National Information and Communications Technology Authority

DRAFT 60 GHz BAND PLAN CONSULTATION

Papua New Guinea

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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 document is based on the ITU Radio Regulations of WRC-15, WRC-19 and provisions for ITU Region 3, as well as relevant APT recommendations. This document must be read with all relevant references quoted to understand various sub-band plans and channeling arrangements. The National Information and Communication Technology Authority (NICTA) of Papua New Guinea hereby expressly disclaims any and all liability connected with or arising from any sole use of or reliance on the contents of this document alone for any purpose whatsoever.

LIST OF ABBREVIATIONS & GLOSSARY

MGWS	Multi-Gigabit Wireless Systems.
60 GHz band	The frequencies covered by the 60 GHz band plan, being 57 – 71 GHz
APT	Asia Pacific Telecommunity
Band plan	Either an administrative or legislative instrument that sets out the allocations of frequencies to services within a specific radiofrequency band.
Apparatus licence	An apparatus licence authorises, under the *NICTA 2010 Licensing & Spectrum Regulations*, the use of a particular service type, in a particular frequency range and at a particular geographic location for a period of 5 years.
CEPT	European Conference of Postal and Telecommunications Administrations
Guard Band	A frequency band that is either deliberately vacant or has specific operating conditions to minimise intra-band interference between the two bands on either side (analogous to a 'buffer').
IMT	International Mobile Telecommunications: International Mobile Telecommunications (IMT) encompasses IMT-2000, IMT-Advanced, IMT-2020 and defines the requirements of 3rd generation (3G), 4th generation (4G), and fifth generation (5G) technologies.
ITU	International Telecommunications Union
LTE	Long Term Evolution—a 3GPP technology standard for wireless communications including high-speed data for mobile devices
FWA	Fixed Wireless Access
NICTA	National Information and Communications Technology Authority
ICT	Information Communication Technology
TDD	Time Division Duplex
TX	Transmit
UE	User Equipment
WRC - 15	World Radio Conference 2015
WRC - 19	World Radio Conference 2019
WRC - 23	World Radio Conference 2023

1. INTRODUCTION

1.1 This document sets out NICTA's proposals to open spectrum in the 57– 71 GHz band for Fixed Wireless applications. The 60 GHz band is widely perceived by analysts and industry as an emerging area for products and services in both the consumer and business markets.

1.2 New 60 GHz technologies have emerged that can utilise this spectrum and take advantage of the high gaseous attenuation exhibited at these frequencies to provide high speed data transmission (100Mbits/sec & above) over short hop link lengths (typically <1km link lengths at high availability) with minimal risk of interference.

1.3 There are two key applications for 60 GHz band to deliver Multi-Gigabit Wireless Systems (MGWS) services, namely the Wireless Personal Area Network (WPAN) and also for Fixed Wireless Services. Possible wireless applications include home/office networking, wireless backhaul and temporary wireless connections during events.

1.4 The unique propagation characteristics of the 60 GHz band is ideally suited for deployment of MGWS to provide short range wireless links (≤ 1km) with high data rate and high bandwidth. It offers a low cost, easy maintenance, highly secure and reliable alternative to other high-capacity links at congested bands.

1.5 Considering the above, there are significant benefits for NICTA to open the 60 GHz band for new mobile and wireless applications leading to even greater adoption and usage of ICT within Papua New Guinea.

1.6 This draft consultation band plan intends to seek the views of interested industry stakeholders and the general public on the allocation plan of the 60 GHz band and usage of this spectrum in Papua New Guinea.

1.7 The 60 GHz Draft band plan consultation is based on Article 5 of the ITU Radio Regulations, provisions for Region 3 and consequent PNG Allocations as per updates from WRC-15 and WRC-19.

2. ALLOCATION IN THE 60 GHz BAND

2.1 Currently, the 60 GHz band (57 – 71 GHz) has not been allocated for use in Papua New Guinea. However, in 2022, NICTA received feedback from the industry indicating interest in bringing commercial equipment that operates in the 60 GHz band into Papua New Guinea. There are two categories of commercial equipment that are readily available in the market: low radiation equipment (≤40dBm EIRP) and high radiation equipment (>40dBm EIRP).

2.2 WRC 2019 identified 66-71 GHz band as part of the license-exempt 57-71 GHz band for IMT globally, which NICTA view as mostly useful for enabling licence-exempt 5G deployment (5G NR-U) that complements licenced deployment in other bands like 26 GHz.

2.3 NICTA recommends allocating the upper part of the 60 GHz band (66-71 GHz) for FWA deployment as a regulated band, while leaving the lower part (57-66 GHz) for unlicensed use. This is because the atmospheric absorption from rain is higher, resulting in higher signal attenuation, as shown in Figure 1.[HSN1]

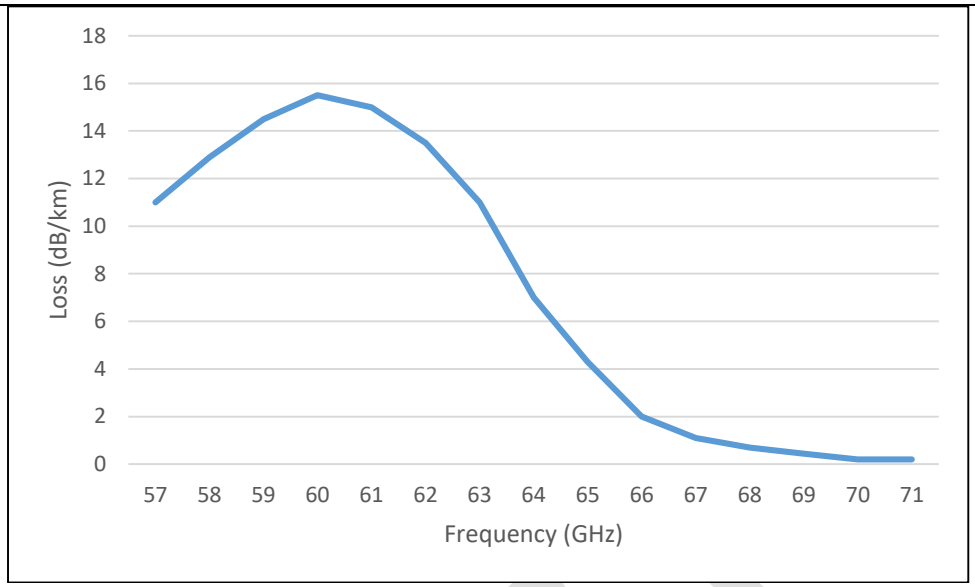

Figure 1: Graph showing high loss between 57 GHz to 66 GHz due to oxygen absorption from rain[HSN2]

3. CHANNELLING PLAN

3.1 CEPT Recommendation ECC/REC/ (09)011 provides a number of flexible options for high power point-to-point fixed wireless services in this band (57-71 GHz), including the option of not having specific channel plan or adopting a channel plan.

3.2 A 2160 MHz channel bandwidth is required for single channels and bonding of single channels are allowed. It is important that MGWS standards employ the same channelization in order to promote better coexistence. Centre frequencies for single channels are recommended to be at 58.32, 60.48, 62.64, 64.80 GHz, 66.96 GHz, and 69.12 GHz. For bonded channels, centre frequencies depend on how many single channels are bonded, but need to be uniformly spaced with respect to the single channel centre frequencies.

3.3 Table 1 below shows the channelling plan, with 6 channels having a bandwidth of 2.16 GHz. NICTA is of the view that channels 5 and 6 will be used for IMT with WRC-19 having indicated for global IMT allocation in that band. Channels 1 to 4 can be used for unlicensed FWA.

Channel	Center (GHz)	Min. (GHz)	Max. (GHz)	BW (GHz)
1	58.32	57.24	59.40	2.16
2	60.48	59.40	61.56	

3	62.64	61.56	63.72
4	64.80	63.72	65.88
5	66.96	65.88	68.04
6	69.12	68.04	70.20

Table 1: Channelling Plan of 60 GHz Band

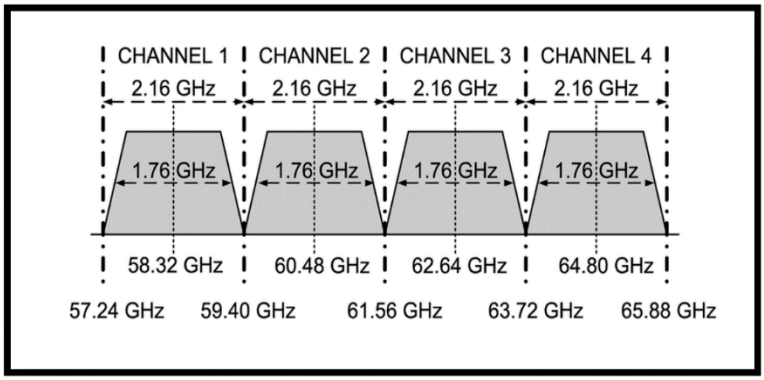

Figure 3: Channelling arrangement of the 60 GHz Band

3.4 Channelling arrangement is by 2.16 GHz block for deployment of FWA in the 57 to 66 GHz and IMT 2020 (5G) from 66 GHz to 71 GHz. Multiples of 2.16 GHz contiguous spectrum can also be used depending on spectrum availability and specific requirements.

3.5 Synchronisation of the Networks deployed in this band will be as per NICTA Network Synchronisation Guideline. Appropriate frame structure selection for local, national and international is required to avoid potential harmful interference between adjacent networks operating in this band.

4. PRINCIPLES OF ASSIGNMENT

4.1 Authorisation to use the frequency band;

- Any license assignment for parts or portion of 60 GHz band is subject to conditions in the Operator Licensing Regulation, 2010 and Radio Spectrum Regulation, 2010.

4.2 Required types of Radiocommunications Licences are;

i. **Spectrum Licence** is needed for the operation of a device or devices within a defined spectrum space (geographic area and frequency band) on the condition that the device(s) operate with accordance to their licence conditions and terms that were set by NICTA for that specific spectrum. This licence is issued for a period of five (5) to fifteen (15) years and fees paid annually.

ii. **Apparatus Licence** is needed for the operation of a device or type of devices at specific locations with specific operating conditions set by NICTA in order to provide an approved service. Apparatus Licences are intended to be directed at certain categories of 'Transmitting' and 'Receiving' apparatus. This licence is issued for a period of five (5) years.

5. INVITATION TO COMMENT

NICTA invites the industry to comment on the matters stated in the above paragraphs and any other related issues not covered in this consultation document but which are considered to be relevant to the formulation of 60 GHz band regulatory framework. Following the end of the consultation period, NICTA targets to announce the 60 GHz band regulatory framework by the second quarter of 2023.

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6. REFERENCES

1 Recommendations to the PNG & PITA Administrations to adopt a Licensed-Exempt Approach, H. Sama Nwana

2 ITU Radio Regulations Articles Edition of 2020

3 ITU NRFAT-2016-Rev 2

4 ITU-R Recommendation M.2003-2 (1/2018)

5 Papua New Guinea Table of Frequency Allocations 2020

6 IDA Singapore Proposed Regulatory Framework for 60 GHz Band

7 Ofcom Release of the 59-64 GHz Band

Annex A: Extract of Article 5 - ITU Radio Regulation 2020 and Papua New Guinea Spectrum Plan

57-71 GHz

Allocation to services				
Region 1	**Region 2**	**Region 3**	**Papua New Guinea**	**Usage**
57-58.2 EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.556A MOBILE 5.558 SPACE RESEARCH (passive) 5.547 5.557			**57-58.2** EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.556A MOBILE 5.558 SPACE RESEARCH (passive) 5.547	TDD or FDD FWS in supporting HDFS in accordance with ITU-R Rec. F.1497, Annex 2. An example of technical specification is available in Table 29, ITU-R Rec. F.758. Inter-satellite service is limited to satellites in the GSO orbit in the bands 57-58.2 GHz.
58.2-59 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) 5.547 5.556			**58.2-59** EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) 5.547 5.556	TDD or FDD FWSs in supporting HDFS in accordance with ITU-R Rec. F. 1497, Annex 2. An example of technical specification has been given in Table 29, ITU-R Rec. F.758.
59-59.3 EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.556A MOBILE 5.558 RADIOLOCATION 5.559 SPACE RESEARCH (passive)			**59-59.3** EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.556A MOBILE 5.558 RADIOLOCATION 5.559 SPACE RESEARCH (passive)	Airborne radar in the band 59 – 64 GHz in radiolocation service (5.559).
59.3-64 FIXED INTER-SATELLITE MOBILE 5.558 RADIOLOCATION 5.559 5.138			**59.3-64** FIXED INTER-SATELLITE MOBILE 5.558 RADIOLOCATION 5.559 5.138	Short range high capacity digital links for fixed and mobile application. Short range vehicle radar equipment, standardized by ASTAP, with power delivered to the antenna less than 10 mW and 1 GHz bandwidth (ITU-R Rec. M.1452).
64-65 FIXED INTER-SATELLITE MOBILE except aeronautical mobile 5.547 5.556			**64-65** FIXED INTER-SATELLITE MOBILE except aeronautical mobile 5.547 5.556	Worldwide high-density applications in the fixed service (HDFS) (ITU RR Res. 75) in the band 64 – 66 GHz. An example of technical specification has been given in Table 33, ITU-R Rec. F.758
65-66 EARTH EXPLORATION-SATELLITE FIXED INTER-SATELLITE MOBILE except aeronautical mobile SPACE RESEARCH 5.547			**65-66** EARTH EXPLORATION-SATELLITE FIXED INTER-SATELLITE MOBILE except aeronautical mobile SPACE RESEARCH 5.547	Worldwide high-density applications in the fixed service (HDFS) (ITU RR Res. **75**) in the band 64 – 66 GHz. An example of technical specification has been given in Table 33, ITU-R Rec. F.758.
66-71 INTER-SATELLITE MOBILE 5.553 5.558 5.559AA MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.554			**66-71** INTER-SATELLITE MOBILE 5.553 5.558 5.559AA MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.554	Implementation of terrestrial component of IMT is permissible subject to Res. **241** see 5.559AA.