



Suruhanjaya Komunikasi dan Multimedia Malaysia
Malaysian Communications and Multimedia Commission

PUBLIC CONSULTATION PAPER

WIRELESS LOCAL AREA NETWORK (WLAN) IN THE 6 GHz FREQUENCY BAND

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PART ONE: INTRODUCTION

1. The increasing reliance on radiocommunication-based technologies and the immense opportunities for social and economic development highlights the growing demand for wireless services.
2. Technological advancement wireless services have incessantly unlocked a plethora of applications and services to support new applications, increased user numbers and explosive traffic for a share of the radio frequency spectrum.
3. The use of wireless services such as Wi-Fi to support everyday activities and new applications drive demand for faster and more reliable services.
4. The 5925 MHz to 7125 MHz ("6 GHz") frequency band is generating a lot of interest worldwide, with many countries opening up access to the frequency band, or parts of it, for use by wireless local area network ("WLAN") systems, among the most prevalent are Wi-Fi networks and devices.
5. Considering this trend, the Malaysian Communications and Multimedia Commission ("MCMC") is investigating the potential use of the 6 GHz frequency band in Malaysia for Wi-Fi devices under the Class Assignment, taking into consideration the critical role of the broadband connectivity ecosystem and the level of interest in this frequency band.
6. The purpose of this Public Consultation Paper ("PC Paper") is to invite industry participants, interested parties and members of the public to provide recommendations, opinions and comments regarding the need for technical and regulatory frameworks that allow efficient management of the radio spectrum, aimed to facilitate the development and introduction of new technologies and application of WLAN.
7. In order to strike a balance between market opportunities without sacrificing national interest, a comprehensive process needs to be planned,

regularly improvised and diligently implemented and executed; hence, there is a requirement for this Public Consultation process.

8. MCMC would like to thank interested parties for their participation in this consultative process and look forward to receiving written submissions.

PART TWO: DEMAND FOR SPECTRUM FOR WI-FI

9. WLAN systems are low power, and short-range wireless equipment consists of access points and associated mobile or nomadic terminals. Wi-Fi is a common term for a particular type of WLAN system. In this PC paper, the term Wi-Fi will be used throughout the document, as it has been the most frequently used WLAN application and is widely understood by both the public and the industry.
10. Wi-Fi services are intended for broadband connectivity to users and include applications such as voice, video, images, interactive multimedia and high-speed data.
11. Broadband internet access is the crux of today's digital age connectivity. The percentage of Internet users in Malaysia stood at 88.7% in 2020, a 1.3% increase from 87.4% in 2018.
12. Wi-Fi adoption is increasing as the number of connected devices increases and innovative applications such as Augmented Reality (AR), Virtual Reality (VR), and Ultra High Definition video becomes available.
13. Over the years, Wi-Fi technologies have evolved to make more efficient use of the available spectrum. However, to meet this growing demand, additional channels and channels with a wider reach may be required. Currently, Wi-Fi can be used in the 2.4 GHz and 5 GHz frequency bands in Malaysia.
14. The evolution to Wi-Fi 6 envisaged delivering higher data rates, increased capacity, improved power efficiency and better performance in environments with many connected devices. Wi-Fi 6 is poised to provide better-untethered experiences and cater proliferation of devices such as smartphones, tablets, laptops and virtual/augmented devices.

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15. Wi-Fi operation in the 6 GHz frequency band (referred to as “Wi-Fi 6E”) enables greater network performance and support more Wi-Fi users at once especially in dense and congested environments such as transportation hubs, sports arenas and business complexes.
16. The latest Wi-Fi standard is expected to enable more efficient use of the spectrum through technological advances that improve data throughput, reduce latency and improve battery life. The result is a better use of spectrum from the outset, improving throughput, bringing down latency and addressing congested environments more efficiently.

Question 1

MCMC seeks your views and comments on the demand for spectrum for Wi-Fi in the 6 GHz frequency band.

PART THREE: POTENTIAL TECHNOLOGIES SUPPORTING 6 GHz FREQUENCY BAND

17. 3GPP has also been developing 5G New Radio-Unlicensed (NR-U) in the 6 GHz frequency band. Hence, a viable ecosystem of devices supporting this technology is expected to be emerging over the next few years. The growing new technologies utilising the 6 GHz frequency band need to be examined in facilitating the overall 6 GHz ecosystem and usage.
18. Parts of the 6 GHz frequency band will also be considered for International Mobile Telecommunications (“IMT”) under agenda item 1.2 of the World Radiocommunication Conference 2023 (WRC-23). The frequency band of 6425 MHz to 7025 MHz is being studied for the potential identification of IMT in Region 1, whereas the frequency band of 7025 to 7125 MHz is being studied for the potential global IMT identification.

Question 2

MCMC seeks your views and comments on the emerging technologies utilising the 6 GHz frequency band.

PART FOUR: DEVELOPMENT OF WI-FI IN OTHER COUNTRIES

19. Some countries have allowed or planned to allow the 6 GHz frequency band for the use of Wi-Fi through different technical and regulatory arrangements. Details of the arrangements, such as power limits and additional restrictions to protect incumbent services, vary between jurisdictions. Some examples of Wi-Fi development in other countries are provided below:

i. United States

The Federal Communications Commission has adopted rules that make 1200 MHz megahertz (5925 MHz to 7125 MHz) of spectrum in the 6 GHz frequency band available for unlicensed use. Unlicensed devices will share the frequency band with incumbent licensed services to protect the licensed services and enable unlicensed and licensed operations to thrive throughout the frequency band.

The rules authorise indoor low-power operations over the entire 1200 MHz and standard-power devices in 850 MHz within the 6 GHz frequency band. An automated frequency coordination (AFC) system will prevent standard power access points from causing interference to incumbent services.

ii. European Union

Based on the studies conducted by CEPT, WLAN devices in the 5925 MHz to 6425 MHz frequency band can coexist with other services (fixed service and fixed-satellite service) under specified conditions, as follows:

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- a. Low power: max EIRP of 23 dBm (for indoor use only); and
- b. Very low-power: max EIP of 14 dBm (portable use for both indoor and outdoor usage).

iii. Republic of Korea

The Ministry of Science and ICT has allowed the use of WLAN devices across the entire 1200 MHz (5925 MHz to 7125 MHz) while the outdoor WLAN operation is limited in the 5925 MHz to 6425 MHz frequency range with the following conditions:

- a. Low power: max EIRP of 24 dBm (for indoor use only); and
- b. Very low-power: max EIP of 14 dBm (outdoor use).

Question 3

MCMC seeks your views and comments on the frequency range within the 6 GHz frequency band that could be considered for Wi-Fi under the Class Assignment in Malaysia. Should MCMC consider allowing Wi-Fi to operate in the entire 1200 MHz (5925 MHz to 7125 MHz frequency band) or only in the 500 MHz (5925 MHz to 6425 MHz frequency band)?

PART FIVE: USE OF 6 GHz FREQUENCY BAND IN MALAYSIA

20. The allocation of services in the frequency range of 5925 MHz to 7125 MHz in Malaysia is provided in **Table 1** below:

Frequency Band (MHz)	Malaysian Allocations
5 925-6 700	FIXED 5.457 MLA61 MLA62 FIXED-SATELLITE (Earth-to-space) 5.457A MOBILE 5.149 5.440 5.458 MLA3 MLA58A MLA102

Frequency Band (MHz)	Malaysian Allocations
6 700-7 075	FIXED MLA62 FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.441 MOBILE 5.458 5.458A 5.458B MLA3 MLA58A MLA102
7 075-7 145	FIXED MLA62 MLA64 MOBILE 5.458 MLA3 MLA102

Table 1: Malaysian Frequency Allocation in 5925-7125 MHz

Notes:

- 1) *MLA3 Class Assignment.*
- 2) *MLA58A Priority to satellite network filed under the administration of Malaysia at 91.5° East orbital slot in the Fixed Satellite Service. Fixed Service stations may operate on a non-interference basis.*
- 3) *MLA61 Standard Radio System Plan 512: Requirements for Fixed Service Line-Of-Sight Radio-Relay Systems Operating in the Frequency Band from 5925 MHz to 6425 MHz.*
- 4) *MLA62 Standard Radio System Plan 513: Requirements for Fixed Service Line-Of-Sight Radio-Relay Systems Operating in the Frequency Band from 6430 MHz to 7110 MHz.*
- 5) *MLA64 Standard Radio System Plan 514: Requirements for Fixed Service Line-Of-Sight Radio-Relay Systems Operating in the Frequency Band from 7111 MHz to 7425 MHz.*
- 6) *MLA102 Standard Radio System Plan 549: Requirements for Devices using Ultra-Wideband (UWB) Technology Operating in the Frequency Bands from 30 MHz to 960 MHz, 2.17 GHz to 10.6 GHz, 21.65 GHz to 29.5 GHz and 77 GHz to 81 GHz.*
- 7) *Other details can be referred to Spectrum Plan Issued 2017: <https://www.mcmc.gov.my/skmmgovmy/media/General/pdf/Spectrum-Plan-2017i.pdf>.*

21. The current use of the frequency range of 5925 MHz to 7125 MHz in Malaysia includes fixed service (terrestrial microwave links) and fixed-satellite service.

22. As the incumbent users are operating under the Apparatus Assignments with primary allocations, it is essential to ensure that compatibility and

coexistence can be achieved in the frequency band between potential future technologies and current uses.

Question 4

MCMC seeks your views and comments on:

- i. the coexistence between Wi-Fi and incumbent services (i.e. fixed service and fixed-satellite service); and
- ii. the potential interference mitigation between these services.

PART SIX: SPECTRUM USE FOR WI-FI IN MALAYSIA

- 23. The use of Wi-Fi in Malaysia is governed under the Class Assignment issued pursuant to section 169 of the Communications and Multimedia Act 1998.
- 24. Under the Class Assignment, a short-range radiocommunications device (“SRD”) is defined as a “radiocommunications device that provides either unidirectional or bidirectional communication over short distances for mobile and fixed applications in the designated frequency bands”.
- 25. The frequency bands and the associated conditions for the SRD, which are related to Wi-Fi are shown in **Table 2** below:

Frequency Bands	Maximum Power	Operational condition
2400 MHz to 2500 MHz	500 mW EIRP	Outdoor/indoor usage
5150 MHz to 5350 MHz	1 W EIRP	i. For SRD operating within the 5250 MHz to 5350 MHz and 5470 MHz to 5650 MHz frequency bands, the devices shall use Dynamic Frequency Selection and Transmit Power Control.

Frequency Bands	Maximum Power	Operational condition
5470 MHz to 5650 MHz	1 W EIRP	ii. The radiated Power Spectral Density for the devices operating within the 5250 MHz to 5350 MHz and 5470 MHz to 5650 MHz frequency bands is limited to 10 mW/MHz. iii. The devices operating in the frequency band 5150 MHz to 5350 MHz are only for indoor usage.
5725 MHz to 5875 MHz	1 W EIRP	Outdoor/indoor usage

Table 2: Frequency bands and conditions for WLAN in Malaysia

Question 5

MCMC seeks your views and comments on the potential technical and operational conditions to be imposed if the 6 GHz frequency band is introduced for Wi-Fi under the Class Assignment. Should part of the frequency band be limited to indoor operation? Should standard power devices operating under the Automatic Frequency Coordination (AFC) system be adopted in Malaysia?

26. Given the increasing demand for Wi-Fi technology and the international uptake in the adoption of Wi-Fi 6E, MCMC is examining possible updates of the existing arrangements for Wi-Fi devices and reviewing the existing spectrum required to meet future demand, address existing issues of slow speeds and congestion, and enable new, innovative applications.

Question 6

What other key issues need to be considered in introducing Wi-Fi in the 6 GHz frequency range?

PART SEVEN: SUBMISSION OF RESPONSES

27. MCMC invites submissions from industry experts, interested parties and members of the public on recommendations, opinions and comments regarding the questions put forward in this PC paper on or before **5:00 PM, 11 October 2021**.
28. Please ensure the following:
 - i. Responses must relate to the questions stated in the order in which they appear in this document. The template for the submission of responses is provided in Annex I of this PC paper;
 - ii. Indicate the specific point (by reference to the paragraph number) to which a comment relates to;
 - iii. Provide a clear rationale for suggestions and opinions; and
 - iv. Provide evidence to support the views given, where applicable.
29. Submissions of the responses and comments should be made in electronic form via email to: spectrumplanning@mcmc.gov.my.
30. All submissions should be accompanied by a cover letter signed by an authorised person from the organisation providing the response.
31. Joint responses by industry players are most welcome. All responses and comments will be published and made available to the public on MCMC's website.
32. Confidential treatment may be requested on any part of the submission that is believed to be proprietary, confidential or commercially sensitive with supporting justification for MCMC's consideration. In such cases, the submission must be provided in a non-confidential form suitable for publication, with any confidential information redacted as necessary and

placed instead in a separate annexe and clearly marked as "CONFIDENTIAL".

33. If MCMC grants confidential treatment, it will consider but will not publicly disclose the information. However, if MCMC rejects the request, the information will be returned and not be considered as part of the submission. Any submission that requests confidential treatment for all, or a substantial part of the submission, will not be accepted by the MCMC.

ANNEX I: TEMPLATE FOR RESPONSE

Please provide the comments or responses in accordance with the table below:

Question	Response
<p>Question 1</p> <p>MCMC seeks your views and comments on the demand for spectrum for Wi-Fi in the 6 GHz frequency band.</p>	
<p>Question 2</p> <p>MCMC seeks your views and comments on the emerging technologies utilising the 6 GHz frequency band.</p>	
<p>Question 3</p> <p>MCMC seeks your views and comments on the frequency range within the 6 GHz frequency band that could be considered for Wi-Fi under the Class Assignment in Malaysia. Should MCMC consider allowing Wi-Fi to operate in the entire 1200 MHz (5925 MHz to 7125 MHz frequency band) or only in the 500 MHz (5925 MHz to 6425 MHz frequency band)?</p>	
<p>Question 4</p> <p>MCMC seeks your views and comments on:</p> <ul style="list-style-type: none"> i. the coexistence between Wi-Fi and incumbent services (i.e. fixed service and fixed-satellite service); and ii. the potential interference mitigation between these services. 	

Question	Response
<p>Question 5</p> <p>MCMC seeks your views and comments on the potential technical and operational conditions to be imposed if the 6 GHz frequency band is introduced for Wi-Fi under the Class Assignment. Should part of the frequency band be limited to indoor operation? Should standard power devices operating under the Automatic Frequency Coordination (AFC) system be adopted in Malaysia?</p>	
<p>Question 6</p> <p>What other key issues need to be considered in introducing Wi-Fi in the 6 GHz frequency range?</p>	