PAPUA NEW GUINEA NATIONAL INFORMATION & COMMUNICATIONS TECHNOLOGY AUTHORITY

PUBLIC CONSULTATION STATEMENT

2600MHz, 3500MHz & Market-Based Spectrum Assignment

Statement

Publication Date: 10 November 2023

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About this Document

In May 2023, NICTA published draft Band Plans under Section 167 of the *National Information and Communications Technology Act 2009* (the Act) in January 2021 to make band plans[1] for additional IMT spectrum identified in WRC 2019. The draft band plans were published to invite relevant comments from stakeholders and affected parties.

NICTA also carried out a Consultation on Market-Based Spectrum Assignments and Pricing[2] in PNG.

Written comments were received from the following:

- Digicel PNG Ltd
- Telikom Ltd
- Kumul Communications Ltd

The summary of comments received (along with some NICTA responses) are collated and included at the end of this Statement.

This document Statement sets out NICTA's decisions on these three May 2023 consultations:

- 2600MHz Band Plan Consultation;
- 3500 MHz Band Plan Consultation; and
- The Market-Based Spectrum Assignment Consultation

It also briefly notes the next steps that NICTA intends to take on these important areas going forward.

[1] 2600MHz & 3500MHz Band Plans & Background Papers, Spectrum Assignment & Licensing Methodology - National Information & Communications Technology Authority (nicta.gov.pg)
[2] https://www.nicta.gov.pg/downloads/download-info/draft-png-market-based-spectrum-assignment/

1 2600MHz Band Plan Decisions

NICTA publishes the following decisions post two consultations (of March 2021 and May 2023) on Draft 2600MHz Band Plans under Section 167 of the *National Information and Communications Technology Act 2009* (the Act), in order to make a 2600MHz band plan for additional IMT spectrum identified in WRC 2019. The draft 2600MHz band plan was published to invite relevant comments from stakeholders and affected parties.

1. Option C3 [of ITU's 2600MHz Recommended Channel arrangements ITU Rec: ITU-R M. 1036-5] emerged as the preferred arrangement for Papua New Guinea with a complete TDD channeling arrangement for the entire 2.6 GHz spectrum band.

2. Therefore, NICTA hereby confirms that it has approved and changed the band plan of 2600 MHz spectrum and adopted the Band 41 (All TDD) configuration for the whole band as shown in Figure 1.

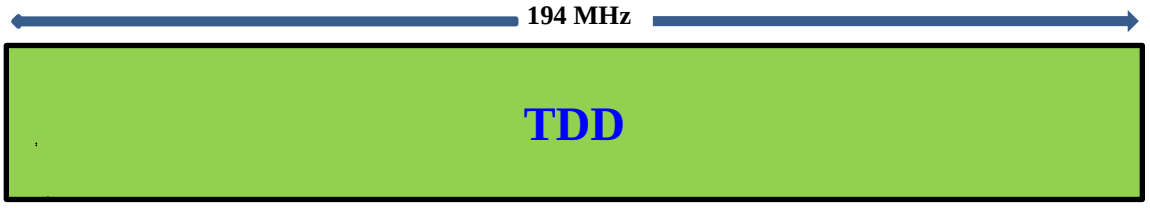

Figure 1: 2.6 GHz Frequency Arrangement for PNG
(Source: ITU Recommendations: Rec. ITU-R M. 1036-5)

3. Furthermore, after WRC 2023, NICTA will proceed to update PNG's National Frequency Allocation Table (NFAT) to reflect a primary allocation in the entire 2.6GHz band to MOBILE, with Fixed only being a secondary allocation. This is as opposed to both of them being co-primary in the band in the current PNG NFAT.

4. Channelling arrangement will be by 10 MHz block for deployment of IMT 2020 (5G). Multiples of 10 MHz contiguous spectrum can also be used depending on spectrum availability and specific requirements.

5. TDD network licensees need to synchronize amongst themselves. Synchronization aligns time and frequency scales of equipment clocks in a network to remain constrained to specific limits so the equipment operates at the correct time and in the correct order. Networks Synchronization deals with the distribution of synchronization reference signal over a network of clocks spread over a wider area. A synchronization network is the facility that implements network synchronization. The basic elements of a synchronization network are the nodes (autonomous and slave clocks) and the links connecting them. NICTA shared a set of Draft Guidelines for TDD Synchronization with stakeholders.

6. NICTA hereby adopts these *Guidelines for TDD Synchronization*[3] that will be binding on all 2.6GHz TDD licensees. The objectives of the TDD Guidelines are the following:

    a. to ensure that the synchronization network for all 2.6GHz incumbent and new telecommunications network and service providers in PNG is implemented and complies with internationally recognized standards and best practices;
    b. to ensure that 2.6GHz telecommunication networks in PNG are synchronized for optimum performance and high availability;
    c. to ensure that all telecommunication network and service providers are equipped with necessary network synchronization plan and guidelines in PNG.

7. Now that NICTA has worked with Industry and other Stakeholders to agree the Band Plan for the 2600MHz Band as well as the Synchronization Guidelines, the next step is for NICTA to proceed with the regulatory processes towards releasing this valuable mid-band 2600MHz spectrum to Operators in order to roll out valuable 4G and/or 5G services for the benefits of the citizens and consumers of PNG. NICTA already has interests from stakeholders for the release of this band.

8. As regards Authorisation to use the 2600MHz frequency band in PNG, any license assignment for parts or portion of 2600 MHz would be subject to conditions in the Operator Licensing Regulations, 2010 and Radio Spectrum Regulations, 2010.

[3] **<Insert Link>**

2 3500MHz Band Plan Decisions

NICTA publishes the following decisions post the consultation of May 2023 on the Draft 3500MHz Band Plan under Section 167 of the *National Information and Communications Technology Act 2009* (the Act), in order to make a 3500MHz band plan for additional IMT spectrum identified in WRC 2019. The draft 3500MHz band plan was published to invite relevant comments from stakeholders and affected parties.

1. NICTA hereby confirms that it has approved and changed the band plan of 3500 MHz spectrum and adopted the Band 78 (All TDD) configuration for the whole band as shown in Figure 2.

Figure 2: 3.5 GHz Frequency Arrangement for PNG

2. Furthermore, after WRC 2023, NICTA will proceed to update PNG's National Frequency Allocation Table (NFAT) to reflect a primary allocation in the entire 3.5GHz band to MOBILE, with Fixed only being a secondary allocation. This is as opposed to both of them being co-primary in the band in the current PNG NFAT.

3. Channelling arrangement will be by 10 MHz block for deployment of IMT 2020 (5G). Multiples of 10 MHz contiguous spectrum can also be used depending on spectrum availability and specific requirements.

4. NICTA notes that there are existing PTP and PTMP links in the 3550 to 3600 MHz band. NICTA would work with Telikom for these links to vacate the band in a timely manner to ensure the introduction of 5G services into this band.

5. NICTA would also work with Stakeholders to ensure adequate protection of C-Band FSS services above 3600MHz.

6. TDD network licensees need to synchronize amongst themselves. Synchronization aligns time and frequency scales of equipment clocks in a network to remain constrained to specific limits so the equipment operates at the correct time and in the correct order. Networks Synchronization deals with the distribution of synchronization reference signal over a network of clocks spread over a wider area. A synchronization network is the facility that implements network synchronization. The basic elements of a synchronization network are the nodes (autonomous and slave clocks) and the links connecting them. NICTA shared a set of Draft Guidelines for TDD Synchronisation.

7. NICTA hereby adopts these *Guidelines for TDD Synchronization*[4] that will be binding on all 3.5GHz TDD licensees. The objectives of the TDD Guidelines are the following:

    a. to ensure that the synchronization network for all 3.5GHz incumbent and new telecommunications network and service providers in PNG is implemented and complies with internationally recognized standards and best practices;
    b. to ensure that 3.5 GHz telecommunication networks in PNG are synchronized for optimum performance and high availability;
    c. to ensure that all telecommunication network and service providers are equipped with necessary network synchronization plan and guidelines in PNG.

8. Now that NICTA has worked with Industry and other Stakeholders to agree the Band Plan for the 3500MHz Band as well as the Synchronization Guidelines, the next step is for NICTA to proceed with the regulatory processes towards releasing this valuable mid-band 3500MHz spectrum to Operators in order to roll out valuable 4G and/or 5G services for the benefits of the citizens and consumers of PNG. NICTA already has interests from stakeholders for the release of this band.

9. As regards Authorisation to use the 3500MHz frequency band in PNG, any license assignment for parts or portion of 3500 MHz would be subject to conditions in the Operator Licensing Regulations, 2010 and Radio Spectrum Regulations, 2010.

[4] **<Insert Link>**

3 Decision: Market-based spectrum assignment & pricing

NICTA has chosen not to conclude and make firm decisions at this stage on the Market-Based Spectrum Assignment and Pricing Consultation. NICTA would conclude its market-based decisions in 2024.

This is because of the obvious "more controversial" nature of this consultation (as can be seen from the responses from stakeholders) – and the significant departure it portends on how spectrum would be managed in PNG into the future. NICTA notes all the responses it has received – summarised at the end of this Statement.

NICTA notes the following key points.

1. Under Section 10(1) of the 2010 NICTA Radio Spectrum Regulations[5], NICTA "may allocate spectrum by issuing a spectrum licence either on a *market basis* or on an *administrative basis and shall use the process that, in NICTA's opinion, would allocate spectrum more efficiently*" [*Italics* are NICTA emphases for the purpose of this consultation].

2. To date NICTA since its inception has only assigned spectrum to operators in Papua New Guinea on an administrative first-come-first-served (FCFS) basis NICTA still maintains the view – even after this consultation - that this administrative-only approach is no longer realizing the outcome of maximizing - "by ensuring the efficient allocation and use of the spectrum, the overall public benefit derived from using spectrum" - as Section 164 (a) of the 2009 NICTA Act stipulates.

3. NICTA still maintains the view that the current Spectrum Pricing formula of Schedule 2 of the 2010 Radio Spectrum Regulations is stipulated as follows: Annual Variable Spectrum Fee for Spectrum and Apparatus Licences using a formula of Annual variable fee payable = V x (2600 / F) x B x T x L. V is the Standard baseline value; F is the Frequency; B is the total Bandwidth in MHz; T is the type of service licenced but specifically looking at opportunity cost; L is for Location. This formula has come under severe strains due to the emergence of higher mmWave frequencies like 28GHz, 66GHz, etc.

4. It is, *inter alia*, for reasons like these above that NICTA remains actively working towards market-based assignments and market-based (or quasi-market-based) spectrum pricing going forward for certain spectrums in Papua New Guinea in order to reduce the risks of such inefficient allocation and assignments of spectrums in Papua New Guinea going forward. This is best practice in spectrum management all over the world.

NICTA is already planning internally the release of more 4G and 5G coverage and capacity spectrums – and they will offer opportunities to work with Stakeholders to firm the market-based spectrum assignment decisions in PNG.

[5] Radio Spectrum Regulations - National Information & Communications Technology Authority (nicta.gov.pg)

4 Consideration of the major comments received and NICTA's response

No.	Sub-mission	Reference and Subject	Key Comments on 2600MHz	NICTA's Response and action
1	Digicel PNG	2600 MHz draft band plan	• Digicel prefers Band 41 Full TDD starting: 2496MHz and finishing at 2690MHz. • Digicel believes NICTA should adopt needs-based allocation for this band rather than equal allocation. • Digicel proposes NICTA be firm on a Use-it-Loose-it policy	• NICTA notes Digicel's preference for Band 41 Full TDD allocation and the starting at 2496MHz. • NICTA maintains its position of sufficient assignment of spectrum to operators in order to promote both coverage and capacity competition. • NICTA notes Digicel's Use-it-Loose-it position
2	Telikom Ltd	2600 MHz draft band plan	• Telikom Ltd recommends NICTA goes with Option C3 • Telikom comments that with respect to Regulatory Framework, the technical prerequisites should be in place • Telikom comments that with respect to Interference Management, guidelines to manage interference issues from optional TDD must be in place • Telikom proposes that Device Certification and Interoperability of Devices should support C3.	• NICTA notes Telikom's preference and comments that Option C3 is implemented • NICTA notes the comments on the regulatory framework. • NICTA notes that the Synchronisation Guideline document addresses the interference issues. • NICTA type approval covers for device certification and interoperability.
3	KCL	2600 MHz draft band plan	• KCL already made comments in the previous consultation on the 2.6 GHz band • KCL noted that LTE band n41 starts at 2496 MHz and not 2500 MHz	• NICTA notes KCL's comments and preference for the n41 allocation • NICTA agrees that LTE Band 41 starts at 2496MHz.

No.	Sub-mission	Reference and Su	Key Comments on 3500MHz	NICTA's Response & Action
1	Digicel PNG Ltd	3500 MHz Draft band plan	• Digicel urges NICTA to adopt a 300 MHz plan to support 100 MHz channel allocations for up to 3 operators whilst protecting C band services in Papua New Guinea. NICTA should ensure adequate protection of C Band services above 3600 MHz • Digicel urges NICTA to adopt a fully justified needs-based process for all spectrum allocations, and not to reserve spectrum or adopt any equal-share policies in Papua New Guinea. • Digicel urges the use, and be using of comprehensive enforcement powers it has available to it under the law in order to ensure that operators meet their obligations and are not hoarding valuable spectrum • Digicel believes the N78 Band approach is more appropriate for this 3500Mhz band • Digicel believes allocation and assignments should cover the 3300-3600MHz range, and should be assigned as 3 x 100 MHz assignments. • Digicel urges NICTA to implement a firm Use-it-or-Lose-it policy • Digicel prefers light licensing for higher bands	• Digicel's comments on the 300MHz allocation and 100MHz assignments are noted. • NICTA notes Digicel's comments on C-Band services protection above 3600MHz. • On the needs-based process comment, NICTA maintains its position of sufficient assignment of spectrum to operators in order to promote both coverage and capacity competition. • NICTA will consider additional allocation and assignment upon evidence that additional spectrum is needed. NICTA is also considering with respect to the market-based spectrum assignment consultation. • NICTA notes Digicel's Use-it-Loose-it position • NICTA notes Digicel's preference for light licensing for higher bands.

No.	Sub-mission	Reference and Subject	Key Comments on 3500MHz	Action
2	Telikom Ltd	3500 MHz Draft band plan	• Telikom urges ensuring the protection of incumbent services and those in adjacent band (FSS,) • Tellikom suggests constant consultation regarding their existing PTP and PTMP in the 3550 to 3600 MHz band, specifically on the timelines on the introduction of 5G services into this band. • Telikom urges NICTA to create policy to have more towers built and in residential areas as 3500MHz needs this – urging NICTA to remove the restrictions on the building of towers. • Telikom urges the creation of NICTA policy to have multiple Internet gateways	• NICTA notes and will ensure adequate protection for FSS • NICTA will work with Telikom to ensure smooth migration to 5G in reasonable timescales. • On the issue building new towers in residential areas, NICTA disagrees. NICTA will set minimum standards for tower erection. • NICTA notes that the current licensing framework provides for multiple internet gateways
3	KCL	3500 MHz	• KCL welcomes the opening of 3500MHz to IMT • KCL notes that a 100 MHz channelization will not be met if NICTA employs if only 3400 to 3600MHz is employed. • Drawing from the previous bullet, KCL - noting point 2.6 of draft document - suggests it will be wise to delay till after WRC 23 outcomes to see if there will be extensions of the 3500 MHZ band through global harmonization.	• NICTA notes comment. • NICTA notes the comment on 100MHz channelization. • NICTA fully notes comment and will await the outcome of WRC-23

No.	Sub-mission	Reference & Subject	Key Comments on Market-Based Spectrum Assignment & Pricing	Action

1	Digicel PNG Ltd	Market-based spectrum assignment and pricing	1. Digicel respectfully disagrees with Market-based spectrum assignment and pricing, as it views the current administrative process meets and will continue to meet the needs and demands of PNG citizens. 2. Digicel notes that NICTA's proposal will give rise to unacceptable insecurities and uncertainties to licensees 3. Digicel argues that there will be uncertainties around spectrum renewal, spectrum awards, license fee levels, business and finance planning and forecasting. 4. Digicel argues that market-based spectrum assignment and pricing will affect investment decisions because of high costs of deployment in PNG 5. Digicel agrees with Paragraph 1.7 of the Market-based spectrum assignment consultation that some operators hold spectrum under administrative allocation and do not provide service to PNG consumers through full utilization. However, Digicel argues that this is a direct result of NICTA's inability to deploy the full range of powers available to it under the NICT Act 2009. NICTA should fully use these powers available to ensure efficient and full utilization of spectrum. 6. Digicel urges that NICTA should implement robust Use-it-or-Loose-it policies on spectrum 7. Digicel respectfully disagrees with Paragraph 1.2 of the consultation by suggesting that market-based assignment does not always ensure efficient or fair distribution of spectrum. Digicel argues that those with financial backing obtain spectrum and mostly do not use them efficiently. 8. Digicel argues that NICTA assigned spectrum to KCL (12.5 MHz), but that absolutely no deployment (with KCL sitting on spectrum), and that NICTA failed to take meaningful step to recall spectrum for efficient use for benefit of PNG citizens. 9. Digicel recognizes the 11 bands listed as High Demand Spectrum (HDS). It believes there's adequate spectrum for 3 operators in PNG through administrative allocation 10. Digicel denies there is shortage of spectrum in the HDS to warrant market-based allocation. It believes respectfully that effective policing of current allocations is needed.	1. NICTA notes the comment, however NICTA will continue to asses the market and intervene whenever necessary 2. The market-based process is sufficient to address all the issues 3. The market-based process is sufficient to address all the issues 4. The market-based process is sufficient to address all the issues 5. NICTA notes the comments 6. NICTA notes the comments 7. Comments noted 8. NICTA notes comments 9. NICTA notes the comment 10. NICTA will assess on a case by case basis for HDS. NICTA maintains its view that *administrative-only* approach is no longer realizing the outcome of maximizing - "by ensuring the efficient allocation and use of the spectrum, the overall public benefit derived from using spectrum" - as Section 164 (a) of the 2009 NICTA Act[6] stipulates.

[6] https://www.nicta.gov.pg/legislative/acts/

No.	Sub-mission	Reference and Subject	Key Comments on Market-Based Spectrum Assignment & Pricing	NICTA's Response
2	Telikom Ltd	Market-based spectrum assignment and pricing	**Q1** – *Do you agree or not on the principle and process of designating High Demand Spectrum (HDS) bands? Kindly justify your response.* Telikom requests that a. NICTA provides data to demonstrate congestion in HDBs b. NICTA should make clear the technical criteria to designate bands as High Demand and licensing must ensure equitable distribution to all licensees c. Telikom is of the view that all HDBs should be equally allocated to the current 3 Mobile network operators **Q2)** *Do you agree with NICTA's proposed definition of HDS spectrum? Kindly justify your response.* a. Telikom agrees with limited HDBs to cater for everyone b. Telikom believes that NICTA is not able to conclusively substantiate that there is inefficient use of spectrum in PNG due to the small market size. c. Telikom cites, e.g., 900 MHz is currently only used by two MNOs, 2100 not accessible to Telikom, 700 MHz used by Telikom 4G Lte aggregation. **Q3)** *Do you agree that HDS spectrum licences and renewals going forward would be issued on a market basis ONLY? Kindly justify your response.* Telikom notes these views a. Telikom disagrees with HDB new licenses and renewals being issued on market-based only. b. Only 3 major MNOs unlike other markets. Small operators will be unfairly disadvantaged as spectrum price increases for HDBs c. **i)** Spectrum availability will be an issue if market based is implemented on the HDBs. • **ii**) Increased costs to the MNOs when bidding for the HDBs • iii) Unequal access with well financed telcos having advantage over new entrants and smaller players • iv) Limited coverage, fragmented spectrum holdings leading the coverage issues • v) Spectrum Hoarding • vi) Regulatory complexity • vii) Uncertainty and Risk	1. NICTA notes these comments *2.* NICTA notes these comments. Based on current NICTA data, sub 1 GHz allocation is fully exhausted. *2.6 GHz is clearly in high demand, i.e. HDS.* 3. NICTA notes these comments. NICTA is considering market based allocation to address these issues with the current administrative process. Indeed, as Section 164(c) of the 2009 NICTA Act places a duty on NICTA to "provide a responsive and flexible approach to meeting the needs of users of the spectrum". This duty to "provide a responsive and flexible approach to meeting the needs of users of the spectrum…" speaks clearly to market-based Spectrum Pricing – particularly for the designated HDS spectrums. The value of spectrum bands changes over time due to technology evolution and/or ecosystem changes. Some former "2G only bands" can now be used for 2G, 3G, 4G and even 5G or 6G. This means the band is now more valuable, and therefore the "pricing" of the said band has appreciated markedly. Market-based spectrum pricing allows for a "responsive and flexible approach" to managing such changes in spectrum valuations over time.

No.	Sub-mission	Reference & Subject	Key Comments on Market-Based Spectrum Assignment & Pricing	Action
	Telikom Ltd	Market-based spectrum assignment and pricing	**Q4**) *Do you agree with the proposed bands that NICTA has provisionally designated as HDS spectrum bands? Kindly justify your response*. Telikom notes these views a. Telikom disagrees. NICTA should encourage competition down to small players. b. Only MNOs will afford HDBs. Others won't have equal opportunity' c. 800 MHz must be included in this list of HDBs d. HDBs in each band should be quantified with respect to congestion in currently used band **Q5***) Do you agree or not with the rationale for spectrum pricing on a market basis for designated HDS spectrums? Telikom* notes these views a. Current formulae adequately addresses value of spectrum below 2600 MHz b. NICTA should encourage small players with reasonable priced spectrum c. Only MNOs will afford HDBs leaving small players missing out d. Concerns for Market based priced HDBs • cost barrier • unequal access • Limited participation • Lack of predictability in pricing • Spectrum fragmentation • Speculative behaviour • Administrative complexity	4. NICTA notes comment. Based on current sub 1 GHz allocation is fully exhausted. High demand for 2.6 GHz is example of HDB demand. NICTA is considering market based allocation to address these issues with the current administrative process. 5. NICTA is considering market based allocation to address these issues with the current administrative process.

No.	Sub-mission	Reference & Subject	Key Comments on Market-Based Spectrum Assignment & Pricing	Action
	Telikom Ltd	Market-based spectrum assignment and pricing	**Q6)** *Do you agree with NICTA's proposed approaches to conservatively derive the market-based spectrum fees? Any further comments?* Telikom notes these views a. Telikom is convinced there is no nationwide need for spectrum except in some main centres b. Potential issues • Lack of transparency in auction process • Mismatch of benchmarking with other countries given unique PNG market dynamics, and conditions • Important to strike right balance with annual license fee • Not setting it too high to burden users or too low to encourage efficient use **Q7)** *Do you have any comments on how NICTA proposes to proceed on the Conversion and/or Marketing plans consistent with the 2010 Radio Regulations? Kindly justify your response.* a. NICTA should enhance stakeholder engagement with workshops, forums, meetings for more inclusive engagement with stakeholders • Provide grater clarity and detail • Consider international best practices. • Increase transparency in decision making • Monitor and evaluate effectiveness of plan	6. NICTA will realise the outcomes expressed once the market based licensing process is fully completed 7. NICTA notes the views However, NICTA still believes that designated High-Demand Spectrum bands in PNG would henceforth be subject to market-based spectrum fees, not administrative cost-based spectrum fees.