

UK Space Agency

Response to consultation on improving consumer access to mobile services at 3.6 GHz to 3.8 GHz

Introduction

The UK Space Agency thanks Ofcom for the opportunity to respond to this consultation on improving consumer access to mobile services at 3.6 GHz to 3.8 GHz. This spectrum, C-band, is very important to the space sector and it is essential that space sector access is retained. We support the principle that satellite earth stations with a receiver component in the 3.6 to 3.8 GHz band are taken into account for frequency management purposes. Further, this should also enable new earth stations introduced through sector growth. We do not support any removal of existing protection or future rights to gain protection, for example through restricting new RSA applications, as this would directly work against the Government-stated objective to grow the space sector.

In general, we find this a view largely based on UK-consumer benefit. This is understandable given Ofcom's primary duty is to citizens and consumers. However, when considering the use of this spectrum by the satellite service, it is important to recognise that UK industry stakeholders have international interests which may not directly impact citizen benefits, but will benefit the UK economy and UK influence.

We have concerns that a largely domestic issue risks unduly influencing international spectrum policy, for example, if Ofcom subsequently supports the de-prioritisation of C-band globally, based on national use patterns. UK domestic policy cannot be isolated from our international spectrum policy, which is a Government responsibility. The UK is unlikely to be able to successfully argue the importance of protecting FSS use in 3.4-4.2 GHz spectrum internationally, while promoting an opposing view at home.

We recognise that the 3.4-3.8 GHz bands are covered by EC Decisions to harmonise this spectrum for TD-LTE like networks. These decisions and the UK Statutory Instrument 49538 that implements them, state that this spectrum will be made available on a non-exclusive basis. Neither of the options proposed in this consultation present a viable future for the incumbent satellite use of this spectrum in the UK.

In our view, not protecting incumbent space use in this band is likely to significantly impede sector growth through damaging the UK's current reputation as a good place to do business in space. That reputation has already been weakened by recent changes in the Ofcom approach around satellite filings. Noting that Ofcom have already made a CFI¹ regarding the 3.8-4.2GHz spectrum, it is likely that this will be seen by the industry as the first stage in the removal of protected access to the satellite telecommunications in C-band as a whole (3.6-4.2GHz). This will make it more difficult to attract and retain investment in the UK space sector.

Question 1: Do you have any comments on the use of the 3.6 to 3.8 GHz band by existing services?

Satellite telecommunications systems have a sweet spot for operation in the 100MHz-30GHz range. This is determined by the propagation characteristics, at the lower end limited by the ionosphere, available bandwidth and practical antenna size and at the higher end by atmospheric and rain attenuation. In some parts of the world, either due to heavy rainfall or sparse population density, satellite systems cannot use higher frequency bands.

The consultation indicates there is very little use of the 3.6-3.8 GHz band by the Fixed Satellite Service (FSS) within the UK. We consider this analysis, which appears to be based on licenses rather than a

¹ "3.8 GHz to 4.2 GHz band: Opportunities for Innovation" June 2016

survey, may have resulted in an underestimate of UK use of satellites. With the limited terrestrial use to date, the majority of users may not have felt the need to apply for RSA. It is unlikely many stakeholders will have referred to the Ofcom web pages without prompting as they would not realise the need to.

We recognise that Ofcom do not have an industrial support mandate, however government departments are mandated to support growth and UK Space Agency is keen to ensure that UK domestic market priorities do not adversely impact UK competitiveness, overseas earnings and sector growth. A weakness in this analysis is that it does not consider UK interests in the FSS use of this band overseas. These interests were reflected in Ofcom's Spectrum Strategy Consultation, which closed in May 2016, though as yet we have not seen a statement or space spectrum strategy following on from that consultation.

Question 2: Do you agree with our identification of a trend towards the use of mobile in the 3.6 to 3.8 GHz band?

We do not see this as proven yet. There is too little evidence given in this document to justify a reallocation of this band to exclusive terrestrial mobile use, i.e. without ensuring the protection of incumbent and future space services. We recognise the band is subject to EC decisions as outlined above, and we base this view on the following:

- No demand study evidence is given and the parameters for mobile use are not finalised.
- Mobile operators are still not making full use of their current allocations and have not yet demonstrated if/when they need this spectrum.
- Large fractions of the UK still do not have reliable 3G/4G coverage in lower frequency bands. Moving to higher frequencies will not improve coverage. It would increase capacity but this would be better satisfied at very much higher frequencies where there is more bandwidth and which are also being considered as part of the WRC-19 process.
- The current terrestrial broadband use in this spectrum does not appear to have been successful in the market and there is no evidence provided that future mobile services would be any more successful.
- No case has been presented in this consultation that this spectrum will be globally harmonised, support in Europe does not translate into wider international support.

Mobile systems should be using higher frequency bands to deliver high-capacity services. Currently this use is largely limited by technology rather than propagation. Providing additional spectrum at significant cost to incumbent spectrum users, discourages the development of a mobile technology that would be able to exploit higher frequency spectrum.

There is an argument given over harmonisation. Satellite systems within the band are already harmonised while mobile systems are not, so this is an opportunity to ensure more equitable sharing. This would require a change in the way mobile operators approach the spectrum they use away from outright expectation of ownership and more towards peaceful co-existence.

The consultation references future European Commission decisions. The UK has decided to leave the European Union and references to future European policy with respect to future spectrum decisions may no longer be appropriate. Instead, only the current and planned UK statutory instruments should be referenced. These state that Ofcom must make this spectrum available, but on a non-exclusive basis. That would imply existing users should still be protected and would eliminate the remove option.

Question 3: Do you agree with our high level proposal to make 116 MHz within the 3.6 to 3.8 GHz band available for mobile and 5G services, bearing in mind our statutory duties and the high level trends we have identified?

We do not agree with making the band exclusively or universally available to mobile and 5G for reasons given above and elsewhere in this response. There may be good solutions that would allow mobile use of this band while protecting space use, however these have not yet emerged. The characteristics of 5G are not yet defined but it is clear that 5G systems similar to 3G/4G would need large exclusion zones to protect satellite ground stations. We fear this would either be used to price satellite operators out of spectrum through the introduction of unmanageable² opportunity costs or in practice these zones would not be implemented, resulting in interference to satellite ground stations. It would also be very difficult to introduce new ground stations if this required new constraints on deployed mobile networks.

In particular, the statement under 7.9 “We are currently considering policies to stimulate such a change.” Is worrying as it implies Ofcom are considering implementing high fees that may discourage future space sector growth. Would this just apply here or across all bands?

Question 4: Do you agree with our general approach regarding spectrum currently licensed to UK Broadband?

We would be very concerned over any relaxation in the requirement for UK broadband to coordinate with satellite ground stations.

Question 5: Do you agree with our assumptions, methodology, and conclusions with regards to potential coexistence between mobile and existing fixed links and satellite earth stations? Please refer to annex 5 for further details.

We agree with the methodology though we do not consider that there are only 19 satellite ground stations in the UK, nor that this number will not grow in the future. Some of the assumptions over mitigation need further testing. It is not clear from the consultation what propagation assumptions were used here so we would be interested in understanding how this was modelled. The identification of interference from 80km distance is not unexpected. This is likely to be a problem when high power mobile base stations are sited at elevated locations and is likely to require mitigation to be taken by the mobile operator to prevent interference to the fixed satellite service.

Question 6: Do you have a view on any of the two options we identified?

Neither of these options takes full account of international and industrial considerations, in particular the growth obligation. We can support some elements of option A, which we comment on below. We do not support any of the proposals in option B.

Under option A, paragraph 9.6 is initially reassuring as it aims to prevent interference to satellite earth stations. However it also raises concern in that it refers to existing infrastructure and does not allow for growth through the introduction of new earth stations. Paragraph 9.7 has the same issue.

Paragraph 9.8 implies it has already been decided to eventually remove space from the band through “incremental reductions in usage in this band by fixed links and satellite earth stations.” This would not be acceptable to the space sector.

Any increase in spectrum charging that might apply to the sector based on opportunity cost as indicated in paragraph 9.9 would be widely interpreted as an attempt by the UK to price the space sector out of its current spectrum allocations. That would set a precedent where future spectrum reallocations are at risk that will undermine confidence in future investment in the UK.

² Earth stations need protection across a large range of frequencies due to their international activity and use of in-space infrastructure. The opportunity costs rapidly become high, forcing incumbents out of business.

With respect to the next steps, paragraph 1.10 is of concern. We do not consider a hold, even if temporary, on the granting of PES or RSA for ROES to be compatible with sector growth objectives. A license limited to 3 years duration is not compatible with investment in space sector infrastructure.

Under 9.12 “In addition, mobile operators might be able to reach commercial deals with existing users to achieve early access to this band, before the appropriate notice period has passed”. This is based on the incorrect assumption that existing fixed satellite service users have the right to take decisions over the deployments and activities of future fixed satellite service operators.

The assumption in paragraph 9.15 is that satellite earth stations can move or somehow further protect themselves. This is sometimes true, with an associated cost, but will not always be true, e.g. where the earth station is supporting a critical asset. Paragraph 9.16 implies it will be up to the space sector to take remediation action rather than the incoming mobile service. We believe remediation should be the responsibility of the incoming service.

Question 7: Do you have any quantitative evidence on the costs and benefits associated with the options? This include costs for existing users and/or consumers of existing services associated with potential changes, and benefits to UK consumers in gaining access to mobile services in this band.

This is a question for industry. Any evaluation must take into account the interests of UK industry and Government. Any decision must not be based solely on citizen consumer benefit.

Question 8: Do you have any other suggestions that would allow widespread 5G availability using the 3.6 to 3.8 GHz band across the UK while allowing certainty for at least some existing users to continue to provide the benefits currently provided by use of the 3.6 to 3.8 GHz band?

As we have indicated, no satellite allocations are suitable for sharing with high power mobile LTE services in close proximity. Mobile services are not good sharers but we feel this could be addressed by the 5G technology and perhaps now would be a good time to put effort into developing 5G systems that can more easily share with satellite ground stations. At the moment, the emphasis is on raising capacity and longer range coverage, with little regards towards sharing spectrum with other users. With some restrictions, we consider that lower power Wi-Fi like technologies are much more likely to be compatible with existing use of this spectrum and could provide the needed mobile capacity.

Question 9: Do you have any comments in relation to these proposals?

The two options given within this consultation appear overly hostile to space and are strongly biased towards the enablement of mobile in a band that has been extensively used by the space sector for many decades. Despite this, we believe there may be a solution that would allow both satellite and mobile to equitably share the band. The original proposals for use of this band considered high density wireless broadband networks. If these are implemented as point to point RLANs it is possible this use could be managed and the band shared with satellite and fixed links which would not be the case for high power IMT systems.