WLAN use in the 6 GHz band

Submission | RSM

30 June 2021

Contents

Executive Summary

Thank you for the opportunity to comment on the RSM's proposals relating to Wireless LAN use in the 6 GHz band – a key mid-band spectrum range. RSM propose to:

- Make the lower 6 GHz band (5925 - 6425 MHz) available for unlicenced WiFi systems on a co-existence basis with incumbent systems (**lower 6 GHz**).
- Continue to monitor the international allocation and studies of the upper 6 GHz band (6425 - 7125 MHz) before making decisions (**upper 6 GHz**).

This mid band spectrum (6 GHz) is being considered by a large number of mobile operators for 5G networks. It is a key priority item for 3GPP Rel 18. 5G is expected to provide ubiquitous high-speed wireless mobile connectivity with user experiences that require download speeds measured in the hundreds of Mbps and, consequently, large amounts of spectrum. In this regard the mid band spectrum has a key role to play – large holdings are more feasible in mid-band spectrum than in low-band, while coverage from mid band sites will be similar to the C band and better than mm wave bands. We expect mid band spectrum will be a key spectrum range for bridging the urban/rural digital divide.

Accordingly, Spark is of the view that the upper 6GHhz band (i.e., 6425- 7125 MHz) should be made available for licenced NR.

We note MBIE's proposal to allow unlicenced use of the spectrum in lower 6 GHz (i.e., 5925- 6425 MHz) band. We also note that a decision to deploy unlicenced technologies is extremely difficult to reverse. Accordingly, care needs to be exercised in making this decision - especially in defining the regulatory conditions that go with that decision.

We agree that there is increasing demand for Wireless LAN services and that the lower 6 GHz band is being considered in many jurisdictions for these systems. However, we believe it is too early to decide to reserve the band only for WiFi technologies. There is support from authorities and vendors for both unlicenced 3GPP (5G NR-U) and IEEE (WiFi) technologies in the band, both of which are expected to be deployed . We prefer that this band be available for NR-U deployment as these technologies, which are part of the 5G eco-system, are expected to have greater synergies for end user and operators and economies of scale for devices.

We also note that the use of NR-U in the lower 6GHz will enable allow MNOs to utilise the additional spectrum in addition to their spectrum holdings using possibly the same NR base stations. This could be useful for peak season demand, peak event demand etc. We also note that many side-link communication services (UE to UE) utilise unlicenced spectrum. This will be very useful for autonomous vehicles. Furthermore, NR-U can also be utilized for private 5G networks deployed by or for industry verticals (for example Health, Ports, Industrial Parks etc).

3GPP studies on co-existence between NR licenced and NR-U are underway that will clarify co-existence conditions for the lower 6 GHz band. We recommend that the RSM awaits the results of these 3GPP studies to define regulatory conditions such as power limits. Spark is a member of 3GPP and can provide regular updates to MBIE on the course of these discussions.

In terms of the upper 6 GHz band, we recommend the RSM promote certainty by noting that it is reserved for NR licenced regardless of an IMT identification at WRC 23 as 6425- 7125 MHz is already co primary to mobile in Region 3. This would align us with major economies and device eco-systems.

Introduction

1. Thank you for the opportunity to comment on the Ministry's proposals relating to WLAN use in the 6 GHz band (**the discussion paper**).

2. The Ministry is considering the use of radio spectrum from 5925 MHz - 7125 MHz to support the ever growing need wireless broadband traffic. The Ministry proposes to:

    a. Make the lower 6 GHz band (5925 - 6425 MHz) available for WLAN use on a co-existence basis with incumbent systems.

    b. Continue to monitor international allocations and studies of the upper 6 GHz band (6425 - 7125 MHz) before making decisions.

3. We recommend that any decisions on the regulatory conditions for the lower 6GHz should for now wait for the completion of 3GPP studies We believe that

    a. 5925 - 6425 MHz could be used for wi-fi or unlicenced 5G NR-U services as this could provide spectrum for extra demand discussed in the MBIE doc., though for interference coordination and synergies reasons we prefer NR-U (**lower 6GHz**).

    b. 6425 - 7125 MHz should be for licenced IMT only (**upper 6GHz**).

WLAN demand and technologies

4. The Ministry notes that Wireless Local Area Network (**WLAN**) demand is increasing – and we agree that there is likely increasing demand licence exempt spectrum for WLAN purposes. However, WiFi technologies are one type of Wireless LAN, which is one type of wireless networking.

5. We note that the lower 6 GHz band is supported by both 3GPP (5G NR-U) and IEEE (WiFi) technologies, both of which are expected to be deployed to meet WLAN demand. Accordingly, while overall WLAN demand is expected to increase, the emerging technologies mean it is unclear whether this new demand will be met by WiFi or the increasing use of 5G NR-U technologies or by using both via a technology neutral approach.

6. Further, at this stage there are divergent views amongst authorities over the use of the lower 6 GHz band, and we believe waiting for current 3GPP studies for co-existence between NR-U and licenced NR would be the best course of action.

Questions

5925 - 6425 MHz for Wireless LAN use

7. RSM proposes to, given the increasing demand for spectrum for WLAN use and the recent development from other countries and regions globally, make the bottom of the 6 GHz frequency band (5925 - 6425 MHz) available for WLAN use.

Q1. Do you agree with RSM's proposal on making the 5925 - 6425 MHz available for WLAN use?

8. We agree that there is likely to increasing demand for Wireless LAN services. However, our primary concern is that RSM risks locking in a Wireless LAN technology (WiFi) when alternative and better technology options are being considered by 3GPP.

9. We note the spectrum in 6 GHz range is also referred to as mid-band spectrum. There are divergent international views on the use of this spectrum:

    a. China will use the entire 1200 MHz (5925 - 7125 MHz) in the 6 GHz band for licenced 5G.

    b. Europe has split the band, (WRC-23 AI 1.2) with the upper part 6425 - 7125 considered for licenced 5G as this is the scope of WRC 23 AI 1.2, with an open decision on support in the lower 6Ghz band for Wi-Fi or NR-U. MBIE is invited to consider ETSI BRAN EN 303 687[1] for unlicensed operation in the frequency range 5945-6425 MHz. In this document, both WiFi and NR-U can be deployed in the same share spectrum on a technology neutral basis.

    c. Africa and parts of the Middle East are taking a similar approach as Europe.

    d. The US and much of Latin America have declared that all of the 6 GHz range be assigned to WiFi technologies.

    e. In addition, 3GPP band n96 is already standardised for NR-U.

10. Further, the international position is evolving:

    a. A number of countries around the world have recently announced consultations for the 6 GHz band for licence exempt operation. But they have different regulatory requirements for maximum EIRP density and out of band emissions. In turn these parameters have a direct impact on A-MPR (power reduction) values which may or may not be supportable by using existing NS (network signalling) values in 3GPP recommendations.

    b. 3GPP TR 37 890 is looking at the feasibility study on 6GHz for LTE and NR in licenced and unlicenced operations in 5925-7125 MHz.

       This study is complex as the regulatory conditions around the world are not the same, it is expected to be completed sometime in 2022. It comprehensively looks into solutions to satisfy the regulatory conditions in various jurisdictions. This study is also looking into the situation if the introduction of un licenced operation in Europe can be achieved by re using existing band n 96 or a new band 5945- 6425 MHz must be defined. 3GPP is also working on TR 38.849 which is about unlicensed operation in the lower 6 GHz band in Europe.

11. In light of this very dynamic situation, we recommend waiting for the completion of the 3GPP work before deciding on regulatory arrangements for the lower 6GHz band.

12. If MBIE must decide arrangements ahead of these studies being completed, we believe that the lower part of the 6GHz band could either be used for WiFi or 5G NR-U or both. However, we are unsure of the regulatory conditions. The ETSI standards provide power limits for low power indoor devices that could apply to either technology. MBIE could adopt these standards, but we caution against the use of outdoor applications (for now) until 3GPP completes the co-existence studies. Eventually the unlicenced spectrum will also be used for outdoor applications such as side link communications.

[1] In line with ECC decision (20)01 on the harmonized use of the frequency band 5945-6425 MHz for Wireless Access Systems including Radio Local Area Networks (WAS/RLAN).

6425 – 7125 MHz for new applications

Q2. What are your views on the potential future use of 6425 - 7125 MHz for new applications (e.g. Wi-Fi or IMT)?

13. At this stage, RSM note that there are different options for use of the upper 6GHz band and propose to monitor international developments and studies.

14. We note that, as observed above 6425- 7125 MHz is a candidate band for IMT in Region 1 (AI 1.2), whereas in Region 3 only 7025- 7125 MHz is a candidate. It is regarded as complimentary to mmWave band. The ITU R is conducting sharing studies between planned IMT services in the upper 6 GHz band and incumbent services - Fixed and Fixed satellite. We also note that in all 3 regions the whole of the 6GHz band is allocated co primary to Mobile.

15. The WRC decision only pertains to IMT identification. We believe NZ should reserve this spectrum for licenced NR as this likely to be the case for major European markets. Access to mid-band spectrum is especially useful for applications which involve wide area video distribution such as:

    a. Audio-visual communications especially 4K/8K video.

    b. Streaming of highdefinition video content at popular locations, eg transport hubs/railway stations, airports, shopping malls, tourist attractions, sport stadiums, etc., and

    c. Enhanced/immersive mobile media experiences with high quality video for augmented or virtual reality (AR/VR) and XR.

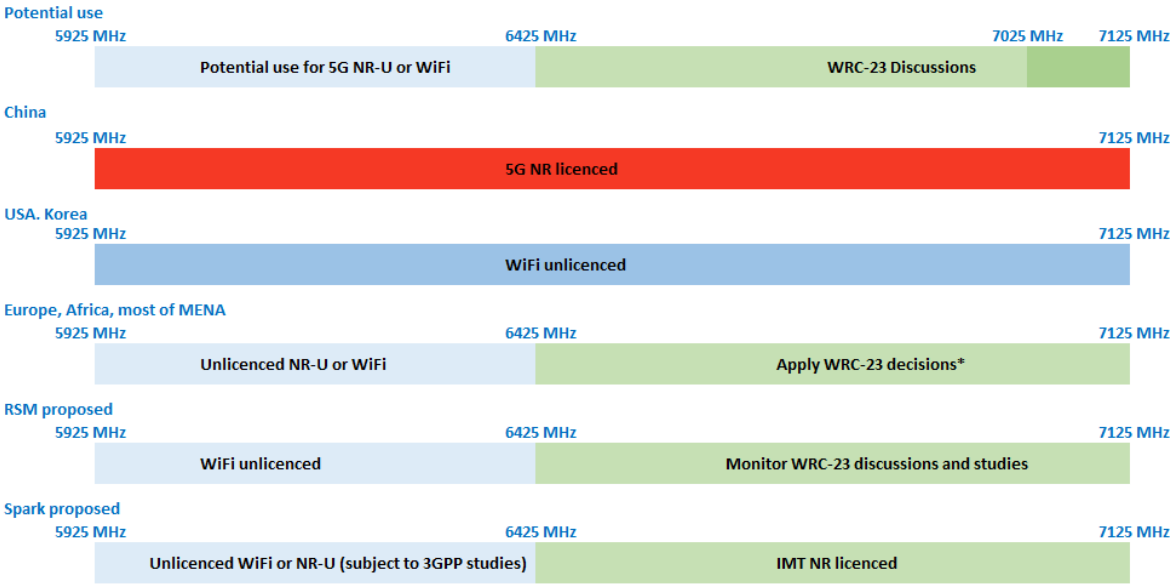
16. Additionally, the following applications will benefit from mid band spectrum access:

    a. Enhanced gaming experiences, such as cloud-based gaming and AR/VR gaming, and

    b. Several high-bandwidth applications relevant for safe and smart cities, such as video surveillance (face recognition cameras), real-time text translation using AR, V2X networks, video-based sensor networks and applications for public safety and emergency response personnel. This is especially relevant for NZL as we experience earthquakes and extremes of climate change.

17. Our proposed approach is set out in Figure 1.

Figure 1: potential arrangements for 6GHz band



* Depends on local Administrations.

General user licence for low power and very low power devices

Q3. Do you agree that RSM should include 5925 - 6425 MHz in the GURL-SRD for WLAN low power indoor and very low power use?

18. RSM has proposed power limits for WiFi devices operating in 5925 - 6425 MHz:

    - 24 dBm (11 dBm/MHz) for indoor use only.
    - 14 dBm (1 dBm/MHz) for all locations (includes user devices, outdoor access point).

19. Spark is of the view that MBIE should await the completion of 3GPP studies before setting regulatory emission conditions. The 3GPP studies will identify power limits and other parameters to support shared use by 5G NR-U equipment, and mitigate interference with use of adjacent licenced spectrum.

20. Further, we prefer the lower 6GHz band to be used for NR-U and that MBIE should await the completion of 3GPP studies before setting regulatory emission conditions.

Q4. Do you agree that RSM should mandate ETSI EN 303 687 as the radio standard for WLAN use in the 6 GHz band? Is there any other regulatory compliance standard we should consider?

21. Spark is of the view that MBIE should await the completion of 3GPP studies before setting regulatory emission conditions.

Higher power devices

22. RSM recognises that there may be occasions where users want to deploy an access point with a higher power level than permitted by the GURL-SRD.

23. We do not believe high power devices should be allowed in this band as this could complicate co-existence with upper 6 GHz band.

Q5. What are your views on using a licensing approach to support 30 dBm EIRP WLAN devices?

Q6. What are your views on supporting 36 dBm EIRP standard power devices using Automatic Frequency Coordination (AFC) system? Do you have any proposals to provide AFC systems to New Zealand?

24. Again, we believe that MBIE should await the completion of 3GPP studies before setting regulatory emission conditions.

Other comments

Q7. Any other comments?

25. No comments

[End]