Three's response to Ofcom's consultation: Optimal use of 3.9GHz spectrum

Non-confidential

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Executive Summary.

Three supports Ofcom's proposal to make technical changes to UK Broadband Limited's ('**UKB**') 3.9 GHz licence to enable it to use 5G technology to improve and expand its 5G Fixed Wireless Access ('**FWA**') offerings.

The proposed variation will enhance capacity of 3UK's 5G FWA service and enable high-speed connectivity – directly benefiting 3UK's customers and increasing competition in the fixed broadband market.

In the Consultation, Ofcom briefly considers moving UKB's frequency to start at 3.8 GHz to promote efficient use of the 3.8-4.2 GHz band but did not propose this due to the impact on existing fixed links and Shared Access Licences ('**SAL**').

In our response we explain that moving UKB's frequency to start at 3.8 GHz would promote efficient use of the broader 3.8-4.2 GHz band. Ofcom's primary concern is that users would end up co-channel with 3UK, and would therefore need to retune their equipment.

To address this, we've conducted an analysis to determine the impact the frequency move would have on existing fixed links and SAL. We have proposed three mitigation measures to minimise the impact, which will be adopted by 3UK (and not by the SAL and fixed links):

- Reducing bandwidth
- Muting downlink transmission, and
- Switching off the sector

These measures would ensure that existing users will not need to retune their equipment.

Ofcom should reconsider moving UKB's licence to start at 3.8 GHz

In the consultation, Ofcom stated that they considered moving UKB's licence frequency to start at 3.8 GHz but considered this move to be incompatible with ten links in South East England and a significant number of SAL (with nearly 150 licences) would end up co-channel with 3UK, requiring these users to retune their equipment. As a result, Ofcom decided not to propose this change, deeming it disproportionate to the potential benefits.

We note several benefits of moving the frequency, which would be proportionate to promoting efficient use of the broader 3.8-4.2 GHz band. These benefits include:

- Increase in usable spectrum: Moving the frequency could increase the amount of usable spectrum and remove fragmentation in the band for SAL, resulting in them having a contiguous holding of 316 MHz.
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- Lower equipment cost for SAL: SAL can benefit from lower equipment costs for 3.9 GHz equipment due to the larger contiguous 316 MHz holding.
- **Simplified coordination:** The move would result in a single boundary with Shared Access users, making coordination easier.

We understand that Ofcom is concerned with the impact this frequency move would have on existing users, particularly regarding the need for retuning their equipment.

To address this, we conducted an analysis to determine how many of 3UK's assignments would impact existing fixed links and SAL using frequency between 3800-3884 MHz. Below, we discuss in detail the methodology used for our analysis and our findings.

Methodology:

We've collected data on fixed links and SAL from Ofcom's Wireless Telegraphy Act Register (WTR) and identified 10 unique fixed link IDs (comprising a total of 20 links with both transmit and receiver) and 176 SAL operating within the 3800-3884 MHz frequency range.

For Fixed Links:

- We mapped out the 20 links using a 200m Fresnel zone.
- We did not account for antenna directivity, as we did not foresee it to significantly impact the analysis.

For Shared Access:

- We mapped out 176 licences and created buffers based on antenna heights from Ofcom's WTR.
- These buffers ranged from [><]m, based on similar distances observed in our network with corresponding antenna heights.

We then queried the above with our existing 3.9 GHz assignments (around 9,000 locations) [\gg].

Further to note:

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- The analysis assumed interference from 3.9 GHz assignment to Shared Access users and fixed links.
- We modelled assuming that Shared Access and fixed links were using a different frame structure and not synchronised with our signal.
- We did not analyse the impact on satellite earth station as data was not available from Ofcom's WTR.

Our findings:

Table 1 below shows our findings on the number of sectors that would impact fixed links and SAL operating within the 3800-3884 MHz frequency range if UKB's frequency is moved to start at 3.8 GHz.

We found that a total of [\approx] of our sectors would impact these fixed links, and [\approx] sectors would impact these Shared Access users, totalling [\approx] impacted sectors. These account for only [\approx]% of our total 3.9 GHz assignments.

Table 1: Number of impacted sectors

[×]

Source: 3UK

Given that only a few sectors are affected, we propose that for existing fixed links and SAL using frequencies between 3800-3884 MHz in close proximity to 3UK's assignments, we:

- 1. Carry one special co-ordination process with these licensees, and
- 2. Apply potential mitigation measures to minimise impact, where 3UK would apply the below measures:
 - a) Reduce bandwidth: [>>]
 - b) Mute downlink transmission of some sub-frames in 3800-3884 MHz in those time slots that cause interference, or
 - c) Switch off the sectors that cause interference

This would ensure that existing fixed links and SAL remain unaffected and would not need to retune their equipment.