National Information and Communications Technology Authority

BAND PLAN

700 MHz

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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
FDD	Frequency Division Duplex
IMT	International Mobile Telecommunications
IMT - Advanced	International Mobile Telecommunications – Advanced
ITU	International Telecommunications Union
LTE	Long-Term Evolution
MHz	Mega Hertz
NICTA	National Information and Communications Technology Authority
PNG	Papua New Guinea
W-CDMA	Wideband Code Division Multiple Access
WRC	World Radio Conference
WRC - 15	World Radio Conference 2015
4G	Fourth Generation

1. INTRODUCTION

1.1 This document covers the frequency plan and channelling arrangements for the 700 MHz Band.

1.2 The 700 MHz band plan relates to the spectrum between 698 – 806 MHz.

1.3 The 700 MHz band is planned to support IMT and IMT based mobile broadband applications.

1.4 PNG adopted the Asia Pacific Telecommunity band plan based on Frequency Division Duplex arrangement. The APT 700 MHz band plan is a type of frequency segmentation formalized by APT for the deployment of mobile broadband technologies most notably Long Term Evolution, LTE.

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

1.6 The band Plan will guide assignments for deployment of 4G LTE and possibly LTE – Advanced technologies in Papua New Guinea.

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 A) provides for the following Primary Services in this 700 MHz Band;

- FIXED
- BROADCAST
- MOBILE

3. FREQUENCY ARRANGEMENT

3.1 The harmonized frequency arrangement adopted by this band plan with the common APT approach.

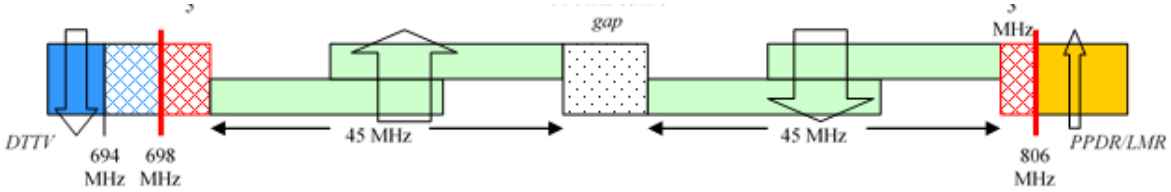

Figure 1: Harmonized FDD Arrangment of 698-806 MHz band

3.2 This 700 MHz band plan in FDD divides the band into contagious blocks of frequencies that are as large as possible taking into account the need to avoid interference with services in other bands. This arrangement is shown graphically in Figure 2.

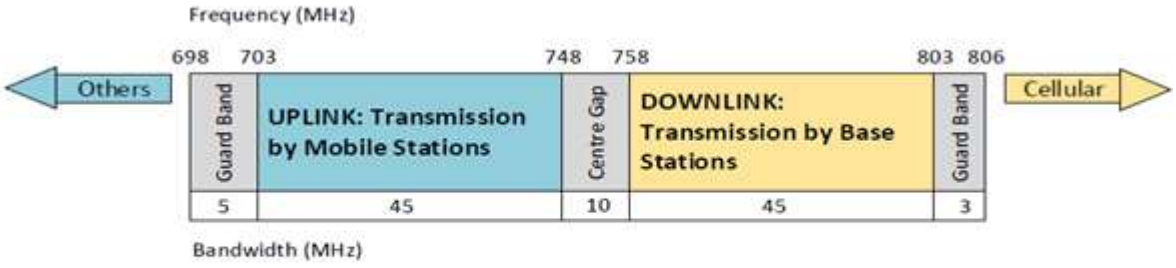

Figure 2: Frequency Division Duplex arrangement

4. CHANNELLING ARRANGEMENT

4.1 The single FDD arrangement comprises two 45 MHz blocks, with guard bands of 5 MHz and 3 MHz at their lower and upper edges, respectively. A center gap of 10 MHz as allowed to mitigated possible interference between the two segments.

4.2 In this FDD channel arrangement, the use of a 5 MHz block approach which is similar to the recognized mobile systems to be used in the band 698 -806 MHz. Channel bandwidths can be assigned as multiples of 5 MHz. The channel arrangement in PNG is shown in Figure 3.

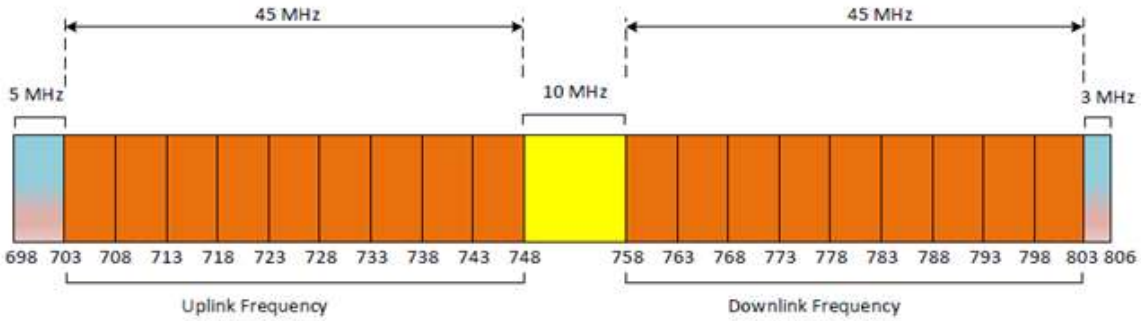

Figure 3: 700 MHz Channel Arrangement in PNG

4.3 The lower frequency segment 703 MHz to 748 MHz is paired with 758 MHz to 803 MHz with a separating gap of 10 MHz. The gap separating the two segments is required to avoid interference between uplink and downlink transmission at the edges.

5. PRINCIPLES OF ASSIGNMENT

Spectrum License

5.1 Authorization to use parts or portion of the 700 MHz band is subject to terms and conditions of the NICTA Operator Licensing Regulation, 2010 and the NICTA Radio Spectrum Regulation, 2010.

Applications

5.2 IMT systems are mobile systems that includes the new capabilities of IMT that go beyond those of IMT – 2000. Such systems provide access to a wide range of telecommunication services including advanced mobile services, supported by mobile and fixed networks, which are increasingly packet-bases.

5.3 IMT – Advanced systems supports low to high mobility applications and a wide range of data rates in accordance with user and service demands in multiple user environments. IMT – Advanced also has capabilities for high-quality multi-media applications within a wide range of services and platforms providing a significant improvement in performance and quality of service. The capabilities of IMT – Advanced systems are being continuously enhanced in line with user trends and technology developments.

6. REFERENCES

1 APT Report on "Coexistence between services at the boundary of the 700 MHz and 800 MHz bands". APT/AWG/REP-44.ITU Radio Regulations Articles Edition of 2016

2 APT Report on "Harmonized Frequency Arrangements for the Band 698-806 MHz". APT/AWF/REP-14ITU NRFAT-2016-Rev 2

3 APT Report on "Implementation Issues Associated with Use of the Band 698-806 MHz by Mobile Services". APT/AWG-REP-24, September 2011.ITU-R Recommendation M.1036-5

4 ITU Radio Regulations Articles Edition of 2016

5 ITU-R Recommendation M.1036 (10/2015)

6 Papua New Guinea Table of Frequency Allocations 2017

7 Papuan New Guinea Radiofrequency Spectrum Allocation Chart May 2017

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

<table>
<tr><th colspan="3">460 - 890 MHz</th></tr>
<tr><th colspan="3">Allocation to Services</th></tr>
<tr><th>Region 1</th><th>Region 2</th><th>Region 3</th></tr>
<tr><td>460-470</td><td colspan="2">FIXED
MOBILE 5.286AA
Meteorological-satellite (space-to-Earth)

5.287 5.288 5.289 5.290</td></tr>
<tr><td rowspan="4">470-694
BROADCASTING

5.149 5.291A 5.294 5.296
5.300 5.304 5.306 5.311A
5.312</td><td>470-512
BROADCASTING
Fixed
Mobile
5.292 5.293 5.295</td><td rowspan="2">470-585
FIXED
MOBILE 5.296A
BROADCASTING

5.291 5.298</td></tr>
<tr><td>512-608
BROADCASTING
5.295 5.297</td></tr>
<tr><td>608-614
RADIO ASTRONOMY

Mobile-satellite except aeronautical mobile-satellite (Earth-to-space)</td><td>585-610
FIXED
MOBILE 5.296A
BROADCASTING

RADIONAVIGATION
5.149 5.305 5.306 5.307</td></tr>
<tr><td rowspan="2">614-698
BROADCASTING
Fixed
Mobile
5.293 5.308 5.308A 5.309
5.311A</td><td rowspan="4">610-890
FIXED
MOBILE 5.296A 5.313A
5.317A
BROADCASTING</td></tr>
<tr><td>694-790
MOBILE except aeronautical mobile 5.312A 5.317A
BROADCASTING
5.300 5.311A 5.312</td></tr>
<tr><td>790-862
FIXED
MOBILE except aeronautical mobile 5.316B 5.317A
BROADCASTING
5.312 5.319</td><td>698-806
MOBILE 5.317A
BROADCASTING
Fixed

5.293 5.309 5.311A</td></tr>
<tr><td>862-890
FIXED</td><td>806-890
FIXED
MOBILE 5.317A
BROADCASTING</td></tr>
</table>

"700 MHz Band"

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		**526-585** BROADCASTING PNG5	UHF Television Channels 28 to 34 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)	**585-610** FIXED MOBILE 5.296A BROADCASTING RADIONAVIGATION 5.149 5.305 5.306 5.307	**585-610** BROADCASTING 5.149 5.306 5.307 PNG5	UHF Television Channels 35 to 37 in the band IV (526 - 606 MHz) using 8 MHz Channel Spacing.
	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 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.