



# The Power of 5G System

---

Mohammed Al-Imari  
Radio Standardization Specialist at MediaTek



- 3GPP: 5G standards & Releases
- 5G Major Use Cases
- 5G Frequency Bands
- 5G over Non Terrestrial Networks (NTN)
- Private Networks



How 5G (& 3/4G) standards get created?

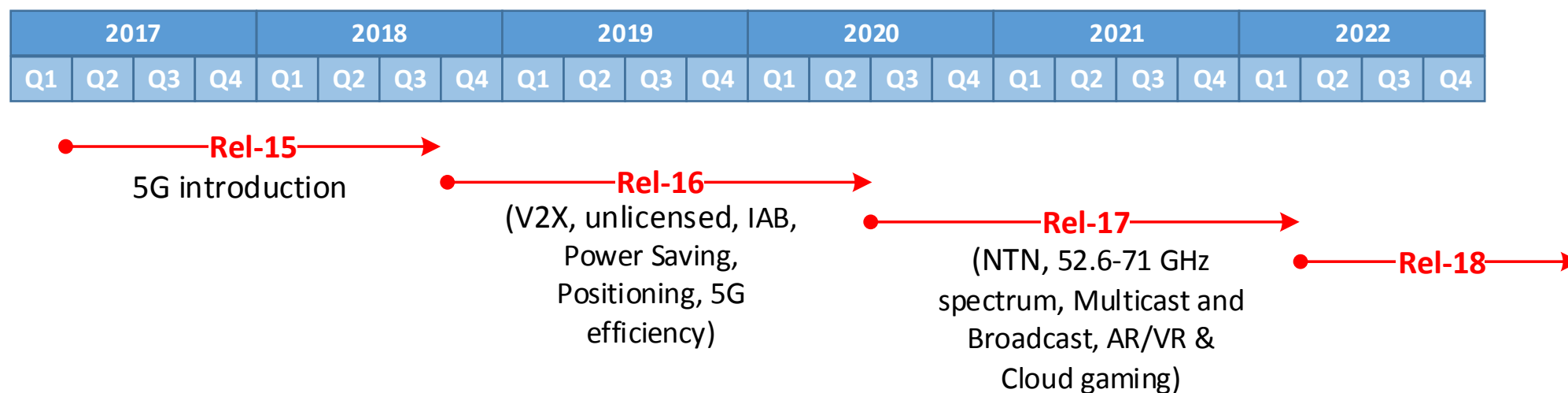
- The 3rd Generation Partnership Project (3GPP): unites telecommunications standard development organizations (ARIB, ATIS, CCSA, ETSI, TSDSI, TTA, TTC), provides their members with an environment to produce the Specifications that define 3GPP technologies.
- Three Technical Specification Groups (TSG) in 3GPP
  - Radio Access Networks (RAN),
  - Services & Systems Aspects (SA),
  - Core Network & Terminals (CT)



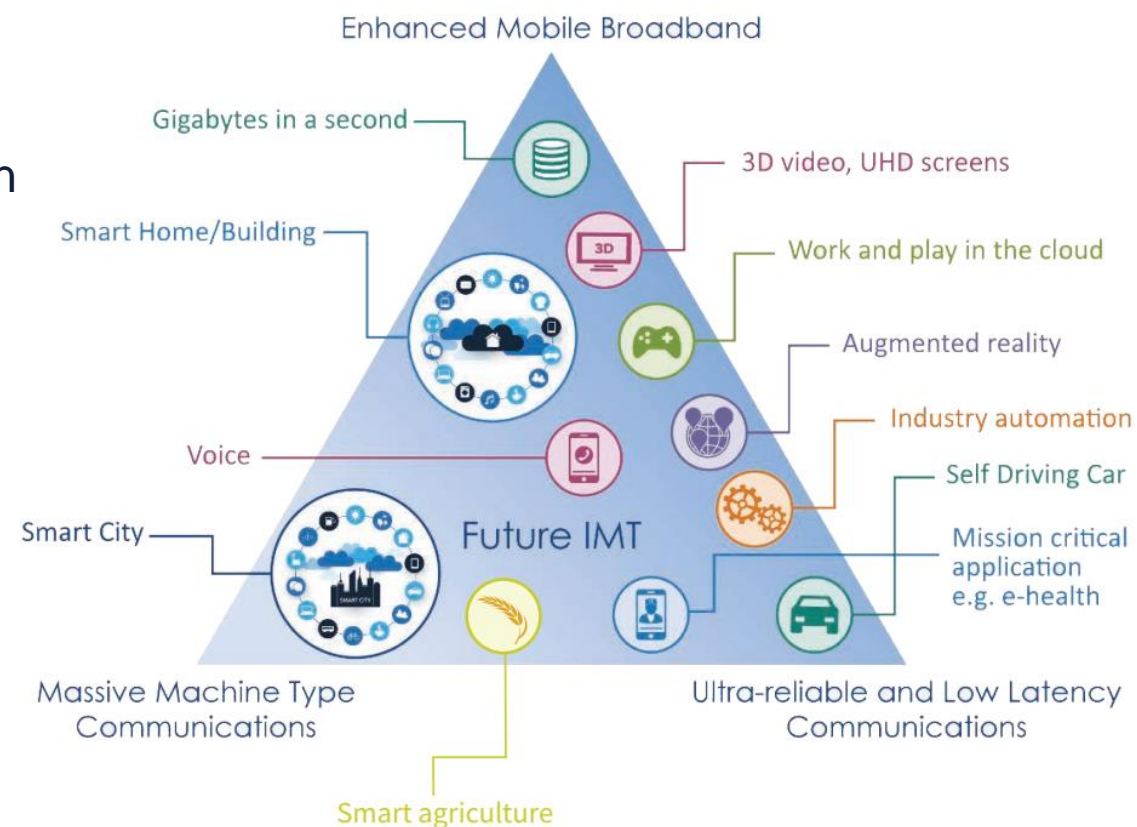
# 3GPP Releases

The measure of progress in 3GPP

- New features, enhancements added in every release
- A release every ~18 months



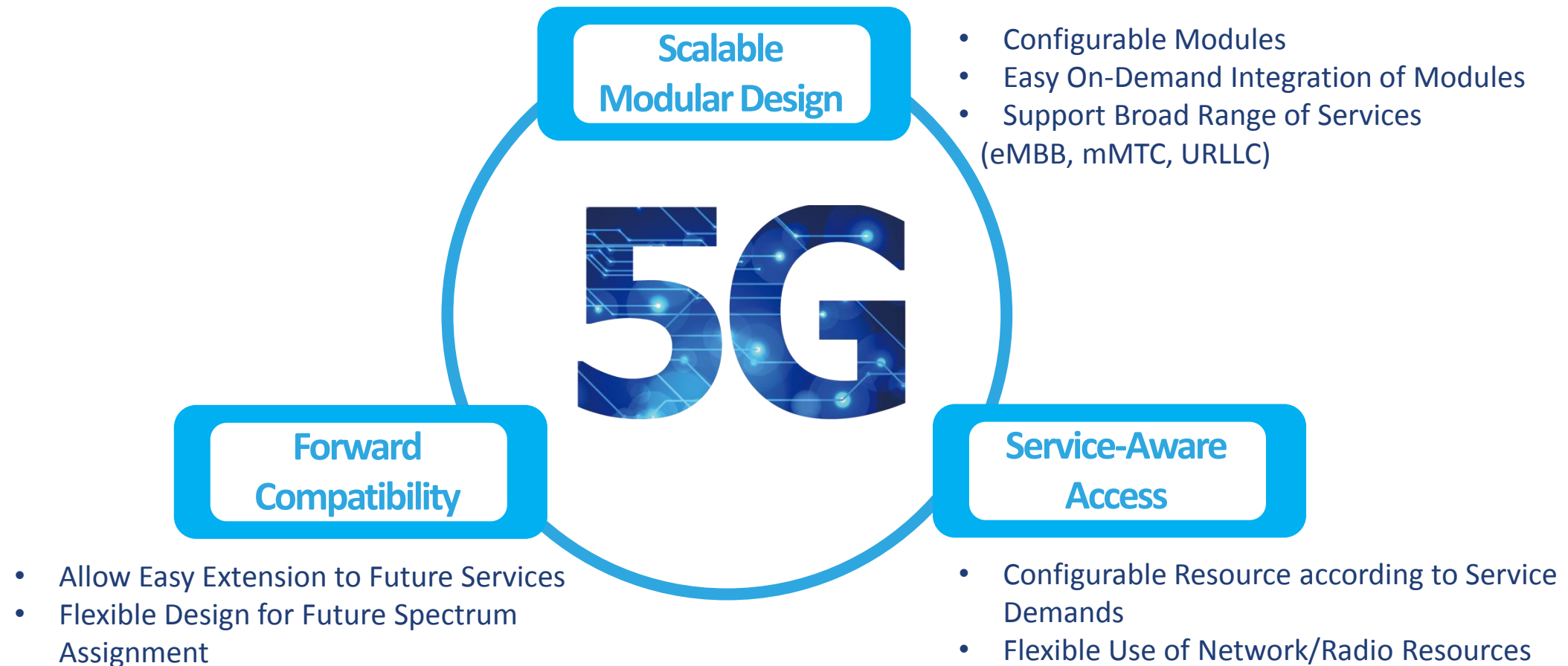
- eMBB: enhanced mobile broadband
  - Downlink peak data rate 20 Gbps
  - Uplink peak data rate 10 Gbps.
- URLLC: Ultra-Reliable and Low Latency Communication
  - 1ms Latency
  - 99.999% reliability
- mMTC: massive Machine Type Communications





# 5G Design Principle

One network, multiple industries

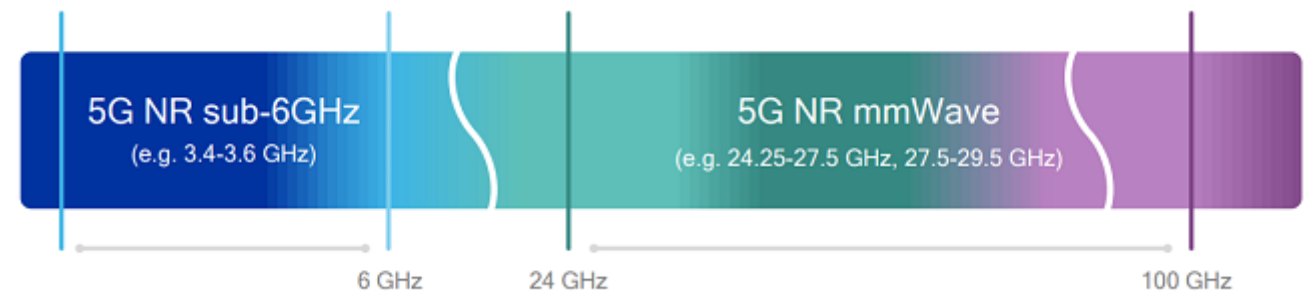




# 5G Frequency Bands

Unified design across diverse spectrum bands/types

- Sub-6GHz (Low-band & Mid-band)
  - Wide coverage
  - Less complex in development of infrastructure
  - Limited spectrum (Low-band)
- mmWave (high-band)
  - More bandwidth
  - Limited coverage
  - Fixed wireless access (FWA)
- Licensed and unlicensed
  - 5G operates as stand-alone in unlicensed spectrum

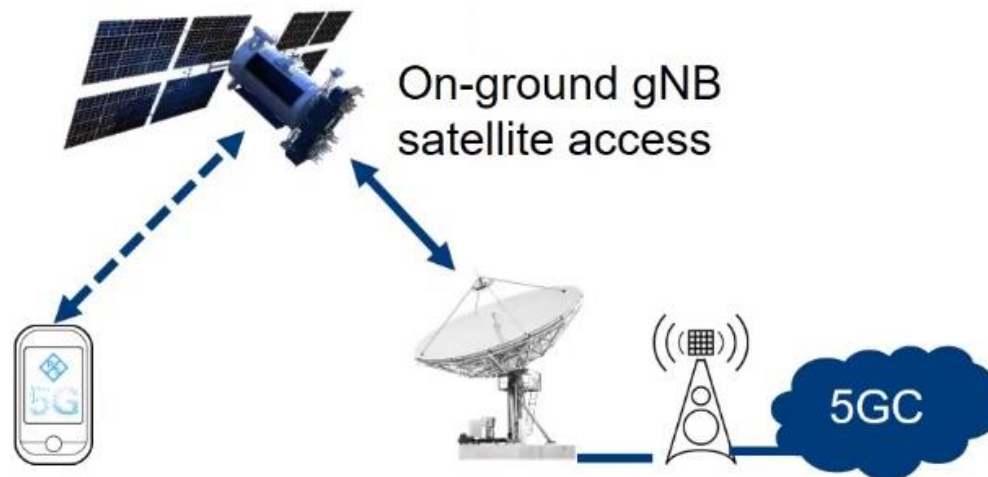


# 5G over Non Terrestrial Networks (NTN)



## Ubiquitous Coverage

- Wide service coverage
  - roll out of 5G service in un-served areas
- Reduced vulnerability of space/airborne vehicles to physical attacks and natural disasters
  - 5G service reliability

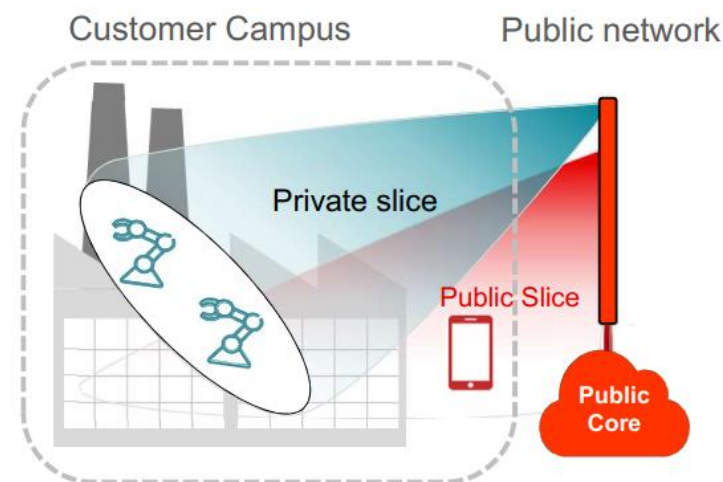
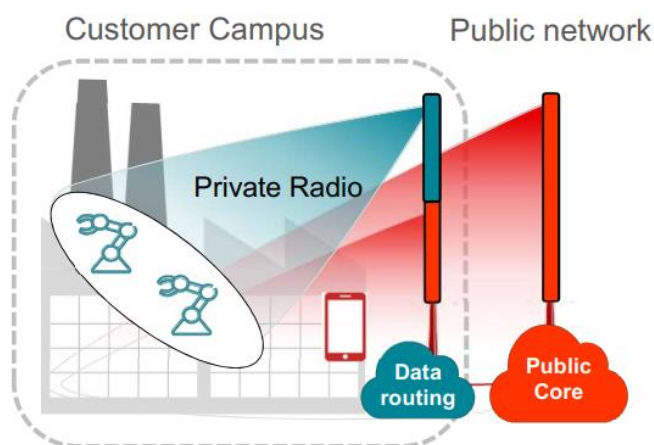
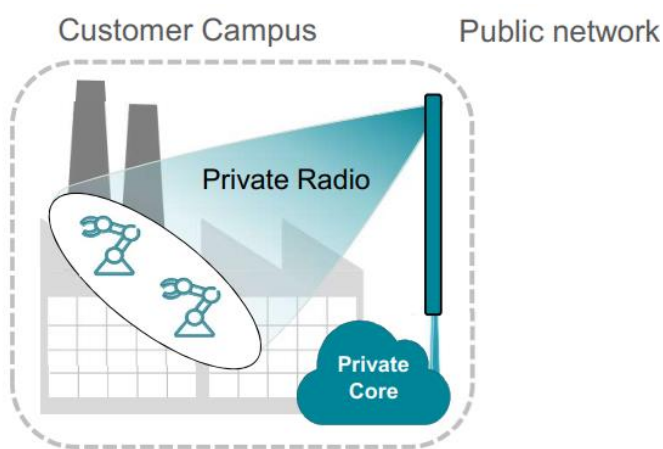




# Private Networks

A range of operating models

A 5G non-public network (NPN, also sometimes called a private network) provides 5G network services to a clearly defined user organisation or group of organisations. NPN is deployed on the organisation's defend premises (e.g. campus or a factory)



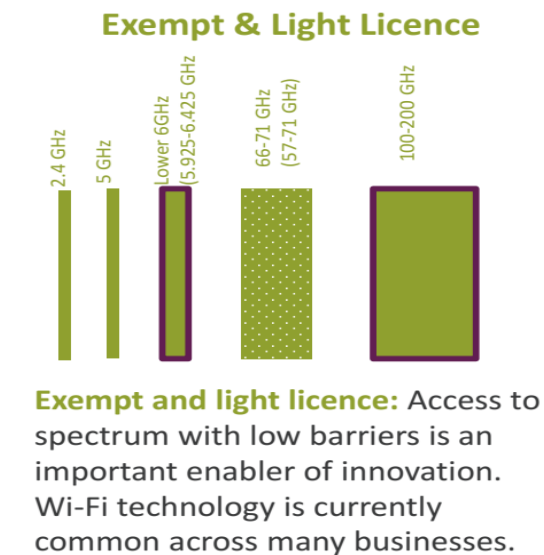
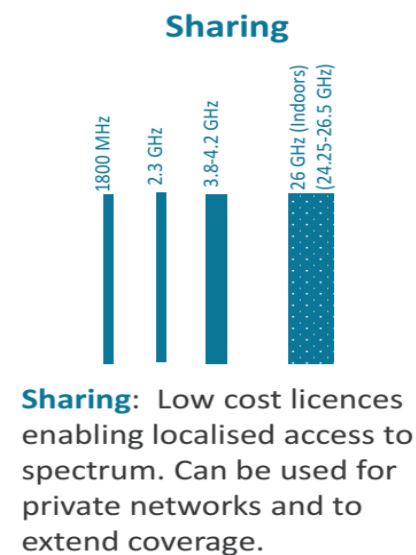
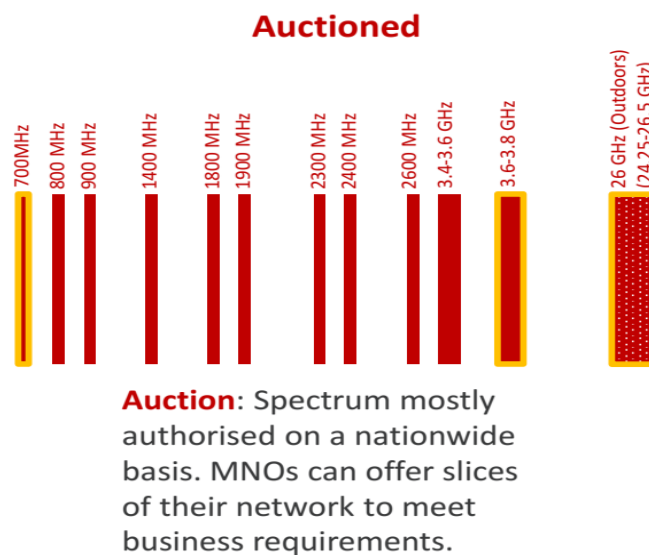


# Private Networks

## Impact to spectrum allocation

- Allocated spectrum for “Local licences”
  - Germany: 3.7 – 3.8 GHz
  - UK: 3.8 – 4.2 GHz
  - Japan: 28.2 – 28.3 GHz
- Unlicensed spectrum for NPN network

Source:  
Ofcom (UK)





# Thank you