

**RADIO SPECTRUM AND TECHNICAL STANDARDS
ADVISORY COMMITTEE**

**Advent of Radio Local Area Network Devices
Operating in the 6 GHz Band**

Introduction

This paper seeks Members' views on the use of radio local area network ("RLAN") devices in the 5.925 – 6.425 GHz band in Hong Kong.

Background

2. In accordance with the Telecommunications (Telecommunications Apparatus) (Exemption from Licensing) Order ("the Exemption Order"), RLAN devices that comply with the requirements stipulated in the Exemption Order and the related HKCA 1039 specification¹ are exempted from licensing when used or offered for sale in Hong Kong. RLAN devices include Wi-Fi devices in compliant with IEEE 802.11 standards operating in the 2.4 / 5 GHz bands (i.e. the 2.4 – 2.4835 GHz, 5.15 – 5.35 GHz, 5.47 – 5.725 GHz and 5.725 – 5.85 GHz bands).

3. Since late 2018, IEEE 802.11ax or Wi-Fi 6 has been the latest generation of Wi-Fi standard. Wi-Fi 6 offers high performance, low latency, and fast data rates and is backward compatible with the legacy IEEE 802.11ac/n/g/b/a standards², which are all developed by the Wi-Fi Alliance³. Wi-Fi 6E is an extended version of the Wi-Fi 6 standard that cover a new band

¹ Entitled "Performance Specification for Radiocommunications Apparatus Operating in the 2.4 GHz or 5 GHz Band and Employing Frequency Hopping or Digital Modulation".

² IEEE 802.11ac and IEEE 802.11n are also known as Wi-Fi 5 and Wi-Fi 4 respectively.

³ Wi-Fi Alliance drives global Wi-Fi adoption and spectrum advocacy through industry-wide collaboration. Its members comprises leading manufacturers of mobile phone (Apple, Huawei, Samsung, etc.) and Wi-Fi router (Asus, Linksys, Netgear, etc.).

in 5.925 – 7.125 GHz or part thereof (hereinafter referred to as the “6 GHz band”). With the additional spectrum in the 6 GHz band, wider bandwidth channels⁴ are made available to support even higher data rates. According to Wi-Fi Alliance, it would start certification of Wi-Fi 6E devices in early 2021.

Overseas Development

CEPT

4. In March 2020, the European Conference of Postal and Telecommunications Administrations (“CEPT”) published a study report entitled “Assessment and study of compatibility and coexistence scenarios for WAS/RLANs⁵ in the band 5.925 – 6.425 GHz”. The report concluded that coexistence between WAS/RLANs with existing services and systems within and adjacent to the band 5.925 – 6.425 GHz would be technically feasible under certain technical conditions, including the restriction of transmitting power level of WAS/RLANs.

5. CEPT would publish another report regarding the feasibility of using the band for WAS/RLAN and identify harmonised technical conditions for their operation in the 5.925 – 6.425 GHz band by November 2020. A draft harmonised standard for WAS/RLANs use of the 5.925 – 6.425 GHz band is expected to be released for public review by European Telecommunications Standards Institute in March 2021 for use by European Union countries.

UK

6. In January 2020, the Office of the Communications (“Ofcom”) conducted a consultation for the proposed release of the 5.925 – 6.425 GHz band for use by Wi-Fi and other related wireless technologies on a licence-exempt basis. Ofcom carried out technical analysis on coexistence with incumbent services (fixed links and satellite uplinks) and proposed licence-exempt use of the 5.925 – 6.425 GHz band. The corresponding statement was published in July 2020 for improving spectrum access for Wi-Fi use of the 6 GHz band. Ofcom permits licence-exempt WAS/RLANs use, including Wi-Fi, in the 5.925 – 6.425 GHz band.

⁴ IEEE 802.11ax supports a wide channel bandwidth up to 160 MHz.

⁵ WAS/RLANs stands for Wireless Access Systems / Radio Local Area Networks.

US

7. In April 2020, the Federal Communications Commission (“FCC”) decided to release additional 1.2 GHz of spectrum in the 6 GHz band for unlicensed use by Unlicensed National Information Infrastructure (“U-NII⁶”) including Wi-Fi 6E devices, subject to the technical requirements as summarised in the table below -

	Frequency Range	Technical Requirement
U-NII-5	5.925 – 6.425 GHz	Automated Frequency Control (“AFC”)*
U-NII-6	6.425 – 6.525 GHz	Low Power Indoor (“LPI”)#
U-NII-7	6.525 – 6.875 GHz	AFC
U-NII-8	6.875 – 7.125 GHz	LPI

*: For AFC, prior to transmitting, a Wi-Fi access point is required to obtain from a database for a list of permissible frequencies on which it can transmit with a view to protecting fixed service sharing the same band.

#: LPI Wi-Fi devices are limited to indoor use only.

Spectrum Availability in Hong Kong

Existing Situation

8. The existing allocation and utilisation status of the 6 GHz band in Hong Kong is summarised below -

Hong Kong Allocation	Hong Kong Utilisation
5.875 – 7.075 GHz FIXED FIXED-SATELLITE(Earth-to-space)	5.875 – 5.950 GHz Fixed-satellite
	5.950 – 6.425 GHz (a) Fixed-satellite (b) Short Range Device (Ultra-Wideband (UWB)) 6 – 8.5 GHz
	6.425 – 7.075 GHz (a) Fixed 6.44 – 7.1 GHz (b) Fixed-satellite (c) Short Range Device (UWB) 6 – 8.5 GHz

⁶ U-NII refers to devices that provide short-range, high-speed wireless networking communication at low cost.

Hong Kong Allocation	Hong Kong Utilisation
7.075 – 7.250 GHz FIXED MOBILE	7.075 – 7.250 GHz (a) Fixed 6.44 – 7.1 GHz (b) Outside Broadcast (OB) Links (c) Short Range Device (UWB) 6 – 8.5 GHz

9. As noted from the table above, in Hong Kong, the 5.925 – 6.425 GHz band is used for satellite uplinks and UWB devices. As per compatibility studies performed by CEPT and Ofcom, coexistence of low power RLAN devices with satellite systems should be feasible, notwithstanding the need to control the maximum transmitting power level of such RLAN devices especially when used outdoors. As regards the use of the 6 – 8.5 GHz band by UWB devices, such use is allowed on condition that they cannot claim protection from harmful interference and their ultra-low emission level⁷ would not cause interference to other legitimate devices. Hence, the use of the 5.925 – 6.425 GHz band for low power RLAN should be technically feasible in Hong Kong.

10. On the other hand, the 6.425 – 7.125 GHz band is now heavily used by fixed links in addition to satellite uplinks and UWB devices in Hong Kong. Moreover, it is also a candidate band for use of International Mobile Telecommunication (“IMT”) to be deliberated in the World Radiocommunication Conference in 2023 (“WRC-23”). OFCA will keep watch on the deliberations in international forum and WRC-23 with a view to timely releasing this band for IMT, if it is so decided by WRC-23, in due course.

The Proposal

11. In order to follow the international development pace to facilitate the on-going development of RLAN to serve the public and the industry, it is proposed that the 5.925 – 6.425 GHz band be released for such use. OFCA will keep in view the development of international standardisation for RLAN devices operating in this band, the frequency planning and the regulatory arrangements in other administrations, as well as the availability of the relevant products on the mass market, and make a recommendation to the Communications Authority on the matter.

⁷ At -41.3 dBm/MHz mean power spectral density equivalent isotropically radiated power.

Advice Sought

12. Members are invited to offer comment on the proposal above.

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