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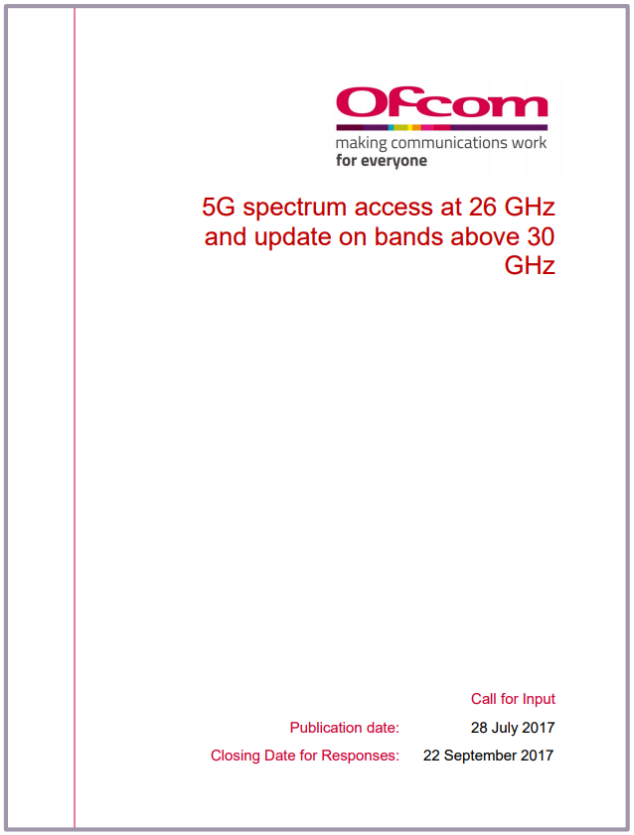
Presentation to SPF Cluster 1 and 2 workshop

Responses to Ofcom's 26GHz 'Call for Inputs' on 5G mm-wave market demand

28 February 2018 • Janette Stewart

In July 2017, Ofcom issued a 'Call for Inputs on 5G spectrum access at 26GHz'

- The Call for Inputs (CFI) asked for stakeholders' input on making the 26GHz band available for 5G deployment in the UK
- Input was sought on areas including:
  - likely 5G demand (with regards to locations, services, channel bandwidth and deployment models)
  - authorisation approaches
  - release options (e.g. progressive release of the upper and lower bands)


Ofcom
making communications work for everyone

5G spectrum access at 26 GHz and update on bands above 30 GHz

Call for Input

Publication date: 28 July 2017

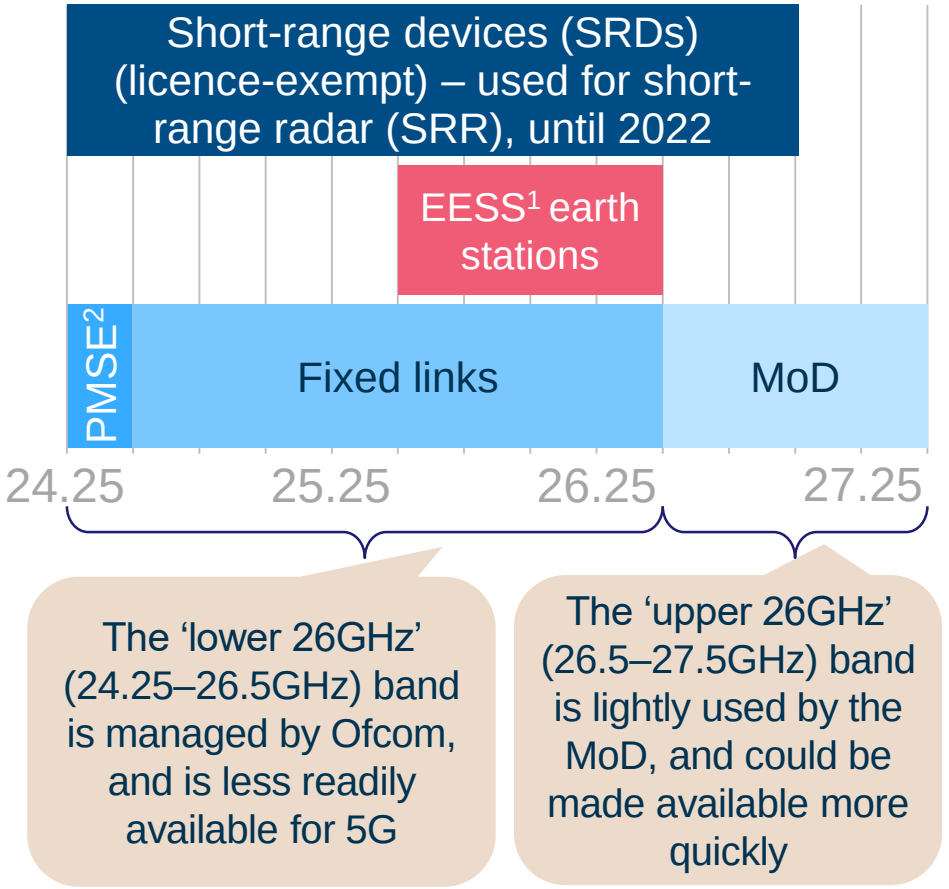
Closing Date for Responses: 22 September 2017

Source: Ofcom's Call for Inputs for 5G spectrum access at 26GHz, July-September 2017

The CFI proposed several alternative options for authorising the 24.25–27.5GHz spectrum for 5G

- The main options were:
  - licence-exempt (shared, unco-ordinated) use
  - shared, co-ordinated deployments
  - area-defined licences
- The CFI also asked stakeholders for their views on whether:
  - a different (or hybrid) approach should be used
  - the 26GHz band should be released progressively (accounting for existing uses of the spectrum)

Current use of 26GHz spectrum in the UK



[1]Earth exploration satellite service; [2]Programme making and special events
Source: Ofcom's Call for Inputs on 5G spectrum access at 26GHz, September 2017

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Several of the CFI responses published on Ofcom's website consider demand for mm-wave bands

- Ofcom has published (redacted) stakeholder responses on its website
- The following categories of response discuss market demand/use cases for 5G in the 26GHz and other mm-wave bands:

	Type of stakeholder	# of responses published
1	Mobile operators	2
2	Other UK operating companies	1
3	Local authorities	2
4	Satellite companies	3

Ofcom also published responses from several terrestrial trade associations, satellite trade associations, equipment vendors, utilities, MOD, UK Met Office, UK Space Agency and the Radio Society of Great Britain

One MNO suggested Ofcom should award nationwide licences on an exclusive basis

- This MNO was of the view that the 26GHz band should be awarded under the following conditions:
  - **award by 2019**, assuming devices will be availably by 2020
  - **preference for the entire range to be awarded at once**, though if this would cause delays, award should be done progressively (i.e. the upper 26GHz band earlier than the lower 26GHz band)
  - **exclusive national licences**, with unlimited duration and technology / service neutrality
  - ability to trade spectrum (including leasing to third parties in locations where the main licensee does not deploy a network)

Source: Published CFI response

This MNO expected to use the band in dense locations to provide high-speed MBB[1] services

- The MNO anticipated that 26GHz spectrum could support the following deployment scenarios:

Urban hotspots outdoors
Stadiums / arenas and other indoor venues with ultra-high density of users
Rural areas for fixed broadband
Railway stations and other transport hubs with very high user concentrations
Enterprise and industrial sites

"Deployments would generally not aim to provide contiguous 26GHz coverage, but would be in specific locations … where ultra-high area capacity density is required to deliver very high performance"

Note: This MNO states in its response that deployment scenarios are based on an assumed cell radii for 26GHz mobile coverage 'of the order of 100m'; [1]Mobile broadband
Source: Published CFI response

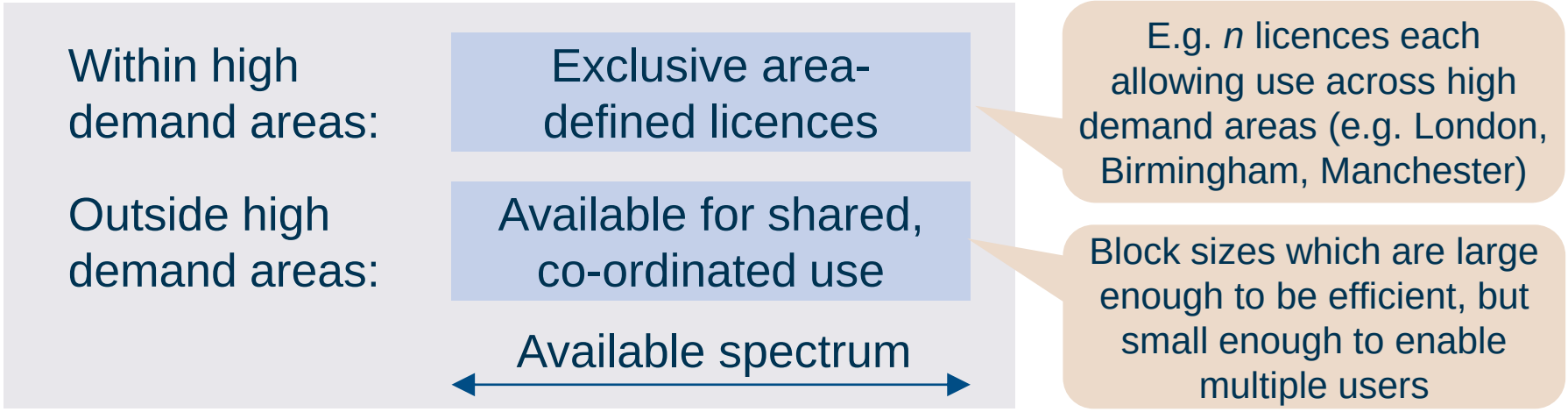
A second MNO was of the view that 5G at 26GHz is still at an early stage of development

- This MNO stated that Ofcom's "*conclusions and licensing models… appear sensible*"
- However, the MNO urged caution that **some of Ofcom's consultation questions included a level of detail that could not be answered at this stage** (pre-commercial trials and pre-international standardisation)
- Regarding use cases, this MNO stated that **uses could be both fixed and mobile**:
  - this MNO currently uses the 26GHz band for fixed links[1]
  - the MNO considers that there is little merit in incurring significant costs ahead of other European markets to clear the lower part of the 26GHz band, until it is to be used for 5G services
  - contiguous blocks in mm-wave spectrum are preferred[2]

[1]*For example, backhaul from mobile sites where it is not possible to use fibre*
[2]*This MNO questioned Ofcom's rationale on carrier aggregation as an alternative to usage of a contiguous 26GHz block*
Source: Published CFI response

This MNO favoured a progressive approach, focussing initially on the upper part of the band

- This MNO supported that **Ofcom should authorise 5G mm-wave spectrum progressively, initially concentrating on the upper band**
- The MNO favoured (a variation of) Ofcom's proposed **hybrid approach, with multiple defined licences covering high demand areas**, and shared co-ordinated use elsewhere (see below)
- This MNO **advised against any 26GHz licence-exempt use** (or mixed licensed / licence-exempt use)



Source: Published CFI responses

Another UK telecoms provider supported use of the full 24.25–29.5GHz spectrum range for 5G

- Services could be deployed to meet high traffic demand or hotspots
- **Neutral hosts may emerge** to identify suitable sites for small cells, and could possibly secure their own spectrum
- Services will seek to take advantage of 5G's low-latency, high-reliability and network-slicing functionality
- **5G FWA[1] services will be deployed** (which are currently being trialled in the 28GHz band in the UK)
- Concern that **early release of 26.5–27.5GHz (i.e. progressive release) could lead to inefficient outcomes** for spectrum below and above this range

This provider, which is a licensed user currently in the 28GHz band, urged Ofcom to consider 26GHz and 28GHz together and to assigning the wider 24.25–29.5GHz range for 5G use

[1] Fixed wireless access

Source: Published CFI response

Two local authorities responded, both favouring a hybrid authorisation approach

Basingstoke Borough Council

- Keen to connect the Basingstoke 5G test-bed to other nearby facilities
- **Considers the band to be well suited to deployments in dense urban locations**, and has "*several industrial areas where 26GHz deployments are likely*"
- States that **hybrid authorisations** "*seem to be appropriate*"

Bournemouth Borough Council

- Initially looking to provide a fixed network to major businesses and new start-ups, but later evolving to mobile
- **Use cases include major business sectors; transport hubs; arenas; the beach/waterside**, etc.
- Supports a **hybrid authorisation** approach,[1] not national licences

[1] *"E.g. defined spectrum to existing users; further defined spectrum to neutral hosts, and … defined spectrum for commercial MNOs". The two local authorities propose progressive authorisation, starting with the upper 26GHz band as soon as possible, and longer licence durations*

Source: Published CFI responses

Several responses discuss spectrum sharing and the potential of 26GHz satellite services

Current and future uses

- Space sector services are already operating in the 26GHz EESS, ISS and FSS[1] allocations
- **The Earth station at Harwell is a primary downlink for the European Space Agency's (ESA) European data relay satellites (EDRS)**
- Important that use of 25.5–27GHz by EESS and SRS[2] Earth stations can expand in the future

5G authorisation

- Licence-exempt 5G at 26GHz does not align with sharing study assumptions, where it is assumed 5G deployment is based on individual authorisations
- **Ofcom's proposals are based on current UK geographical use, but should also recognise the UK as a major contributor to ESA and EU satellite programmes**

[1]EESS – Earth exploration satellite service, ISS – International Space Station, FSS – fixed satellite service; [2]Space research service
Source: Published CFI responses

Summary of key comments from stakeholders

	Type of stakeholder	Stakeholder comments	
		Authorisation approach	*Spectrum use cases*
1	Mobile operators	Exclusive nationwide licences; award in 2019 depending if ecosystem is ready; allow spectrum trading	MBB in dense urban locations (also FWA in rural areas)
		Hybrid authorisation; progressive release (timings not to be rushed)	Both fixed and mobile
2	Other UK op. company	Assign wider 24.25–29.5GHz range	FWA
3	Local authorities	Hybrid authorisation; progressive release	Fixed and mobile; dense urban locations
4	Satellite companies	Geographical authorisation (not licence-exempt) for sharing with satellite services	Current satellite stations must be able to expand in future

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