



Vodafone Response to Ofcom Consultation: UK preparations for the World Radiocommunication Conference 2023 (WRC-23)

UK provisional views and positions for WRC-23



Introduction

Vodafone welcomes the opportunity to comment on Ofcom's proposed positions for the World Radiocommunication Conference 2023 (WRC-23). WRCs occur regularly but infrequently: it is therefore important that the positions adopted make adequate provision for the spectrum needs of critical sectors in both the medium and long term.

Although Vodafone is perhaps best known in the UK for provision of mobile services, we also operate over 1.6M kilometres of fibre/coaxial cable globally and provide fixed broadband services to 25M customers across Europe, 9M of whom are converged. We operate satellite earth stations. Our European operations provide television service to almost 22M customers. Our policy positions with respect to spectrum therefore take a balanced view, and are not dominated by the needs of a particular sector.

Our key policy asks are therefore that Ofcom adopts positions on the following three agenda items at WRC-23:

- WRC-23 agenda item 1.2: a single European approach, consistent with the Digital Single Market¹, should be taken for the upper band and we support the IMT identification of 6425-7125 MHz at WRC-23 and that at least 6425-7125 MHz is made available for licensed 5G.
- WRC-23 agenda item 1.3: reflecting the UK usage, there should mobile allocation on a primary basis in the 3600- 3800 MHz band at WRC-23
- WRC-23 agenda item 1.5: Ofcom should support co-primary allocation to mobile services in the band 470-694 MHz, thereby laying the groundwork to permit the necessary reallocations when reasonable to do so.

The remainder of this response sets out the logic for these positions, and also our views on the other questions raised by Ofcom.

¹ Although the UK is no longer a member of the EU, the UK benefits from scale economies created by this market.



Answers to questions

1. Do you agree with the prioritisation of the agenda items, as shown in Annex 5, and if not why?

We agree that Ofcom has identified the high priority items.

2. What are your views on the continued need to protect global aeronautical and maritime services, in the 4.8 – 4.99 GHz band, under this agenda item?

Ofcom's position appears reasonable.

3a. Do you agree that the UK interest in the bands 3 600-3 800 MHz and 3 300-3 400 MHz in Region 2 (North & South Americas) should be limited to any impacts on UK operational use in those areas?

We support Ofcom's position on these bands.

3b. Do you agree that the UK should maintain its objections to changes to the regulatory environment for the band 3300-3400 MHz (in Region 1, Europe, Africa, Middle East), noting UK has interests in use of radar for both ground and airborne operations?

We support Ofcom's position on this band.

3c. What is your view on the use of 6425-7025 & 7025-7125 MHz, and what evidence do you have to support this view? How does that inform your views on a IMT identification in these bands?

As discussed at length with Ofcom, Vodafone strongly supports an allocation of the Upper 6 GHz band for IMT.

The Government has been clear that it sees 5G as a key enabler to powering a technology revolution to boost the post-Brexit UK economy. The Prime Minister has described mobile service as one of the “arteries of the economy”². 5G mobile brings high capacity, low latency², wide-area connectivity to British consumers

² See for example Evening Standard [report](#).



and enterprises. GSMA Intelligence³ estimates that 5G will generate \$960 billion in gross domestic product (GDP) in 2030 on a global basis with 65% of this socio-economic value being a result of deployments in mid-band spectrum.

Ofcom has identified the rapid growth of mobile traffic. Our network statistics back this up, with the migration to 5G stoking consumer demand: ✂ For mobile networks to meet demand, it is essential that additional mid-band spectrum is made available. We have provided evidence to Ofcom that sets out that even with optimisation of spectrum usage via refarming, there are parts of our access networks that face congestion in a 5-7 year time-frame. ✂

The alternative put forward by Ofcom for mobile operators to meet demand is one of significant densification of networks using mm-wave spectrum. This is a flawed proposal. Recent analysis by Coleago⁴ considered how mobile demand might be accommodated using mid-band spectrum, mm-wave spectrum or a mix, and concluded that mass densification using mm-wave would not represent a viable option, being very costly, and undesirable from an environmental perspective. We agree with Coleago's conclusions and fundamentally differ from Ofcom around the prospects for mass adoption of mm-wave spectrum across the network.

At a technical level, the propagation characteristics of mm-wave are significantly inferior to mid-band spectrum, meaning inter-site distances would need to be very small, propagation into buildings is impossible, and blackspots of coverage would be created by urban clutter. We do not believe that it will be possible to deploy mm-wave spectrum in the way that Ofcom envisages, not least because creation of the small cell grid suggested would mean such precision in site location that we would need to deploy cells on specific buildings, regardless of the appetite of the owners. The energy consumption of a dense grid would be considerably higher than the current macro grid; this is a major issue when energy costs present an unprecedented burden and are a significant factor in consumer pricing. There is no workable investment case for deployment of mm-wave for capacity relief outside extremely high footfall areas, as there would be massive deployment costs with no associated incremental revenue stream.

We must also highlight that although much of the focus on mm-wave has been around capacity relief, there are some use cases for mid-band which simply cannot be met using mm-wave. ✂

There is no credible outcome where all UK mobile networks densify using mm-wave in the manner that Ofcom has suggested. The most plausible outcome is that no-one can make the business case for such densification, hence networks go into congestion. Whilst this would have limited impact on competition – customers would have little motivation to switch provider on the basis of quality to move from one congested network to another – it would be damaging to the UK economy as communications would be compromised in the very locations that require high capacity. Ofcom will have failed in its duty to further the

³ "The socio-economic benefits of mid-band 5G services" (June 2022), GSMA [report](#).

⁴ "Estimating the mid-band spectrum needs in the 2025-2030 time frame; Global Outlook; A report by Coleago Consulting Ltd" (July 2021), GSMA [report](#).



interests of citizens in relation to communications matters. ✂. In summary, there is no good outcome for Ofcom in starving the mobile industry of mid-band spectrum. Taking the Prime Minister's analogy, Ofcom will have applied a tourniquet to the arteries of the UK economy.

Ofcom has portrayed the usage of 6 GHz for mobile as being an exercise in delaying the inevitable, with mobile networks either seeking further spectrum or having to densify networks a matter of years later. We disagree. ✂. The reality is, absent access to mid-band spectrum, given a stark choice between uneconomic investment in mass rollout of mm-wave, and the alternative of networks going into congestion in demand hotspots, the rational decision will be to tolerate network congestion – it is this inevitability that is being delayed.

We note Ofcom's concerns about coexistence between IMT and incumbent users. Studies of sharing between IMT and existing services in the upper 6 GHz band are on-going in ITU WP 5D, but the vast majority of contributions to ITU-R conclude that IMT (5G NR) deployments can coexist with the Fixed Satellite Service (FSS). As an operator of satellite earth stations, we would also highlight that the level of sub-10GHz FSS usage in Europe will likely diminish over time.

There has been significant debate about whether the upper 6 GHz band should be made available for licensed mobile, or licence-exempt (Wi-Fi) use, with differing views expressed across stakeholders. We reiterate that Vodafone is not just a mobile operator, but is also one of the largest fixed broadband providers in Europe and, by extension, a supplier of large volumes of home Wi-Fi router equipment. We acknowledge that the provision of additional licence-exempt spectrum for use by Wi-Fi would bring some benefits. However, considering that the lower 6 GHz band has recently been made available for licence-exempt use, and recognising that spectrum is a finite resource, as a stakeholder with interests in both camps we consider that the social and economic benefits of licensed mobile use of the upper 6 GHz band are overwhelming. We also note that many (if not all) of the applications cited for licence exempt usage are more technically-suited to higher frequency spectrum.

GSMA Intelligence⁵ has also conducted a cost-benefit analysis comparing allocations in the upper 6 GHz band for licensed or licence-exempt use. The analysis concluded that allocating the upper 6 GHz band for licensed mobile use would drive the greatest socio-economic benefits in the UK scenario of the lower 6 GHz band having already been set aside for licence-exempt use.

We note Ofcom has previously questioned whether an identification of the upper 6 GHz for mobile narrowly in Region 1 represents sufficient scale economies for a device ecosystem to develop. With respect, we must highlight that mobile network operators and network equipment vendors have overwhelmingly lobbied Ofcom in favour of the IMT identification being made: it is not in our interests to secure access to spectrum that will not be supported by terminals hence not available to our customers. GSMA's analysis⁶ suggests that

⁵ "The socioeconomic benefits of the 6 GHz band; Considering licensed and unlicensed options" (January 2022), GSMA Intelligence [report](#).

⁶ "The 6 GHz IMT Ecosystem" (August 2022), GSMA [report](#).



commercial 5G NR products in the 6 GHz band, both for the radio access network and user equipment, will be available to deploy in the 6 to 12 months following initial assignments to mobile use.

We note that during this consultation process Ofcom has made submissions to CEPT ECC PT1 on behalf of the UK supporting that “no change” be a prime option, which can readily be interpreted as Ofcom leaving its position of neutrality and favouring the Upper 6 GHz being used on a licence-exempt basis. We understand that Ofcom still regards itself as neutral, and being of the belief that like the situation for 3.6-3.8 GHz⁷, there is not necessarily a need to identify the Upper 6 GHz as being for IMT in order to licence it for mobile usage. We are disappointed that Ofcom saw fit to make international submissions on a key point of debate whilst this consultation was still open – if Ofcom adopts an international position prior to receiving stakeholder responses, it calls into question the purpose of Ofcom consulting. Whilst acknowledging that it is in principle possible to utilise spectrum for mobile without a primary IMT identification, it complicates matters: we struggle to understand the logic that CEPT might harmonise a band for mobile broadband whilst opposing an IMT designation.

We therefore strongly advocate that the UK supports IMT identification of the upper 6 GHz band at WRC-23.

⁷ Described at para 4.3.3. of the consultation



3d. What are your thoughts on the current UK view that IMT should not be identified in Region 2 in the band 10-10.5 GHz in order to ensure the protection of the globally operating EESS (active) systems and airborne & vessel mounted radars?

Vodafone has no comments on this question.

4. Do you agree that, where no additional technical limitations are placed on mobile services, the UK can support an upgrading of the mobile allocation, in 3600 - 3800 MHz, from secondary to primary?

We believe that there should be a mobile allocation on a primary basis in the 3600 – 3800 MHz band. We acknowledge Ofcom’s concerns about more stringent technical limitations being imposed, and that a cautious approach should be taken should attempts be made to impose such restrictions.

5. What are your views on the development of regulatory conditions to facilitate deployment of high altitude IMT base stations in IMT identified bands below 2.7 GHz?

Vodafone has no comments on this question.

6. Do you agree that a formal modification to the Radio Regulations is not needed for fixed service applications that use IMT technologies?

We support Ofcom’s position.



7. What are your views on the proposed approach for 470-694 MHz, recognising the national decisions already in place and taken for DTT multiplex licensing in the band, and the additional and supplementary spectrum made available for UK PMSE usage?

We draw Ofcom's attention to the work currently being carried out by UK Spectrum Policy Forum in this area, which may provide a useful input resource when Ofcom finalises its policy position.

Vodafone supports a co-primary allocation for mobile services in the sub-700 MHz band. In adopting this position, we do not necessarily argue for a change to the current Digital Terrestrial Television (DTT) usage in the UK. Rather, co-primary is the only outcome that allows the necessary future flexibility for individual countries to make their own decisions on the correct mix of DTT and mobile spectrum usage (within the bounds of international agreements).

It is clear that we are going through an evolutionary (bordering on revolutionary) process with respect to television viewing, with linear viewing declining and take up of on-demand services via broadband access (whether fixed or mobile) increasing dramatically. At this stage, we do not argue that there is a case for DTT to be discontinued or reduced in scope in the UK market - the evidence base does not exist, because future viewing habits are unclear. However, in coming years the picture will become clearer. The position in the UK may or may not align with that in other countries which have greater prevalence of television reception via cable and/or broadband.

If the UK opposes a co-primary allocation, the result is that it imposes a straitjacket of usage of the band universally for DTT, whether or not this fits the needs of individual markets. In contrast, if Ofcom supports a co-primary allocation, this still allows the UK to retain DTT usage of the sub-700MHz band if this works best for the UK, whilst allowing other markets to react as best fits their needs (within the bounds of international agreements protecting UK usage). If the evidence base supports the UK reducing the spectrum usage by DTT, then this is facilitated by the co-primary allocation. It is an option, not a mandate, to license the band (or part of it) for mobile usage.

8. What are your views on the need to establish an international regulatory environment that provides adequate protection of UK fixed links from earth stations in motion, in the band 12.75 – 13.25 GHz, which is also practicable from an enforcement/implementation perspective?

Vodafone has no comments on this question.



9. Do you agree that the UK continues to support the maritime distance figure for ESIMs that work to non-geostationary satellites and to test the other conditions agreed at WRC19 for ESIMs working to geostationary satellites to ascertain whether these remain appropriate for non-geostationary satellites?

We support Ofcom's stance on this topic.

10. What are your views on whether an allocation to inter satellite links is necessary for existing satellite allocated bands and whether this would provide benefits internationally?

Vodafone has no comments on this question.

11. What are your views on the need for additional satellite allocations in support of narrowband IoT "M2M" type applications, noting that there remains the continued use of PMSE for wireless cameras in the band 2010 – 2025 MHz?

Vodafone has no comments on this question.

12. What are your views on the proposed approach to this agenda item concerning the fixed satellite service in 17.3-17.7 GHz in Region 2?

Vodafone has no comments on this question.

13a. On Topic B, what are your views on the post milestone procedures for non-geostationary satellite systems?

Vodafone has no comments on this question.

13b. On Topic L, what are your views on regulatory conditions for Telemetry, Tracking and Command (TT&C) for NGSO in-orbit servicing?

Vodafone has no comments on this question.



13c. What are your views on the remaining topics currently listed for Agenda Item 7?

Vodafone has no comments on this question.

14. Noting that any UK position will be developed only after the ITU Plenipotentiary Conference, do you have any comments relating to the use of Article 48 that may be addressed at WRC-23?

Vodafone has no comments on this question.

15. What are your views on the need to establish an international regulatory environment for sub-orbital vehicles, which at the same time does not limit flexibility of spectrum options, and retains international safety considerations?

Vodafone has no comments on this question.

16. Do agree that where the adjacent band compatibility issues are addressed and ICAO coordination processes are not compromised, that the addition of an aeronautical satellite (AMS(R)S) allocation to the band can be supported?

Vodafone has no comments on this question.

17. Do agree that functions related to international aviation safety are a matter for ICAO? On this basis, and absent any contrary information from ICAO, should the UK support the development of an international spectrum regulatory framework for UA use of FSS that would support efficient use of spectrum?

We are supportive of the position adopted by Ofcom. However, as Ofcom states, international aviation safety matters are a function of ICAO. It is perhaps a nuance of wording, but we believe that the UK should be supportive of the development of a regulatory framework so long as ICAO are supportive of the initiative, rather than absent any objection stated by ICAO.



18. Recognising the recent diminishing industry interest in this item relating to possible modification of the aeronautical HF assignment plan, and the general lack of global interest, do you agree that UK move towards a No Change proposal under this agenda item?

Vodafone has no comments on this question.

19. What are your views on the need for additional spectrum, specifically in the 15 and 22 GHz bands, for non-safety aeronautical use?

Vodafone has no comments on this question.

20. What are your views on Agenda Item 1.11 and the proposed UK position to support modernisation of GMDSS?

Vodafone has no comments on this question.

21. What are your views on the approach to the review of 1240-1300 MHz, recognising that discussions concerning future satellite navigational needs for the UK are a matter for Government?

Vodafone has no comments on this question.

22. What are your views on a new spectrum allocation in the 40-50 MHz range to support and enhance climate monitoring, such as, environmental shifts in ice sheets?

Vodafone has no comments on this question.



23. What are your views on upgrading the Space Research Service allocation, from secondary to primary, in the 14.8-15.35 GHz band?

Vodafone is currently in discussions with Ofcom regarding a very small number of fixed links in the 14 GHz band. We cautiously support Ofcom's position on Space Research usage, so long as coexistence studies establish that there will be no impact on the remaining links.

24. What are your views on the potential for defragmentation in this band to facilitate both EESS (passive) use and provide for larger contiguous blocks for fixed & mobile allocations?

Vodafone has no comments on this question.

25. Do you agree that formal international recognition for Space Weather Sensors should be implemented in the Radio Regulations?

Vodafone has no comments on this question.

26. What are your views on the limits proposed to protect EESS (passive) under Agenda Item 9.1 topic d) and do you have any views on which of these limits might be accommodated in the Radio Regulations and how?

Vodafone has no comments on this question.

27. Do you agree that the formalised time reference in common global use, is not a matter of spectrum regulation?

We agree with Ofcom's position.

28. Do you have any comments concerning the Standing Agenda Items, where not covered elsewhere in this document?

Vodafone has no further input.

29. Do you have a view on any of the footnotes to which UK is a party?

Vodafone has no comments on this question.



30. Are you aware of any specific issues, not covered elsewhere in this document, which are likely to be raised in this part of the Director's Report and of which you think Ofcom should be aware?

We are not aware of any further issues likely to arise.

31. Do you have any comments on Agenda Item 9.3 considering Resolution 80?

Vodafone has no comments on this question.

32. What changes to the Radio Regulations have you identified that would benefit from action at a WRC and why? Do you have any proposals regarding UK positions for future WRC agenda items or suggestions for other agenda items, needing changes to the Radio Regulations, that you would wish to see addressed by a future WRC?

Although Vodafone does not have any particular policy push in this area, we would welcome evidence-based evaluation of any potential future IMT bands.

33. What are your views on the use of IMT stations that use antennas that consists of an array of active elements, in bands shared with satellite services?

We acknowledge the rights of satellite services to be protected. However, we consider that the risk of interference from IMT using AAS antennas in the 26 GHz band has been over-stated. WRC-19 Resolution 242 already contains conditions to protect satellite services in the band. Further unnecessary restrictions on mobile networks in bands that are already used or planned to be used for IMT should be avoided.

Vodafone UK
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