National Information and Communications Technology Authority

CALL FOR COMMENTS

DRAFT BAND PLAN FOR 800 MHz BAND

BACKGROUND

In recent years Mobile Broadband Systems have experienced extraordinary improvement which results in increasingly high requirement for radio frequency spectrum. The 800 MHz frequency is well recognised as one of the essential spectrum resources with perfect radio transmission characteristics.

In accordance with the *NICT Act 2009*, it is NICTA's mandate to develop Radio spectrum plans including frequency band plans in PNG. All band plans are developed in accordance with recommendations developed by the ITU Radiocommunications sector (ITU-R).

In the interest of PNG particularly the ICT sector, NICTA is conducting this consultation on the 'Draft 800 MHz Band Plan'. NICTA will finalize the plan taking into account feedback from this process.

FEEDBACK CONSIDERATIONS:

NICTA welcomes feedback from the operators, stakeholders and general public taking into account the following;

- Radio Spectrum Plan
- Channeling Plan and,
- Principle of Assignment

ATTACHMENT:

1. Draft 800 MHz Band Plan

National Information and Communications Technology Authority

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	Final 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 document is based on the ITU Radio Regulations of WRC-15 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

APT	Asia Pacific Telecommunity
BS	Base Station
FDD	Frequency Division Duplex
IMT	International Mobile Telecommunications
IP	Internet Protocol
ISDN	Integrated Services Digital Network
ITU	International Telecommunications Union
LTE	Long-Term Evolution
MS	Mobile Station
NICTA	National Information and Communications Technology Authority
PPDR	Public Protection and Disaster Relief
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

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.

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 C) 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.

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;

3. CHANNELLING PLAN

3.1 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)]. Figure 1 below shows Single Duplexer FDD Frequency Arrangement.

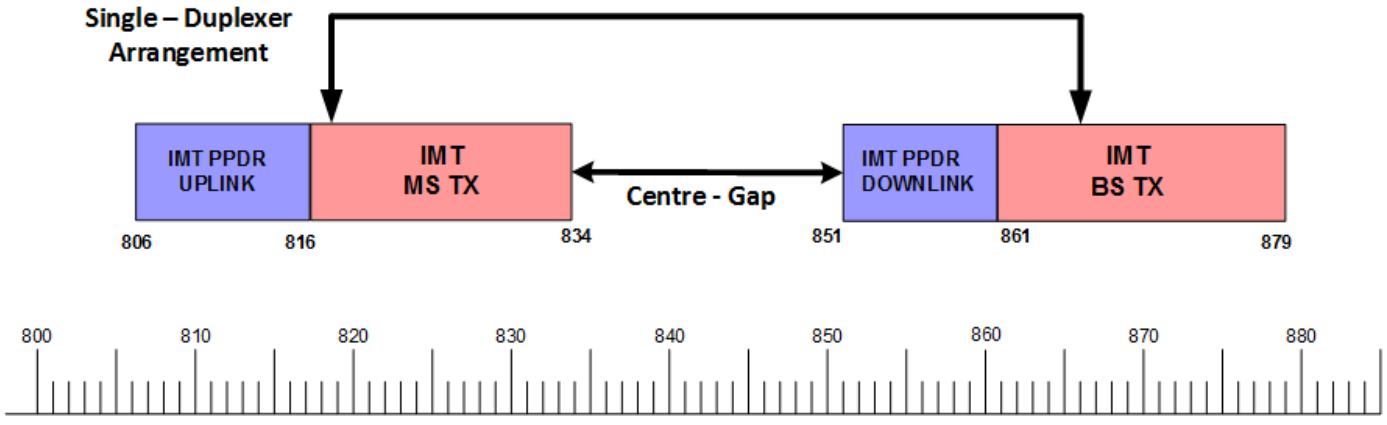

Figure 1: FDD Mode Single-Duplexer Frequency Arrangement

3.2 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.

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

3.4 Therefore, Channel arrangements for IMT and IMT Based Applications in the 800 MHz band is 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

3.5 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.

3.6 IMT and IMT based Broadband PPDR systems can be deployed in the band 806-834 MHz paired with 851-879 MHz. See Annex A Figure A-1.

3.7 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.

3.8 The sub-band 834-851 MHz (Centre Gap) can be used for the purpose of STL link applications. However, there is a possibility of moving the STL Applications to another frequency Band and utilizing TDD mode in this sub-band.

3.9 Summary of Allocations

	Frequency Sub-band (MHz)	**Applications**	**Associated Technologies**
1	806 - 816/851-861	IMT PPDR	LTE LTE Advanced W-CDMA
2	816 – 834/861 - 879	IMT	LTE LTE Advanced W-CDMA
3	834-851	STL, SRD or Possible Future TDD mode Application	

4. PRINCIPLES OF ASSIGNMENT

4.1 Authorisation to use the frequency band;

- Any license assignment for parts or portion of 806 MHz to 834 MHz paired with 851 MHz to 879 MHz 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. 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: Channelling Plan of 800 MHz Band IMT System

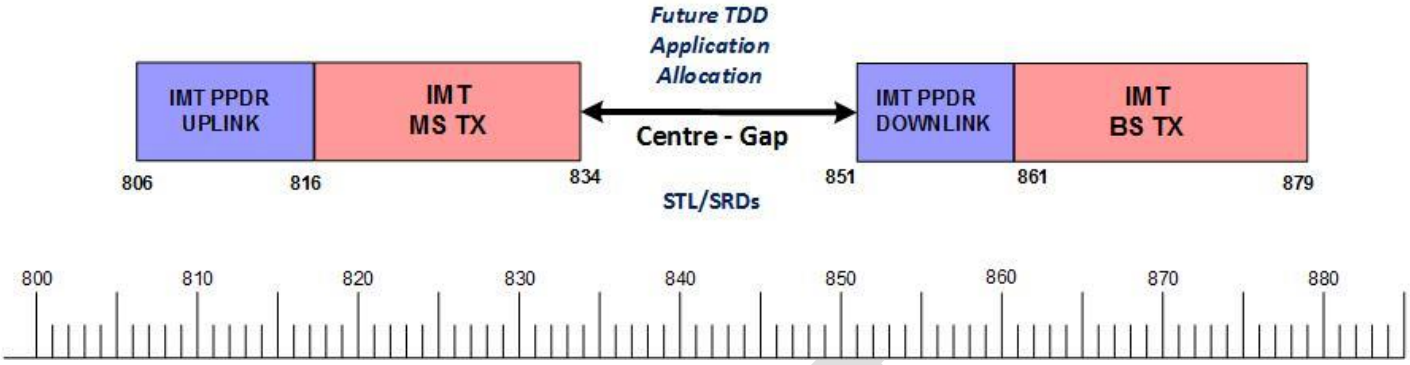

Figure A-1: 800 MHz IMT Channel Plan

Annex B: 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**			**Usage type**
		Mobile station transmitter (MHz)	**Base station transmitter (MHz)**	**Duplex separation (MHz)**	
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 B-1: Harmonized Frequency Arrangements in Region 3

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