Virgin Media's response to Ofcom's consultation : Public Sector Spectrum Release (PSSR): Technical coexistence issues for the 2.3 and 3.4 GHz award

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NON-CONFIDENTIAL VERSION

Introduction

Virgin Media is pleased to respond to Ofcom's consultation on Technical coexistence issues for the 2.3 and 3.4 GHz award.

Virgin Media has focussed its response on the issues identified in Section 6 of the consultation; coexistence with Wi-Fi. In that context, we propose to set out our views on the proposal made by Ofcom not to intervene to address interference issues from LTE emissions from the 2.3GHz band, and to make comment on relevant issues that, in our view, need further consideration before Ofcom can come to a final view on this matter. We have not answered the specific consultation questions, but consider that this response covers questions 6.1 – 6.6 posed in the consultation.

The effective use of Wi-Fi is a vital element in ensuring that the communications network continues to adequately serve the consumer. Consumers have come to regard Wi-Fi as a standard component of a fixed line broadband service – and the proliferation of wirelessly connected devices in the home will only serve to strengthen both demand for Wi-Fi connectivity and the expectations related to that.

Similarly, as the capability of fixed line connections improves and increases, in particular with the increased deployment and take up of superfast broadband, Wi-Fi will need to be able to support this. This relates not only to ensuring that sufficient bandwidth is available to support higher speeds, but also maintaining/enhancing quality levels.

It is therefore vital that interference is minimised and that WiFi as a delivery mechanism is protected.

Wi-Fi is also an important complement to cellular services and plays a key role in moderating the demands placed on mobile networks. It is significant that only 19% of Mobile Data is carried by cellular means, and the vast majority is carried over fixed networks via Wi-Fi offload, and as such it is vital that the effective use of Wi-Fi is maintained in the presence of increased spectrum allocation for mobile broadband use. There is, otherwise, a real risk of unintended consequences: the opportunities envisaged for increased mobile data traffic will be undermined by a loss of efficiency in delivering the majority of that traffic when it moves between mobile and fixed networks.

Virgin Media notes that it is not alone in its concern relating to the need to ensure the integrity of Wi-Fi networks. We understand that these concerns are being raised across industry and have been reflected in TechUK's response, which Virgin Media supports.

Level of Interference

Virgin Media agrees with Ofcom's assessment that it is appropriate to consider the onset of interference as the relevant benchmark to assess the impact to routers[1]. The use of the alternate benchmark where throughput drops below 50% would be entirely unacceptable, which would allow inappropriate levels of interference to be regarded as acceptable to the consumer. In that sense it would be setting a standard on behalf of end users, which appears to be beyond the remit of the policy consultation on the PSSR award.

[1] See Paragraph 6.35 where Ofcom sets out its central case used for the policy assessment

Ofcom, however, justify the continued use of the 50% benchmark when considering impact on UE. The rationale for this is that throughput is already a variable for a consumer when using their device, and that they already "self-mitigate" to achieve better throughput. As stated above, there is a concern that applying a 50% benchmark to UE is imposing a low standard on consumers. That consumers already suffer throughput issues should not be a reason for allowing a further source of interference to disrupt their user experience[2], requiring further action on their part, indeed given that user experience is already compromised to a certain degree by factors other than LTE interference, there is a clear argument that 50% allowable degradation from 2.3GHz LTE would exacerbate an already sub-optimal situation and the higher benchmark of on set of degradation would be the better standard to apply.

At paragraph 6.44 of the consultation, Ofcom suggest that operators prefer to utilise the highest grade infrastructure, when developing their outdoor Wi-Fi Access Points. Ofcom rely on this to suggest that, when considering outdoor Access Points, it may be appropriate to place reliance on the best performing device, rather than the median of all devices. Virgin Media would caution against such an approach. Although the use of high performing devices is a material consideration on deployment (given the need to operate in already congested 2.4GHz spectrum), there has now been considerable investment in outdoor Wi-Fi networks, and the lifespan of an Access Point can be lengthy, and considerably longer than the period suggested in the consultation. Therefore, early Access Points, whilst being "high performing" at the time of installation, may not be so high performing at the time of this consultation, or indeed 2.3GHz LTE roll out. It would be inappropriate to penalise this early investment in outdoor Wi-Fi networks by assessing acceptable interference by reference to more recent technologies.

Virgin Media has reviewed its current deployment of outdoor Access Points [✂]. The requirement to upgrade Access Points affected by interference by 2.3GHz LTE emissions, is therefore likely to be costly and in addition to any current replacement / upgrade plans, and contrary to the suggestion made by Ofcom, not likely to occur in normal "business as usual" cycles.

Mitigation for Domestic Networks

Ofcom suggest that the effect on routers could be mitigated in one or more of three ways :

a. moving the router
b. applying a filter to the router
c. moving to the 5GHz band

Virgin Media considers that these mitigation options will not provide a comprehensive solution to a potentially large number of in home devices. As Ofcom acknowledge it may not be possible to move the router to reduce interference from base station emissions. However, to base the effective use of Wi-Fi on a need to position a router in a "safe" environment away from walls/windows risks creating an overly prescriptive and inappropriate siting requirement through the back door.

Ofcom also do not consider (in this context) interference from UE, which may well operate within the home, and in close proximity to the router, by the choice of the

[2] Which is suggested by Ofcom as a reason for adopting the reduced 50% benchmark at paragraph 6.42.

user (who will often want to have access to their mobile phone whilst in the same room (eg the living room) as their Wi-Fi router.

Additionally, Ofcom also include the BT FON model in the context of domestic networks. This model has shown that home CPE can provide a particular method of outdoor Wi-Fi coverage to complement the use of dedicated outdoor Access Points. If users of routers were required to move their equipment further inside dwellings to prevent interference, then this would have the effect of making their use as public Access Points less viable, reducing their range and reducing the potential for continuous connectivity. [✂].

The option of applying additional filtering to routers would, in effect, require the replacement of the router with a new model which incorporated the required level of filtering. Ofcom suggest that such CPE will be swapped out regularly at 2 year intervals so such upgrades could be considered as "business as usual". Virgin Media disagree with this logic. Whilst new versions of CPE, such as routers may be developed over a reasonably short timeframe (such as a 2 year cycle), it does not mean that all existing CPE will be swapped out[3]. The cost of deployment of more recent models of CPE are high compared to the re-use or continued deployment of older stock. This ability to differentiate packages is important with newer, more advanced CPE typically being offered with higher end packages. Therefore, the statement that an affected customer could simply be issued with the "latest" model is not necessarily reflective of the reality, and could skew the forecast costs and underlying economics for packages, irrespective of the costs of any filtering solution to be integrated within a new product. Virgin Media understand that Ofcom do not suggest that all customers should be upgraded, but only those affected by interference, however, such a cost impact would be significant even if there was a relative small portion of the base affected, requiring the suggested upgrade mitigation.

It is of note that when additional filtering was considered necessary to guard against interference from 2.6GHz LTE into the 2.7GHz band (S-Band ATC Radar), it involved a supported scheme to develop specific filtering solutions. Ofcom state that "*we believe filters do exist and manufacturer development will make this achievable*"[4]. This statement appears to demonstrate an overreliance on a potential solution being available, without considering the impact on ISPs and other router suppliers. Whilst we do not attempt to suggest that the complexities involved in ATC filter design will apply to router filtering, it does appear to evidence a gap in Ofcom's impact assessment of the viability of this mitigation. In the context of outdoor Access Points Ofcom suggests that filters developed for DTT mitigation may be able to be adapted, but the lack of certainty in this comment does not promote confidence in this mitigation[5].

The reliance on an ability to use the 5GHz band as an alternative to the 2.4GHz band for Wi-Fi use is also concerning. 5GHz may not be technically feasible in some cases given limitation in how the different bandwidths can be used. Further, the different properties and characteristics of Wi-Fi services delivered in this band may result in a poorer end user experience. Additionally, many current Wi-Fi devices do not support 5GHz use, so this proposed mitigation would not be open to them. Given the growth of Wi-Fi and the potential uses of 5GHz and adjacent spectrum going

[3] [✂]
[4] Paragraph 6.63
[5] See Footnote 52

forward, it seems inappropriate to rely on the availability of alternative spectrum (when spectrum is at a premium for Wi-Fi use) as an industry acceptable solution on a forward look basis.

Mitigation for Public Networks

Ofcom again note that the current (high) level of interference experienced by Wi-Fi in the context of public networks is reason for not being unduly concerned about additional interference from the 2.3GHz band[6]. Virgin Media, as stated above in the context of domestic networks, considered that this argument is undermined by the counter argument that congested spectrum that is the subject of existing interference should not be degraded by additional interference from a new source, to the extent that this would endanger its effective working. That operators have "a set of tools" to address existing interference is not a reason to determine that there are no necessary additional mitigations to prevent interference from LTE operating in 2.3GHz.

Ofcom also propose that two of the same mitigating measures can be taken in relation to outdoor Access Points, namely, filtering and moving to 5GHz. Our comments on the viability of filtering, as set out above, remain valid for Access Points, save to say that the filter requirements will differ depending on the particular equipment (end user / Access Point) under discussion. Further, as Ofcom note themselves, requiring the use of 5GHz (by reason of 2.4GHz being rendered as ineffective due to interference), may result in an overall loss of capacity, which in the context of the increasing importance of Wi-Fi off load particularly in out of home situations (as set out in our introduction) is not an enticing prospect, for either the network operator concerned, or wider users of mobile data. In addition, as we set out above, the different characteristics and capabilities of WiFi services delivered in the 5GHz band may result in a poorer end user experience.

Ofcom also suggest that adaptive antenna may mitigate the effects of Access Points. Give that this is an "existing tool", it will have already been taken account of in the testing undertaken by Ofcom, so to suggest that it is a valid mitigation would appear to be a form of double counting. [✂].

Ofcom's cost benefit analysis suggests that the mitigations are "*relatively cheap and straightforward*"[7], and the cost of any other remediation scheme would outweigh its benefit. Again, this proposition appears to be made on the basis of little evidence of the costs themselves, and little thought has been given to remediation schemes, which can come in various forms, both involving extensive support and cost from government, or those administered and funded by the mobile industry (eg DTT). There appears to be little discussion of these potential issues.

Conclusion

Virgin Media is concerned that the assessment of Ofcom made in relation to the level of interference is not complete, and whilst, where the evidence is supportive, taking a non-interventionist position is consistent with Ofcom's approach to regulation, there appear to be some potential shortcomings in the analysis undertaken. If these shortcomings are exposed by the reality of increasing Wi-Fi use and demand for

[6] Paragraph 6.67
[7] Paragraph 6.76

bandwidth, they could have a seriously detrimental impact on both Wi-Fi providers and end users, thus unravelling the potential benefit from 4G access and leaving the consumer in a worse position that before.

It is not the case, from the evidence, that there is a clear cut case for no intervention in relation to the demonstrable interference likely to be suffered by Wi-Fi equipment, and Virgin Media would encourage Ofcom to ensure that the perceived gaps in its analysis are addressed prior to any final determination of this issue.

Virgin Media is willing to actively support any additional trials and testing in the forthcoming period to ensure that the ultimate solution for co-existence between 2.3GHz LTE use and 2.4GHz Wi-Fi use is one that provides an appropriate and acceptable environment for both sets of stakeholders.

Virgin Media
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