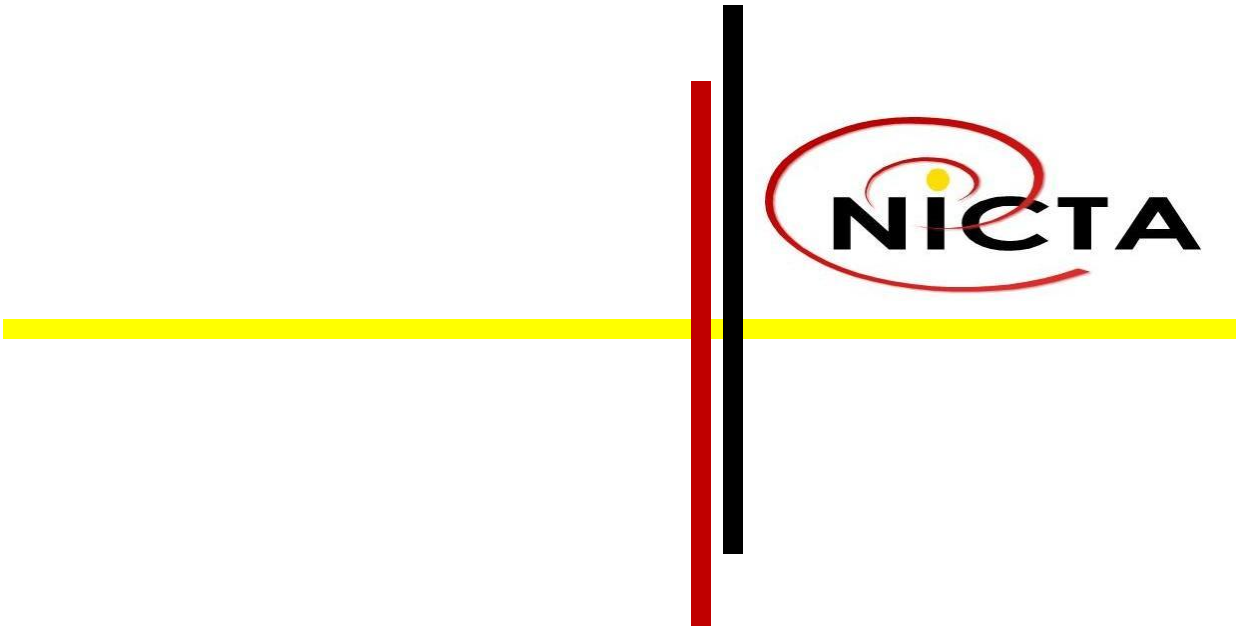

RECOMMENDATION & INQUIRY REPORT

A report to the Minister recommending the declaration of certain wholesale services relating to access to submarine cable landing station facilities and transmission capacity on international submarine cables

26th February 2013

CONTENTS

1 EXECUTIVE SUMMARY

Part VI of the *National Information and Communications Technology Act 2009* (the Act) provides for the Minister, upon the recommendation of NICTA, to declare wholesale services. Operator Licensees that supply a declared service are required to comply with statutory non-discrimination obligations in relation to that declared service. The pricing of a declared service must also be consistent with the General Pricing Principles and any relevant Service Specific Pricing Principles.

NICTA has held a public inquiry into whether or not certain wholesale services in the national market for wholesale capacity on, and access to, international fibre optic submarine cables should be recommended to the Minister for declaration. As a result of that inquiry NICTA concluded that it was appropriate to consider the ex ante regulatory intervention in that market. NICTA therefore identified and considered against the statutory declaration criteria the following wholesale services:

(1) the international submarine cable transmission capacity service; and
(2) the international submarine cable gateway access service.

NICTA is satisfied that all of the declaration criteria specified in section 128 of the Act would be met by the declaration of those wholesale services by the Minister. Accordingly NICTA hereby recommends that the Minister declare those services for a period of five years.

A draft declaration that reflects this recommendation (and which NICTA has considered against, and is satisfied meets all of, the declaration criteria) is provided at Annex C.

This report identifies:

- the specific terms of the recommended declaration;
- the extent to which the declaration criteria are met by the recommended declaration;
- the extent to which the terms of the recommended declaration are technology neutral and non-discriminatory; and
- the expiry date for the recommended declaration.

By doing so this report fulfils the requirement set out in section 129 of the Act. It also sets out NICTA's findings as a result of the public inquiry for the purposes of section 235 of the Act.

NICTA has consulted with the Independent Consumer and Competition Commission (ICCC) during the inquiry process and in the preparation of this recommendation. The ICCC supports NICTA's recommendation.

2 BACKGROUND

Part VI of the *National Information and Communications Technology Act 2009* (the Act) sets out the wholesale access regime for the ICT industry. Under that regime:

- NICTA may recommend to the Minister that certain wholesale services should be made declared services;
- Access Providers (i.e. Operator Licensees) that supply a declared service are required to comply with certain non-discrimination obligations in relation to that declared service (unless exempted);
- The terms and conditions on which Access Providers are required to comply with the non-discrimination obligations are subject to agreement between the Access Provider and the Access Seeker, which must be consistent with the General Pricing Principles and any relevant Service Specific Pricing Principles;
- In the event that such an agreement cannot be reached, the terms and conditions of access will be as set out in any reference interconnection offer (RIO) that the Access Provider has submitted to NICTA and which NICTA has accepted. A RIO must also be consistent with the General Pricing Principles and any relevant Service Specific Pricing Principles. In the absence of both an agreement and a RIO, the terms and conditions of access are those determined by NICTA through arbitration.

2.1 THE DECLARATION CRITERIA

NICTA may only recommend that the Minister declare a particular wholesale service if NICTA is satisfied that such a declaration would satisfy all of the declaration criteria set out in section 128 of the Act as follows:

> The "declaration criteria" are as follows –
>
> (*a*) that declaration of the wholesale service will further the achievement of the objective of this Part as set out in Section 124; and
>
> (*b*) specifically, in relation to the competition objective, that –
>
> (i) access or increased access to the wholesale service (as a consequence of declaration) is necessary for the promotion of effective competition in at least one market other than the market for the wholesale service; and
>
> (ii) the wholesale service is supplied in whole or in part via a facility that cannot feasibly be substituted, as a matter of commercial reality, via another facility in order to supply that wholesale service; and
>
> (*c*) specifically, in relation to the efficiency objective, that –
>
> (i) declaration would not materially compromise the incentives for efficient investment in any facility over which the wholesale service may be supplied; and
>
> (ii) access or increased access to the wholesale service (as a consequence of declaration) is technically feasible having regard to the specific factors identified in Section 124(2)(a); and
>
> (iii) in the case of wholesale services that are facilities access services, increased access to the wholesale service would avoid inefficient replication of underlying facilities that may be efficiently shared.

2.2 THE PUBLIC INQUIRY PROCESS

In May 2012 NICTA decided to hold a public inquiry to examine whether certain wholesale services relating to access in PNG to international connectivity should be recommended for declaration. The terms of reference for the inquiry are provided at Annex A. The focus of the inquiry was on three services mentioned in subsection 132(1) of the Act that were exempted from declaration until after 1 July 2012. Those services were:

- access to capacity on international communications cables;
- access to international gateway facilities; and
- access to capacity on international communications satellite links.

As part of the inquiry process NICTA published a public discussion paper on 4th September 2012 that set out NICTA staff's preliminary examination of the key issues and consulted with stakeholders and interested parties between September and November 2012.

Submissions were received from:

- Digicel (PNG) Limited (Digicel);
- Telikom PNG Limited (Telikom);
- Telstra International (PNG) Limited (Telstra); and
- Mr Wully Ronald, a private citizen.

NICTA also provided an opportunity for interested parties to review and submit comments on those submissions. Such cross-submissions were received from Telikom only.

The results of that consultation process were set out in a Response to Comments report, published on 7th December 2012. Attached to that report was a draft recommendation to the Minister that reflected NICTA staff's views following their consideration of the public consultation comments. NICTA invited further public comment on the terms of that draft recommendation. Comments were received from:

- Digicel;
- Telikom; and
- Telstra.

Telikom expressly declined the opportunity to comment on, or otherwise contribute to the specification of, the terms of the draft recommendation.[1]

In general the consultation processes confirmed the tentative conclusions that NICTA staff had reached and identified in the discussion paper. Pursuant to section 129 of the Act, NICTA decided on 19th February 2013 to recommend that the Minister declare the international submarine cable transmission capacity service and the international submarine cable gateway access service.

A list of the inquiry documents is provided at Annex B. All documents were published on, and remain available from, NICTA's Public Register on its website.

[1]Covering letter from Telikom's Acting CEO to NICTA's CEO dated 19th December 2012.

3 THE INQUIRY FINDINGS

3.1 OVERVIEW OF NICTA'S FINDINGS

The public inquiry into the need for declaration of certain wholesale services in international connectivity markets led NICTA to make the following key findings:

(a) there is a national market for wholesale capacity on, and access to, international fibre optic submarine cables ("the submarine cables market");

(b) the submarine cables market is susceptible to ex ante regulation as it is characterised by high barriers to entry, it is not trending towards effective competition, and ex post competition law is insufficient to resolve any market failure or anticompetitive behaviour issues that may arise;

(c) Telikom has significant market power (SMP) in the submarine cables market (indeed, it has a monopoly);

(d) the nature and sources of Telikom's SMP make it potentially harmful to the development of effective competition in the submarine cables market; and

(e) these circumstances make it appropriate for NICTA to consider the declaration of wholesale services relating to access to submarine cable landing station facilities and transmission capacity on international submarine cables.

Such findings are not required by the Act in order to recommend the declaration of a service to the Minister. However, international best practice in competition regulation is that obligations such as those that flow from the declaration should only be imposed on competitors with SMP and only to address identified risks of market failure and/or anti-competitive consequences.

Through the inquiry NICTA also found that:

(f) there is a national market for wholesale access to capacity on international communications satellites ("the satellite capacity market");

(g) the satellite capacity market is not susceptible to ex ante regulatory intervention because it is already effectively competitive. This is evident in the number of actual and potential suppliers of satellite capacity into and out of PNG; and

(h) these circumstances make it inappropriate for NICTA to consider the declaration of wholesale services relating to access to capacity on international communications satellites.

3.2 NICTA'S FINDINGS IN RELATION TO THE SUBMARINE CABLES MARKET

3.2.1 The definition of the market

NICTA defined a national market for wholesale capacity on, and access to, international fibre optic submarine cables as a relevant market ("the submarine cables market"). NICTA reached this conclusion through the application of the hypothetical monopolist test (HMT), which is a commonly used approach to identify close demand-side and supply-side substitutes. NICTA's analysis covered the forward-looking two-year period ending 31st December 2014.

A product is considered to constitute a separate market if a hypothetical monopolist supplier could impose a small but significant (taken to mean a 5–10% increase), non-transitory (at least one-year's duration) increase in price without losing sales to such a degree as to make the exercise unprofitable. Whether or not the small but significant non-transient increase in price (SSNIP) is profitable will depend on the number of customers that move to a substitute service or/and the extent to which alternative suppliers are encouraged to enter the market.

The hypothetical monopolist test starts by identifying a focal product, i.e. the most narrowly-defined product that is obviously in the named market. Other candidate products will then be included in the same market depending on the extent to which any of the following forms of substitution applies between the candidate product and the focal product:

- supply-side substitution
- wholesale demand-side substitution
- retail demand-side substitution.

If the SSNIP would be unprofitable because consumers would switch to other products or because suppliers of other products would begin to compete with the hypothetical monopolist, then the market definition should be expanded to include the substitute products in the same market. If the SSNIP would be profitable then this will be evidence of the absence of appropriate substitutes and therefore that a discrete market exists.

NICTA began by identifying the relevant focal product as wholesale capacity on, and access to, international fibre-optic submarine cables. Telikom supplies such capacity on two separate cables—PPC-1 and APNG-2. NICTA then considered the potential substitutability of the following products:

- wholesale access to other international submarine cables (i.e. besides PPC-1 and APNG-2);
- wholesale international access via terrestrial links (e.g. fibre-optic cable or microwave); and
- wholesale international access provided via satellite.

Wholesale supply-side substitution—whereby an alternative supplier is attracted into the market in response to a small but significantnon-transientincrease in price (SSNIP)being implemented by a hypothetical monopolist supplier of the focal product (i.e. wholesale capacity on, and access to, international fibre-optic submarine cables)—was found to be infeasible and unrealistic. Although other international submarine cables exist in the Pacific and additional deployments are underway in the region,[2] NICTA is not aware of any plans for a third submarine cable to be landed in PNG at either an existing landing station or at a newly constructed landing station. Although there is a currently unused branching unit (BU#3) on the PPC-1 cable at Alotau that allows for future expansion in the form of an additional spur to PNG, substantial investment would still be required to land such a spur in PNG. NICTA staff estimate that the cost of laying a 1,000 kilometre submarine cable from that branching unit to Port Moresby to be in the vicinity of US$30–$35 million. Further, the lead time for such an endeavour would be well over one year.There is therefore no realistic opportunity for wholesale supply-side substitution in response to a SSNIP by a hypothetical monopolist.

Wholesale demand-side substitution—whereby the purchasers of wholesale capacity on international submarine cables are persuaded to use alternative products in response to a SSNIP by a hypothetical monopolist—was found to be probable by insufficient to render the SSNIP unprofitable. As there is no realistic prospect of a third cable being landed in PNG during the period under analysis there is consequently no opportunity for wholesale customers to access an alternative submarine cable in response to a SSNIP by a hypothetical monopolist. Wholesale customers could of course access international connectivity via satellite-based services instead of via a submarine cable however, this is practicable only for applications and products that have relatively low (international) capacity requirements. International experience makes it very clear that such substitutability is limited and that high speed and high capacity applications and products require cable technologies.The same conclusion has been reached by the national regulatory authorities in many other countries in similar contexts,

[2] Namely, point-to-point cable projects in Solomon Islands (US$78m to link directly into a new BU#5 on PPC-1), Tonga (US$33m to link to the Southern Cross Cable Network (SCCN) at the existing CLS in Fiji), and Vanuatu (US$30m to link to the SCCN at the existing CLS in Fiji).

including Bahrain,[3] Bangladesh,[4] Colombia,[5] Liberia,[6]and Singapore.[7] Any substitution in favour of satellite-based services would thus not be a material constraint on the hypothetical monopolist.

The possibility of wholesale demand-side substitution in favour of terrestrial links was also considered, such as fibre-optic cable and long-haul (over sea and/or island hopping) microwave. However, there are currently no such options available in PNG. Although there are occasional trials and plans proposed for the establishment of such links, the lead time for such an endeavour would be likely to be well over a year, making such systems an unrealistic substitute for international connectivity via submarine cables during the period under consideration. Further, in the case of microwave, the overall limitations of the capacity of such systems compared to the capacity offibre cables make them inferior and not fit for most of the purposes commonly associated with submarine cable usage.

Retail demand-side substitution—whereby the retail purchaser of international capacity is persuaded to use an alternative product in response to the SSNIP by a hypothetical monopolist supplying wholesale access to capacity on international submarine cables—was also considered but was found not to present any credible substitutes for wholesale access to international fibre-optic submarine cables. For retail customers to switch to an alternative service provider in PNG for international calls and/or internet access they would have to be willing to accept the consequential service degradation and likely price increase associated with satellite communications. Their only other alternative would be to switch to another service provider that was dependent on the same hypothetical monopolist for its wholesale international access. Neither option is likely to be preferable to accepting the SSNIP.

In light of these findings from the application of the HMT, NICTA concluded that there are no adequate or credible substitutes for wholesale capacity on, and access to, international fibre-optic submarine cables. Consequently that product defines the boundaries of the market.

NICTA also notes that the Act itself suggests that there is a market for wholesale capacity on, and access to, international fibre-optic submarine cables. Section 132 of the Act has already pre-determined that a relevant service for consideration for potential declaration is ‘access to capacity on international communications cables’. As Part VI of the Act only applies to supply of services between operator licensees in PNG, the Act thus envisages the supply of such access between operator licensees on a wholesale basis.

NICTA further concluded that the relevant market is national in its scope. Although physical access to the PPC-1 cable has to occur at the cable landing station in Madang, and physical access to the APNG-2 cable has to occur at the landing station at Ela Beach,the same supply conditions apply for access and capacity services via those particular cables regardless where the wholesale customer is located in PNG.

3.2.2 Overview of the submarine cables market

Telikom is the only supplier in the submarine cables market and owns and controls the two submarine cable landing stations in PNG. An overview of the attributes of the submarine cables market is provided in Figure 1.

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[3]Telecommunications Regulatory Authority (2012) *Dominance determination for wholesale international services: draft determination*

[4]International Telecommunication Union (2005), *Report to the Bangladesh Telecommunications Regulatory Commission (BTRC) on Significant Market Power*

[5] Comisión de Regulación de Comunicaciones (2009), *Resolution no. 2065*

[6]Liberia Telecommunications Authority (2001), *Public Consultation Document on the Licensing of the Cable Consortium of Liberia*

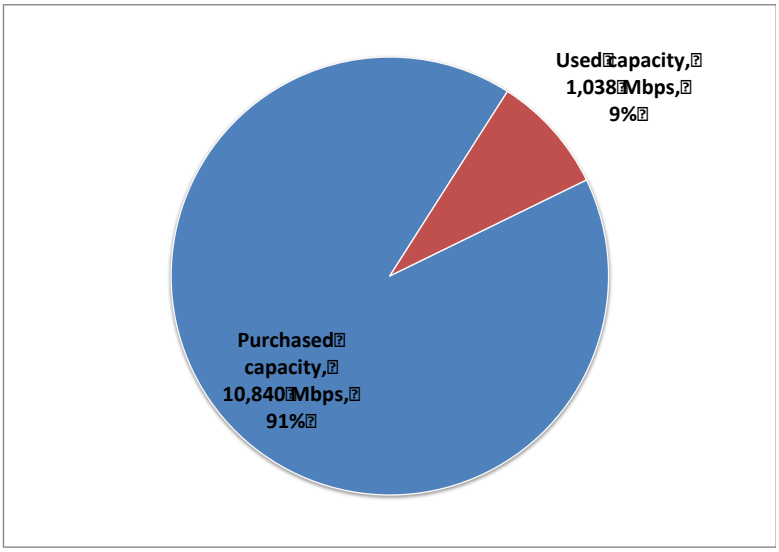
[7]IDA (2005), *Explanatory Memorandum to the Decision of the Info-communications Development Authority of Singapore on the Request by Singapore Telecommunications Limited for Exemption from Dominant Licence Obligations with respect to the ‘International Capacity Services’ Market*, paragraph 46

Figure 1: Overview of international submarine cables landed in PNG (2011)

Cable system	APNG2	Pipe Pacific Cable 1 (PPC-1)
Owners	• Telikom • Telecom New Zealand • Reach (Telstra)	• Pipe Networks
Dimensioning[8]	2 x 1 x 0,565 Gbps between Sydney and Port Moresby	128 x 2 x 10 Gbps between Sydney and Guam with spur to Madang
Design capacity	1.136 Gbps	2.56 Tbps
Lit capacity	1.136 Gbps (of which only 600 Mbps is useable due to a faulty repeater)	• 140 Gbps on the Sydney-Guam Trunk • 40 Gbps on the PNG-Guam route • 40 Gbps on the PNG-Australia route.
Purchased capacity	1.136 Gbps (Telikom IRU)	10 Gbps (Telikom IRU)
Used capacity	600 Mbps (Telikom)	438 Mbps (Telikom)
Landing Stations	• Ela Beach, PNG(owned by Telikom) • Sydney Australia	• Cromer, Sydney, Australia • Madang, PNG (owned by Telikom) • Piti, Guam

There is a significant amount of unutilised capacity in the submarine cables market. Although the usable capacity (600 Mbps) on the APNG2 was fully utilised in 2011, only 4% of Telikom's purchased capacity on the PPC-1 cable was used in 2011. It is likely that the rate of utilisation in 2012 was similar (Telikom has not provided information directly on this point). The proportion of total (usable) purchased capacity on international submarine cables into/out of PNG that was utilised in 2011 is shown in Figure 2.

Figure 2: Utilisation of total purchased capacity on international submarine cables into/out of PNG (2011)



3.2.3 The susceptibility of the market to ex ante regulation

NICTA found that the submarine cables market was susceptible to ex ante regulatory intervention after applying the so called 'three criteria test'.[9] Although the application of the three criteria test is not a statutory requirement in

[8] That is,the number of fibre pairs in the cable, multiplied by the number of wavelengths per fibre pair multiplied by the capacity per wavelength

PNG in that same that it is within European Union countries, NICTA considers it to be an important filter for determining whether a market is susceptible to ex ante regulation of dominance and thus an important (if non-mandatory) part of NICTA's process for determining whether it is necessary to consider ex ante regulation in the form of a recommended service declaration under Part VI of the Act. NICTA regards the application of the three criteria test in such circumstances as a regulatory best practice even though it is not specifically required of NICTA under the Act.

Under the three criteria test a particular market will be considered susceptible to ex ante regulation if:

1) it has high and non-transitory barriers to entry;
2) it has a market structure which does not tend towards effective competition within the relevant time horizon; and
3) the application of competition law alone is insufficient to address adequately the market failure(s) concerned.

A market that satisfies all three criteria is susceptible to ex ante regulation. That is, the application of ex ante regulation may be warranted. However, even if a particular market fulfils all three criteria it does not automatically mean that ex ante regulation is necessary in that market. NICTA may still forbear from regulation to monitor the way the market develops, particularly if there are other constraints that might discourage or prevent the exercise of any significant market power (SMP).

In the case of the submarine cables market, NICTA found that:

- In relation to barriers to entry:There are high and non-transitory barriers to entry. The difficulty and high costs involved in landing an international submarine cable in PNG are considerable. Notwithstanding any reductions generally in the costs of investing in new submarine cable systems or links and landing station infrastructure, the associated costs remain substantial. By way of example, the PPC-1 cable system cost approximately US$200 million and took two years to introduce (from concept to launch). NICTA staff estimate the cost of laying a 1,000 kilometre submarine cable from the spare branching unit (BU#3)on PPC-1 in Alotau to Port Moresby to be in the vicinity of US$30–35 million. Given the existing glut of unused purchased capacity (refer Figure 2 above) it is also unrealistic to expect that either a third submarine cable or a second spur on the PPC-1 (by a party other than Telikom) will be landed in PNG unless or until there is substantial growth in demand for international bandwidth into and out of PNG.
- In relation to trends to effective competition: There is no trend towards effective competition behind the barriers to entry. Given technological differences, satellite access is not a credible substitute for international fibre-optic cables, except possibly in the remotest locations not abutting or connected to the national terrestrial wireless and cable networks.
- Also in relation to trends to efficient competition: NICTA is not aware of any industry plans to land a third submarine cable in PNG and it seems likely that demand in the foreseeable future would not support the construction of a third submarine cable. Given the construction and deployment costs and logistical complexity of landing new cables (or spurs) in PNG, and the existing glut of unused purchased capacity (let alone lit capacity), PNG is likely to continue to be served by the two existing submarine cable systems for the foreseeable future.
- In relation to competition law: Ex post competition law is insufficient to resolve any likely market failure in a suitable timeframe—that is, within a timeframe that ensures minimum lasting damage to competition and consumer welfare. Although market participants are subject to the prohibition against taking advantage of significant market power (SMP) contained in section 56 of the *Independent Consumer and Competition Commission Act 2002* (the ICCC Act), the Independent Consumer and Competition Commission (ICCC) has no power under the ICCC Act to issue desist orders. As such, in the event of an abuse of SMP, either the ICCC or a licensee would need to initiate litigation in the National Court against the licensee concerned, which would likely involve significant expense. Further the time and effort involved in confirming ex post that

[9]The application of this test has been documented by the European Commissionand by the Body of European Regulators for Electronic Communications and has since been adopted widely and is applied in many countries outside of Europe, such as Moldova, Oman, Saudi Arabia and the United Arab Emirates.

there has been an abuse of a position of SMP, and then finding the means to rectify it, would likely cause substantial and lasting damage to the downstream retail markets that depend upon international connectivity and, subsequently, to the economic development of PNG.

3.2.4 Identification of significant market power

NICTA found that Telikom has a position of SMP in the submarine cables market. NICTA found this conclusion to be clear and compelling based on the following factors.

Telikom's market share

Telikom is the only supplier in the submarine cables market. It controls the only two cable landing stations in PNG and, through those facilities, controls access (and the associated terms and conditions, including price) to the two international submarine cable systems to which PNG is connected. Consequently Telikom has a market share of 100%.These conditions are likely to persist for the foreseeable future.

Telikom's control of essential infrastructure that is not easily duplicated

Telikom controls infrastructure—namely cable landing stations—that is essential to supply services in the submarine cables market. It is impracticable for a competitor to duplicate that infrastructure in relation to either of the submarine cable systems that are currently landed in PNG. It is highly unlikely that any other submarine cable systems will be landed in PNG in the foreseeable future.

Telikom's technological advantages and superiority arising from its control of essential infrastructure

Telikom is the only licensee with direct access to international fibre-optic submarine cables, which is a superior alternative to satellite-based international connectivity for most purposes.This is highly likely to persist over the period of analysis and reinforce Telikom's SMP.

The absence of potential competition

There is no likelihood of a rival landing station being established in PNG in relation to either of the submarine cable systems that are currently landed in PNG in the period under consideration (notwithstanding the existence of a currently unused branching unit on PPC-1). Given the high barriers to entry and the existing glut of (Telikom's) purchased capacity it is also highly unlikely that another competitor will enter the submarine cables market within the foreseeable future.

The absence of or low countervailing buying power

Based on data from Telikom's wholesale customers submitted to NICTA as part of its data request, it does not appear than any of Telikom's existing wholesale customers account for a large proportion of Telikom's total output compared to the proportion accounted for by Telikom's self-supply. Further, the power that might otherwise be countervailing is theoretical and not real and therefore cannot be wielded to demand a better deal from Telikom in the submarine cables market.Given the absence of suitable alternatives to wholesale capacity on, and access to, international fibre-optic submarine cables, wholesale customers of Telikom have little leverage with which to establish effective countervailing power. Wholesale access to their networks (i.e. interconnection) is already subject to regulation,[10]which prevents the formation of countervailing buying power in that area. Some of the demand of those wholesale customers could be (and has been) transferred to satellite on a self-supply basis however,satellite capacity is an inferior substitute for submarine cable capacity and self-supply would not be an effective basis for leveraging buying power.

[10]That is, the declaration of the domestic mobile terminating access service.

Telikom's vertical integration

Telikom is vertically integrated, with presence in both the wholesale and retail markets. It therefore has a major incentive to discriminate in the provision of wholesale services in ways that will advantage its own retail operations relative the competitive retail operations.

Economies of scale

Telikom is likely to benefit from economies of scale relative to any new entrant or potential competition (assuming such was probable). As Telikom's investment costs in its cable landing stations are sunk, it enjoys potential economies of scale relative to any new entrant. For example, if a new entrant wished to introduce 20 Gbps of additional international capacity into the market, it would need to secure the necessary indefeasible right of use (IRU) with PIPE and then either land an additional spur in PNG or secure access through Telikom's existing cable landing station in Madang (the terms of which may be discriminatory in the absence of the declaration of that particular service). In contrast, if Telikom wished to supply 20 Gbps of capacity in the market, it would need only to secure an additional 10Gbps IRU from PIPE and possibly purchase some additional IT equipment within its cable landing station. Telikom could thus achieve the same result as the new entrant at a substantially lower cost than the new entrant. The key point though is not that Telikom has economies of scale but that the scale involved covers substantially the whole of the capacity involved, thereby making it impossible for new entrants without separate submarine cable systems to match the economies achievable by Telikom. Such a cost advantage would deter potential new entrants, which in turn would help to reinforce Telikom's SMP.

Ease of market entry

The submarine cables market is not an easy market to enter given the substantial costs and difficulty involved in, first, persuading an international cable consortium to land its cable in PNG (given that two cables are already landed) and, second, constructing and operating a cable landing station.

3.2.5 Potential problems arising from Telikom's SMP

NICTA considered the key sources of Telikom's SMP in the submarine cables market and concluded that Telikom has both the commercial incentive and ability to use its SMP in ways that would be very damaging to the development of effective competition in that market and in various downstream markets. These findings are summarised in Figure 3. As a consequence NICTA concluded that it would be appropriate to consider the potential declaration of one or more wholesale services in the submarine cables market.

Figure 3:Summary of the potential problems arising from Telikom's SMP

Source of SMP	Potential use of Telikom's SMP and its effects
Control of essential infrastructure not easily duplicated Technological advantages and superiority	*Refusal to supply / denial of access* Given its SMP and its control of essential infrastructure and the technological advantages that its affords, Telikom has the incentive and ability to strengthen unfairly its position in downstream retail markets by denying access to international submarine cables, or refusing to supply capacity on international submarine cables, to other licensees that compete against Telikom in downstream retail markets (such as the retail mobile services market or the market for internet access). As wholesale capacity on, and access to, international fibre-optic submarine cables is a key wholesale input for many downstream retail communications services (and likely to become more so over time), any such action by Telikom would unfairly raise its rivals' costs (e.g. by forcing them to rely wholly on satellite capacity) and could therefore significantly impede the development of effective competition in those downstream markets.[11]
Absence of potential competition Absence of or low countervailing buying power	*Excessive pricing* Prices can be considered excessive if they allow the supplier concerned to sustain profits that are higher than it could expect to earn in a competitive market. Given its SMP, the absence of potential competition and any significant countervailing buying power, Telikom has the incentive and ability to set its wholesale prices for submarine cable access and capacity services at levels that maximise Telikom's profits at a given level of demand. A consequence of such pricing behaviour would be that the quantity of capacity/access demanded, consumer surplus, and total welfare would all be less than their potential values under competitive conditions.
Vertical integration	*Anti-competitive price discrimination* Telikom's SMP and its vertical integration gives it the incentive and ability to use price discrimination to attempt to raise unfairly the costs incurred by its rivals in the downstream retail markets. This can be achieved by Telikom charging a higher price to downstream competitors than the price that Telikom implicitly charges to its own retail arm (i.e. price discrimination between external and internal supply). The market has created the circumstances where such a risk might be realised.
	Quality discrimination Telikom's SMP and its vertical integration gives it the incentive and ability to use quality discrimination to attempt to raise unfairly the costs incurred by its competitors in the downstream retail market, restrict their sales and potentially foreclose downstream retail markets to competition. This could be achieved by Telikom supplying its downstream competitors with services that are of a lesser quality than those Telikom supplies to its own retail arm.[12]The costs of Telikom's downstream competitors would be raised if additional efforts or investments were necessary to offset the quality disadvantage. The sales of Telikom's downstream competitors could be restricted if the differences in quality cannot be offset and are perceived by retail customers. An example of such quality discrimination could be Telikom giving priority to the restoration of its own retail customers'services in the event of a network fault that also affected the services of its wholesale customers.

3.3 NICTA'S FINDINGS IN RELATION TO THE SATELLITE CAPACITY MARKET

3.3.1 The definition of the market

NICTA defined a national market for wholesale access to capacity on international communications satellites ("the satellite capacity market"). NICTA reached this conclusion through the application of the HMT for a forward-looking two-year period ending 31st December 2014.

[11]In this respect NICTA notes the comments by Digicel on page 8 of its submission that: 'Digicel, for example, cannot despite customer demand currently provide customers with PLCs, Ethernet, MPLS, BGP peering services in PNG given the limitations of satellite facilities and Telikom's refusal to offer any wholesale access services over its submarine cable other than a limited Layer 3 (IP-transit) service. Digicel has repeatedly been refused Layer 2 (Ethernet) and Layer 1 (SDH) access by Telikom.'

[12]In this respect NICTA note the comments by Digicel on pages 7–8 of its submission that: 'Digicel sources the majority of its transmission requirements for its data services from satellite providers given the prohibitive pricing of Telikom's wholesale IP-transit offering and the poor quality of service associated with the latter offering. This is illustrated by the fact that critical issues such as service outages take between 24 and 72 hours to rectify, while minor issues such as packet drops of five per cent take in excess of seven days to rectify with no proactive rectification updates'. NICTA also note that there have been unsubstantiated (and as far as NICTA is aware, unexamined) allegations of such discrimination made against Telikom in the past. See for example page 27 in Freehills and Concept Economics (2009) *Experts' report on National ICT Policy, Phase 2 Reforms* (published by the Department of Communications and Infrastructure): 'Access to sufficient international capacity was also a major complaint, with allegations that Telikom was limiting capacity to ISPs to prevent the supply of VoIP services and discriminating in favour of its own downstream Internet services business.'

NICTA began by identifying the relevant focal product as wholesale access to capacity on international communications satellites. Operator Licensees in PNG acquire this service directly from satellite operators such as APT Satellite, AsiaSat, Intelsat, JSAT, and SES World Skies. NICTA then considered the potential substitutability of the following products:

- wholesale access to international submarine cables (i.e. PPC-1 and APNG-2); and
- wholesale international access via terrestrial links (e.g. fibre-optic cable or microwave).

NICTA concluded that it is inconceivable that a SSNIP in the supply of wholesale access to capacity on international communications satellites *in PNG* would lead to the entry of an alternative supplier, let alone entry within a year or which would render the SSNIP unprofitable. Given the global nature of satellite systems and the huge costs, complexities, and long lead times associated with launching and maintaining a satellite-based service, such wholesale supply-side substitution is implausible.In addition the characteristics of the satellite-based international services(e.g. the possibility of nomadic services and the avoidance of any need to be connected to the terrestrial network) mean that for at least some users substitution in favour of international submarine cable-based services would be impracticable.

It is feasible that the purchasers of wholesale capacity on satellites could be persuaded to use alternative products, such as wholesale capacity on either the PPC-1 or APNG2 international submarine cables. Such cable-based services would provide a technologically superior service to satellite for many purposes. However, based on the limited information that has been supplied to NICTA about the current prices being charged in PNG for capacity on satellite systems and submarine cables, it appears that wholesale prices for satellite capacity tend to be lower than those currently charged by Telikom for equivalent capacity on either the PPC-1 or APNG2. NICTA's data is insufficient to quantify that difference but given the global nature of satellite services it seems unlikely that any substitution in favour of submarine cable capacity would be sufficient to render unprofitable a SSNIP in the supply of wholesale satellite capacity.

The possibility of wholesale demand-side substitution in favour of terrestrial links such as fibre-optic cable and long-haul microwave was also considered but ultimately dismissed for the same reasons it was not considered to be an effective substitute to submarine cable access within the period under consideration.

Some satellite-based retail services would be at risk of being substituted for submarine cable-based services, if a submarine-cable based service could be made available with a better price/service characteristics mix. Permanent (satellite service) installations would be especially vulnerable to this kind of substitution. However NICTA concluded that a SSNIP would be profitable, at least in the short term horizon of the assessment, as there are specific lower capacity satellite services that tend to value the potential for nomadicity and fast set-up that exists with satellite-based services and which therefore preclude substitution in favour of submarine cable-based services.

NICTA further found that the market for wholesale access to capacity on international communications satellites is a national market, in the sense that the typical satellite coverage and service capability from satellite systems in PNG is national rather than sub-national or regional.

NICTA notes that all respondents to this aspect of the public inquiry concurred with NICTA's proposed market definition.

3.3.2 Overview of the satellite capacity market

Capacity on international communications satellites is currently supplied by a number of satellite operators, including APT Satellite, AsiaSat, Intelsat, JSAT, and SES World Skies. There are also a number of other satellite operators with existing satellite systems that have the potential to supply capacity in PNG.

Operator Licensees in PNG acquire wholesale capacity services directly from satellite operators.

3.3.3 The susceptibility of the market to ex ante regulation

NICTA applied the three criteria test to the satellite capacity market and found that, although there are indeed high and non-transitory barriers to entry, behind those barriers there is a clear trend towards effective competition in that market. This is evident in the number of actual and potential suppliers of satellite capacity into and out of PNG. That market structure strongly suggests that the satellite capacity market offers substantial real choice and that it is already effectively competitive.

The three criteria are to be applied in cumulative fashion and for the market to be susceptible to ex ante regulation of dominance it must pass all three tests. As the satellite capacity market did not satisfy the second criterion, the third criterion (that of the sufficiency of ex post competition law) was not considered and NICTA concluded that the market was not susceptible to ex ante regulation. As such NICTA concluded that it would not be appropriate to consider the potential declaration of any particular wholesale services in that market and that the circumstances do not want any such consideration.

NICTA notes that all respondents to this aspect of the public inquiry concurred with that view.

3.4 OUTCOME OF THE INQUIRY

Based on NICTA's findings from the public inquiry NICTA concluded that it would be appropriate to consider—pursuant to section 129 of the Act—the potential declaration of wholesale services relating to access to submarine cable landing station facilities and transmission capacity on international submarine cables. Through the inquiry process NICTA refined its definition of those services and solicited input from stakeholders on the potential terms of the declaration.

Following the inquiry NICTA considered those two services against the declaration criteria and was satisfied that all those criteria would be met by the declaration of both of those services. The remainder of this report sets out the recommended terms of the declaration and the extent to which the declaration criteria are met.

As the inquiry found that the market for wholesale access tocapacity on international communications satellites was not susceptible to ex ante regulation, NICTA did not consider any services in that market for potential declaration or against the declaration criteria.

4 THE SERVICES RECOMMENDED FOR DECLARATION AND THE TERMS OF DECLARATION

The definitions of the two services recommended for declaration are set out below together with the recommended terms of the proposed declaration. A draft declaration reflecting these terms is provided at Annex C.

4.1 THE SERVICES RECOMMENDED FOR DECLARATION

NICTA recommends that the Minister declare the following services:

(1) the international submarine cable transmission capacity service; and
(2) the international submarine cable gateway access service.

4.1.1 The international submarine cable transmission capacity service

NICTA defines the international submarine cable transmission capacity service as a Network Service:

(a) for the carriage of any combination of voice communications and/or data via an international fibre-optic submarine cable between:
  (i) any of the following Points of Interconnection:
    A. a Point of Interconnection located at the Access Provider's Cable Landing Station; or
    B. a Point of Interconnection located in the Access Provider's Switching Centre that is nearest to that Cable Landing Station and which contains a Point of Interconnection between the Access Provider and an Operator Licensee; or
    C. a Point of Interconnection located in the Access Provider's Switching Centre the use of which for this purpose is mutually agreed to by the Access Provider and the Access Seeker; and
  (ii) a Mid Point or End Point; and
(b) with any unit of transmission capacity.

This service includes, but is not limited to, transmission capacity at wavelength, Layer 1 (SDH) and Layer 2 (Ethernet) levels.

4.1.2 The international submarine cable gateway access service

NICTA defines the international submarine cable gateway access service as a Facilities Access Service that provides an Access Seeker with such access to, or use of, the Facilitates of an Access Provider at the Access Provider's:

(a) Cable Landing Station; or
(b) Switching Centre that is nearest to the relevant Cable Landing Station and which contains a Point of Interconnection between the Access Provider and an Operator Licensee; or
(c) Switching Centre the use of which for this purpose is mutually agreed by the Access Provider and the Access Seeker;

as is necessary to enable the Access Seeker to interconnect its Facilities to an international fibre-optic submarine cable.

4.2 THE RECOMMENDED TERMS OF THE DECLARATION

The specific terms that NICTA recommends the Minister incorporate into the recommended declaration are set out in the draft declaration in Annex C. Section 5 of that draft declaration sets out a number of terms that have been included for clarity and the avoidance of doubt in the interpretation and implementation of the recommended declaration.

Thus the draft declaration includes terms that clarify that the recommended declaration has the following effects and implications.

(a) The international submarine cable transmission capacity service and the international submarine cable gateway access service are separate Wholesale Services, meaning that although that may be offered by an Access Provider as a bundle they must also be offered and made available separately (i.e. unbundled);

(b) The international submarine cable transmission capacity service includes the supply of backhaul transmission capacity by the supplier of the international submarine cable transmission capacity service to the extent that such is necessary to connect an Access Seeker's Facilities at a virtual colocation Site to the Access Provider's Facilities in a Cable Landing Station. This means that any such supply of backhaul transmission capacity by the Access Provider is subject to the non-discrimination obligations and must be consistent with the General Pricing Principles and any relevant Service Specific Pricing Principles. Any other supply of backhaul transmission capacity (including any supplied by the Access Seeker) is not a declared service.

(c) The international submarine cable gateway access service enables an Access Seeker,among other things, to do any or all of the following:

(i) Access the International Gateway Facilities of an Access Provider including, but not limited to, physical network infrastructure and ancillary services such as power supplies and air-conditioning;

(ii) physically collocate its Facilities in any available space within the Access Provider's Cable Landing Station; and

(iii) physically or virtually collocate its Facilities in any available space within a relevant Switching Centre controlled by the Access Provider.

(d) An Access Provider that supplies an international submarine cable transmission capacity service with a particular transmission capacity is, subject to the constraints of the relevant submarine cable capacity available to it through contract or ownership, deemed to be able to supply that service with other transmission capacities as well. For example, if an Access Provider supplies an international submarine cable transmission capacity service with a capacity of an STM-1, that Access Provider is deemed to also be able to supply an Access Seeker with an E1 and/or an STM-4, depending on the specific capacity requirements of the Access Seeker.

4.2.1 Extent to which the terms are technology neutral

Section 129(1)(b)(iii) of the Act requires NICTA to identify the extent to which the terms of the recommended declaration are technology neutral. It does not require that the recommended declaration be technology neutral, although the Act elsewhere envisages that regulatory measures 'to the extent feasible, should be technology neutral *to reflect the potential for convergence of technologies*'[13] (s.3(b)(ii)).

The terms of NICTA's recommended declaration are not completely technology neutral but they are technology neutral to the extent feasible.

The services recommended for declaration (and thus the terms used to describe them) are technology-specific in the sense that they relate specifically to the technology of fibre-optic submarine communications cables. However, that is a consequence of the relevant market being defined as the market for wholesale capacity on, and access to, international fibre-optic submarine cables. That market definition exercise was technology neutral and considered—but ultimately discounted—the relevance and substitutability of other technologies, such as satellite communications technologies, as part of the application of the Hypothetical Monopolist Test. NICTA notes that the Act itself envisages (in section 132) the potential declaration of a similarly technology-specific service called 'access to capacity on international communications cables'.

[13] Emphasis added.

As recognised in the regulatory principles set out in section 3 of the Act, the reason for trying to keep regulatory measures technology neutral'to the extent feasible' is because of 'the potential for convergence of technologies'. In this context, the recommended declaration is technology neutral in an important aspect in that the international submarine cable transmission capacity service is defined as being for 'the carriage of any combination of voice communications and/or data…'. The recommended declaration thus accommodates the convergence of telephony and data communications.

NICTA believes that the extent to which the terms of the recommended declaration are technology specific is necessary, has been minimised, and will not in any way detract from the effectiveness or relevance of the declaration over the period it is to remain in effect.

4.2.2 Extent to which the terms are non-discriminatory

Section 129(1)(b)(iii) of the Act requires NICTA to identify the extent to which the terms of the recommended declaration are non-discriminatory. It does not require that the recommended declaration be non-discriminatory, although the Act elsewhere envisages that regulatory measures 'should be non-discriminatory in application such that, to the extent appropriate, similarly situated ICT licensees are treated on an equivalent basis subject to recognition of legitimate differences' (s.3(b)(v)).

The terms of NICTA's recommended declaration are completely non-discriminatory as they apply equally to any and all ICT licensees that supply the services recommended for declaration. As of todayTelikom is the only ICT licensee that supplies the services recommended for declaration, but if that situation changes over the period that the recommended declaration is in effect (something that Telikom believes is likely but which NICTA does not), then the draft declaration at Annex C would automatically apply to that new Access Provider and would not require amendment.

4.3 THE RECOMMENDED DURATION OF THE DECLARATION

Section 129(1)(b)(iv) of the Act requires NICTA to identify an expiry date for the recommended declaration. NICTA recommends that the declaration remain in effect for a period of five years. That is the maximum period permitted by the Act.

In the event that the Minister accepts NICTA's recommendation and makes the proposed declaration, NICTA proposes to review the effects of the declaration after it has been in operation for two to three years. That review may identify a need for a public inquiry to consider an amendment to (or even the revocation of) the declaration and will ensure that the declaration remains current and responsive to any changes or developments in the market over the five year duration of the declaration.

5 THE EXTENT TO WHICH THE DECLARATION CRITIERA ARE MET BY THE RECOMMENDED DECLARATION

NICTA has considered whether the declaration criteria in section 128 of the Act would be met by the making of the recommended declaration at Annex C and is satisfied that all the criteria would be so met. The extent to which the declaration criteria would be met is described below.

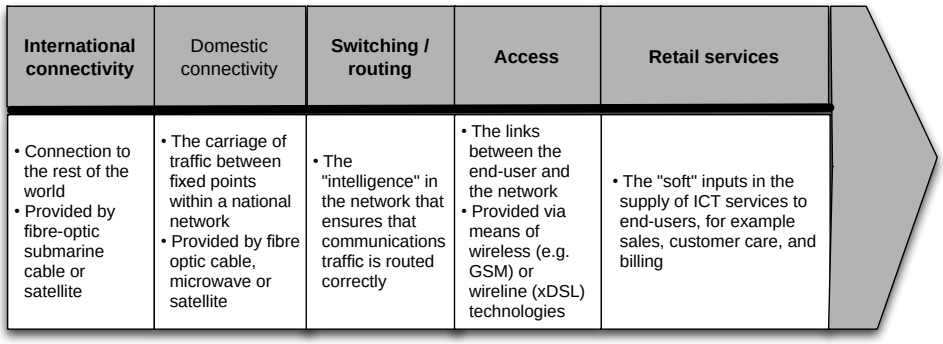
5.1 DECLARATION CRITERION 1

Paragraph 128(a) of the Act specifies that declaration will further the achievement of the objectives set out in Section 124 of the Act (i.e. the competition objective subject to the efficiency objective). The competition objective is to 'promote effective competition in markets for ICT services in Papua New Guinea'. That objective is subject to the efficiency objective, which is to promote 'the economically efficient use of, and the economically efficient investment in, the facilities by which ICT services may be supplied'.

NICTA is satisfied that the declaration of both services would meet this criterion (for the reasons identified here and those discussed further below).

International connectivity, particularly via fibre-optic submarine cables, sits at the very top of the supply chain of many ICT services and is particularly important for those ICT services that involve access to and use of the internet. Refer Figure 4.International connectivity is of course possible via satellite-based services in addition to fibre-optic submarine cables; however, due to quality differences and capacity constraints, satellite-based connectivity is considered to be an inferior substitute for international connectivity via fibre-optic cables for many types of communications services. For example, the high latency of satellite transmissions can affect the quality of voice and data transmissions and the transmission speeds of fibre-optic cables are considerably greater than those possible with the latest satellites.

Figure 4: General supply chain for ICT services



Adapted from Williams, M.D. (2009), *Broadband for Africa: Developing backbone communications networks*, Washington, DC, World Bank January,

Given its position atop the supply chain, international connectivity has the potential be a bottleneck that constrains the development of competition indownstream markets and, consequently, retards the growth and development of those markets. As noted in a World Bank's *Broadband Strategies Handbook:*

> 'As electronic communications traffic—particularly Internet traffic—enters and leaves a country, it is typically routed through one or more international facilities, including submarine cables, cable landing stations, and international gateways.Since international facilities provide the entry and exit point for voice, data, video, and other broadband services, they can become bottlenecks if access and traffic are restricted or prices are set above costs.As the adoption of broadband services and applications increases, demand for international bandwidth also rises…The most efficient way to lower costs and keep pace with demand is through liberalization and promotion of competition among facilities that provide international connectivity, in particular,

international gateways, submarine cables, and landing stations.'[14]

NICTA has analysed the level of competition in two separate markets in PNG:

- the national market for wholesale capacity on, and access to, international fibre optic submarine cables ("the submarine cables market"); and
- the national market for wholesale access to capacity on international communication satellites ("the satellite capacity market").

The satellite capacity market was found to be trending towards being effectively competitive (if not already so) and thus not susceptible to ex ante regulatory intervention. In contrast NICTA found that the submarine cables market was not effectively competitive because Telikom has a position of SMP. Further, NICTA found that Telikom's position of SMPgave it both the commercial incentive and ability to use that market power in a manner that would be damaging to competition in both the submarine cables market and various other downstream markets.The particular potential abuses of Telikom's SMP that were identified by NICTA were:

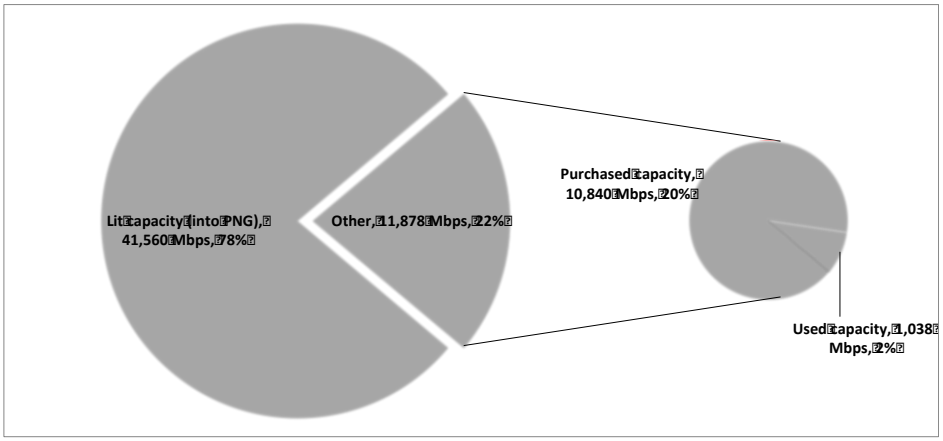
- a refusal to supply or a denial of access (including a refusal to supply on reasonable terms), which can raise rivals' costs and lead to the foreclosure of downstream retail markets to competition;
- excessive pricing, which has negative welfare effects in the form of allocative inefficiencies;
- anti-competitive price discrimination, which can impose margin squeezes or raise rivals' costs in downstream retail markets, thereby foreclosing those markets to competition; and
- quality discrimination, which can raise rivals' costs and potentially foreclose downstream retail markets to competition.

The declaration of the international submarine cable transmission capacity service and the international submarine cable gateway access service would prevent all of these potential abuses of Telikom's SMP by subjecting the supply of those services to the non-discrimination obligations and the general pricing principles specified in the Act (and also to service specific pricing principles that NICTA will determine following declaration). Addressing this market failure is necessary to promote competition in both the submarine cables market and in the numerous downstream markets that are dependent upon international connectivity.

Declaration would also promote economically efficient use of, and investment in, the facilities by which ICT services may be supplied. This is particularly so in the submarine cables market where there is a glut of international capacity into/out of PNG. (There are actually two gluts, one of lit capacity and another of purchased capacity; refer Figure 5). Further, data supplied to NICTA by market participants indicates that Telikom's existing wholesale customers do not account for a significant proportion of Telikom's total output (i.e. its utilisation of its purchased international capacity) compared to the proportion accounted for by Telikom own use (i.e. self-supply to its own downstream retail operations).

[14]Kelly, T. and Rossotto, C. (eds), (2012) *Broadband Strategies Handbook*, Washington, DC, World Bank, August, p.112

Figure 5: Utilisation of the total lit capacity on international submarine cables into/out of PNG (2011)



The declaration of the international submarine cable transmission capacity service and the international submarine cable gateway access service would further the achievement of the efficiency objective by fostering greater utilisation of the existing capacity in the submarine cables market by both Telikom and its wholesale customers (both new and existing). This is supported by the findings in a study by the International Telecommunication Union. Its report *Trends in Telecommunications Reform 2008: Six Degrees of Sharing* examined cases where national regulators had acted to introduce competitive access to submarine cable landing stations and found that such action typically resulted in:

- lower prices for international communications;
- increased international bandwidth;
- increased investment (as a result of increased demand);
- faster market growth via increased traffic and use; and
- economic growth.

In addition, as the current capacity glut is a significant deterrent to further investment in the submarine cables market—both to Telikom itself and to any potential new entrants—better utilisation of that capacity would help to improve the investment incentives in the longer term.

5.2 DECLARATION CRITERION 2

Paragraph 128(b)(i) of the Act specifies that, with respect to the competition objective, access or increased access to the wholesale service (as a consequence of declaration) is necessary for the promotion of effective competition in at least one market other than the market for the wholesale service.

NICTA is satisfied that the declaration of both services would meet this criterion.

Declaration will ensure that the access terms for the services in question will be non-discriminatory and the access prices will be cost-based and that in turn will increase access to the services. That is demonstrated by the experience of numerous other countries that have introduced regulation of access terms and prices with respect to submarine cable facilities and capacity services. In the specific case of the international submarine cable gateway access service, declaration will also provide forms of access that to date have not been made available.[15]

[15]By way of example, Digicel has advised NICTA that 'Digicel has repeatedly been refused Layer 2 (Ethernet) and Layer 1 (SDG) access by Telikom'. (See Digicel (2012) *Submission to public inquiry into the need for declaration of certain wholesale services in international connectivity* markets, paragraph 28.) Such access will be required to be provided, upon request, under the terms of the recommended declaration.

Increased and improved access is necessary to promote competition in many downstream retail markets, including in particular the national retail markets for mobile telecommunications services, narrowband internet access and broadband internet access.This is because international connectivity via fibre-optic submarine cable is a key input in the supply of internet access and international telecommunications services.(International connectivity is, of course, possible via satellite-based services but, as noted above, is not an effective substitute for international connectivity via fibre-optic cables for many types of communications services.)

The importance of access to submarine cable facilities and landing stations for the development of competition in broadband markets is widely recognised. For example, a recent report by the World Bank notes:

> 'The potential for international connectivity to be a bottleneck in the development of broadband connectivity cannot be overstated...Because all operators in a market, particularly new entrants, may not have the resources to own and operate a cable landing station, the owners of such stations—generally the incumbent operators in newly liberalized markets—may be required to provide access to the station, and therefore to the cable, on reasonable terms to competing service providers. ***Limited access to landing stations can have a chilling effect on the diffusion and take-up of broadband services***.'[16]

Another World Bank report, focused on the advancement of broadband in the developing economies of Africa, states:

> 'High-speed international connectivityis currently a major constraint on the delivery of broadband services in Sub-Saharan Africa. Most of the region is dependent on satellites for international connectivity. Even where countries are connected to international submarine cables…,the impact has been very limited because access to these cables is controlled by individual operators that have been able to set high prices. **Access to high-bandwidth international capacity at low prices is a necessary (but not sufficient) condition for the development of mass-market broadband**.**The global experience of international connectivity shows clearly that international infrastructure competition results in lower prices and higher bandwidth**. In order to support the development of such competition in Sub-Saharan Africa, licensing and regulatory frameworks, including rights to land submarine cables, may need to be reformed to ensure that monopoly control over bottleneck facilities does not emerge. However, this facilities competition may take some time to develop. In the short run, regulators will have a key role to play in guaranteeing access to bottleneck facilities such as landing stations.'[17]

Increased access would foster competition in the downstream markets in a number of important ways. Most significantly, it would remove the potential forTelikom—or any other licensee that may control access to an international submarine cable and/or cable landing station—to:

- deny its competitors in the downstream markets access to or capacity on international submarine cables(including absolute denials and denials of reasonable terms);
- set excessively high prices for access to, or capacity on, international submarine cables;
- discriminatein terms of price or quality between its internal and external supply of access to, and capacity on, international submarine cables (i.e.to the advantage of its own downstream business operations and to the disadvantage of its competitors in thosesame downstream markets).

Further, declaration of both services—i.e. both the international submarine cable transmission capacity service and the international submarine cable gateway access service—will provide access seekers with greater flexibility and choice to determine how they might develop their businesses and adjust their business models. This in turn will leave open for commercial consideration how best to compete in the relevant markets. NICTA does not want to intrude on these processes or distort the choices that the market may throw up.

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[16]Kelly, T. and Rossotto, C. (2012) *op.cit.*Emphasis added.
[17]Williams, M.D. (2009), *Broadband for Africa: Developing backbone communications networks*, Washington, DC, World Bank January. Emphasis added.

5.3 DECLARATION CRITERION 3

Paragraph 128(b)(ii) of the Act specifies that, with respect to the competition objective, the wholesale service is supplied in whole or in part via a facility that cannot feasibly be substituted, as a matter of commercial reality, via another facility in order to supply that wholesale service.

NICTA is satisfied that the declaration of both services would meet this criterion.

The services in question—namely the international submarine cable transmission capacity service and the international submarine cable gateway access service—are supplied principally over facilities that constitute a cable landing station and enable access to, and use of, an international submarine cable system. It is not possible to supply the services without access to the facilities that constitute a landing station.[18]

In PNG at present there are two cable landing stations each of which lands a different submarine cable (either the APNG2 cable or the PPC-1 cable).The appearance of competition and choice is, however, deceptive as both landing stations are owned and controlled by the one licensee. Further, although it is possible for the services in question to be supplied via the construction of a third landing station that lands either a third submarine cable to PNG or a second spur from PPC-1 cable, such a development is neithereconomically feasible nor commercially realistic. By way of example, the PPC-1 cable system cost approximately US$200 million and took two years to introduce (from concept to launch) and NICTA staff estimate the cost of laying a 1,000 kilometre submarine cable from PPC-1 BU3 in Alotau to Port Moresby to be in the vicinity of US$30–35 million.

5.4 DECLARATION CRITERION 4

Paragraph 128(c)(i) of the Act specifies that, with respect to the efficiency objective, declaration would not materially compromise the incentives for efficient investment in any facility over which the wholesale service may be supplied.

NICTA is satisfied that the declaration of both services would meet this criterion.

The services in question are supplied principally over facilities that constitute a cable landing station and enable access to, and use of, an international submarine cable system.Following declaration, the pricing of access to and use of these services would be in accordance with the General Pricing Principles and thus set so as to generate expected revenue that is sufficient to meet the efficient costs of providing access to the services. That includes a reasonable return on investment over the economic life of the assets employed that is commensurate with the regulatory and commercial risks involved. Although that return on investment might be different from the desired return of a particular facility owner or investor, it is incumbent on NICTA to ensure that it is nonetheless sufficient to encourage continued investment by the access provider in the relevant facilities.

The experiences of other countries that have taken similar regulatory actions in relation to access to submarine cable transmission capacities and facilities in landing stations shows that such regulation actually encourages increased investment by the landing station operators as a result of increased demand and regulatory and pricing certainty.[19]For example, the InfoComm Development Authority in Singapore found that as a consequence of its imposition of access and non-discrimination obligations, the revenues of the submarine cable landing

[18] There are of course alternatives to the services in question, for example an international satellite link. However, NICTA—consistent with many other national regulatory authorities including those in Bahrain, Bangladesh, Singapore and Liberia—is not satisfied that any such alternatives are sufficiently substitutability with the submarine cable services in question to be considered to exist in the same market. The claimed substitutability of satellite-based services for submarine cable-based services is a different application and consideration of “substitutability” to that which is required under this criterion. As the particular wholesale services that are being considered for declaration are the international submarine cable transmission capacity service and the international submarine cable gateway access service, the claimed substitutability of satellite-based services and facilities is irrelevant to an assessment of this criterion.

[19] International Telecommunication Union (2008), *Trends in Telecommunications Reform 2008: Six Degrees of Sharing*.

station operators in Singapore increased significantly—despite that regulation forcing a decrease in wholesale prices—as retail usage and hence demand increased exponentially.[20]

In any case declaration of the services is highly unlikely to affect the incentives for investments in submarine cable landing facilities in PNG over the coming years because any such investment is itself highly unlikely. As the above mentioned World Bank report notes: 'Facilities-based competition in the international connectivity markets may not be feasible in all developing countries, especially those that generate small amounts of traffic.'[21]Submarine cable investments are dependent on traffic, which in turn is a function of the size of the addressable market and the intensity of use.With a population of approximately 7.1 million and very low computer penetration[22] and internet usage[23]the economics of establishing *additional* submarine cable connectivity in PNG are very challenging.[24] Further, the existing PPC-1 submarine cable system has enormous current[25] and planned capacity that is likely to deter the construction of a third cable to PNG in the foreseeable future. Thus the existing glut of both purchased and lit capacity in PNG, as shown inFigure 5 above, provides a major deterrent to additional entry.

5.5 DECLARATION CRITERION 5

Paragraph 128(c)(ii) of the Act specifies that, with respect to the efficiency objective, access or increased access to the wholesale service is technically feasible having regard to the technology available, the costs involved, and the effect of supply on the integrity, operation and performance of other ICT services and facilities.

5.5.1 International submarine cable transmission capacity service

NICTA is satisfied that the declaration of this service would meet this criterion.

Access to this service has been demonstrated to be technically feasible in PNG and in other countries. Indeed, Telikom currently offers the service (though on different terms than it would if the service was declared).As reflected in the consideration of criterion 2, declaration of the service is necessary to promote effective competition in various downstream retail markets, which in turn will have positive effects on the pricing, quality and choice of ICT services in those markets. By the same token, *not* declaring the service will have a continuing negative effect on the pricing, quality and choice of ICT services in those downstream markets.

5.5.2 International submarine cable gateway access service

NICTA is satisfied that the declaration of this service would meet this criterion.

Access to this service has been demonstrated to be technically feasible in many other countries, including Bahrain, Hong Kong, India, Jordan, Mauritiusand Singapore (and many others where access is not regulated in a manner equivalent to declaration as in PNG).Telikom has also confirmed thatit is willing and able to supply this service at both its Madang and Ela Beach landing stations.[26]Further, if insufficient space should exist to enable access to be provided at a landing station, or some other factor makes such access technically infeasible, the proposed terms of the recommended declaration allow for access to be provided at a gateway exchange (i.e. virtual colocation),if necessary in conjunction with backhaul transmission capacity between the two sites. This

[20] IDA (2008) *International gateway liberalization: Singapore's experiences*; presentation to the ITU global symposium of regulators.

[21]Kelly, T. and Rossotto, C. (2012) *op.cit.*p.113

[22] As of 2010 (the latest year for which data was available) the ITU estimates household computer penetration in PNG at 3.5 per 100 households and the proportion of households with internet access (at home) at 2.7%. See World Bank (2012) *The Little data book on information and communications technology,* Washington, DC, World Bank p.168

[23] As of 2010 (the latest year for which data was available) the World Bank estimates there were just 1.3 internet users per 100 people in PNG. See World Bank (2012) ibid.

[24] Sutherland, E. (2009), *Telecommunications in Small Island Developing States*, August

[25]Approximately only 2% of the design capacity of PPC-1 is currently lit. See Figure 1.

[26] Telikom (2012) *Submission to public inquiry declaration of wholesale services in international connectivity markets*, 19th October, p.6

has also been shown to be technically feasible in many other countries.In this way the recommended Declaration ensures that access to the declared service will be and remain technically feasible.

5.6 DECLARATION CRITERION 6

Paragraph 128(c)(iii) of the Act requires that, with respect to the efficiency objective, in the case of wholesale services that are facilities access services, increased access to the wholesale service would avoid inefficient replication of underlying facilities that may be efficiently shared.

5.6.1 International submarine cable transmission capacity service

This service is a network service, not a facilities access service. Accordingly criterion 6 is not applicable.

5.6.2 International submarine cable gateway access service

This service is a facilities access service. NICTA is satisfied that the declaration of this service would meet this criterion.

Although declaration of the international submarine cable gateway access service will ensure that the access terms are non-discriminatory and the access prices are cost-based, and this in turn will increase access to the service, this will not contribute to the avoidance of inefficient replication of landing stations because such replication is impracticable in the first case. The effect of the declaration would thus be neutral. For the avoidance of doubt, this in no way diminishes the fact that declaration of the international submarine cable gateway access service would meet this criterion.

6 CONCLUSION

NICTA considers that regulatory intervention in the national market for wholesale capacity on, and access to, international fibre optic submarine cables is necessary to promote competition both in that market and in numerous downstream retail markets in which international connectivity is a key input. NICTA is satisfied that all of the declaration criteria would be met by the Minister's declaration of the international submarine cable transmission capacity service and the international submarine cable gateway access service. In accordance with section 129 of the Act, NICTA recommends that the Minister declare those wholesale services on the terms set out in Annex C.

ANNEX A: INQUIRY TERMS OF REFERENCE

Under the authority of section 127 of the *National Information and Communications Technology Act 2009* (the Act), NICTA has decided to inquire into and report on whether certain wholesale services relating to access to international connectivity should be declared under section 130 of the Act. In doing so, NICTA will:

(a) analyse the extent of competition in the relevant international connectivity access markets;

(b) consult with the Independent Consumer and Competition Commission, operator licensees, and any other relevant parties or government agencies;

(c) form a view as to whether or not those markets are effectively competitive; and, if any is not effectively competitive,

(d) consider whether the declaration by the Minister of any particular wholesale service or services in that market—in particular access to international gateway facilities, access to capacity on international communications cables, and/or access to capacity on international communications satellite links—would satisfy the declaration criteria specified in section 128 of the Act;

(e) determine whether or not NICTA should recommend to the Minister that one or more wholesale services in those markets be declared under section 130 of the Act; and, if such a recommendation should be made,

(f) specify the recommended terms of the declaration(s) and the recommended expiry date(s) for the declaration(s);

(g) prepare for the purposes of section 135 of the Act draft service-specific pricing principles in relation to the wholesale service(s) recommended to be declared; and

(h) identify and consider relevant matters relating to the technical and operational quality of the supply of the wholesale service(s) recommended to be declared for the purposes of section 136 of the Act.

The inquiry is expected to be conducted over a period of four months, commencing with the publication of a public discussion paper in June 2012 or shortly thereafter. The inquiry will be paper-based (i.e. rely entirely on written submissions and evidence) and is not expected to involve any public hearings.

ANNEX B: LIST OF INQUIRY DOCUMENTS

1. DISCUSSION PAPER: Published on 4th September 2012
2. RESPONSE TO COMMENTS REPORT: Published on 7th December 2012
   RECOMMENDATION & INQUIRY REPORT: Published on 26th February 2013

ANNEX C: RECOMMENDED DECLARATION

Wholesale Service Declaration No. 1 of 2013

National Information and Communications Technology Act 2009

The Minister for Communications and Information Technology makes this declaration under section 130 of the *National Information and Communications Technology Act 2009*.

Dated 2013

Minister for Communications & Information

Wholesale Service Declaration No. 1 of 2013

1. Name of declaration

(1) This declaration is the *Wholesale Service Declaration No. 1 of 2013*.

2. Commencement and expiry

(1) This Declaration commences 30 calendar days after the date on which it is notified in the National Gazette.

(2) The date this Declaration commences shall be the Commencement Date.

(3) This Declaration expires on the day before the fifth anniversary of the Commencement Date unless it is varied or revoked earlier pursuant to Section 130 of the Act.

3. Interpretation

(1) In this Declaration, unless the contrary intention appears:

"Act" means the *National Information and Communications Technology Act, 2009* and includes any regulations made under that Act;

"cable landing station" is a Site at which an international fibre-optic submarine cable is available on shore for the purpose of accessing transmission capacity on the cable. For the avoidance of doubt this includes the cable landing stations located at Ela Beach and Madang;

"end point" means a nominal point at a Cable Landing Station or international gateway Switching Centre in a foreign jurisdiction that is used to demarcate an end of a service, normally if it is supplied in the form of a full circuit;

"mid point" means a nominal point along an international fibre-optic submarine cable that is used to demarcate an end of a service, normally if it is supplied in the form of a half circuit;

"point of interconnection" means a location in Papua New Guinea which is a physical point of demarcation between the Access Seeker's Network and the Access Provider's Network;

(2) Each of the following terms used in this Declaration has the meaning given to it by the Act:

- Access
- Access Provider
- Access Seeker
- Facilities Access Service
- International Gateway
- Network
- Network Service
- Operator Licensee
- Resale Service
- Site
- Switching Centre
- Wholesale Service

4. Declaration

(1) The following Wholesale Services are hereby declared:

(a) the international submarine cable transmission capacity service; and

(b) the international submarine cable gateway access service.

5. Service descriptions

(1) The international submarine cable transmission capacity service is a Network Service:

(a) for the carriage of any combination of voice communications and/or data via an international fibre-optic submarine cable between:

(ii) any of the following Points of Interconnection:

A. a Point of Interconnection located at the Access Provider's Cable Landing Station; or

B. a Point of Interconnection located in the Access Provider'sSwitching Centre that is nearest to that Cable Landing Station and which contains a Point of Interconnection between the Access Provider and an Operator Licensee; or

C. a Point of Interconnection located in the Access Provider's Switching Centre the use of which for this purpose is mutually agreed to by the Access Provider and the Access Seeker; and

(iii) a Mid Point or End Point; and

(b) with any unit of transmission capacity.

(2) The international submarine cable gateway access serviceis a Facilities Access Service that provides an Access Seeker with such access to, or use of, the Facilitates of an Access Provider at the Access Provider's:

(c) Cable Landing Station; or

(d) Switching Centre that is nearest to the relevant Cable Landing Station and which contains a Point of Interconnection between the Access Provider and an Operator Licensee; or

(e) Switching Centre the use of which for this purpose is mutually agreed by the Access Provider and the Access Seeker;

as is necessary to enable the Access Seeker to interconnect its Facilities to an international fibre-optic submarine cable.

(3) For the avoidance of doubt:

(a) the international submarine cable transmission capacity service and the international submarine cable gateway access service are separate Wholesale Services;

(b) the international submarine cable transmission capacity service may be supplied as either a Resale Service or otherwise;

(c) the international submarine cable transmission capacity service includes the supply of backhaul transmission capacity by the Access Provider to the extent that such is necessary to connect an Access Seeker's Facilities at a virtual colocation Site in the relevant Switching Centre to the Access Provider's Facilities in a Cable Landing Station;

(d) the international submarine cable gateway access service enables an Access Seeker to:

(i) Access the International Gateway Facilities of an Access Provider including, but not limited to,

physical network infrastructure;

(ii) physically collocate its Facilities if technically feasible in any available space within the Access Provider's Cable Landing Station;

(iii) virtually or physically collocate its Facilities if technically feasible in any available space within the Access Provider's relevant Switching Centre.

(e) if an Access Provider supplies an international submarine cable transmission capacity service with a particular transmission capacity from:

(i) a Cable Landing Station that is under its control; or

(ii) a Switching Centre that is under its control;

then, subject to the constraints of the relevant submarine cable capacity available through contract or ownership to the Access Provider, the Access Provider shall be deemed to be able to supply international submarine cable transmission capacity services withdifferenttransmission capacities to Access Seekers with different international capacity requirements.