

ESOA Consultation response

VIA Email

22 September 2017

ESOA Members¹ welcome the opportunity to submit these comments to Ofcom CFI on 5G spectrum access at 26 GHz and update on bands above 30 GHz.

This is an exciting time in the development of communications in our modern societies through a mixture of technologies, including satellite. The “5G ecosystem” vision can only be achieved by bringing next generation connectivity to all users across the globe. It is important that the right investments and technology decisions are made now to ensure the optimal development of all the advanced, efficient, next generation communications systems that will be needed to this end.

For the provision of advanced existing and new satellites services, including 5G services, sustainable continued and fullest access to the bands above 6 GHz which are currently allocated to the FSS, BSS, and MSS will be required.

Currently, the highest growth in the introduction of new satellite systems and services is in the Ka-band frequencies (roughly between 17 and 30 GHz).

Additionally, in light of the unprecedented demand for satellite data services, interest is growing rapidly in the Q/V band frequencies (around 40 and 50 GHz), and these bands are likely to show rapid uptake for new satellite systems in the near future. Some of these frequency bands are also being considered for terrestrial 5G systems and hence there is potentially competing demand for some frequency bands.

ESOA is a non-profit organisation established with the objective of serving and promoting the common interests of EMEA satellite operators. The Association is the reference point for the European, Middle Eastern, and African satellite industry and today represents the interests of 34 members, including satellite operators who deliver information communication services across the globe as well as EMEA space industry stakeholders and insurance brokers.

Question 2.1: What are your planned timelines for commercial availability of network equipment and devices for the 26 GHz band? When will equipment for testing and trials be available?

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¹ A complete list of ESOA Members can be found at www.esoa.net

Please specify the specific mmWave tuning ranges supported and their timing.

Question 2.2: Given the 3GPP studies into NR-based operations in licence-exempt spectrum, when (if ever) do you expect to support licence exempt operation and/or coordinated sharing in the 26 GHz band in your products?

Whilst there is a significant emphasis being placed on the development of the suite of 5G standards with intense activity and investment across the globe, the timeframes being contemplated are somewhat ambitious and the demand assessments are questionable. As such we anticipate that it will be some years before 5G based communication systems are widely available and adopted in the 26 GHz band.² As a consequence of the long lead times anticipated, it is imperative that Ofcom afford appropriate protection to vital incumbent space services on which people depend when determining spectrum policy, and not feel pressured to make spectrum decisions that favor a single technology rather than an optimised range of services to achieve the ultimate goal: mobile broadband for all.

In particular, in the context of 3GPP study on 5G NR operations in unlicensed spectrum, ESOA wish to express warnings about 5G NR-SS (New Radio Spectrum Sharing) since the « existing & new spectrum sharing paradigms » examples currently explored seem to be applicable for sharing cases between mobile operators only, but not between different services (e.g. terrestrial service vs satellite service). A clear example is the 5G NR MulteFire (Listen Before Talk) where the spectrum sharing paradigm is not appropriate for space to Earth satellite bands (e.g. receive only earth stations).

ESOA does not support use of licence exempt 5G services in the 26 GHz range, since that would in effect preclude coordinated sharing with existing and planned earth stations of space services.

ESOA recommends that Ofcom adopts an approach enabling coordinated sharing on a geographical basis between 5G and existing and future earth stations of the space services in the 26 GHz band. Ofcom is well aware that the information presented by the 5G terrestrial interests about 5G deployments in mmwave bands

² ETSI CTO Adrian Scrase said the “extremes” of 5G performance targets, particularly ultra-reliable low latency and massive machine-type communication “will not really be addressed maybe until the mid-20s. So this is quite a long-term play”. From Policy Tracker, 21 Feb 2017. The most optimistic vendors acknowledge that 5G will not be in consumer’s hands before 2023-2025

	<p>indicates that less than 5% of the territory of major countries (such as the UK) would be used for 5G deployments (which are inherently of short range). ESOA therefore believes it would be inappropriate to award licences for 5G on an exclusive nation-wide basis in the UK as some proponents have argued, as that would unnecessarily constrain other services, such as for coordinated sharing with existing and planned earth stations of space services.</p>
<p>Question 2.3: When do you expect to support standalone New Radio in the 26 GHz band in your products?</p>	<p>-</p>
<p>Question 3.1: Are there any other aspects related to the existing use of 26 GHz not covered in this CFI that you believe need to be considered?</p>	<p>ESOA members are concerned that focusing on the 26 GHz band as a “pioneer band” for 5G has effectively negated the allocation of the 24.65-25.25 GHz by the ITU as the Fixed-Satellite Service (FSS) uplink band intended to feed the 21.4-22 GHz Broadcasting-Satellite Service (BSS) downlink band. The ITU affirmed and expanded this allocation as recently as WRC-12. Without access to this uplink band, the ability to efficiently feed the 21.4-22 GHz band is lost. Satellite operators are just starting to deploy in this band. (e.g. DIRECTV 14 & 15). In the future, it is conceivable that the BSS bands would be used to efficiently multicast content to multiple 5G base stations, as described above. Some HTS systems have also begun to deploy in the 27.0-27.5 GHz band (e.g. Australia’s NBN). Ofcom should consider either avoiding use of these bands for 5G or ensuring shared use of the band by satellites and 5G terrestrial mobile services. Sharing is currently being studied by ITU-R TG 5/1 and the results of those studies would likely require constraints on terrestrial 5G systems.</p> <p>In addition, ESOA members are not comfortable with the term “tuning range” being used as though it were an obvious, “win-win” solution for all. In fact, ESOA believe that equipment built with a wider range than necessary for its purpose could constrain the use of other services anywhere in the equipment’s entire “tuning range,” even if part of that “range” was not meant to be used for that service in that country.</p> <p>To remind Ofcom, satellite technology already plays a major role in 4G and will play an important role in the future 5G ecosystem as well.</p>

<p>Question 3.2: What options for the existing services in the 26 GHz band do you believe need to be considered to allow for the introduction of new 5G services? Please give as detailed a response as possible along with all relevant information and explain how you would see any potential option you provide working in practice.</p>	<p>-</p>
<p>Question 3.3: Should a moratorium be placed on issuing new licences in the 26 GHz band for existing services? E.g. to ensure that the 26 GHz band is not unnecessarily encumbered prior to the development of a new authorisation / licensing approach for 5G services?</p>	<p>ESOA strongly opposes all considerations of adopting such a moratorium on new licenses for earth stations of the space service (FSS, EESS) in the 26 GHz range. The EU has prioritised three frequency bands for the early introduction of 5G services (5G “pioneer” bands), as part of the European Commission 5G Action Plan: 700 MHz, 3.4-3.8 GHz and 26 GHz. This preference was expressed by the RSPG in its Opinion on spectrum for 5G in November 2016³ and confirmed by the RSC in their Mandate to the CEPT in December 2016.⁴ 5G deployment therefore should focus first on the 700 MHz and 3.4-3.6 GHz bands already identified for IMT at WRC 15.</p> <p>We believe that Ofcom should solve the fundamental issues of coexistence between mobile and satellite earth stations in the 3.6 – 3.8 GHz band before starting to limit the deployment of incumbent fixed satellite services in the 26 GHz band range (24.65-25.25 GHz sub-band).</p>
<p>Question 4.1: What service would be delivered and to which consumer and/or organisations?</p>	<p>-</p>
<p>Question 4.2: Where in the UK would the 26 GHz spectrum be used to deliver services? For example, will deployments be focussed on:</p> <ul style="list-style-type: none"> a) Areas of existing high mobile broadband demand? b) Rural areas? c) Rail and road corridors? d) Specific types of enterprise or industrial sites? 	<p>-</p>

³ Strategic Roadmap Towards 5G for Europe, RSPG Opinion RSPG16-032

⁴ Opinion of the RSC RSCOM16-40

<p>e) Indoors or outdoors? f) Specific nations or regions of the UK?</p>	
<p>Question 4.3: Where 5G cells are deployed, are they expected to be individual cells or as clusters of cells required to give wider areas of contiguous coverage? What would be the area of a typical contiguous coverage cell cluster?</p>	-
<p>Question 4.4: What capacity and bandwidth (i.e. Channel Bandwidth in MHz) would be required at each cell to meet initial capacity requirements? How will this change over time?</p>	-
<p>Question 4.5: What quality of service is required? How sensitive is the service being offered to variations in radio interference from other operator's 5G cells and other spectrum users?</p>	-
<p>Question 4.6: Will end users be fixed or mobile?</p>	-
<p>Question 4.7: What are the characteristics of 5G at 26 GHz which make this band particularly suited to the service you plan to deploy? What other spectrum bands could be used as an alternative, or in preference to, the 26 GHz band? To what extent could carrier aggregation and other techniques reduce your reliance on 26 GHz?</p>	<p>ESOA emphasizes the potential of the 32 GHz band as a band that is relatively unused and which, therefore, could easily be allocated to the mobile service on a primary basis as it was recognized by the RSPG Opinion.</p> <p>Even though there is no current international allocation to the mobile service at 32 GHz (31.8 – 33.4 GHz), it is quite likely that sufficient international agreement could be found at WRC-19 to create such an allocation to be officially made before any true 5G services are ready to be deployed. The physical characteristics of this band are nearly identical to the 26 GHz band that will have already been studied, and the 32 GHz band has the enormous advantage of being supported by the satellite industry as a place for the entire, multi-technology “5G ecosystem” to flourish.</p>

	<p>In addition ESOA welcomes and fully supports Ofcom’s promotion of the prioritization of the 66 - 71 GHz band at CEPT for 5G/IMT-2020.</p> <p>The bands around 66-71 GHz and 81-86 GHz have very little incumbent use and are a perfect fit for high density indoor use, near-indoor use or high density outdoor scenarios like stadiums, campuses or shopping malls. They provide extremely wide bandwidths for terrestrial 5G applications, up to 15 GHz and can support multiple 5G operators each with significant access to spectrum.</p> <p>Deployment of 5G/IMT-2020 in 66-71 GHz and 81-86 GHz bands would benefit from synergies with WiGig, which is being deployed at 61 GHz by various vendors with speeds of up to 4.6 Gbps.⁵</p> <p>ESOA would recommend that Ofcom also promotes the use of the 71 – 76 GHz and 81 – 86 GHz bands for 5G/IMT-2020 both for use within the UK and internationally.</p> <p>ESOA notes that 4G networks which use carrier aggregation using some mobile bands below 2.6 GHz already support commercial 4G services at data rates of about 500 Mbit/sec. ESOA also believes that the increased use of carrier aggregation by 4G and in future 5G networks using bands already identified in Europe for terrestrial mobile services below 3.8 GHz will allow for enhanced mobile broadband services to be provided supporting data rates in excess of 1 Gbit/sec to the 4G and 5G mobile devices. The use of carrier aggregation in low frequency bands will reduce the need to rely on the 26 GHz bands for 5G/IMT-2020 service.</p>
<p>Question 5.1: Should Ofcom consider licencing options other than the 3 examples set out above (licence exempt, shared coordinated and area defined) for the 26 GHz band? If so, what other options do you consider should be included?</p>	<p>It is important that any licensing approach is adapted to each band and that it affords the necessary flexibility while taking into account the principle of technology neutrality.</p> <p>The design of licences for 5G in this band are influenced by a number of factors, including the need to ensure that other services in the same and adjacent frequency bands are adequately protected from interference. The sharing studies related to the potential interference to satellite systems have made important assumptions about the technical characteristics and deployment characteristics of</p>

⁵ Samsung Electronics press release (2014), available at: <https://news.samsung.com/global/samsung-electronics-60ghz-wi-fi-technology-accelerates-data-transmission-by-five-times>

	<p>terrestrial 5G systems. Some of the assumptions, such as mobile base station EIRP, antenna pointing, and deployment only in urban and suburban areas are key to the feasibility of sharing the spectrum. Hence one of the tasks for the 5G licences is to ensure that actually deployed 5G systems are consistent with those study assumptions - failure to do so could lead to harmful interference to, for example, receiving satellites. Licences should therefore be for geographic areas which are predominantly urban and suburban and should include technical conditions to limit the EIRP in the direction of the geostationary orbit. Licence exemption of terrestrial 5G networks would not be feasible while meeting these requirements.</p> <p>Furthermore, licences for 5G will need to be designed such that new FSS or EESS earth stations can be deployed, at least in the areas where terrestrial 5G systems have not already been deployed. Nation-wide, or exclusive, or licence-exempt schemes for terrestrial 5G licensing are therefore not feasible in the bands shared with satellite services.</p> <p>The ECC Decision on Harmonised technical conditions for Mobile/Fixed Communications Networks (MFCN) in the band 24.25-27.50 GHz is currently under development and is due to be completed next June 2018.</p> <p>Furthermore, at the last ECC PT 1 meeting (4-8 September 2017), the draft Decision in “considering g)” concluded <i>“that some technical conditions related to coexistence with other services attached to the Decision have been developed on the assumption of individual authorisation and any other assumption on the authorisation framework, as either general authorisation or a combined individual/general authorisation regime would require other technical conditions “.</i></p> <p>ESOA considers therefore that harmonized tools shall be developed by CEPT to support administrations in ensuring a coordinated 5G deployment and the protection of existing (and future) fixed satellite earth stations in the 26 GHz band.</p>
<p>Question 5.2: What methodologies could be used to pre-define ‘high demand</p>	<p>-</p>

areas' for area defined licences?	
Question 5.3: What mechanism could be used to coordinate cell deployments by different operators in shared spectrum?	-
Question 5.4: What methodologies could be used for determining the proportion of spectrum to allocate using area defined licences and coordinated deployment?	-
Question 5.5: Do you agree that the 26 GHz band should be released progressively? What risks do you envisage with such an approach and how can these be best mitigated?	-