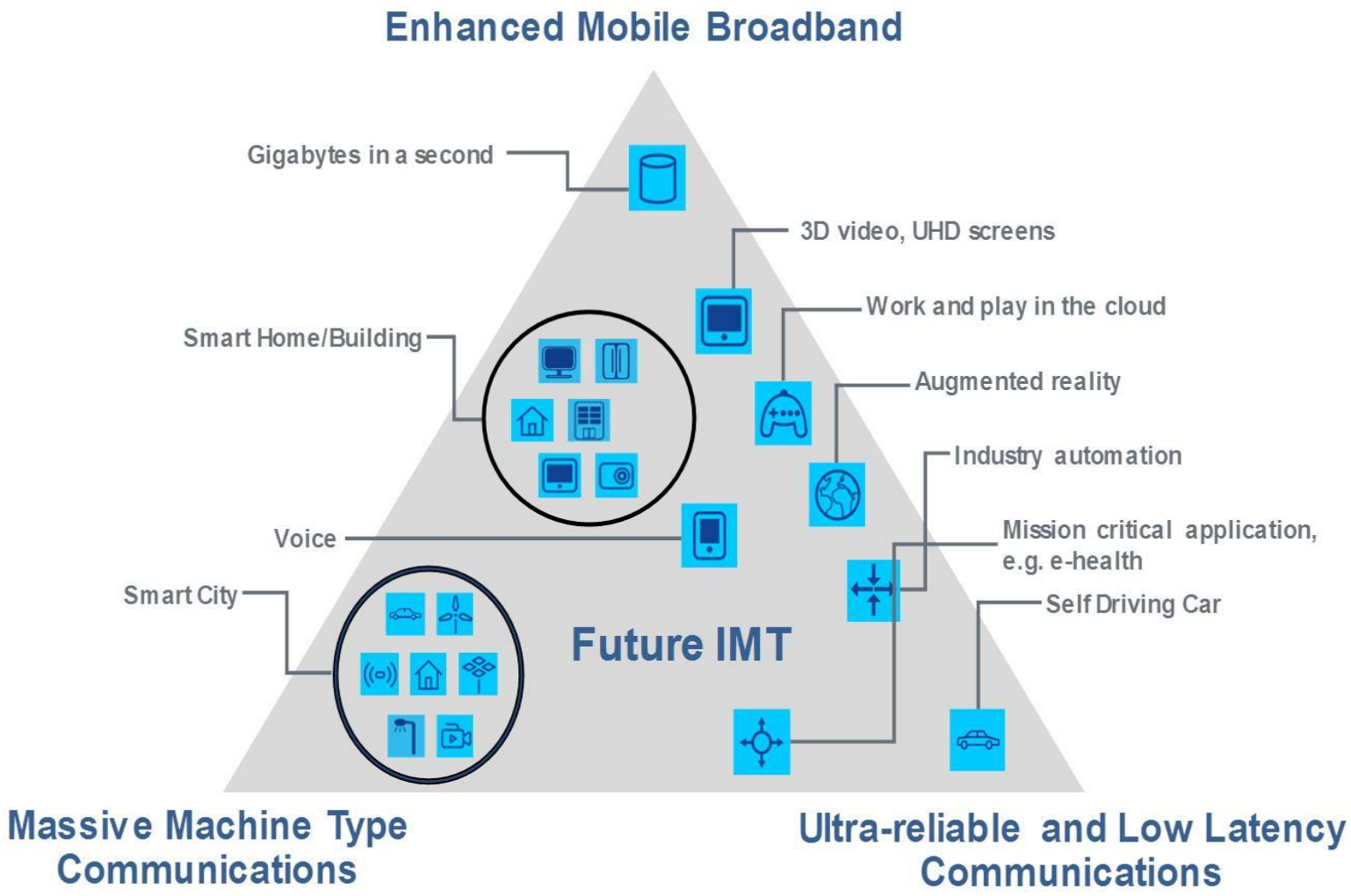
DIGITALEUROPE

5G Spectrum Considerations

CEPT workshop on new spectrum solutions for industry sectors
02-03 May 2019 - Copenhagen

An overview on 5G

Very different requirements in very different application areas require cooperation



Source: ITU-R M.2083

DIGITALEUROPE

Pioneer bands for 5G in Europe

To meet requirements of initial commercial deployments in 2020 and to achieve full 5G capabilities by 2025, **the 700 MHz, 3.5 GHz and 26 GHz EU pioneer bands should be licensed no later than end of 2019**.

- **700 MHz** is suitable for wide area and indoor coverage, including several IoT applications.
- **3.4-3.8 GHz** is essential for 5G deployment. It is a harmonized mobile band that provides unique opportunity for early and wide-scale 5G deployment. It is paramount to clear and defragment this band to enable contiguous 80 to 100 MHz bandwidth per operator. Extension to 4.2 GHz is for future consideration.
- **24.25-27.5 GHz** necessary for very high data rates and capacity, leveraging equipment development in other regions e.g. US, Korea and Japan (all or part of 26.50-29.50 GHz). Where the whole 26 GHz band is not available for early release, 26.5-27.5 GHz should be considered. Countries should then commence re-farming to make 24.25-26.5 GHz available for 5G as soon as possible. Administrations are encouraged to clear the band by 2023, recognizing national situations.

- **Many applications can work in licence-exempt spectrum and many others will require licensed spectrum** e.g. for low latency or very high reliability and availability requirements

- Licensed spectrum can be accessed via MNOs offering network slices in their licensed spectrum, managed sharing arrangements e.g. under LSA or CBRS, concurrent licensing and so on, or via dedicated local licences.

- **Verticals differ very much in their requirements** in terms of size of the coverage area, data rates, latency, availability etc. Examples covered include:
  - Mobile learning, mobile government, mobile health
  - Connected and autonomous mobility
  - Broadcast and PPDR
  - IoT and smart cities
  - Industry 4.0 and professional PMSE

- Verticals' applications requiring wide area coverage and/or mobility (often not requiring very wide bandwidth) often can be well addressed by networks slices of MNOs in e.g. 700 MHz or even NB-IoT.

- Local high performance requirements deserve further analysis.

DIGITALEUROPE Views on 5G Licensing and Authorisation (September 2017) [1]

DIGITALEUROPE

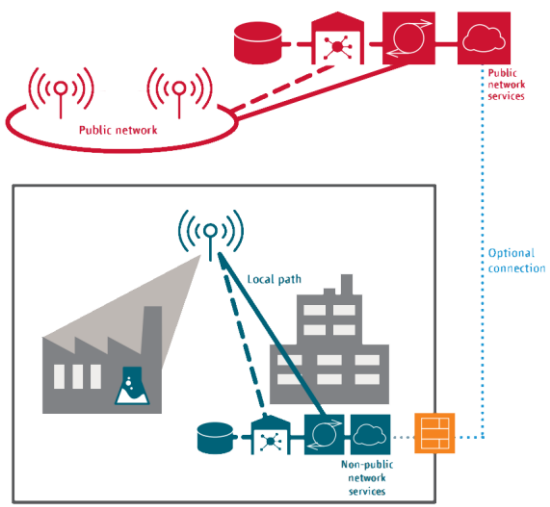
[1] https://www.digitaleurope.org/resources/digitaleuropes-views-on-licensing-and-authorisation-towards-5g/

The 5G Alliance for Connected Industries and Automation

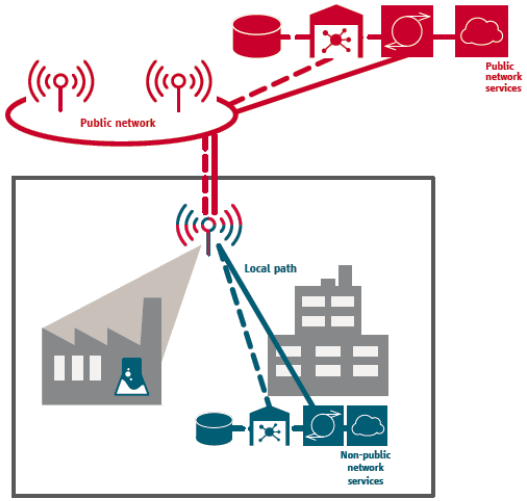
5G-ACIA gathers companies from the industrial (OT) domain as well as from the ICT domain plus academia to discuss and evaluate relevant technical, regulatory, and business aspects with respect to 5G for the industrial domain.

See white papers:

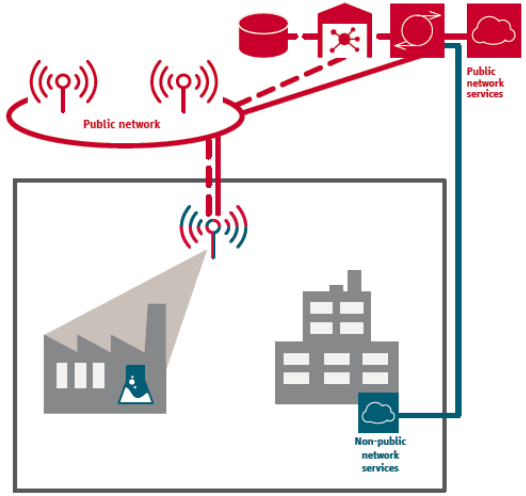
- "5G for Connected Industries and Automation"[2]
- "5G Non-Public Networks for Industrial Scenarios"[3] describing architecture options for cooperation between public and non-public networks



e.g. isolated network
(c.f. chapter 5.2)



e.g. shared RAN
(c.f. chapter 5.3.1)



e.g. NPN within Public Network
(c.f. chapter 5.3.3)

[2] https://www.5g-acia.org/index.php?id=5125
[3] https://www.5g-acia.org/index.php?id=6958

5G-ACIA discusses cooperation models between CSPs and enterprises specific to the industry 4.0 context

5G ACIA
5G Alliance for Connected Industries and Automation

DIGITALEUROPE

Access to 5G pioneer bands in Europe for verticals

Verticals require access to **harmonised bands and common ecosystems**.

- 700 MHz is typically exclusively licensed to CSPs capable of offering network slices for wide area and indoor coverage to verticals.

- For 3.4-3.8 GHz, different regulatory models emerge, such as:
  - Finland assigned 130 MHz each to 3 CSPs incl. provisions for sublicensing
  - Germany has reserved 100 MHz for local, private enterprise use
  - Austria has auctioned besides nationwide some regional licenses
  - UK has consulted e.g. 3.8-4.2 GHz just above 3.4-3.8 for local use
  - …

- In 24.25-27.5 GHz, again different regulatory models seem to be applied, such as:
  - Italy auctioned 200 MHz each nationwide with provisions to pool
  - Germany consulted the full band for local and regional assignments
  - …

- Any national approach should consider both MNO and vertical needs.

DIGITALEUROPE considerations on licensing

- All licensing conditions shall target maximising the investment capabilities of the licensees
- Nationwide auctions to CSPs shall avoid scarcity (e.g. provide 80-100 MHz wide licences per CSP in 3.4-3.8 MHz), and allow for secure investments by reasonably long licence durations at reasonable spectrum costs.
- Consideration should be given to spectrum for IoT solutions and verticals.
- MNOs may manage vertical services by network slicing, may build dedicated local networks or may sub-lease spectrum.
- Locally licensed spectrum may be considered for verticals.
- Licence-exempt bands for vertical use, where and when appropriate.

Spectrum regulation should aim at the best possible options enabling cooperation of MNOs and verticals.

DIGITALEUROPE

Thanks for your attention!

CEPT workshop on new spectrum solutions for industry sectors
02-03 May 2019 - Copenhagen