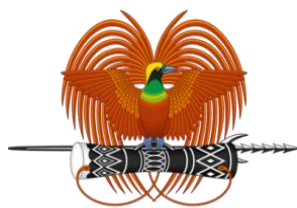




National Information and Communications Technology Authority

DRAFT GUIDELINE ON THE OPERATION OF WAS/RLAN IN 6GHz BAND



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DOCUMENT REVISION DETAILS

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DRAFT

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DISCLAIMER

Due to the continuous developments in Radiocommunication technologies and enhancement in related applications, the PNG spectrum plan covering Service Allocations and their applications may change with the outcome of each World Radio Conference (WRC).

This Guideline is based on the ITU Radio Regulations, including outcomes of WRC-15, WRC-19 and WRC-23, relevant ITU Region 3 provisions, and applicable APT recommendations. It should be read in conjunction with all referenced standards, regulations, and NICTA regulatory instruments.

Nothing in this Guideline shall override the National Information and Communications Technology Act 2009, the Papua New Guinea Table of Frequency Allocations, licence conditions, or any other regulatory instrument issued by NICTA.

NICTA reserves the right to review and amend this Guideline from time to time to reflect national requirements, technological developments, and international regulatory developments.

DRAFT

LIST OF ABBREVIATION

Abbreviation	Meaning
APT	Asia Pacific Telecommunity
CNSA	Commercial National Security Algorithm
DFS	Dynamic Frequency Selection
EHT	Extremely High Throughput
EIRP	Equivalent Isotropically Radiated Power
ECC	Electronic Communications Committee
ETSI	European Telecommunications Standards Institute
FS	Fixed Service
FSS	Fixed Satellite Service
GHz	Gigahertz
IEEE	Institute of Electrical and Electronics Engineers
IMT	International Mobile Telecommunications
ISP	Internet Service Provider
ITU	International Telecommunication Union
ITU-R	International Telecommunication Union Radiocommunication Sector
LIPD	Low Interference Potential Devices
LPI	Low Power Indoor
MHz	Megahertz
MIMO	Multiple Input Multiple Output
NICTA	National Information & Communications Technology Authority
OFDMA	Orthogonal Frequency Division Multiple Access
PNG	Papua New Guinea
PSD	Power Spectral Density
RADIUS	Remote Authentication Dial-In User Service
RLAN	Radio Local Area Network
SRD	Short Range Device
TWT	Target Wake Time
VLP	Very Low Power
VSAT	Very Small Aperture Terminal
WAS	Wireless Access System
Wi-Fi	Wireless Fidelity
WLAN	Wireless Local Area Network
WRC	World Radiocommunication Conference
WPA	Wi-Fi Protected Access
WPA3	Wi-Fi Protected Access Version 3

INTRODUCTION

1. In PNG, Wi-Fi bands operate in the 2.4 GHz (2400-2483.5 MHz) and 5 GHz (5150-5350, 5470-5725 MHz) ranges and are becoming increasingly congested due to the rapid growth in wireless devices and data consumption. The increasing demand for wireless broadband connectivity, digital services, cloud applications, video streaming, smart devices, and emerging technologies significantly increased pressure on existing Wireless Local Area Network (WLAN/RLAN) spectrum resources.
2. With the continued evolution of wireless technologies, new WLAN devices capable of operating in the **5925–7125 MHz frequency band (the “6 GHz band”)** are emerging globally. These technologies support significantly higher data rates, lower latency, improved spectrum efficiency, and enhanced performance in high-density deployment environments, making them well suited for next-generation broadband and digital applications.
3. The use of the upper 6 GHz band (6425–7125 MHz) remains under review. While portions of the band have been identified for IMT by some administrations, international and regional approaches continue to evolve. NICTA will adopt a technology-neutral approach and continue to monitor ITU-R studies, APT developments, and WRC-27 outcomes before making a final decision on the long-term use of this band.
4. The availability of the lower 6 GHz band will support innovation, digital transformation, broadband expansion, enterprise connectivity, and improved user experience across Papua New Guinea.
5. This guideline establishes the regulatory, technical, operational, and compliance framework governing the use of Wi-Fi 6E/7 systems within the approved portion of the 6 GHz frequency range to guide individuals, commercial or corporate businesses in Papua New Guinea who plan to invest in Wi-Fi 6E/7 services.

CURRENT 6 GHz SPECTRUM PLAN & USAGE IN PNG

6. In accordance with the ITU Radio Regulations and provisions for region 3, the Papua New Guinea Table of Frequency Allocations (See Annex A) provides for the following Primary Services in this 6 GHz Band;
 - FIXED SERVICES
 - FIXED SATELLITE SERVICES
 - MOBILE SERVICES
7. The 6 GHz Band (5925 MHz – 7 125 MHz) in PNG accommodates VSAT uplink in the band 5 925 – 6 725 MHz. See ITU-R Res.902 for licensing Earth stations on board vessels (ESV) in the band 5 925 – 6 725 MHz. There are currently incumbent services in the 6 GHz band that are operating on a primary basis. These services include fixed point-to-point, fixed satellite service (FSS), mobile services operating on a primary basis.

SPECTRUM PLAN & ARRANGEMENT

- Wi-Fi technologies operate in licence-exempt frequency bands, including 2.4 GHz, 5 GHz and 6 GHz. The 6 GHz encompasses 1200 MHz of spectrum from 5925–7125 MHz, significantly expanding the spectrum available for Wi-Fi compared with approximately 83.5 MHz available in the 2.4 GHz band and 570 MHz available in portions of the 5 GHz band as illustrated in Figure 1.
- Following global and regional developments, NICTA has made available the **5925–6425 MHz frequency band** for the deployment and operation of next-generation Wireless Access Systems, including Radio Local Area Networks (WAS/RLAN), commonly referred to as **Wi-Fi 6E/7** technologies.

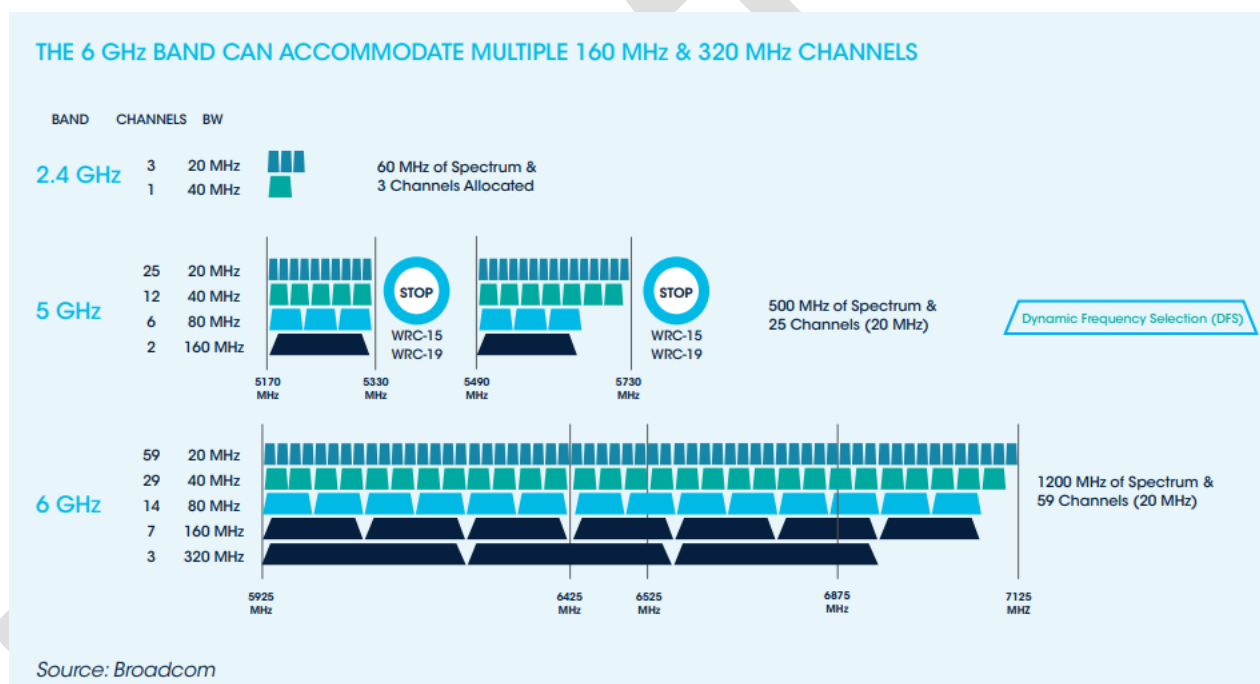


Figure 1 Wi-Fi Spectrum Comparison¹

CHANNELLING PLAN

- The frequency band **5925–6425 MHz** provides a contiguous **500 MHz block of spectrum** for Wi-Fi 6E/7 WAS/RLAN applications. The availability of this additional spectrum supports higher network capacity, improved throughput, lower latency, and enhanced user experience for broadband applications, enterprise networks, cloud services, video streaming, and emerging digital technologies.
- Within the Lower 6 GHz band (5925–6425 MHz), Wi-Fi 6E/7 technologies may support up to **25 x 20 MHz channels, 12 x 40 MHz channels, 6 x 80 MHz channels, 3 x 160 MHz**

¹https://6ghz.info/wp-content/uploads/2023/11/5397_6GHz_summary_document_4th-1.pdf

channels, and 1 x 320 MHz channel, subject to the applicable technical and operational requirements. The availability of wider channel bandwidths enables improved spectrum efficiency and supports high-capacity wireless broadband services in dense deployment environments.

12. The channelling arrangement for 6 GHz band is based on the relevant provisions of IEEE 802.11ax (Wi-Fi 6/6E), IEEE 802.11be (Wi-Fi 7), ETSI EN 303 687, ECC Decision (20)01, and Wi-Fi Alliance technical specifications. Refer to Figure 2 below.

Lower 6 GHz (5925 – 6425 MHz) Channel Plan

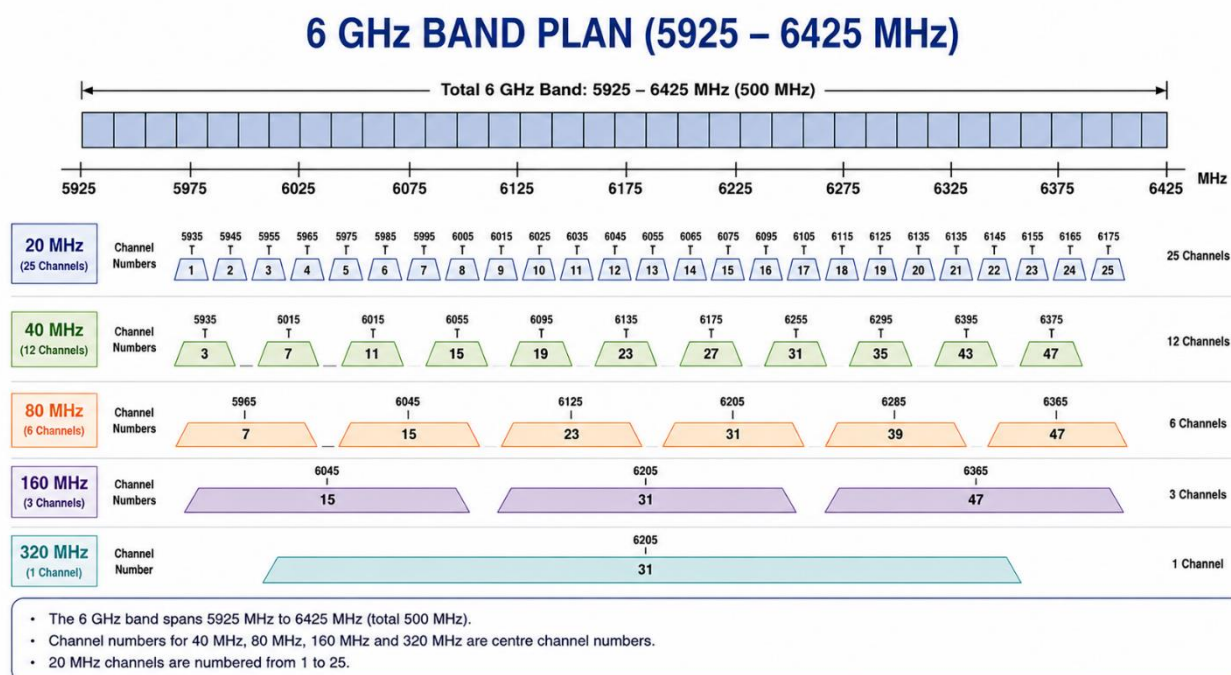


Fig 2 Lower 6 GHz Channel Plan

LICENSING REQUIREMENTS

13. Wi-Fi 6E/7 WAS/RLAN equipment shall operate under a Class Licence (Licence-Exempt) framework on a non-interference and non-protection basis. Users shall not claim protection from interference caused by licensed radiocommunication services.
14. Wi-Fi 6E/7 equipment under a licence-exempt framework shall comply with all applicable technical and operational requirements prescribed by NICTA. Users shall ensure that only approved and type-approved equipment is deployed and operated within the specified frequency bands, power limits, and technical parameters.
15. Licensed incumbent services shall retain priority protection status. Where harmful interference is identified, users shall cooperate with NICTA and affected parties to investigate and resolve the interference. NICTA may require modification, relocation, reduction of transmission power, suspension, or cessation of operation where necessary to protect authorised radiocommunication services.

TECHNICAL OPERATING LIMITS

16. Operational categories for Wi-Fi 6E/7 devices operating in the 5925–6425 MHz band shall include Low Power Indoor (LPI) and Very Low Power (VLP) categories. The applicable technical requirements are specified in the NICTA LIPD/SRD Minimum Requirements 2026, Item 63A of Schedule 1. The technical limits applicable are summarised in Table 2 below.

Operational Category	Maximum EIRP	Maximum PSD	Permitted Environment
Low Power Indoor (LPI)	250 mW (24 dBm)	10 dBm/MHz	Indoor only
Very Low Power (VLP)	25 mW (14 dBm)	1 dBm/MHz	Indoor and outdoor portable use

Table 2. Technical limits summarised

17. Low Power Indoor (LPI) devices shall operate indoors only and utilise integrated antennas. Such devices shall not be deployed outdoors, nor operated on aircraft, vessels, vehicles, or unmanned aerial systems unless otherwise authorised by NICTA. LPI devices shall comply with the applicable maximum Equivalent Isotropically Radiated Power (EIRP), Power Spectral Density (PSD), and other technical requirements specified by NICTA.
18. Very Low Power (VLP) devices may be used in portable and nomadic applications, subject to the applicable transmission power limits and technical requirements prescribed by NICTA. VLP devices shall operate within the approved technical parameters to minimise the potential for harmful interference to incumbent services and other authorised users.

TYPE APPROVAL OF TERMINAL EQUIPMENT

19. Terminal Equipment(s) having technical capability or feature for using unlicensed radio frequency data services through WLAN shall require approval in accordance with eh Type Approval Technical Standards Regulations, 2026 and any amendments made from time to time.

REFERENCES

1. Recommendation ITU-R M.1450-4, *Characteristics of Broadband Radio Local Area Networks (RLANs)*.
2. IEEE Std 802.11, *Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications*.
3. National Information and Communications Technology Authority (NICTA), *Type Approval Standards for WLAN Equipment (2.4 GHz and 5 GHz)*, Papua New Guinea.
4. LitePoint, *Wi-Fi 6E Whitepaper*.
5. Cisco Systems, *Wi-Fi Basics and Channel Planning Best Practices*.
6. Malaysian Communications and Multimedia Commission (MCMC), *Guideline on the Provision of Wireless Local Area Network (WLAN) Service*.
7. International Telecommunication Union (ITU), *Radio Regulations*, Edition of 2024.
8. National Information and Communications Technology Authority (NICTA), *Papua New Guinea Table of Frequency Allocations*, January 2025.
9. National Information and Communications Technology Authority (NICTA), *Papua New Guinea Radiofrequency Spectrum Allocation Chart*, 2026.
10. IEEE Std 802.11be, *Enhancements for Extremely High Throughput (EHT) Wireless LAN*.
11. ETSI EN 303 687, *6 GHz Wireless Access Systems/Radio Local Area Networks (WAS/RLAN) Harmonised Standard*.
12. ECC Decision (20)01, *On the Harmonised Use of the Frequency Band 5945–6425 MHz for Wireless Access Systems Including Radio Local Area Networks (WAS/RLANs)*.
13. Wi-Fi Alliance, *Wi-Fi 6E Regulatory Framework and Deployment Guidance*.
14. Source: Wi-Fi Alliance / Broadcom 6 GHz Spectrum Overview.

ANNEX A

5 150-5 470 MHz

Allocation to services				
Region 1	Region 2	Region 3	Papua New Guinea	Usage
5 150-5 250 FIXED-SATELLITE (Earth-to-space) 5.447A MOBILE except aeronautical mobile 5.446A 5.446B AERONAUTICAL NAVIGATION 5.446 5.446C 5.446D 5.447 5.447B 5.447C			5 150-5 250 AERONAUTICAL RADIONAVIGATION FIXED-SATELLITE (Earth-to-space) 5.447A MOBILE except aeronautical mobile 5.446A 5.446B 5.446 5.447B 5.447C	HIPERLAN indoor applications (under LPD category) in the band 5150 – 5250 MHz with a maximum mean e.i.r.p. of 200 mW (see ITU-R Res.229).
5 250-5 255 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH 5.447D MOBILE except aeronautical mobile 5.446A 5.447F 5.447E 5.448 5.448A			5 250-5 255 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH 5.447D FIXED 5.447E MOBILE except aeronautical mobile 5.446A 5.447F 5.448A	FWA systems in fixed service and stations in mobile service shall not claim protection from the other services in the band 5 250-5 350 MHz (see 5.447E and 5.447F for details) HIPERLAN in the band 5250 – 5350 MHz with a max. mean e.i.r.p. of 200 mW for indoor and 1 W for outdoor applications (ITU-R Res.229).
5 255- 5 350 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) MOBILE except aeronautical mobile 5.446A 5.447F 5.447E 5.448 5.448A			5 255- 5 350 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) FIXED 5.447E MOBILE except aeronautical mobile 5.446A 5.447F 5.448A	HIPERLAN in the band 5250 – 5350 MHz with a max. mean e.i.r.p. of 200 mW for indoor and 1 W for outdoor applications (ITU-R Res.229). FWA systems in fixed service and stations in mobile service shall not claim protection from the other services in the band 5 250-5 350 MHz (see 5.447E and 5.447F for details).
5 350-5 460 EARTH EXPLORATION-SATELLITE (active) 5.448B SPACE RESEARCH (active) 5.448C AERONAUTICAL RADIONAVIGATION 5.449 RADIOLOCATION 5.448D			5 350-5 460 EARTH EXPLORATION-SATELLITE (active) 5.448B SPACE RESEARCH (active) 5.448C AERONAUTICAL RADIONAVIGATION 5.449 RADIOLOCATION 5.448D	Aeronautical navigation service limited to airborne radars and associated airborne beacons in the band 5350 – 5470 MHz.
5 460-5 470 RADIONAVIGATION 5.449 EARTH EXPLORATION-SATELLITE (active) SPACE RESEARCH (active) 5.448C RADIOLOCATION 5.448D 5.448B			5 460-5 470 RADIONAVIGATION 5.449 EARTH EXPLORATION-SATELLITE (active) SPACE RESEARCH (active) RADIOLOCATION 5.448D 5.448B	Aeronautical navigation service limited to airborne radars and associated airborne beacons in the band 5350 – 5470 MHz.

5 470-6 700 MHz

Allocation to services				
Region 1	Region 2	Region 3	Papua New Guinea	Usage
5 470-5 570 MARITIME RADIONAVIGATION MOBILE except aeronautical mobile 5.446A 5.450A EARTH EXPLORATION-SATELLITE (active) SPACE RESEARCH (active) RADIOLOCATION 5.450B			5 470-5 570 MARITIME RADIONAVIGATION MOBILE except aeronautical mobile 5.446A 5.450A EARTH EXPLORATION-SATELLITE (active) SPACE RESEARCH (active) RADIOLOCATION 5.450B	For the conditions of sharing between WAS, including RLANS, and the EESS (active) in this band see ITU-R Rec. M.1653. In the band 5470-5725 MHz, mobile service shall be restricted to a maximum TX power of 250 mW with a maximum mean e.i.r.p. of 1W and a maximum mean e.i.r.p. density of 50 mW/MHz in any 1 MHz band (ITU RR Res. 229).
	5.448B 5.450 5.451		5.448B	
5 570-5 650 MARITIME RADIONAVIGATION MOBILE except aeronautical mobile 5.446A 5.450A RADIOLOCATION 5.450B			5 570-5 650 MARITIME RADIONAVIGATION MOBILE except aeronautical mobile 5.446A 5.450A RADIOLOCATION 5.450B	In the band 5470-5725 MHz, mobile service shall be restricted to a maximum TX power of 250 mW with a maximum mean e.i.r.p. of 1W and a maximum mean e.i.r.p. density of 50 mW/MHz in any 1 MHz band (ITU RR Res. 229). Ground-based meteorological radar in the band 5600-5650 MHz for weather services (5.452).
	5.450 5.451 5.452		5.452	
5 650-5 725 RADIOLOCATION MOBILE except aeronautical mobile 5.446A 5.450A Amateur Space research (deep space)			5 650-5 725 RADIOLOCATION MOBILE except aeronautical mobile 5.446A 5.450A Amateur Space research (deep space)	In the band 5470-5725 MHz, mobile service shall be restricted to a maximum TX power of 250 mW with a maximum mean e.i.r.p. of 1W and a maximum mean e.i.r.p. density of 50 mW/MHz in any 1 MHz band (ITU-R Res. 229). Use of this band by Amateur service is restricted to professional amateurs only.
	5.282 5.451 <u>5.453</u> 5.454 5.455		5.282 <u>5.453</u>	
5 725-5 830 FIXED-SATELLITE (Earth-to-space) RADIOLOCATION Amateur 5.150 5.451 5.453 5.455	5 725-5 830 RADIOLOCATION Amateur 5.150 5.453 5.455		5 725-5 830 FIXED <u>5.453</u> RADIOLOCATION Amateur 5.150	5.8 GHz ISM band (5725-5 875 MHz).
5 830-5 850 FIXED-SATELLITE (Earth-to-space) RADIOLOCATION Amateur Amateur-satellite (space-to-Earth) 5.150 5.451 5.453 5.455	5 830-5 850 RADIOLOCATION Amateur Amateur-satellite (space-to-Earth) 5.150 5.453 5.455		5 830-5 850 FIXED <u>5.453</u> RADIOLOCATION Amateur Amateur-satellite (space-to-Earth) 5.150	Use of this band by Amateur service is restricted to professional amateurs only. 5.8 GHz ISM band (5725-5 875 MHz).
5 850-5 925 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.150	5 850-5 925 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE Amateur Radiolocation 5.150	5 850-5 925 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE Radiolocation 5.150	5 850-5 925 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE Radiolocation 5.150	Microwave links in the 6 GHz band in accordance with ITU-R Rec. F.3835.8 GHz ISM band (up to 5875 MHz).
5 925-6 700 FIXED 5.457 FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B MOBILE 5.457C 4.457D 5.457E 5.457F			5 925-6 700 FIXED FIXED-SATELLITE (Earth-to-space) 5.457A MOBILE 5.457E	Microwave links in the 6 GHz and 6.5 GHz bands in accordance with ITU-R Rec. F.383 and F.384 (see <i>noting a</i>), ITU- R Res. 902). VSAT uplink in the band 5925 – 6725 MHz. See ITU-R Res. 902 for licensing Earth stations on board vessels (ESV) in the band 5925–6425 MHz.
	5.149 5.440 5.458		5.149 5.440 5.458	