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Internet of Things Deployment
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Spectrum Considerations for IoT in the 5G Era

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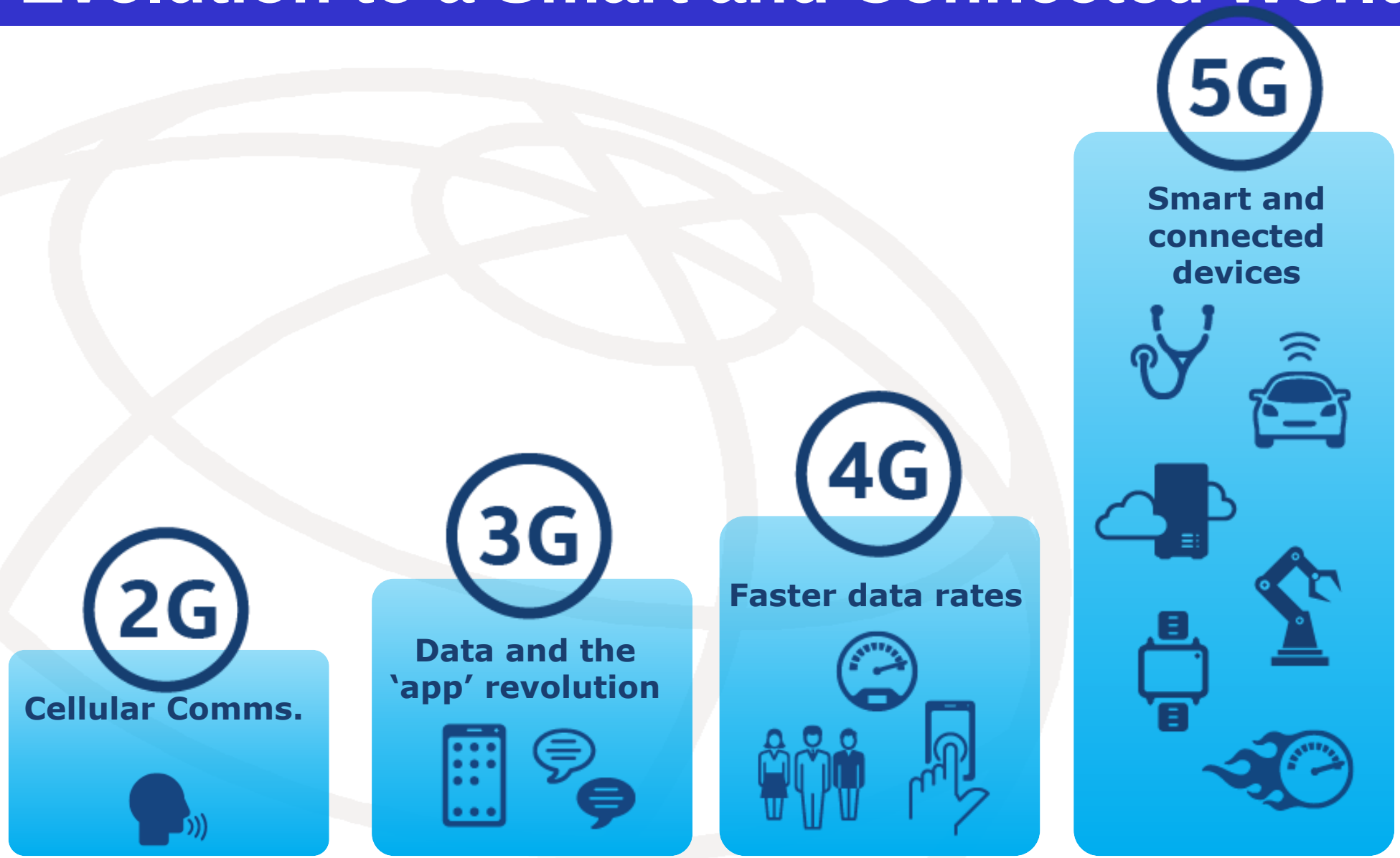
Evolution to a Smart and Connected World



5G: A Transformative Force for IoT

Smart City & Buildings

CPE, Phones, Tablets

Massive Machine to Machine

Machine Learning

Connected Health

Autonomous Driving

Gigabits/sec

Enhanced Mobile Broadband

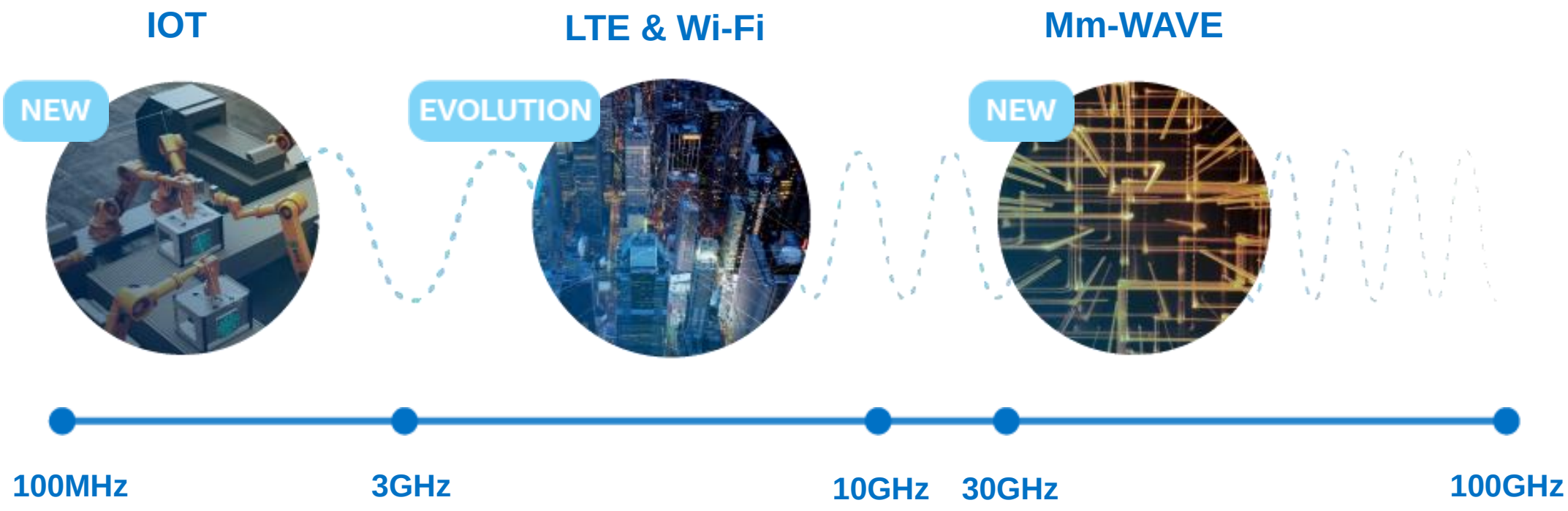
3D Video and UHD Screens

Work and Play in the Cloud

VR Gaming

Ultra-Reliable and Low Latency

5G Wireless Technology & IoT



What are the spectrum needs of mMTC/IOT?

Spectrum Needs of IoT

What are the spectrum needs of IoT?

- Determined by each application's throughput requirements, but also latency
  - For a given spectral efficiency (b/s/Hz), the lower the latency requirements the larger the bandwidth needed to send a given amount of data
- While many IoT applications might not need high speed connections and/or have very stringent latency requirements, some do (e.g. remote surgery)

In what frequency bands?

- Determined by each IoT application's range and coverage requirements, but also bandwidth needs of the applications
- Range and coverage requirements also depend on deployment scenarios
  - Point-to-point, mesh, broadcast, multi-cast, etc.

Dedicated “IoT” Spectrum?

Pros

- Global harmonization of spectrum increases economies of scale
- Dedicated spectrum might help lower spectrum management risks

Economies of scale in a variety of existing bands (cellular, unlicensed) could emerge through industry consensus and market development

Cons

- Achieving global harmonization on band(s) for IoT likely very difficult, if not impossible
- Could delay deployments and implementations
- Many gov’ts strongly opposed to dedicated spectrum for IoT
- Less flexibility as proponents could seek dedicated spectrum for various applications