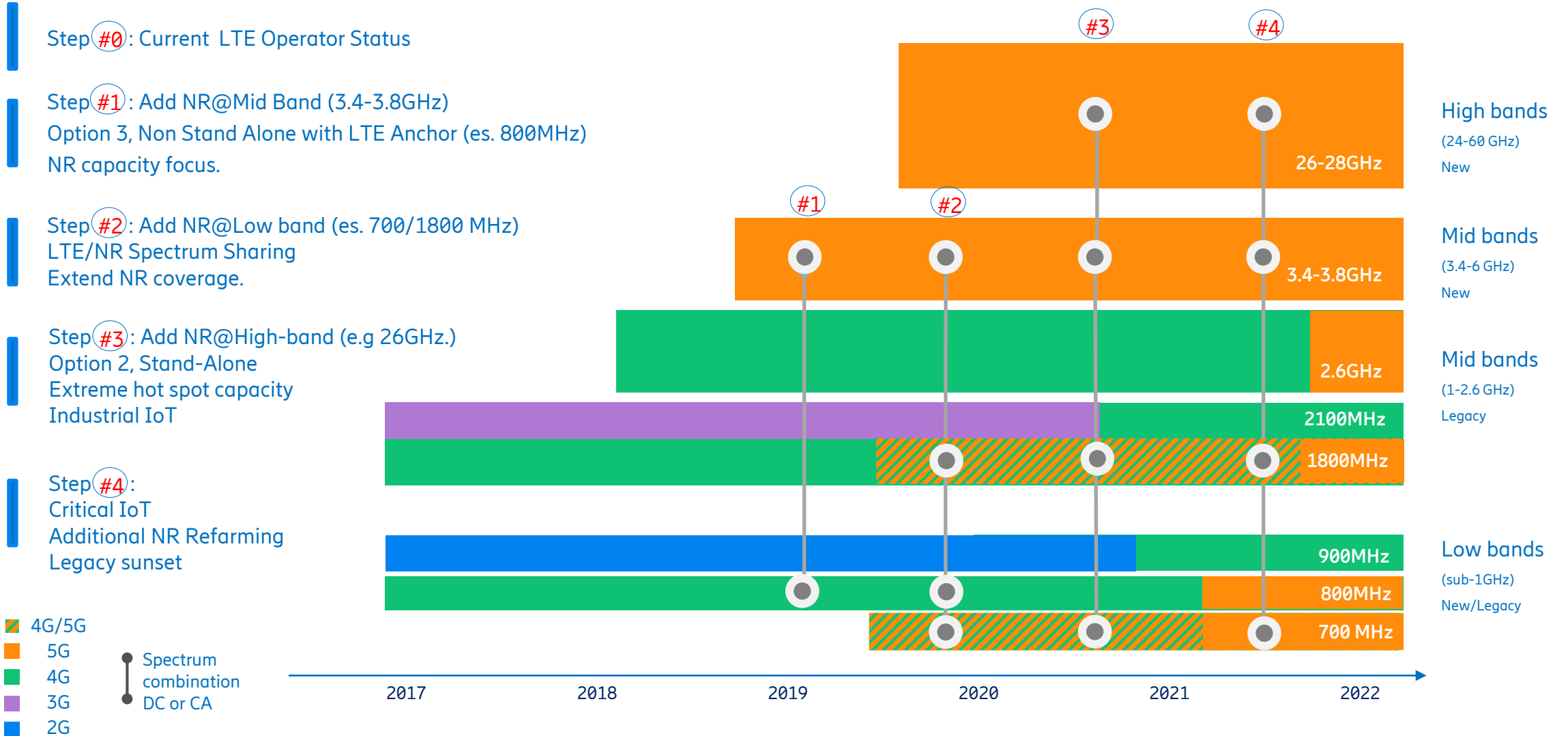
Step #2: Add NR@Low band (es. 700/1800 MHz)
LTE/NR Spectrum Sharing
Extend NR coverage.



5G Spectrum and Deployment, Europe



5G Spectrum and Deployment, Europe



Why Step#1, #2 and #3?



#1 3.4-3.8GHz Spectrum

C-Band is the Primary band in EU with earlier availability

Early C-Band Terminal availability vs other bands

#1 Non Stand Alone

Early NR introduction (TTM) even with NR spotty coverage

Extended Downlink coverage
LTE@lower frequency extends NR DL coverage.

Increased bandwidth
In NR coverage areas, NR+LTE bandwidth are aggregated by Dual Connectivity

Minimal Network Impact & Voice Support
No new Core Network, limited impact on Business Supporting Systems, no need of VoNR

#2 NR @low band

NR Coverage through low band
Nation wide and deeper indoor coverage with Low band NR, enabling Stand Alone Arch

Better Performances of NR vs LTE
10%-20% better spectral efficiency (FDD), Energy efficiency, 3x Cell edge coverage at low load

Extended Downlink coverage
NR@low frequency extends NR@Mid Band DL coverage.

#2 NR-LTE Spectrum Sharing

Pre-refarming
Smooth NR (nation-wide) introduction, minimizing impact for LTE UEs

NR at lowest TCO
Enabling Stand-Alone Arch

#3 Mmwave 26GHz

26GHz is the pioneer band in EU

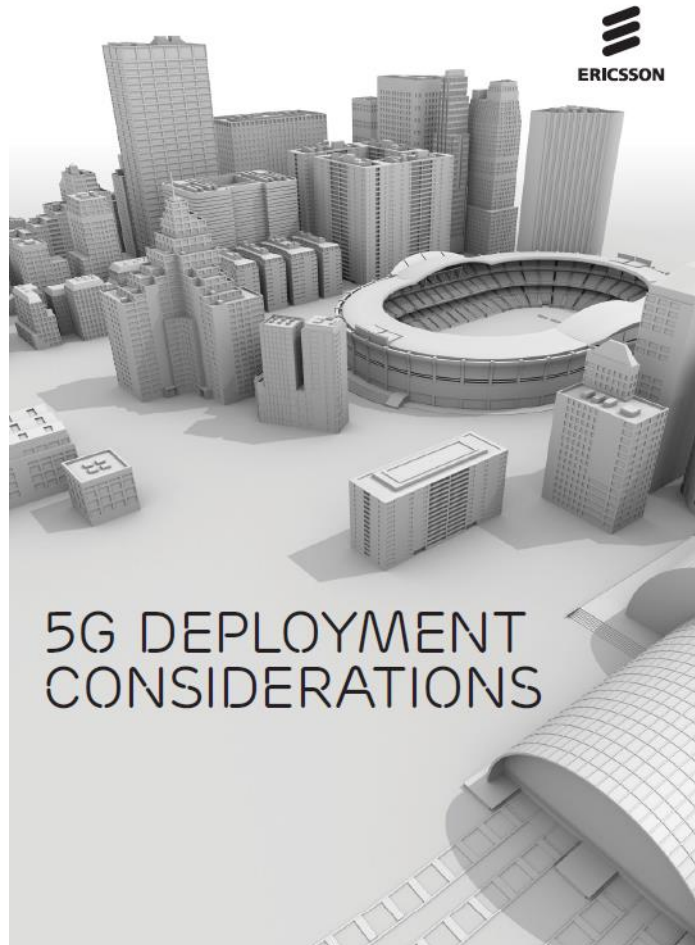
MmWave spectrum enables new Industrial IoT use cases (highest throughput) and Critical IoT (shortest latency)(URLLC)

#3 Stand-Alone

5G Full Architecture

Network of Networks: Dynamic, optimized orchestrated Network Slicing for convergent accesses (fixed, wifi, 3GPP), Service Based Architecture, new QoS framework, Fast Upswitch Time, Native Voice (VoNR), etc

Ericsson 5G Deployment Considerations



<https://www.ericsson.com/en/networks/trending/insights-and-reports/5g-deployment-considerations>

