

## Avanti Response to Ofcom Consultation: Review of Spectrum Fees For Fixed Links and Satellite Services

30th July 2015



### Summary of Avanti position

Avanti welcomes this review by Ofcom to the fixed link and satellite spectrum and is pleased to contribute its views on the subject matter. We welcome the recognition that fees should be reduced where there is little utilisation by fixed service. We recommend Ofcom to take into account the policy, social and economical value and benefit of spectrum used by the satellite services in UK.

Avanti is also mindful if the effect of any revised fees would be to discourage the use of fixed satellite services within the UK as that would clearly lead to less efficient use of spectrum rather than more efficient use of spectrum. Where satellite FSS connectivity is a lower cost option than terrestrial connectivity in rural areas or in sub-urban areas, increasing spectrum fees would logically alter that balance, as well as making satellite FSS services more expensive. We strongly support Ofcom's proposals to reduce fees for use of the bands above 20 GHz for earth stations is welcome. We also believe from looking at the assessment data that the demand from satellite FSS services in the 10-20 GHz frequency range is unlikely to decline, meaning these bands will continue to be increasingly used by satellite services.

We do not agree with the assessment by Plum that the spectrum used by satellite earth stations has not grown appreciably in the last 3 years. This statement is not a true reflection, noting also that such earth stations act as an anchor for multiple Ka-band spot beam coverages over Europe or elsewhere which continues to be used by a growing number of customers not just in rural areas but also in suburban regions across multiple countries. The future outlook is for continued demand growth, at Ka band where demand for spectrum for broadband services to consumers, enterprises and government will grow substantially in UK and elsewhere.

Avanti FULLY agrees that alignment of satellite earth station and fixed links fees continues to be a sensible approach. Avanti however disagrees that there is sufficient evidence supporting technical justification for the proposed increases in fees as set out in the Plum Report. Avanti recommends that one should more accurately model the potential interference distances between satellite Earth stations and fixed links, with the effect that the appropriate satellite fees would be close to the present levels. One can also develop a reasoned justification that satellite earth station fees in Ka band spectrum should be reduced or maintained at present levels.

Avanti also welcomes the discounts to fees in remote and suburban areas where there is little prospect of future congestion and penetrate by terrestrial infrastructure and we encourage Ofcom to develop specific consultation proposals in order to promote connectivity in such areas and close the digital divide.

We also consider that market value should not be the only factor in setting fees and "social benefits" to UK society and HMG "ICT policy goals" should be a very important factor considered by Ofcom in setting fees for earth station.



## Question 1: Do you agree with Plum's view of the potential higher value alternative mobile use of the 3.6-3.8 GHz bands over the next seven to ten years?

Avanti would like to raise the point that such growth in demand as proposed by the Plum assessment beyond mega cities or developed urban areas is required since such spectrum will be used for short distances. This may be more relevant to areas of high mobile traffic density, reinforcing the importance of satellite services for rural and suburban areas.

Furthermore, Avanti does not support potential higher fees in higher bands above 17 GHz since they are already used by satellite FSS services and that use will continue to grow. Such growth should be encouraged by Ofcom in order to promote the roll out of such services in urban, rural and suburban areas.

Question 2: Do you agree with Plum's analysis of current and future demand for spectrum for fixed links? Please give your reasoning.

We do note that Plum have not sufficiently assessed the likelihood that Fixed Service links used for backhaul to MNO mobile networks will be migrated over time to fibre.

## Question 3: Do you agree with Plum's analysis of current and future demand of spectrum for PES and TES? Please give your reasoning

We would like to highlight that satellite earth stations are used to transmit and receive telecommunications traffic for many different types of services, users, and applications such as telecom operators, broadcasters and private organisations.

Much of the traffic is international in nature, but there is a substantial amount of traffic also used within the UK by telecom operators, enterprise users, and consumers, as well as the Ministry of Defence (MoD). In addition VSAT services providing broadband connectivity, data services and broadcast content are provided directly to consumers and SME businesses using small VSAT dishes fixed on the ground within the UK.

What is missing from the Plum analysis for the future demand for spectrum from satellite services is the use by satellite earth stations to backhaul 3G/4G and indeed in the future anticipated 5G data backhaul connectivity. The frequency bands used by these satellite services cannot potentially be used by fixed links.

We also like to make it clear that within Figure 4-1 These numbers are based on information held by Ofcom on licences for permanent earth stations, as well as those with Recognised Spectrum Access (RSA); they do not include licence-exempt terminals e.g. VSATs at high density fixed satellite systems which number in the tens of thousands currently and will rise to hundres of thousands in the near future. Permanent earth stations might be lower in number, however they provide as gateway earth stations (GES) connectivity to very much larger population of smaller VSAT terminals in UK and elsewhere.

Question 4: Do you agree with the approach taken by Plum to calculate the opportunity cost of the spectrum? If not, how would you suggest the LCA is calculated? Do you also agree that this methodology is likely to provide a more conservative estimate?

Avanti would like to highlight that any increase on current fees for many bands below 20 GHz is not required given that there are no certainty as to whether there is sufficient concerns around congestion to warrant fee increases below 20 GHz when considering all the bands available, together with the fact that reduced fees are proposed by Ofcom for bands above 20GHz.



Question 5: Do you agree that Plum has identified the correct options for its LCA analysis? If not, what option(s) do you suggest we consider for the Least Cost Alternative?

No comment.

## Question 6: Do you agree with the cost assumptions that Plum has used in its analysis? Please provide documentary evidence if you disagree.

No comment.

Question 7: Are there any other pieces of publicly available evidence we could use to estimate the opportunity cost of the use of 3.6-3.8 GHz for mobile use now?

No comment.

#### Question 8: Do you have any comments on Plum's suggestion to remove the path length factor?

We agree that the path length factor could be considered for removal to encourage efficient use of higher frequencies where technically feasible.

#### Question 9: Do you have any comments on Plum's suggestion to add a location factor?

Avanti considered a geographic factor as one possible approach to the algorithm provided that this should not be reflected in existing earth stations licences where there are no fixed links services in the near vicinity.

Such consideration should also discount the normal fees in cases where a permanent earth station (PES) is anchored to a satellite Ka band spot beam in a rural area for which, taking into account the range of spectrum bands available and the low demand, there is little realistic prospect of congestion. For example. Avanti's licensed Ka-band PESs / GESs are located in rural areas of SW England and West England.

Avanti would welcome more detailed proposals from Ofcom as to how this geographic discount might be implemented.

## Question 10: What are your views on the need to revise the bandwidth factor in the fixed link algorithm?

Typical/traditional C and Ku band satellites with broad coverage beams used for consumer broadband provide around 1 Gbps of throughput. However thanks to frequency re-use made possible by using multi-spot beams on the Ka band, this throughput can be increased 50 to 100 fold – hence these satellites are referred to as high-throughput satellites ("HTS"). The massive increase in throughput allows satellite operators to offer satellite capacity at considerably more favourable prices.

By employing frequency reuse (using either linear or circular polarisation discrimination), a satellite can utilise up to say 500 MHz of C-band bandwidth twice, giving a typical capacity of 1 GHz in a beam.

When looking at a simplified comparison where, in each case, no satellite coverage beams overlap in coverage, only a single polarisation is used and there are no frequency coordination restraints, a C band satellite with two hemi beams can support at least 2 x 500M Hz = 1 GHz of bandwidth. A Ku band satellite at the same orbital position, but with two regional beams and four large spot beams could



support 6 x 500 MHz = 3 GHz of bandwidth. But, a Ka band satellite with two regional beams, two steerable beams and twenty multi-spot beams could well support up to  $24 \times 1$  GHz = 24 GHz. That's 24 times the bandwidth of the C band and 8 times the bandwidth of the Ku band satellite. So we consider that the bandwidth factor should take into account the efficient use of Ka band spectrum and due to the spot beam technology more bandwidth is provided, such increase on bandwidth should not be reflected in increase of fees.

We would also like to propose that there should be a discounted fee for the second polarisation when two different polarisation are used with the same frequency simultaneously.

Question 11: What are your views on the benefits of additional incentives for the use of high performance antennas? How might these best be implemented in our fees algorithm?

Avanti is in favour to include a reduction in fees if an operator spends extra monies to use a higher performance antenna than those that are more typically used at present. However we would need to better understand the range of currently deployed antennas and understand the costs and benefits that high performance would arise. This could be an area of further analysis prior to developing consultation proposals.

Question 12: What are your views on the suggestion that we further consider ways to incentivise the use of automatic power control, a suggestion we are minded not to take up?

No comment.

Question 13: What are your views on the proposed revisions to the PES algorithm and the TES ratio? In particular, do you agree we should use the relative denial areas to reflect the difference in opportunity cost between PES, TES and fixed links? Do you have any other suggestions for improvement?

Avanti notes that Ofcom consultation proposes that in respect to fees for earth stations is that *"underpinning the algorithm is the principle of charging an equivalent price to those faced by terrestrial links"* [Cons. P. 15]. We believe that this is at the highest level an appropriate assumption.

Avanti is concerned the implied efforts in this Ofcom consultation to suggest movement of earth stations out of populated areas. VSAT earth stations can serve equally urban and populated markets as well as other radio services. Ofcom should not assume that VSAT are only deployed in the hinterlands.

Avanti's experience is that a smooth earth diffraction model does not accurately predict the propagation in the Ka band nor take into account line of sight. Instead, it systematically and substantially overstates the predicted propagation. In support of Earth station licensing activities we have performed a number of on-site measurements as a follow up to computer simulations of the predicted levels from FS links. In every case the actual measured levels were significantly lower than predicted. Attenuation of signals from trees, buildings, and other structures, appears to have significant impact on the propagation of Ka band signals along the potential interference path between a fixed site and an Earth station. Thus an analysis using actual surface data would yield much more realistic results when calculating "denial area".



# Question 14: Do you agree that the benefits of implementing geographic pricing are sufficiently high to warrant us considering this further? Should we look at both where mobile is, and is not, an alternative use? Do you have ideas on how this could be implemented?

See answer to question 13.

## Question 15: Do you have any comments to make on any issues related to next steps and implementation?

Avanti considers that some further analysis is needed before developing consultation proposals to address the areas of concern as well as those areas of the proposals that in principle Avanti supports. Avanti is also ready to assist Ofcom in its further work in advance of its publication of consultation proposals. One method to assist Ofcom is to hold a workshop with stakeholders.

We also strongly believe that "market value" should not be the only factor in setting earth station fees; in particular realisation of "social benefits" and "policy goals" should be an important factor with a high weighting.