Consultation response form

Consultation title	Ofcom's proposed Plan of Work
Full name	[✂]
Contact phone number	[✂]
Representing (delete as appropriate)	Organisation
Organisation name	Global Satellite Operators Association (GSOA)
Email address	[✂]

Your response

Question	Your response
Question 1: Do you have any comments on Ofcom's proposed Plan of Work 2024/25?	Confidential? – N

The Global Satellite Operators Association ("**GSOA**") is a non-profit association and collaboration of members of the global satellite ecosystem. As the unified voice of the satellite industry, GSOA is appreciative of Ofcom's work programme which is generally supportive of enabling innovative satellite communications to support UK consumers and businesses.

GSOA is pleased to provide its comments on Ofcom's proposed Plan of Work 2024/25 (the "**Plan**"), and through this submission, provides inputs essentially on Ofcom's '*Enable wireless services in the wider economy*' workstream. The following submissions pertain to Ofcom's programme identified in Paragraphs 2.36 and 2.37, pages 22-23 and related project details in the Project Annex, pages 42-43 of the Plan.

1. Supporting network evolution and convergence

1.1. Enable innovative satellite communications to contribute to UK goals. GSOA welcomes Ofcom's support for technologies that can demonstrably bring extended connectivity and promote digital inclusion, and its continuous recognition of the satellite sector's importance to the UK's communications ecosystem. Over the last 20 years, the UK space industry has grown significantly, creating some of the most highly skilled jobs in the country and delivering economic growth to the

country. The sector is critical to the UK's national infrastructure, in the communications, defence, and security areas. The satellite industry very much relies on Ofcom's cooperation to driving further progress and contribution to the communications ecosystem.

Existing and developing satellite connectivity solutions notably will further increase and extend connectivity solutions in the UK and elsewhere, and also contribute to the full deployment of 5G and the emergence of 6G. These satellite solutions will include LEO, MEO and GEO constellations with spectrum usage spanning over L, S, C, X, Ku, Ka, Q/V, as well as W and E frequency bands in the future. Hence, GSOA welcomes Ofcom's recognition of the importance of examination of spectrum needs and updating the licensing of satellite services.

1.2. 6G network rollout. Satellite systems are already an integral and essential part of the 5G ecosystem and are contributing to the deployment of 5G services to end-users in many locations including the most remote geographical areas. They are enabling communications on the move, direct to premises connectivity in rural and urban areas, direct connectivity to end user devices including consumer electronic phones and IoT devices, video content and big data delivery worldwide. Satellites are also reinforcing 5G service reliability by providing service continuity to users, reducing power consumption and by scaling 5G networks through the provision of efficient multicast/broadcast resources for data delivery towards the network.

Satellites will be an increasingly integral part of 6G non-terrestrial network architecture and extend global coverage of 6G for wider interconnectivity and heightened resiliency.[1] For satellites to perform this role effectively, satellite systems require unfettered access to spectrum on a global basis, including spectrum that facilitates 6G development and adoption. Therefore, GSOA suggests evaluation of actual spectrum needs of all wireless technologies and the credibility of business opportunities, prior to mandating sharing of spectrum.

While most services such as satellite services and fixed services generally share spectrum, an identification for terrestrial international mobile telecommunications (IMT) generally makes it difficult or even prevents use of the same frequency bands by other national and international services such as the 'science services' (including for climate), HD video broadcasting or other satellite applications such as broadband to the home and gateway services, as well as narrowband communications for Internet of Things (IoT) devices. Ofcom should consider these limitations and take a balanced approach when evaluating terrestrial network (TN) and non-terrestrial network (NTN) technologies and responding to the evolving connectivity needs of UK citizens and businesses. For 6G services to be socially and economically inclusive, Ofcom should ensure that its policies and regulations are also technologically inclusive so that each technology can play its role in the 6G ecosystem.[2]

2. Managing spectrum coexistence

2.1. Mitigating risks of interference. The outcomes of WRC-23 reaffirm that satellites are essential to ensure and extend fixed and mobile connectivity everywhere. Continuing to extend and increase satellite connectivity for all applications will significantly help reduce the digital divide and

[1] The satellite industry is already contributing to leveraging extensive ground network partnerships and developing breakthrough technology solutions for secure communications. For example, SES has led 20 European partners under the EAGLE-1 project to develop and implement a space-based Quantum Key Distribution system provides secure communications in Europe. See SES Press Release on how Eagle 1 advances Europe's leadership quantum communications.

[2] See GSOA's study on Satellite communications and their role in enabling 6G.

bring broadband, narrowband and other satellite applications to many more people. To achieve this, a predictable regulatory and spectrum environment is critical.[3]

GSOA agrees with Ofcom that spectrum is a scarce and essential resource, and its efficient use is key to unlocking the potential of different wireless systems and applications contributing to achieving national connectivity goals. In some cases, sharing spectrum in band or between adjacent bands can be envisaged to accommodate several needs. Sharing spectrum remains a delicate matter, and some operations are more susceptible to suffer from interference (typically, satellite space-to-Earth downlinks) or, on the contrary, more inclined to create interference (typically, 5G IMT[4]).

Notably, it will be essential to mandate and supervise mitigation of interference risks to ensure the most efficient co-existence of TN and NTN systems. In particular, roll out of next-generation high-power and ubiquitous wireless services should be done under technical conditions that proactively safeguard the continued operation and development of satellite earth stations with Fixed Satellite Service (FSS) and Mobile Satellite Service (MSS) frequency allocations.

2.2. Spectrum sharing in 3800-4200 MHz. GSOA seeks guarantees that satellite will keep access to this frequency band for its current and future operations. Given its unique characteristics, C band remains essential to FSS for some specifically critical services which require both global geographical coverage and high resistance to rainfall conditions. GSOA responded in the consultation on this topic, for which the deadline was 2 February 2024, and very much expects Ofcom to take its comments in due consideration.

2.3. Hybrid sharing in upper 6GHz band. While WRC-23 has designated the upper 6GHz band for IMT in region 1, GSOA is cognizant of the practical issues that need to be considered for hybrid sharing models such as the indoor-outdoor split, and geographical sharing approaches. The significant issues concerning coexistence between outdoor IMT and FSS receivers (onboard satellites and in earth stations) will nevertheless need to be addressed. GSOA looks forward to further deliberations on approaches best suited for economies of scale, and nuances such as the extensive power levels and density constraints to be placed on IMT stations to ensure they do not interfere with FSS services.[5]

2.4. 26GHz and 40GHz band. GSOA is supportive of Ofcom's proposal to use 26GHz and 40GHz band for terrestrial mobile systems in the UK, only if Ofcom implements sufficient protections from harmful interference to protect existing, planned, and future satellite broadband services. GSOA therefore reminds Ofcom of its initial comments in response to the consultation on enabling mmWave spectrum for new uses.[6]

GSOA notes that Ofcom will need to consider adequate technical, operational, and regulatory arrangements for sharing of frequencies between FSS earth stations and mobile systems in its licensing and authorisation regime for IMT services, as parts of 26GHz and 40GHz bands can be used for FSS uplinks with earth stations to be deployed in the UK. Any authorisation framework should require technical conditions to ensure appropriate coexistence of terrestrial systems with

[3] See GSOA's study on the Socio-economic value of satellite communications.
[4] See GSOA's study on Technical compatibility challenges between FSS earth stations and 5G in C-band downlink spectrum. Pages 4-6 of the study discusses coexistence between 5G and FSS, interference mechanisms, and mitigation techniques.
[5] See GSOA's response to Ofcom's consultation on Hybrid sharing: enabling both licensed mobile and Wi-Fi users to access the upper 6GHz band.
[6] See GSOA's response to Ofcom's consultation on Enabling mmWave spectrum for new uses.

other services in the band, taking due account of continued deployment of FSS and MSS earth stations. For both bands, this includes measures such as limiting the areas for placement of antennas for mobile base stations, monitoring, and requiring reporting of number and location of IMT base stations, plus geographic separation requirements between satellite earth stations and mobile base stations.

3. Updating and reviewing the spectrum management framework

3.1. Enabling further deployment of NTN. GSOA recognizes the need for harmonised licensing frameworks that enable NTN to play a part in extending the reach of connectivity to all geographical areas. Depending on target coverage, capacity, and performance of the NTN, 3GPP is considering a variety of frequency bands in both sub-6 GHz frequencies (FR1) and higher frequencies bands above 10 GHz (FR2). As part of this development, the appropriate licensing framework for the deployment of GSO and NGSO satellite gateways will be essential to strengthen the role of satellites in deploying broadband and narrowband services for businesses and consumers.

In this regard, enlarging FSS access to spectrum in the Ka-band 28GHz (27.5-29.5GHz) is critical, and GSOA urges Ofcom to pursue efforts on this front as a follow-up to their consultation in 2023.[7]

3.2. Supporting satellite direct to device (D2D). GSOA welcomes Ofcom's recognition of the role of satellite direct to device D2D as a key contributor to future connectivity, by making spectrum available for transmission directly to devices.

As noted above, the satellite industry relies on the regulator's ability to further enable access to spectrum allocated to MSS, in line with WRC-23 decisions, to play a key role in future development of satellite connectivity to end-users. To meet the expected growing demands for this service, sufficient spectrum must be safeguarded and made available to accommodate the expected large numbers of end users' devices. Additionally, terrestrial Mobile Service spectrum can be provisioned for satellite networks and systems for transmission between existing user equipment (mobile devices) and satellites, thereby complementing the terrestrial mobile network coverage, particularly in areas where it may be unavailable or does not exist.

Irrespective of the regulatory framework under which satellite D2D connectivity is provided, access to harmonised spectrum is a foundational requirement.

3.3. The importance of partnerships. From WRC-23 it is evident that regulators such as Ofcom need to strike a balance between the needs of satellite operators in an evolving technological landscape, by providing both certainty and flexibility in spectrum usage. GSOA commends Ofcom for its recognition of the impact of regulating actors with global footprint, and the importance to pursue international partnerships and hopefully seek harmonisation within the ITU, CEPT and 3GPP.[8]

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[7] See Consultation: Expanding spectrum access for satellite gateways in the 28 GHz band - Ofcom and GSOA response form.

[8] Indeed, as Ofcom mentions it at paragraph 4.5, page 31 of the Plan: "*As well as serving as the chair of the lead spectrum committee (ECC) and vice-chair of the preparatory committee (COM-ITU) for the European Region, the UK is an elected member of the governing [ITU] Council for 2023-2026*" together with France, Germany, Italy, Spain, Sweden, Switzerland, and Türkiye.

GSOA also supports Ofcom's approach to industry-led standardisation and leveraging domestic partnerships to experiment with innovative approaches on spectrum usage. GSOA notes that Ofcom wishes to be increasingly involved in spectrum sandbox initiatives and experimental spectrum sharing arrangements, to reduce uncertainty, promote confidence, and facilitate adoption of more effective solutions.

4. **International leadership on spectrum management.** GSOA welcomes Ofcom's intention to take account of the WRC-23 outcomes in the UK spectrum policies and priorities. As mentioned in Section 4.17 of its Space Spectrum Strategy Statement,[9] Ofcom already had a plan to enable the use of aeronautical Ka band terminals communicating with NGSO satellites pending WRC-23 deliberations on this issue. Following the successful outcome of WRC-23 Agenda Item 1.16 which establishes a globally harmonized framework for aeronautical and maritime NGSO Earth Stations in Motion (ESIM), GSOA proposes extension of the Earth Station Network License to include the authorization of NGSO aeronautical services in the full Ka band (27.5-29.1 GHz and 29.5-30 GHz). Furthermore, WRC-19 expanded the regulations for GSO ESIMs through Resolution 169 (WRC-19), which was followed by revision to CEPT ECC Decision ECC/DEC/(13)01,[10] setting out a framework for the authorisation of Earth Stations on Mobile Platforms (ESOMP) in CEPT administrations in the whole of the 17.3-20.2 GHz and 27.5-30.0 GHz bands.

   The authorization of NGSO and GSO ESIM operations in the UK could be now extended to the full Ka band supporting higher capacity on ships and aircraft, aligned with Ofcom's intention as mentioned in Section 4.7 of Space Spectrum Strategy Statement. GSOA requests Ofcom to initiate action on this work item in 2024/25 together with the implementation of ECC/DEC/(15)04 for aeronautical ESIM. Similarly, GSOA expects Ofcom to extend the Ku-band available for aeronautical ESIM uplink operations to the frequency band 12.75-13.25 GHz by implementing the ECC Decision (19)04,[11] following the successful outcome of WRC-23 Agenda Item 1.15. GSOA also proposes that Ofcom should support initiatives in the UK and within CEPT ECC to enable the use of maritime ESIM in this band.

[9] See Ofcom's Space Spectrum Strategy Statement, 2022.
[10] See Revised CEPT ECC Decision ECC/DEC/(13)01.
[11] See ECC Decision (19)04, and Ofcom's stated intention to review implementation of ECC Decision (19)04 post WRC-23.