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CONSULTING

Status, costs and benefits of 5G 26GHz deployments in the UK

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In May 2021, Analysys Mason published a study on 5G mmWave deployment in Europe

- The aim of the study was to consider the status, costs and benefits of 5G mmWave deployment in Europe
  - the scope being EU27, Norway, Switzerland and the UK
- Inputs to the study included:

1. secondary research of public announcements made by industry players on mmWave developments
2. Analysys Mason's economic modelling of the costs and benefits associated with 26GHz 5G deployment
3. primary research (interviews) with MNOs to discuss plans for 5G mmWave deployment

Note: MNO = mobile network operator
Source: Analysis Mason

Key conclusions from the study are summarised as follows

1. mmWave will complement mid-band spectrum for a range of 5G use cases in Europe; regulators should assign mmWave spectrum if not already available

2. Our modelling suggests significant economic benefit to deploying 5G mmWave across different use cases

3. Our primary research suggests MNOs expect to use mmWave to address a variety of use cases, in outdoor and indoor locations, including eMBB, FWA, factories, city centres, stadiums and venue-specific coverage

Note: eMBB = enhanced mobile broadband; FWA = fixed-wireless access
Source: Analysys Mason

26GHz provides a large amount of additional capacity beyond what is available at 3.5GHz

- We found that what the 26GHz band could provide for MNOs over and above 3.5GHz deployment, is:
  - capability to accommodate eMBB traffic in high-use locations, outdoors, and, depending on the use case, indoors
  - potential to deliver the multi-gigabit peak speeds, ultra-low latency and high reliability needed by certain 5G use cases
  - ability to dimension capacity to meet specific use-case requirements, varying the TDD structure to address local uplink and/or downlink capacity requirements, without impacting the wider 5G network dimensioning

Source: Analysys Mason

As such, 26GHz enables several potential new/expanded use cases

A variety of 5G eMBB uses where capacity is required, such as:

- Gaming
- AR/VR experiences in tourism and shopping, etc.

Use of 26GHz for 5G FWA services providing high-speed wireless broadband to homes and offices

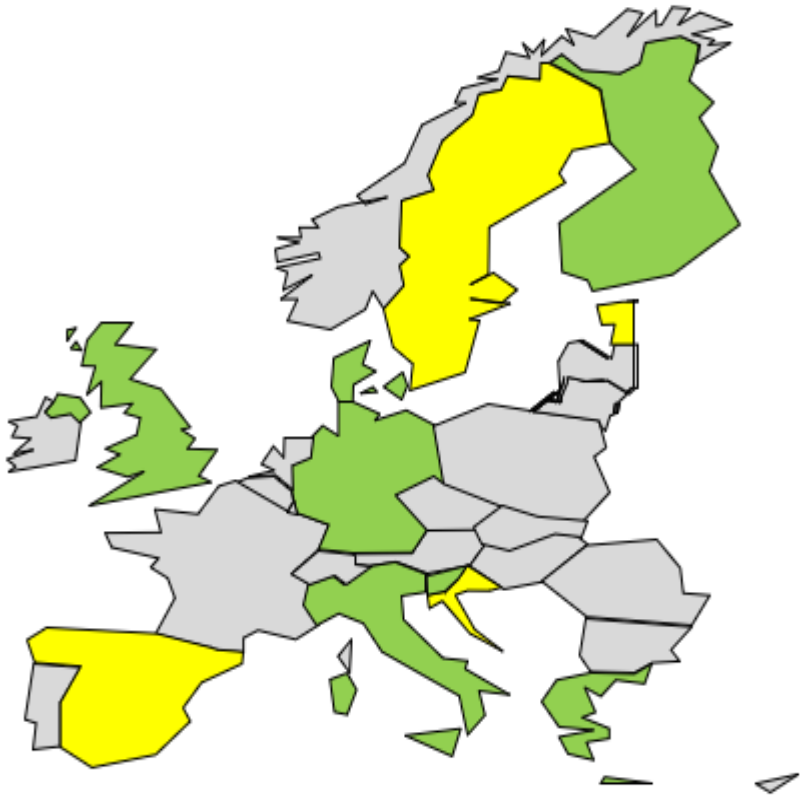
A range of uses at specific locations where specific connectivity needs can be addressed with 26GHz spectrum, such as:

- Industrial use cases with heavy uplink traffic
- Stadiums or venues using immersive media

Note: AR = augmented reality, VR = virtual reality
Source: Analysys Mason

26GHz licensing has been slower in Europe than for other 5G bands, but is now accelerating

Map of status of 26GHz award for 5G deployment in Europe



Key:

- 26GHz spectrum assigned for 5G
- Assignment expected later in 2021
- No date specified for assignment, or no data

Source: NRAs

In the UK, local licences are available in the 24.25–26.5GHz band, but for indoor use only

Initial 26GHz assignment

- Ofcom has made the 24.25–26.5GHz band available for 5G via low-power local 'Shared Access' licences for indoor-only use
- Licences are assigned on an administrative first-come-first-served basis, with applications being subject to co-ordination and approval by Ofcom

Potential further assignment

- No decision has yet been made concerning further 26GHz licensing in the UK for 5G outdoor use
- However, Ofcom's plan of work for 2021/22 (published in March 2021) states that it intends to issue a consultation about the award of spectrum in the 26GHz band in Q3 2021/22

Source: Ofcom

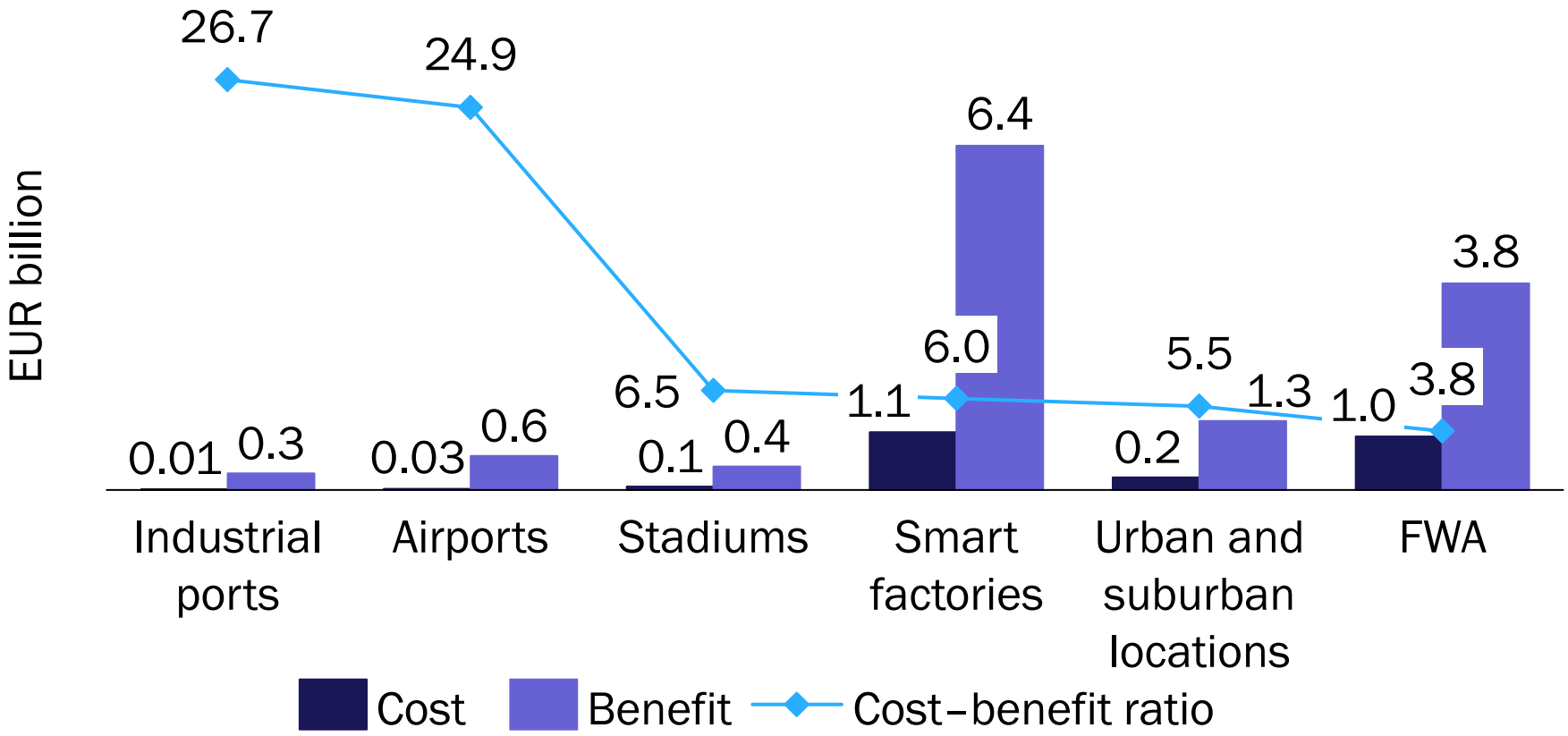
Our modelling considers a mixure of mmWave architectures, predominantly outdoors

- We calculate the costs and benefits of mmWave deployment (built on top of a 'base case' eMBB network deployment) for a mixture of use cases:
  - urban and suburban locations, FWA
  - industrial and enterprise use cases
- We model a mixture of architectures (depending on use case):
  - 3.5GHz macro site upgraded with 26GHz
  - new 26GHz dedicated site, possibly sharing 3.5GHz from a nearby macro site
  - 26GHz small cell

Source: Analysys Mason

For each use case modelled, we estimate a benefit-to-cost ratio of between 4 and 30

PV of UK-wide costs and benefits up to 2040 from deploying 26GHz, by use case (EUR billion, 2020 terms)



Source: Analysys Mason

A variety of mmWave use cases were identified in stakeholder interviews with MNOs

mmWave use cases identified by stakeholders

- eMBB in high-capacity locations, outdoors, and indoors
- 5G-based FWA
- Smart factory and other industrial applications
- City centre hot spots
- Venue-specific coverage (tourism, sports, events)

Interviews with stakeholders demonstrate that MNOs will potentially deploy mmWave capacity in multiple specific locations (with variation in requirements based on local market demand)

Source: Stakeholder interviews

Stakeholders noted the capability of mmWave for high capacity and flexible frame structures

- Stakeholders stated that mmWave can:
  - provide very high capacity where deployed
  - allow for more flexibility to adapt TDD frame structures to cater for local variations in traffic profile

As capabilities of mmWave technology continue to improve, MNOs expect that quality of service within deployments can be ensured even as traffic levels increase

Note: TDD = time division duplex
Source: Stakeholder interviews

The 26GHz equipment ecosystem is expected to develop as further deployments take place

- Multiple mmWave networks have now been deployed globally on a commercial basis, with European markets in the process of catching up with earlier deployments in other regions
- European MNOs noted that further European (and non-European) deployments will help to build the 26GHz equipment/device ecosystem

Selected non-European countries that have awarded 26GHz spectrum for 5G[1]

Australia
Chile
Hong Kong
Russia
Singapore
Thailand
UAE
USA

[1] Other non-European countries have made spectrum available for 5G in the 28GHz band, e.g. China, Japan and South Korea. Source: Analysys Mason, NRAs

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