National Information and Communications Technology Authority

REVISED DRAFT BAND PLAN
800 MHz

Papua New Guinea

Document Ref. 0000.0

DOCUMENT REVISION DETAILS

Revision	Date	Who	Details
1	14/06/2018	Visia J	First Draft
2	25/01/2021	Visia J	Draft after 2021 Consultation
3	10/11/2022/ 17/01/2023	Visia J/H Nwana	Final Draft after 2021 Consultation
4			
5			
6			
7			
8			
9			
10			

Table of Contents

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

3GPP	3rd Generation Partnership Project is the international body responsible for the standardisation of (cellular) mobile (including broadband) telecommunications.
800 MHz band	The frequencies covered by the 800 MHz band plan, being 806–894 MHz.
850 MHz band	The frequency segments within the 800 MHz band currently licensed via spectrum licence for the provision of 3G and 4G services (824–849/869–894 MHz), i.e. 3GPP Band 5.
800 MHz 'expansion' band	The FDD-paired frequencies lower-adjacent to the 850 MHz band that are standardised by the 3GPP for 4G technologies (3GPP bands 26 and 27). These are 814–849/859–894 MHz or 3GPP Band 26; and 807–824/852–869 MHz or 3GPP Band 27.
900 MHz band	The frequencies covered by the 900 MHz band plan, being 890-960 MHz.
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.
BS	Base Station
CDMA	Code Division Multiple Access – a now-outdated 3G technology
FDD	Frequency Division Duplex
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.
IP	Internet Protocol
ISDN	Integrated Services Digital Network
ITU	International Telecommunications Union
LTE	Long Term Evolution—a 3GPP technology standard for wireless communications including high-speed data for mobile devices
MS	Mobile Station
NICTA	National Information and Communications Technology Authority
PPDR	Public Protection and Disaster Relief

PPP	Public Private Partnership
PSTN	Public Switched Telephone Network
RFID	Radiofrequency Identification
RX	Receive
SRD	Short Range Devices
STL	Studio-Transmitter Link
TDD	Time Division Duplex
TX	Transmit
UE	User Equipment
W-CDMA	Wideband Code Division Multiple Access
WRC - 15	World Radio Conference 2015
WRC - 19	World Radio Conference 2019

1. INTRODUCTION

1.1 Demand for Mobile Broadband Access continues to increase thus creating the need for more radio frequency spectrum. The 800 MHz Band is well recognised as essential spectrum resource with perfect radio transmission characteristics.

1.2 This 800 MHz Band plan relates to spectrum between 806 and 880 MHz.

1.3 Other services within the band are also mentioned briefly for sharing and compatibility reasons.

1.4 This document provides information on technical characteristics of radio systems, frequency channeling and coordination initiatives in order to maximize the band utilization and minimize interference by applications in operation within this band.

1.5 This band plan intends to guide assignments and regulate usage of this spectrum in Papua New Guinea.

1.6 The 800 MHz Band Plan 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. RADIO SPECTRUM PLAN

2.1 In accordance with the ITU Radio Regulations and provisions for Region 3, the Papua New Guinea Table of Frequency Allocations (see Annex B) provides for the following Primary Services in this 800 MHz Band;

- FIXED
- MOBILE

2.2 The 800 MHz band accommodates the following Service Applications;

- IMT
- IMT Based Broadband Public Protection and Disaster Relief Systems
- Broadcast Station to Transmitter Links

2.3 Other applications permitted in this band are mostly Short-Range Devices (SRDs) which include;

- Cordless Telephones
- Radio Telemetry
- Tele command
- RFID Systems

2.4 PPDR is defined in Resolution **646 (Rev.WRC-15)** through a combination of the terms "public protection radiocommunication" and "disaster relief radiocommunication". The first term "PP" refers to "radiocommunication used by responsible agencies and organizations dealing with maintenance of law and order, protection of life and property and emergency situations". The second term "DR" refers to "radio communications used by agencies and organizations dealing with a serious disruption of the functioning of society, posing a significant widespread threat to human life, health, property or the environment, whether caused by accident, natural phenomena or human activity, and whether developing suddenly or as a result of complex, long-term processes".

Resolution **646** is an international agreement under the U.N. and ITU that encourages administrations to use harmonized frequency ranges for public protection and disaster relief (PPDR) operations to the maximum extent possible and to consider the 694 – 894 MHz range when planning for PPDR applications with an emphasis on broadband.

RESOLUTION 646 (REV. WRC-19) [Public protection and disaster relief] encourages "administrations to also consider parts of the following regionally harmonized frequency ranges for their PPDR applications" [1].

1-3 Region 3

1-3.1 Harmonized frequency arrangements within the frequency range 694 to 894 MHz in accordance with the APT harmonization measures[8] for broadband PPDR

Frequency arrangements for broadband PPDR in the 694-894 MHz frequency range

Frequency arrangement	Paired arrangements				Notes
	Mobile station TX (MHz)	Centre gap (MHz)	Base station TX (MHz)	Duplex separation (MHz)	
a)	703-748	10	758-803	55	3GPP Band 28 (Note 1)
b)	824-849	17	869-894	45	3GPP Band 5
c)	814-849	27	859-894	45	3GPP Band 26
d)	807-824	28	852-869	45	3GPP Band 27

NOTE 1 – 3GPP Band 28 consists of a dual-duplexing arrangement as shown in the Figure below.

Table 1 - Excerpt from Resolution 646 and Recommendation ITU-R M.2015-2

2.5 The term IMT is the root name which encompasses IMT-2000, IMT-Advanced and the upgrade for the next generation of these technologies as well as any other new technology that is made available in the future.

IMT-2000 systems are third generation mobile systems which provide access to a wide range of telecommunication services, supported by the fixed telecommunication networks (e.g., PSTN / ISDN / IP), and other services which are specific to mobile users.

IMT-Advanced systems are mobile systems that include capabilities of IMT-2000 and go beyond those of IMT-2000. Such systems provide access to a wide range of telecommunications services including advanced mobile services supported by mobile and fixed network.

The usage of the said band is intended for providing wireless telecommunication connectivity to subscribers and may include applications such as voice, internet, video, images, interactive multimedia, high-speed data and mobile TV.

The technologies which can provide IMT services in the 800 MHz Band include, but are not limited to:

- LTE;
- LTE Advanced; and
- IMT-2020.

[1] [1] RESOLUTION 646 (REV.WRC-19), Public protection and disaster relief, The World Radiocommunication Conference (Sharm el-Sheikh, 2019) https://www.itu.int/dms_pub/itu-r/oth/0C/0A/R0C0A00000F00133PDFE.pdf

3. PROPOSED 2021 CHANNELLING PLAN

3.1 In March 2021, NICTA proposed a chanelling plan for 800MHz as shown in Figure 1 for consultation with stakeholders -'The Draft 800 MHz Band Plan'[2]. It proposed for the 800 MHz Band in Papua New Guinea to be allocated to Mobile - specifically IMT or IMT Based Applications, and that it will utilise FDD mode Single-Duplexer frequency arrangement [Recommendation ITU-R M.1036-5 (10/2015)]. Figure 1 below shows the Single Duplexer FDD Frequency Arrangement.

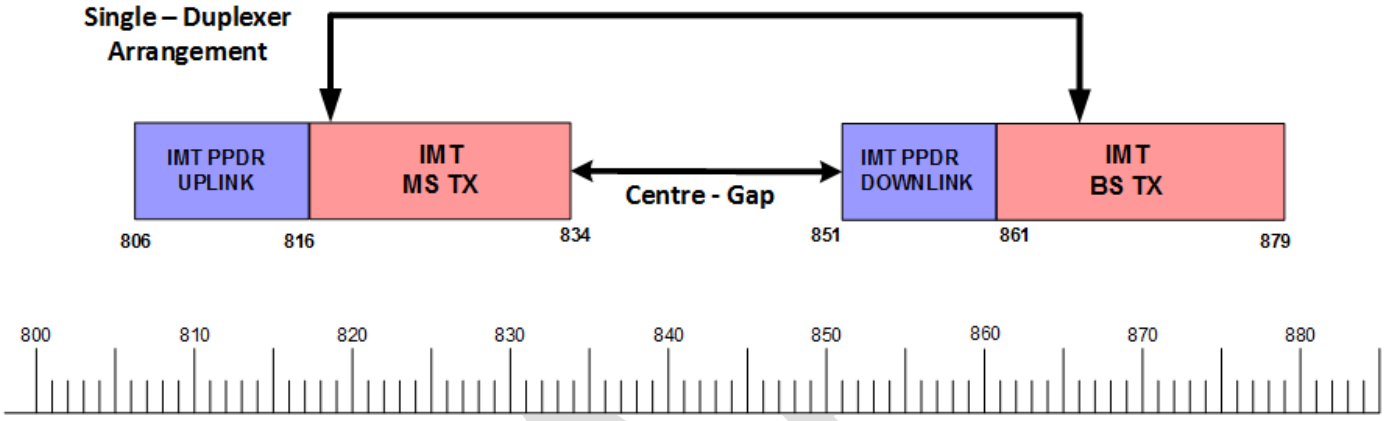

Figure 1: FDD Mode Single-Duplexer Frequency Arrangement

3.2 Drawing from Figure 1, NICTA proposed a Channel arrangements for IMT and IMT Based (including IMT-based PPDR) Applications in the 800 MHz band based on basic 5MHz blocks as follows:

- 806-834 MHz (MS TX)/ (UE TX)/ (UPLINK)
- 851-879 MHz (BS TX)/ (UE RX)/ (DOWNLINK)
- 834-851 MHz (Centre Gap)

Mobile Station Transmitter (MHz)	Centre Gap (MHz)	Base Station Transmitter (MHz)	Duplex Separation (MHz)	Un-paired Arrangements (e.g., For TDD) (MHz)
806-834	17	851-879	45	None

Table 1: Paired FDD Arrangement

3.3 The proposal allowed for IMT and IMT based Broadband PPDR systems can be deployed in the band 806-834 MHz paired with 851-879 MHz. SRDs such as Cordless Telephones, Radio Telemetry, Tele command and RFID Systems were also permitted to operate in the 800 MHz band provided they do not cause harmful interference to the Licenced services.

[2] Draft Band Plan for 800MHz, NICTA, https://www.nicta.gov.pg/2021/03/cp-0-11-2-2/, March 2021

Use of SRDs must be in accordance with the Radiocommunications (Low Interference Potential Devices) Class Licence 2016, made under Section 176 of the NICT Act, 2009.

3.4 The 2021 proposal also allowed for the sub-band 834-851 MHz (Centre Gap) to be used for the purpose of STL link applications, though it allowed for a possibility of moving the STL Applications to another frequency Band and utilizing TDD mode in this sub-band.

3.5 Key to NICTA's 2021 800MHz Band Plan channelling proposal was NICTA's wish to see the emergence of a sub-1GHz IMT-based PPDR network in Papua New Guinea – as clearly shown in Figure 1: 806-816MHz Uplink paired with 861-879MHz downlink.

4. STAKEHOLDER FEEDBACK & OTHER RECENT APT 800MHz UPDATES

4.1 NICTA received two important stakeholder responses to its proposed March 2021 800MHz Draft Band Plan.

4.2 Both responses highlighted two key issues with the proposal:

4.2.1 The inconsistency of the Proposed Draft 800MHz Band Plan with widely-implemented 3GPP Band Plans, as well as incompatibility to the 900MHz channelling plan in force in the PNG today. Therefore they argue there is unlikely to be any compatible devices, and a small market like PNG is also most unlikely to drive the device ecosystem for the proposed 800 MHz band plan.

4.2.2 The risk of any PPDR network as envisaged by the proposed Draft 800MHz band plan emerging in Papua New Guinea is very high. They argued that it would be economically cost prohibitive to invest in an independent infrastructure for this purpose [PPDR], and suggested a partnership (e.g., PPP) with mobile operators is a more viable option. This risk would result in stranded and unused PPDR allocated spectrum in Papua New Guinea.

4.3 NICTA has considered these feedback carefully. It has to balance the risks highlighted in the stakeholder feedback with its duties towards the efficient use of spectrum in PNG, as well as ensuring that there is a viable equipment and device ecosystem for the proposed Draft 800MHz band plan.

4.4 NICTA also considered the fact that Telikom PNG is clearing all Band 5 CDMA transmissions from the 800MHz band and vacating the band. The CDMA-based Band 5 850MHz band plan has virtually no ecosystem left. Therefore, Band 5 CDMA is no longer the highest value use of the 850MHz Band in the PNG.

4.5 Indeed, NICTA realises that 5G LTE is increasingly the highest value use of the 800MHz band in Papua New Guinea, as in other countries in Region 3. As per GSA Report [GSA -

Low Band Spectrum for LTE and 5G (May 2021)[3]], 67 operators have been identified that have invested in LTE Band 5 (824–849 MHz/869–894 MHz).

4.6 Of these, at least 33 have launched networks, 29 others have licences to operate their networks at 850 MHz and five more have been identified as running tests/trials or planning deployment. As per GSA, two operators have launched 5G using spectrum in Band n5 (in Puerto Rico and the USA), one deploying the frequency range (in neighbouring Australia) and another one testing with Band n5 (in Japan). As of May 2021, 8104 LTE devices supported Band 5, out of which, 58.29% accounts for phones and there were 201 announced 5G devices supporting this band, and out of which 49.30% accounts for phones.

4.7 India with its very large market has adopted FDD configuration based 3GPP Band 5 for 800 MHz spectrum band[4]. Considering that the telecom operators are already utilizing this band for other older mobile technologies, they would be refarming it for the latest 5G LTE mobile technologies.

4.8 In neighbouring Australia, for historic reasons, this band has been operated in the 825–845/870–890 MHz range, which currently accommodates spectrum-licensed 3G and 4G services operated by VHA and Telstra. However, "in the long term, the ACMA intends to shift the boundaries of the 850 MHz band down by 1 MHz, so that it operates in 824–844/869–889 MHz band – matching Band 5"[5].

4.9 These facts of this *May 2021* GSA Report were obviously not known to NICTA by the time the 800MHz Band plan proposal was made in *March 2021*.

4.10 As regards PPDR, NICTA has studied *what* other APT/Region 3 countries are doing. From Table 1 earlier, Arrangement (c) i.e. 3GPP Band 26, is arguably the most popular preferred arrangement in Region 3. For example, Malaysia, Thailand and Singapore have opted for, or are inclined towards, Band 26 PPDR arrangements.

4.11 However, NICTA is aware that neighbouring Australia is adopting 3GPP Band Plan 27 for PPDR and would help drive a Band 27 device ecosystem close to PNG. Other APT Countries have opted for PPDR in the Band 28 700MHz band.

5. NICTA CONCLUSIONS ON 800MHz

5.1 Accordingly, NICTA has now concluded that the most efficient allocation of the 800MHz is through a combination of:

5.1.1 3GPP Band 5 5G LTE use for the 850MHz sub-band;

[3] Low-Band Spectrum for LTE and 5G - May 2021 - GSA (gsacom.com) - https://gsacom.com/paper/low-band-spectrum-for-lte-and-5g-may-2021/

[4] CP_30112021.pdf (trai.gov.in)

[5] 803–960 MHz overview | ACMA - https://www.acma.gov.au/803-960-mhz-overview

5.1.2 Along with a 3GPP Band 27 use for the so called 850MHz 'Expansion Band', which possibly allows for a potential commercial-led PPDR deployment for PNG – consistent with ITU recommendations.

5.2 Figure 2 shows the new proposed allocation approach.

5.3 As can be seen in Figure 2, once 3GPP Band 5 LTE is first licensed in Papua New Guinea, further spectrum in the 3GPP Band 27 'expansion' band arrangement would be licensed using some of the Centre gap. The assignment of the spectrum to operators at this stage [using some of the centre gap of the 3GPP band 5] would take into consideration coexistence issues and any required guard bands, if necessary, between the 3GPP Band 5 LTE and 3GPP Band 27 arrangements.

5.4 Figure 2 allocation arrangement would allow for another important sub-1GHz 5G LTE band (and therefore wider-range 5G deployments) in Papua New Guinea.

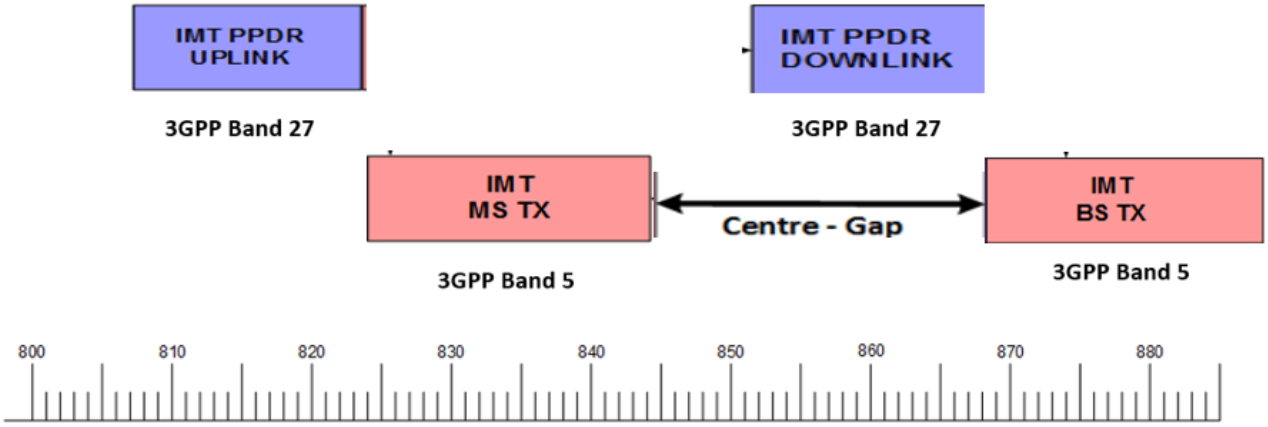

Figure 2: Allocation of 800MHz Band

(The 806-824MHz/851-869MHz is already under refarming)

5.5 NICTA is aware that licensing 3GPP Band 5 fully in PNG as Figure 2 suggests would not be possible because there are already licensed use and users above 880MHz. This is why Figure 1 from the 2021 proposed Channeling Plan terminates at 879MHz. Therefore, any licensing according to 3GPP Band 5 would end at 879MHz.

Issues for Consultation (Question 1)

For 806-894 MHz frequency range, do you agree with this revised *allocation* band plan (Figure 2) to the March 2021 Band plan proposal (Figure 1)? Kindly justify your response.

6. CHANNELLING PLAN

6.1 Following on from the last section, the 800 MHz Band in Papua New Guinea is allocated to Mobile, specifically IMT or IMT Based Applications and therefore will utilise FDD mode Single-Duplexer frequency arrangement [Recommendation ITU-R M.1036-5 (10/2015)] as shown in Figure 2 and Figure 3 next.

6.2 Conventional duplex direction for FDD terrestrial mobile systems will be maintained. This means the mobile terminal transmits at lower frequencies and the base station at higher frequencies.

6.3 Papua New Guinea adopted harmonised frequency Arrangement for Region 3 APT G3-1-6 as defined in Annex A. The whole Band will be utilised by IMT and IMT Based Service Applications.

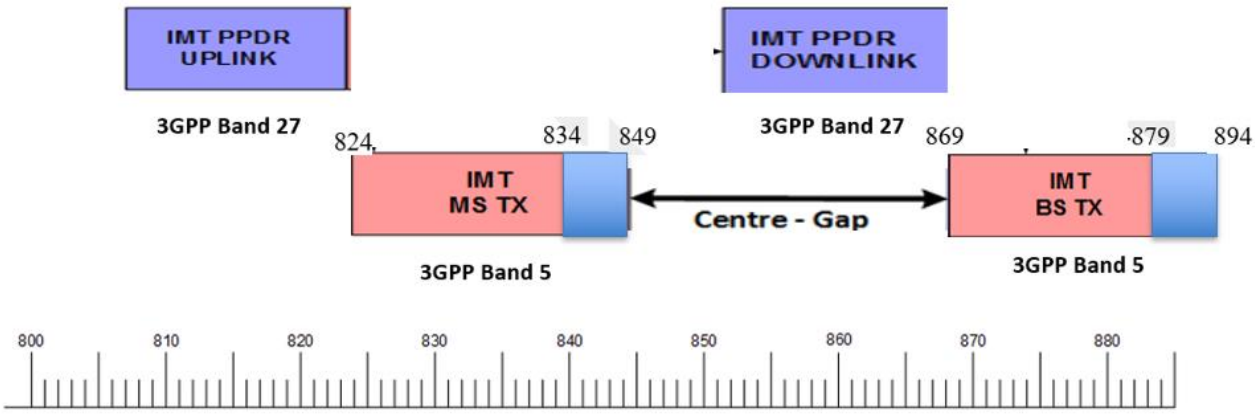

Figure 3: Potential Assignment in the 800MHz Band
(The 806-824MHz/851-869MHz is already under refarming)

6.4 Figure 3 shows the likely assignment of the 800MHz band given the constraints of the use of the band in PNG above 880MHz. It depicts how the top 15MHz of the 3GPP Band 5 arrangement in PNG would not be used because of this constraint leaving only 2x10Mhz of the Band for 5G LTE licensing. With future clearance of the band above 880MHz, more 5G Band 5 5G LTE spectrum would be released.

6.5 Therefore, Channel arrangements for IMT and IMT Based Applications in the 800 MHz band for PNG (taking into consideration the constraints of use and existing licensees above 880MHz) are as follows (see Figure 3):

- 807-834 MHz (MS TX)/ (UE TX)/ (UPLINK), i.e. 3GPP Band 27/Band 5 uplinks
- 852-879 MHz (BS TX)/ (UE RX)/ (DOWNLINK), i.e. 3GPP Band 27/Band 5 downlinks
- 849-869 MHz (Centre Gap) – for the 3GPP Band 5 arrangement, but effectively increased by 15MHz to 834-869MHz.

Mobile Station Transmitter (MHz)	Centre Gap (MHz)	Base Station Transmitter (MHz)	Duplex Separation (MHz)	Un-paired Arrangements (e.g., For TDD) (MHz)
807-834	20	852-879	25	None

Table 1: Paired FDD Arrangement

6.6 The Channelling arrangement is based on the basic 5MHz block for deployment of IMT or IMT Based Applications. Multiples of 5 MHz can also be used depending on spectrum availability and specific requirements.

6.7 IMT and IMT based Broadband PPDR systems can be deployed in the band 807-834 MHz paired with 852-879 MHz, see Figure 3.

6.8 SRDs such as Cordless Telephones, Radio Telemetry, Tele command and RFID Systems are also permitted to operate in the 800 MHz band provided they do not cause harmful interference to the Licenced services. Use of SRDs must be in accordance with the Radiocommunications (Low Interference Potential Devices) Class Licence 2016, made under Section 176 of the NICT Act, 2009.

6.9 The sub-band 849-869 MHz (Centre Gap) can be used for the purpose of IMT 3GPP Band 27 PPDR subject to coexistence with the primary licenced 3GPP Band 5 LTE services.

6.10 Typical technical and operational characteristics of IMT systems as identified by the ITU are described in the following documents:

- Recommendation ITU-R M.2012-5 (02/2022): Detailed specifications of the terrestrial radio interfaces of International Mobile Telecommunications-Advanced (IMT Advanced);
- Report ITU-R M.2241-0 (2011): Compatibility studies in relation to Resolution 224 in the bands 698 - 806 MHz and 790 - 862 MHz;
- Report ITU-R M.2074-0 (2006): Report on Radio Aspects for the terrestrial component of IMT-2000 and systems beyond IMT-2000;
- Recommendation ITU-R M.1645 (06/2003): Framework and overall objectives of the future development of IMT-2000 and systems beyond IMT-2000;
- Recommendation ITU-R M.1036-6 (10/2019): Frequency arrangements for implementation of the terrestrial component of International Mobile Telecommunications (IMT) in the bands identified for IMT in the Radio Regulations (RR); and
- Recommendation ITU-R M.2150-1 (02/2022): Detailed specifications of the terrestrial radio interfaces of International Mobile Telecommunications-2020 (IMT-2020).

6.11 Summary of Allocations

	Frequency Sub-band (MHz)	**Applications**	**Associated Technologies**
1	824 - 834/869-879	IMT	LTE LTE Advanced IMT-2020
2	807 – 824/852 – 869	IMT/IMT PPDR	LTE LTE Advanced IMT-2020

6.12 Assignment Approach

6.12.1 Frequency Sub-band 824 - 834/869-879 MHz would be licensed first;
6.12.2 and then 807 – 824/852 – 869MHz would be licensed taking into consideration guard bands and coexistence constraints/studies and ITU Reports, listed above.

Issues for Consultation (Question 2)

Do you agree with this revised *allocation* and channel *assignment* approaches? Kindly justify your response.

7. PRINCIPLES OF ASSIGNMENT

7.1 Authorisation to use the frequency band;

- Any license assignment for parts or portion of 807 MHz to 834 MHz paired with 852 MHz to 879 MHz is subject to conditions in the Operator Licensing Regulation, 2010 and Radio Spectrum Regulation, 2010.

7.2 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.

8. PPDR in Papua New Guinea

8.1 Part IV, Division 1, Section 68 of the NICTA Act of 2009 stipulates that "The Minister may require an operator licensee to provide certain assistance in the case of a public emergency or in the interest of public safety".

Issues for Consultation (Question 3)

What is the most optimal way to realise a national public safety network in Papua New Guinea? Kindly justify your response

8.2 As shown in Table 1 above, the relevant 800MHz PPDR arrangements for Region 3 includes frequency arrangements (b), (c) and (d), i.e. 3GPP Bands 5, 26 and 27.

8.3 PPDR could also be deployed in Region 3 in 3GPP Band 28 700MHz.

8.4 In addition to the frequency range 694-894 MHz, the ITU's WRC 2015-agreed Region 3 positions suggest PPDR networks could consider these bands too:

- 406.1-430 MHz,
- 440-470 MHz and
- 4 940-4 990 MHz.

Issues for Consultation (Question 4)

Which of these bands do you believe would be the most suitable for a PPDR network in PNG? Kindly justify your response

9 WHEN & HOW TO SUBMIT WRITTEN RESPONSES

1.1 NICTA invites comments on this entire 800MHz Band re-consultation.

1.2 Written representations or enquires may be in sent in writing or via email directed to: spectrum@nicta.gov.pg by no later than 5 pm on 11th April 2023.

10 REFERENCES

1 ITU Radio Regulations Articles Edition of 2016
2 ITU NRFAT-2016-Rev 2
3 ITU-R Recommendation M.1036-5 (10/2015)
3 APT Report on 806-960 MHz Frequency Arrangements, National Allocations and Assignments for IMT No. APT/AWG/REP-36 Edition: March 2013
4 APT Report on Harmonisation of frequency ranges for use by Wireless PPDR Applications in Asia-Pacific Region No. APT/AWG/REP-73 Edition: April 2017
5 Papua New Guinea Table of Frequency Allocations 2017
6 Papuan New Guinea Radiofrequency Spectrum Allocation Chart May 2017

Annex A: Extract of APT Harmonised Frequency Arrangement – APT Report No. APT/AWG/REP-73

Harmonized Frequency Arrangements					
Section 1: Arrangements in parts of the frequency range 694-894MHz (as per *resolves* 2 of Resolution 646 (Rev.WRC-15))					
Regional Organ-isation	**Frequency Arrangement Number**	**Paired arrangements**			
		Mobile station transmitter (MHz)	**Base station transmitter (MHz)**	**Duplex separation (MHz)**	**Usage type**
APT	G3-1-1	703-748	758-803	55	Broadband
APT	G3-1-2	806-824	851-869	45	Narrowband -25kHz
APT	G3-1-3	806-824	851-869	45	Narrowband- 25kH; 12.5 kHz & 6.25 kHz
APT	G3-1-4	806-824	851-869	45	Broadband & Narrowband
APT	G3-1-5	806-824	851-869	45	Broadband & Narrowband
APT	G3-1-6	806-834	851-879	45	Broadband & Narrowband

Table A-1: Harmonized Frequency Arrangements in Region 3

Annex B: Extract of Article 5 - ITU Radio Regulation 2016 and Papua New Guinea Spectrum Plan

460 - 890 MHz		
Allocation to Services		
Region 1	**Region 2**	**Region 3**
460-470	**FIXED** **MOBILE 5.286AA** **Meteorological-satellite (space-to-Earth)** **5.287 5.288 5.289 5.290**	
470-694 **BROADCASTING**	**470-512** **BROADCASTING** **Fixed** **Mobile**	**470-585** **FIXED** **MOBILE 5.296A** **BROADCASTING**

	5.292 5.293 5.295	
	512-608 **BROADCASTING** **5.295 5.297**	**5.291 5.298**
	608-614 **RADIO ASTRONOMY** **Mobile-satellite except aeronautical mobile-satellite (Earth-to-space)**	**585-610** **FIXED** **MOBILE 5.296A** **BROADCASTING** **RADIONAVIGATION** **5.149 5.305 5.306 5.307**
5.149 5.291A 5.294 5.296 5.300 5.304 5.306 5.311A 5.312	**614-698** **BROADCASTING** **Fixed** **Mobile** **5.293 5.308 5.308A 5.309 5.311A**	**610-890** **FIXED** **MOBILE 5.296A 5.313A 5.317A** **BROADCASTING**
694-790 **MOBILE except aeronautical mobile 5.312A 5.317A** **BROADCASTING** **5.300 5.311A 5.312**	**698-806** **MOBILE 5.317A** **BROADCASTING** **Fixed** **5.293 5.309 5.311A**	
790-862 **FIXED** **MOBILE except aeronautical mobile 5.316B 5.317A** **BROADCASTING** **5.312 5.319**	**806-890** **FIXED** **MOBILE 5.317A** **BROADCASTING**	
862-890 **FIXED** **MOBILE except aeronautical mobile 5.317A** **BROADCASTING 5.322 5.319 5.323**	**5.317 5.318**	**5.149 5.305 5.306 5.307 5.311A 5.320**

460 - 890 MHz

Allocation to Services				
Region 1	**Region 2**	**Region 3**	**Papua New Guinea**	**Usage**
460-470 FIXED MOBILE 5.286AA Meteorological-satellite (space-to-Earth) 5.287 5.288 5.289 5.290			**460-470** FIXED MOBILE 5.286AA Meteorological-Satellite (space-to-Earth) 5.287 5.289	Fixed and land mobile service in accordance with the "Public Cellular Band Plan".
470-694 BROADCASTING 5.149 5.291A 5.294 5.296 5.300 5.304 5.306 5.311A 5.312	**470-512** BROADCASTING Fixed Mobile 5.292 5.293 5.295	**470-585** FIXED MOBILE 5.296A BROADCASTING 5.291 5.298	**470-526** FIXED MOBILE	UHF CBRS in the Band 476.400 - 477.425 MHz in accordance with document No. TR603
	512-608 BROADCASTING 5.295 5.297	**585-610** FIXED MOBILE 5.296A BROADCASTING RADIONAVIGATION 5.149 5.305 5.306 5.307	**526-585** BROADCASTING PNG5 **585-610** BROADCASTING 5.149 5.306 5.307 PNG5	UHF Television Channels 28 to 34 in the band IV (526 - 606 MHz) using 8 MHz Channel Spacing. UHF Television Channels 35 to 37 in the band IV (526 - 606 MHz) using 8 MHz Channel Spacing.
	608-614 RADIO ASTRONOMY Mobile-satellite except aeronautical mobile-satellite (Earth-to-space)			
	614-698 BROADCASTING Fixed Mobile 5.293 5.308 5.308A 5.309 5.311A	**610-890** FIXED MOBILE 5.296A 5.313A 5.317A BROADCASTING	**610-694** BROADCASTING PNG5	UHF Television Channels 38 - 48 in the Band V (606 - 694 MHz) using 8 MHz Channel Spacing
694-790 MOBILE except aeronautical mobile 5.312A 5.317A BROADCASTING 5.300 5.311A 5.312	**698-806** MOBILE 5.317A BROADCASTING Fixed		**694-890** FIXED MOBILE 5.313A 5.317A	700 MHz Band for IMT according to APT FDD Plan (698 - 806 MHz)
790-862 FIXED MOBILE except aeronautical mobile 5.316B 5.317A BROADCASTING 5.312 5.319	5.293 5.309 5.311A **806-890** FIXED MOBILE 5.317A			Allocation for PPDR subject to the plan and assignment "in the 800 MHz band".
862-890 FIXED MOBILE except aeronautical mobile 5.317A BROADCASTING 5.322 5.319 5.323	BROADCASTING 5.317 5.318	5.149 5.305 5.306 5.307 5.311A 5.320	5.149 5.311A 5.320	

5.296A In Micronesia, the Solomon Islands, Tuvalu and Vanuatu, the frequency band 470-698 MHz, or portions thereof, and in Bangladesh, Maldives and New Zealand, the frequency band 610-698 MHz, or portions thereof, are identified for use by these administrations wishing to implement International Mobile Telecommunications (IMT) – see Resolution **224 (Rev.WRC-15)**. This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. The mobile allocation in this frequency band shall not be used for IMT systems unless subject to agreement obtained under No. **9.21** and shall not cause harmful interference to, or claim protection from, the broadcasting service of neighbouring countries. Nos. **5.43** and **5.43A** apply. (WRC-15)

5.305 *Additional allocation:* in China, the band 606-614 MHz is also allocated to the radio astronomy service on a primary basis.

5.306 *Additional allocation:* in Region 1, except in the African Broadcasting Area (see Nos. **5.10** to **5.13**), and in Region 3, the band 608-614 MHz is also allocated to the radio astronomy service on a secondary basis.

5.307 *Additional allocation:* in India, the band 608-614 MHz is also allocated to the radio astronomy service on a primary basis.

5.311A For the frequency band 620-790 MHz, see also Resolution **549 (WRC-07)**. (WRC-07)

5.313A The frequency band, or portions of the frequency band 698-790 MHz, in Australia, Bangladesh, Brunei Darussalam, Cambodia, China, Korea (Rep. of), Fiji, India, Indonesia, Japan, Kiribati, Lao P.D.R., Malaysia, Myanmar (Union of), New Zealand, Pakistan, Papua New Guinea, the Philippines, Solomon Islands, Samoa, Singapore, Thailand, Tonga, Tuvalu, Vanuatu and Viet Nam, are identified for use by these administrations wishing to implement International Mobile Telecommunications (IMT). This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. In China, the use of IMT in this frequency band will not start until 2015. (WRC-15)

5.317A The parts of the frequency band 698-960 MHz in Region 2 and the frequency bands 694-790 MHz in Region 1 and 790-960 MHz in Regions 1 and 3 which are allocated to the mobile service on a primary basis are identified for use by administrations wishing to implement International Mobile Telecommunications (IMT) – see Resolutions **224 (Rev.WRC-15)**, **760 (WRC-15)** and **749 (Rev.WRC-15)**, where applicable. This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. (WRC-15)

5.320 *Additional allocation*: in Region 3, the bands 806-890 MHz and 942-960 MHz are also allocated to the mobile-satellite, except aeronautical mobile-satellite (R), service on a primary basis, subject to agreement obtained under No. **9.21**. The use of this service is limited to operation within national boundaries. In seeking such agreement, appropriate protection shall be afforded to services operating in accordance with the Table, to ensure that no harmful interference is caused to such services.