Outcomes of the upper n77 (3.8-4.2 GHz band) market study

A UK5G report for DCMS delivered by UK5G and Real Wireless

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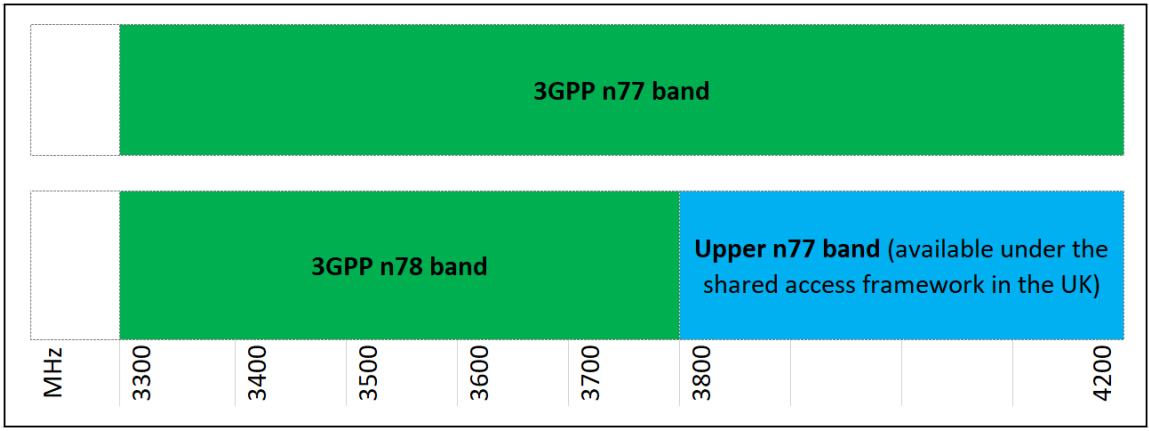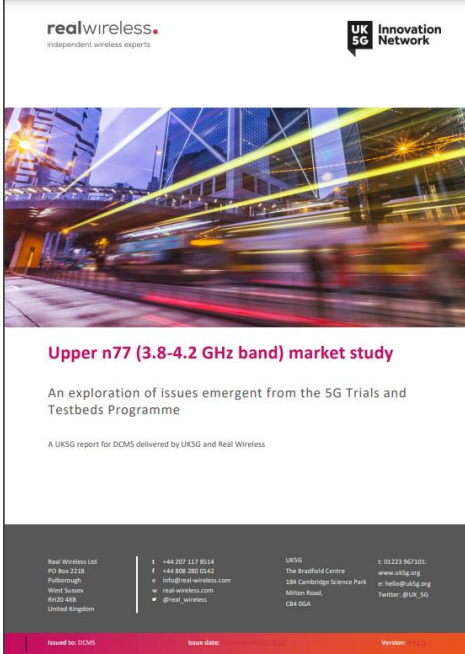22/11/2022

Introduction

- DCMS have commissioned UK5G to undertake a market study into the operation of the market for product operating in the 3.8 – 4.2 GHz spectrum (n77 upper band).

- UK5G is partnering with Real Wireless to undertake the study, draw conclusions and make recommendations.

Background

- The 5G T&T programme, has experienced numerous challenges in sourcing suitable products.
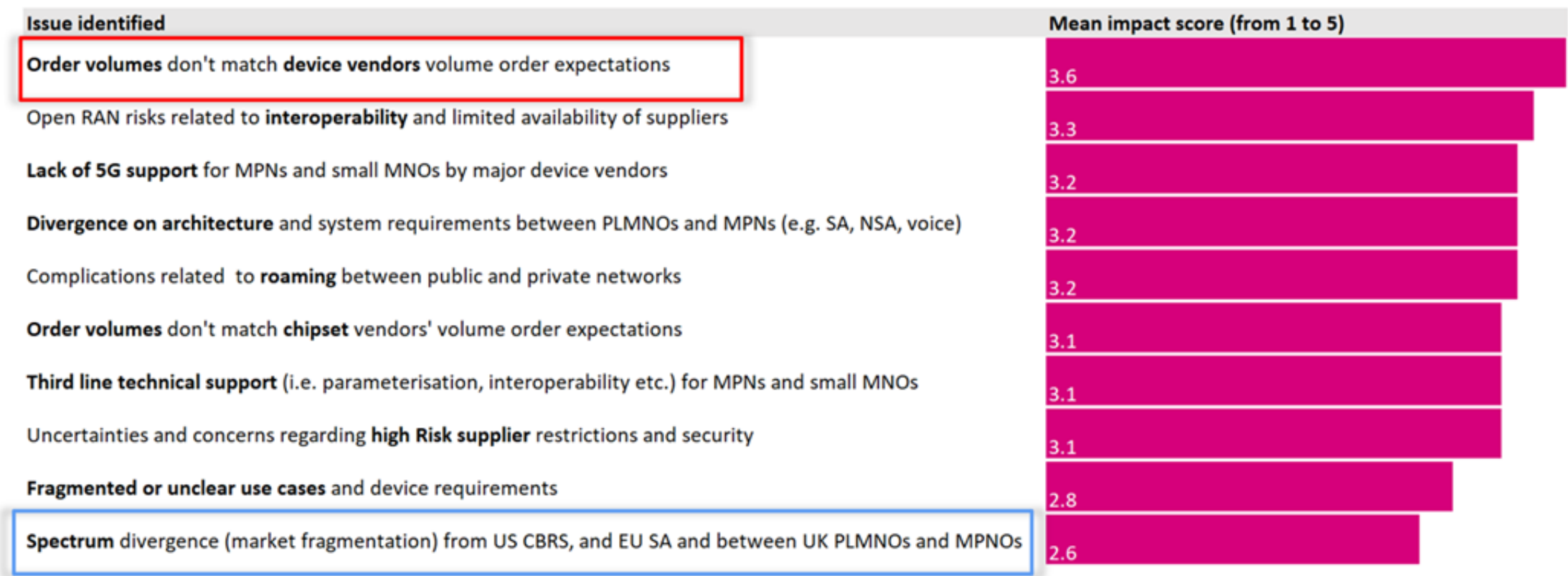
- PRINCIPAL QUESTION

  - IS THERE A SUBSTANTIVE SUPPLY AND DEMAND CONCERN IN THE 3.8 – 4.2 GHz BAND OR IS IT AN EARLY-STAGE MARKET ISSUE?

  - IF SO, WHAT ARE THE OPTIONS AVAILABLE TO IMPROVE THE SITUATION?

Upper n77 (3.8-4.2 GHz band) market study

An exploration of issues emergent from the 5G Trials and Testbeds Programme

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Ranking of issues

- **Demand volumes** not OEM or silicon readiness has been identified as the key challenge by stakeholders

Issue identified	Mean impact score (from 1 to 5)
Order volumes don't match **device vendors** volume order expectations	3.6
Open RAN risks related to **interoperability** and limited availability of suppliers	3.3
Lack of 5G support for MPNs and small MNOs by major device vendors	3.2
Divergence on architecture and system requirements between PLMNOs and MPNs (e.g. SA, NSA, voice)	3.2
Complications related to **roaming** between public and private networks	3.2
Order volumes don't match **chipset** vendors' volume order expectations	3.1
Third line technical support (i.e. parameterisation, interoperability etc.) for MPNs and small MNOs	3.1
Uncertainties and concerns regarding **high Risk supplier** restrictions and security	3.1
Fragmented or unclear use cases and device requirements	2.8
Spectrum divergence (market fragmentation) from US CBRS, and EU SA and between UK PLMNOs and MPNOs	2.6

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Summary of findings and conclusions from the study

- Comprehensive list of 27 recommendations, derived from direct suggestions of stakeholders and through analysis of the issues.

- The recommendations are focused on four key themes that are proven dimensions of any ecosystem management approach:

  1. Market formation

  2. Architecture harmonisation

  3. Interoperability testing

  4. Regulatory adjustments

Regulatory remedies

- The main concern is that if the shared access licensing framework is not considered fit for purpose by its prospective users, then pure-play MPNs would find themselves:

  - with an unviable business model and walk away from the UK market, or,

  - even more substantially disadvantaged compared to virtual and hybrid private networks operating over licenced spectrum.

- Now that more service providers have moved closer to pre-commercial testing, a more inclusive, focused consultation should be held to fully understand their concerns and any specific proposals for improvement here.

Regulatory remedies - Calls for a higher Power

- Some service providers raised concerns about the low and rigid power limitations applied to the shared access band

- Some approaches to allow the use of higher EIRPs where there's significant economic/social benefit and little interference risk, e.g. for mobile WANs or FWA, in mines, ports, airports, large private estates, rural towns and villages, large retail centres, large hangar-like industrial buildings, community broadband, hospital and academic campus, etc.

- The power concern could also indicate that there may be an element of service providers seeking to use the upper n77 band for use cases it was not originally intended for.

- Any industry consultation around this band should probably seek to either clarify any such misconceptions or make changes to enable (some of) these use cases.

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Regulatory remedies – Fine-tune the spectrum application framework

- A few requests to fine-tune and improve the current Ofcom shared access spectrum licencing framework, specifically focusing on the following:

  - Allowing applications for a specific sub-band and/or centre frequency

  - Improvements to the radio propagation analysis tools, the base station parameter database and the overall application process, including decision traceability and appeals

  - Remove the risk of Ofcom revoking individual base station licences or need to retune stations.

  - Improvements to the current manual application and evaluation process would be necessary to unleash demand and speed up adoption.

- Ofcom should continue to engage closely with interested industrial users of this band to ensure that their key concerns are addressed.

  - A specific forum could be established inviting prospective spectrum users and other impacted ecosystem players to advise on how best to make the shared access more commercially viable and/or to propose and implement viable solutions, including for automation of key processes.

Summary

- Embrace CEPT Harmonisation: Considering the interest from the EC, member states may take early actions to make spectrum available prior to EC's recommendation/mandate

- The challenge with the highest impact on the market is the lack of volume demand for devices

- 10 issues examined were recognised as valid concerns by the ecosystem players, but none was altogether dismissed or stood out as uniquely critical

- Whilst spectrum divergence is one of the issues identified, it also ranked as the least critical issue

- Regulatory remedies:

  - Calls for a higher Power

  - Fine-tune the spectrum application framework

- UK5G Real Wireless report is available: https://uk5g.org/media/uploads/resource_files/Upper_n77_market_study_v2.0_clean.pdf

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