Airbus Defence and Space response to Ofcom's Consultation: "5G spectrum access at 26 GHz and update on bands above 30 GHz"

Introduction:

Airbus Defence and Space wish to thank the Ofcom for having the opportunity to provide inputs to this consultation.

Airbus Defence and Space appreciate that Ofcom promotes innovation in the wireless sector and have no doubt that Ofcom takes existing usage into consideration and will continue protecting their future existence.

Airbus Defence and Space has been the prime contractor of over 40 Earth observation satellites for a period of more than 30 years and wishes to strongly advocate the need to ensure the protection of the receiving satellite earth stations used or planned to be used worldwide in this band.

In addition to designing, manufacturing and project management of satellite missions Airbus Defence and Space researches, develops and manufactures the advanced instruments that are carried on many of its satellite missions. The instruments are divided into two main groups: Optical and Radar.

More than 150 earth observation satellites have been launched in the last 10 years in the world, and more than 350 are planned by 2025, including small satellites, for applications such as weather forecast, natural disaster relief or security. Satellite technology is used to monitor changes in the environment, giving governments and other agencies greater understanding.

Starting from the Baveno Manifesto back in 1998, the Copernicus program was established as a world – leading system for global monitoring for environment and security, coordinated and managed by the EC with the space observation infrastructure performed under the aegis of ESA, using data from a wide variety of sources including the new generation of Sentinel satellites.

The potential of cost savings of environmental monitoring have always been part of the rational for Copernicus. One estimate that every euro invested in environmental monitoring will bring ten euros of benefits.

Natural as well as man-made disasters regularly cause significant damage across the world (e.g. British Virgin Island, Anguilla, Turks and Caicos hit by Hurricanes Irma and Maria this month), particularly flooding has become a regular problem, and no matter the precautions, industrial accidents can never be invariably prevented. At the same time, the increasing monetary values affected by such disasters result in a continuously growing amount of loss.

Quick and easy access to up-to-date, accurate and timely geo-information provides reliable and cost-effective answers to civil protection and rescue services, humanitarian relief community, insurance organizations and all risk managers. Airbus Defence and Space solutions allows for:

- **Rapid provision of satellite imagery and geo-information products** to efficiently supports the coordination of civil protection and rescue teams, relying on data acquired by the full constellation of optical and radar operated satellites.
- **Accurate and up-to-data geographic information** that is vital to the humanitarian services across the world to assess damage from disasters, monitor complex crises and reduce response time and human suffering.

Airbus Defence and Space is a full member of ESOA (the European and Middle East and Africa Satellite Operators non-profit organization) and fully supports the comments provided by ESOA regarding 5G spectrum access at 26 GHz under this consultation

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

No Comment on this Question

***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?*

Airbus wants to highlight the fact that sharing studies are still going on at European and International levels, and that it would be relevant considering the results of these studies before choosing the most appropriate licensing regime. The need to protect incumbent systems – and therefore to coordinate with them according to specific sharing constraints – makes a license exempt regime choice hasty – if not inopportune – at this point in time.

In the current draft CEPT brief on Agenda Item 1.13[1], it is stated that "*CEPT supports sharing and compatibility studies for the bands listed in Resolves 2 of Resolution 238*", and that "*Studies need to take into account the compatibility with and protection of all existing services, including their future deployments, in the same and adjacent frequency bands; in particular the protection of current and future EESS/SRS earth stations should be addressed.*"

As of now, the CEPT brief on A.I. 1.13 states that unwanted emissions from IMT-2020 in the 26 GHz band will create harmful interference to EESS passive sensors and Radio Astronomy Services stations in the passive band 23.6-24 GHz, and that "*only a drastic reduction of the IMT-2020 emissions in the 23.6-24 GHz can ensure such protection*". In addition, the brief mentions emission-free zones around RAS stations from 15 to 43 km (depending on the category of the IMT devices considered) to protect this service from IMT spurious emissions.

Within the 26 GHz band, current studies in the 25.5-27 GHz band also show that the separation distances around several EESS/SRS earth stations locations within Europe would be in the order of:

[1] DRAFT CEPT BRIEF ON AGENDA ITEM 1.13 (SWG 1.13 Annex 7 CEPT Brief 1.13)

- 4 km around earth stations supporting NGSO EESS satellites
- 7 to 24 km around earth stations supporting SRS spacecraft

Furthermore, future studies will address the aggregate effect of a full deployment of 5G network near those earth stations, and therefore are not expected to improve those figures.

The studies undertaken under this Agenda Item for the 26 GHz band so far assume that the IMT-2020 networks are operated on an individual licensed basis. Additional studies are therefore necessary to prove that license exempt operations of IMT2020 networks would be feasible.

Finally, some features of the 5G NR Spectrum Sharing presented in the 3GPP such as the "Listen Before Talk" feature might be of interests to share the spectrum between stations of terrestrial services (mobile and fixed), but are not appropriate to share spectrum between IMT stations and earth stations in space to Earth frequency bands where no emission from the ground occurs, as it is the case in the EESS/SRS 25.5 – 26.5 GHz band in UK for example.

Question 2.3: *When do you expect to support standalone New Radio in the 26 GHz band in your products?*

No Comment on this Question

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?*

The need to protect adjacent passive frequency bands from unwanted emission coming from IMT 2020 systems, as highlighted in sharing studies mentioned in the CEPT brief on A.I. 1.13 (see Question 2.2).

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.*

The need to take into account the existing services in the band 24.75 – 27.5 GHz and more specifically the current and future EESS Earth stations is identified via a footnote in ITU WRC 15 Resolution 238:

"*When conducting studies in the band 24.5-27.5 GHz, to take into account the need to ensure the protection of existing earth stations and the deployment of future receiving earth stations under the EESS (space-to-Earth) and SRS (space-to-Earth) allocation in the frequency band 25.5-27 GHz.*"

The EESS earth stations are clearly not numerous nor ubiquitously over the UK, and are currently using only a portion of the 26 GHz band (i.e. 25.5 – 26.5 GHz in UK).

Therefore, a sharing of the 26 GHz band could be achieved by preserving both interests, i.e. through segmentation of the 26 GHz band and/or by ensuring minimum separation distances of the magnitude defined by the on-going sharing studies mentioned in Question 2.2.

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?*

No Comment on this Question

Question 4.1: *What service would be delivered and to which consumer and/or organisations?*

No Comment on this Question

Question 4.2: *Where in the UK would the 26 GHz spectrum be used to deliver services? For example, will deployments be focused on:*

- *Areas of existing high mobile broadband demand?*
- *Rural areas?*
- *Rail and road corridors?*
- *Specific types of enterprise or industrial sites?*
- *Indoors or outdoors?*
- *Specific nations or regions of the UK?*

As long as Ofom takes all appropriate actions to ensure continued protections of current and future deployment of satellite services from harmful interference, Airbus supports the current CEPT brief stating:

"*In the bands above 24 GHz, mobile communication services will mainly target urban and sub-urban hotspot areas. There is no expectation that the bands above 24 GHz will be used for contiguous nationwide coverage of MFCN networks. There may be a need for hotspots also in rural areas e.g. dedicated locations or along major roads and railway tracks. The deployment of MFCN will target mainly a small cells type of usage (around 150 m). These frequency bands do not present the characteristics to support a national coverage objective and wide coverage areas. MFCN networks could be deployed indoor and/or outdoor."*

Furthermore, Airbus wishes to point to the Ofcom that 5G/IMT eMBB uses will not be practicable on an indoor-to-outdoor and outdoor-to-indoor basis at 26 GHz. Therefore we would support a policy decision for the preparations of 5G trials in relation to the 26 GHz spectrum well in advance to any full 5G licensing in the band. This would allow testing the spectrum needed for trials and the geographic locations for these.

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?*

No Comment on this Question

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?*

No Comment on this Question

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?*

We invite Ofcom to consider the on-going sharing studies on A.I. 1.13 where technical parameters to ensure protection of stations operating in existing primary services – such as EESS earth stations – are specified.

Question 4.6: *Will end users be fixed or mobile?*

No Comment on this Question

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?*

An important portion of the 26 GHz band is allocated to Earth Exploration Satellite Services (EESS). Applications using the information collected by systems of the EESS are manifold and used goes from climate and environment protection to support in catastrophic events and from geo-intelligence to homeland security. A typical Earth Exploration Satellite can generate and transmit in one single day a volume of data of about 40 Terabit. In the future this amount will increase up to 80 Terabit per day.

The Frequency Band 25.5 – 27 GHz is the only band available for Earth Exploration Satellite Services that can be used to download this amount of data. Because of the high importance of the Earth Observation, it is essential to make sure that existing and future base stations in UK remain protected from harmful interference.

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?*

The licensing approach should take into proper account the conclusions of the CEPT/ITU-R sharing studies, including the need to enable the continued viable and sustainable use of the 26 GHz band by other primary space and terrestrial services.

The frequency bands identified to enable 5G in Europe by RSPG Opinion last November 2017 include 24.25-27.5GHz (the 26 GHz band), identified as the 'pioneer' mm-wave band for ultra-dense, very high capacity 5G networks. The 32 GHz and the 40 GHz bands have also been identified in Europe as promising bands for 5G. All these are priorities bands for study for WRC-19 under AI 1.13.

Alternative licensing mechanisms that might be considered to be used in the mmwave bands at 26 GHz band for 5G, are also relevant to the 32 GHz and 40 GHz band, although how existing services will be accommodated alongside 5G will vary between bands, since each band currently has different utilisation and existing authorisations in UK and throughout Europe.

This being said, Airbus appreciates the pragmatic hybrid option presented by Ofcom. Allocate a small number of area defined licences in areas of high demand for part of the 26 GHz band, with the remainder available for individual, coordinated deployment could indeed allow a fair sharing of the band between future IMT systems and existing and future earth stations operating in primary services in the band. As suggested by the Ofcom, the entire spectrum would be available for coordinated deployments outside of the defined licence areas.

Question 5.2: *What methodologies could be used to pre-define 'high demand areas' for area defined licences?*

Airbus suggests that not only marketing information such as the market demand to be considered to pre-define the "high demand areas", but also technical information such as

- the actual and planned deployment of the optical fibre infrastructure in order to ensure a proper backhaul of the amount of (aggregated) mobile data

- the required separation distances between IMT systems and earth stations of existing and future satellite services determined by the sharing studies

Question 5.3: *What mechanism could be used to coordinate cell deployments by different operators in shared spectrum?*

No Comment on this Question

Question 5.4: *What methodologies could be used for determining the proportion of spectrum to allocate using area defined licences and coordinated deployment?*

The RSPG opinion suggests 5G will use 'a portion' of the 26GHz band; it also states that EESS earth stations and ISS use need to be safeguarded and consideration is also needed passive services below 24GHz. The 25.50 – 27 GHz band is understood to be used by Earth observation and a continued access to the 26 GHz band is especially important for high resolution earth-observation satellites worldwide.

The required measures to safeguard existing and future 26 GHz use will depend on the conclusion of sharing studies, which are now underway within CEPT and in the ITU-R. The results of sharing studies should be used to inform the decisions on how spectrum can be made available for 5G in the 26 GHz band at national level.

Airbus supports UK efforts to undertake the relevant studies within European and international fora. The CEPT Roadmap for 5G asks ECC PT1 to investigate the impact of the use of spectrum for 5G in higher frequency bands in relation with general authorization regime, with an action to consider this in the studies for 26 GHz harmonisation and for future activities as appropriate.

As industry we are in need of these clarifications. On the basis of the implementation at national level of the relevant precautions ensuring regulatory compliance with interference management criteria developed by CEPT and ITU-R studies, EESS earth stations shall continue operating and shall coexist with 5G in the future and this without impact on the viability of the spatial data downloaded.

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?*

Based on its experience of the Wireless Local Loop in the C band, Airbus supports a progressive approach allowing Ofcom to assess the market response in a timely manner and take advantage of the evolution of the technology in the same time.

Conclusion

Airbus calls for regulatory certainty and licensing conditions predictability under the terms of a general authorization and individual right of use in the 26 GHz band. The authorisation conditions for terrestrial 5G operations should ensure that future EESS earth stations can also be deployed and protected.

Finally AIRBUS thanks the Ofcom for giving the opportunity to provide comments to the "5G spectrum access at 26 GHz and update on bands above 30 GHz" consultation.