Vodafone PNG Response to NICTA Consultation on Operator Licensing for the Provision of Low Earth Orbit Satellite Services in PNG

11th Sept 2023

11th September 2023

Mr. Kila Gulu – Vui
Chief Executive Officer
NICTA Head Office
Section 43, Lot 19 & 20
Frangipani Street, Hohola, Port Moresby
Papua New Guinea

Re: Submission to Consultation for Licensing of the Provision of Non-geostationary Orbit (LEO/MEO) Satellite Services in Papua New Guinea

Dear Sir,

Thank you for the opportunity to respond to the above consultation. Vodafone PNG (Digitec Communications Limited) welcomes the opportunity to respond to NICTA's consultation on the Non-geostationary Orbit (LEO/MEO) Satellite Services in Papua New Guinea, published on 14 August 2023.

Key points

- Vodafone PNG agrees on NICTA's focus to regulate and implement a licensing regime for the Provision of Low Earth Orbit Satellite services in Papua New Guinea.
- It is quite important for NICTA to consider that any licensed Service Provider whether Wholesale and Retail Services needs to fulfil its obligations under the NICTA Act and its respective Spectrum Usage Agreement. Therefore, any RF spectrum terrestrial or space segment is a country resource, and any commercial entity needs to be subject to the relevant taxes and fees for use of the country's resource.
- We further encourage NICTA to consider Reseller model licensing where LEO Satellite Service Provider is permitted to resell through a service provider licensed by NICTA where the required fees can be applied by the Service provider for use and provide services as per their license obligations.

To conclude, Vodafone PNG generally supports the licensing of LEO Satellite services in PNG and has provided various case studies in the attached paper for NICTA consideration and understanding.

Yours faithfully

Justine Prakash
Chief Technology Officer (on behalf of CEO – Mr Pradeep Lal)
Digitec Communications Limited T/A Vodafone PNG

Table of Contents

1/ Introduction 4

2/ Responses to Consultation Questions 5

Question 1: LEO Licensing 5

(a) Appropriateness of Licensing 5

(c) Licence Exemptions 5

Question 2: LEO Licence Terms and Conditions 8

i/ Fees 8

ii/ Commercial or Local Presence 10

iii/ Network Availability 10

iv/ Co-ordination with Terrestrial Services 11

v/ Mandatory Coverage Obligations 11

Question 3: Licensing Special Rule 11

Question 4: LEO Constraints 11

Question 5: UAS Implications 12

3/ Further Comments 13

Equipment Approval and Registration 13

4/ Reservation of Vodafone's Rights 13

Annex: Acronyms 14

1/ Introduction

Thank you for the opportunity to respond to the NICTA Consultation on Operator Licensing for the Provision of Low Earth Orbit Satellite Services in PNG.

Vodafone sees the entry of LEO satellite service providers into PNG as competitors to existing providers, as well as bringing in a technology that can facilitate the provision of services in locations that can be hard to reach by other means (apart from MEO and GEO satellite technologies). The ability of LEO providers to win customers will increase over time as LEO satellite and related technologies develop. Although LEO satellite service provision appears relatively new, there is a big difference between it and other network rollouts in past decades in terms of its competitive effect. That is because it provides immediate nationwide coverage. In addition, thanks to the arrival of the internet, customers can sign up instantly and much more easily to the services of a new provider without visiting a physical location. Therefore, service competition by LEO providers could increase rapidly.

With this in mind, Vodafone believes that the starting point for regulation is the path that the Authority has taken: starting with the same obligations as other providers in the market and then considering whether there can be some reduction to the extent that sufficient differences exist. We anticipate that any such reduction would be kept under review as the LEO satellite service industry develops in PNG.

The key factors to be borne in mind when considering how to regulate the LEO sector, are, in Vodafone's view and in harmony with the points made by the Authority:

- Maximising benefits to customers.
- The potential for competition with existing providers and therefore placing LEO providers on a level playing field with other non-dominant providers in terms of obligations.
- The ability to ensure compliance with laws and other PNG licensing requirements.
- Minimising spectrum interference.
- Contributing to PNG's development by fee payments and other financial contributions.

2/ Responses to Consultation Questions

Question 1: LEO Licensing

(a) Do you agree that providers of LEO satellite services in PNG should be licensed by NICTA under the Act, as other providers of network services are licensed?
(b) If not, what other authorisation arrangements, if any, should apply?
(c) Would any form of exemption be appropriate, and under what circumstances?

(a) Appropriateness of Licensing

Vodafone agrees that LEO operators should be licensed. This is because:

- They use spectrum resources.
- Many of their customers will be using equipment that is not passive receive only, but, instead, transmits data to the satellite constellation. Consequently, there is a risk of interference, and potentially public safety issues depending on the transmitter power combined with the antenna gain.
- They may cause radio interference with other networks operating in PNG – for example, in-line interference – more details of this are provided below.
- They receive revenue from customers in PNG.
- Customers expect the same regulatory standards to be applied to all operators providing telecommunications service in PNG to the extent possible.
- Fair competition requires that the same obligations are applied to LEO service providers in PNG to the extent possible otherwise they will have an unfair competitive advantage.

Additionally, if customers switch from existing service providers to LEO providers that indicates that it may be appropriate to treat them as being in the same economic market. That would make the case for the full application of all obligations to LEO providers that already apply to other providers. Alternatively, deregulation of existing providers could also be considered to level the playing field.

With respect to quality of service obligations, if LEO services start to take significant numbers of customers away from existing operators, or significantly grow their percentage share of all traffic, then the same standards need to be applied. Obligations could be either levelled up, or levelled down.

(c) Licence Exemptions

New Zealand Exemptions from Licensing

In New Zealand any legal entity with a General User Radio Licence (GURL) for satellite services may transmit radio waves using satellite earth stations for the purpose of Mobile Satellite Service (MSS), or Fixed Satellite Service (FSS) including Satellite News Gathering (SNG) and Very Small Aperture Terminal (VSAT); being handheld, portable, transportable (vehicle mounted and re-locatable) and fixed radio transmitters.

The spectrum these exemptions apply to is as follows:

Exceptions to Licensing Requirements				
Low (MHz)	**High (MHz)**	**Reference Frequency (MHz)**	**Maximum Power dBW EIRP**	**Remarks**
148	150.05	149.025	10	Special condition 1
399.9	400.5	400.2	-3	Special condition 1
1610	1660.5	1635.25	20	Special condition 1
14000	14500	14250	56	Special conditions 1, 5 and 6
14000	14500	14250	67	Special conditions 2, 4 and 6
14000	14500	14250	62	Special conditions 3, 4 and 6
29500	30000	29750	62	Special conditions 3, 4 and 5

The special conditions referred to are:

Special Conditions	
1	Use is limited to MSS.
2	Use is limited to SNG.
3	Use is limited to VSAT.
4	The maximum permitted emission bandwidth per channel is 20 MHz.
5	Transmissions are permitted from land earth stations operating in accordance with the class of station known as “Earth Station in Motion” (ESIM) to communicate with satellite network for the purpose of FSS or MSS.
6	In the band 14,000 – 14,500 MHz, stations for the purpose of MSS, including “Earth Station in Motion” (ESIM), must not cause interference to, or claim protection from, stations for the purpose of FSS operating as SNG and VSAT.

In addition, off-axis EIRP density has to comply with ITU-R S.524, or the satellite operator's requirements, whichever is more stringent.

Finally, generally, the operation of the terrestrial component of a satellite service must comply with ITU-R recommendations.

Considering all of these requirements in New Zealand, the GURL is a possible starting point for consideration by the Authority in terms of spectrum exemptions, although note that none of these refer to exactly the kind of end-user equipment that is used by the customers of companies such Starlink. The table of frequencies, for example, only refers to VSAT, which is based on Geographically Stationary Orbit (GSO) satellites as opposed to Non-Geographically Stationary Orbit (NGSO) satellite constellations. We suspect therefore that more stringent requirements would be necessary.

It appears to make sense for the Authority to require compliance with ITU-R S.524 and to require that the terrestrial component of a satellite service must comply with ITU-R recommendations.

Finally, although this does not affect Vodafone's current operations, we note that there are a number of frequency bands that are shared via international allocation on a co-primary basis between ITU defined Space Services and the Fixed Services. Therefore, sharing analysis seems advisable in order to avoid interference.

European Exemptions from Licensing

The European Conference of Postal and Telecommunications Administrations (CEPT) has made the following exemption from individual licensing of fixed earth stations operating with NGSO FSS satellite systems in the frequency bands 10.7-12.75 GHz and 14.0-14.5 GHz (ECC Decision (17)04):

> *"*
> *Fixed earth stations operating with NGSO FSS satellite systems in the frequency bands 10.7-12.75 GHz and 14.0-14.5 GHz shall comply with the following technical and operational requirements:*
>
> *1. The fixed earth stations shall operate under the control of a Network Control Facility (NCF);*
>
> *2. The design, coordination and operation of the fixed earth stations shall take into account the*
> *following factors:*
> *a) antenna mis-pointing;*
> *b) variations in the antenna pattern;*
> *c) variations in the transmit e.i.r.p.;*
>
> *3. That use closed-loop tracking of the satellite signal shall employ an algorithm that is resistant to capturing and tracking signals from nearby satellite. Fixed earth stations shall immediately inhibit transmissions when they detect that unintended satellite tracking has happened or is about to happen;*
>
> *4. Fixed earth stations shall be in conformance with the Harmonised European Standard EN 303 980;*
>
> *5. The fixed earth stations comply with the following requirements that ensure compliance with aircraft HIRF protection criteria based on ECC Report 272, using maximum HIRF field strengths of 190 V/m in 14.00-14.5 GHz:*
> *a) The maximum e.i.r.p. of earth stations shall be limited to 60 dBW ;*
> *b) The maximum e.i.r.p. of earth stations operating within TDMA networks shall be respected after*
> *taking into consideration the duty cycle (see section 3.3 and 3.4 of ECC Report 272 [6]);*

c) When an antenna is coupled to more than one transmitter or a transmitter provides more than one carrier (multi-carrier operation), the above e.i.r.p. level is the sum of all simultaneous emissions from the antenna on the main lobe.
"

There are 46 countries in the CEPT. The decisions of its Electronic Communications Committee (EEC) are not binding but considered as important guidance. The EEC ensures that its guidance is in harmony with binding rules in the 27 countries in the European Union (EU).

Of course, CEPT countries are in ITU Radio Regulations Region 1 and PNG is in Region 3. Therefore, consistency with Region 3 Radio Regulations would be necessary if a similar approach was adopted in PNG, but we feel that this exemption would be useful for the Authority's consideration.

Question 2: LEO Licence Terms and Conditions

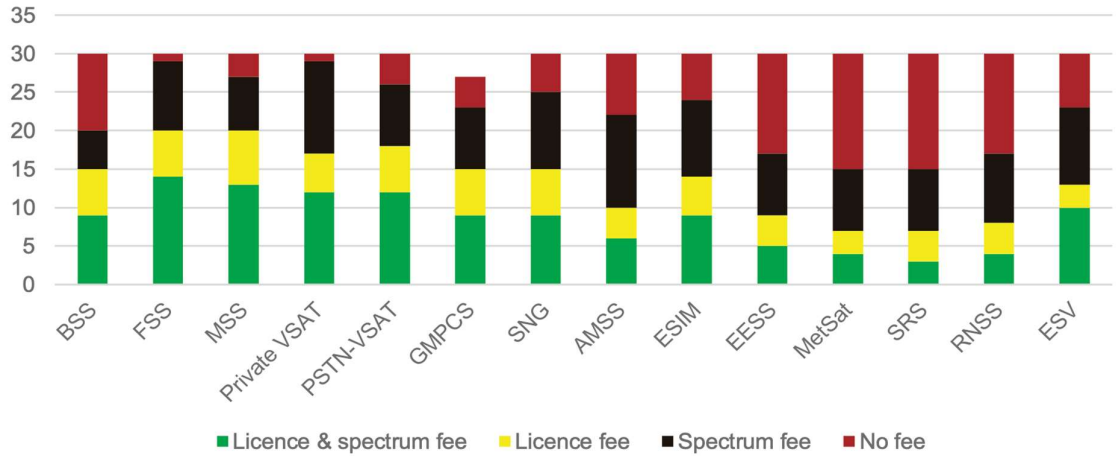
Question 2: Do you agree with NICTA's assessment of the current terms and conditions of individual network licences which should apply to the provision of LEO satellite services? If not, what alternative arrangements should apply?

We agree that a consistent approach to licensing should be applied in PNG and with the proposals made by the Authority other than a lack of any coverage obligations (we address coverage elsewhere in this response).

i/ Fees

Fee Charging in a Survey of African Countries

The Authority has stated its intent to charge licence fees. This is supported by the results of a survey of 30 African countries last year as can be seen here with respect to the ground segment of satellite services:



Source: African Telecommunications Union, 2022. Note that LEO satellite services can be FSS or MSS (see Annex for acronyms).

As can be seen in the two categories of relevance to LEO satellites, FSS and MSS the vast majority of the 30 African countries that responded to the survey charge one or both of licence fees and spectrum fees. The survey did not collect licence fee figures please note.

With respect to the space segment of a satellite network, 8 of the 30 countries had regulations restricting or prohibiting emissions to or from foreign satellites without approval. Further, 16 out of 30 require the procurement of additional authorisations for the space segment provision of satellite services by foreign operators, irrespective of prior coordination and notification via the ITU.

Fee Charging in the Philippines

In the Philippines the following fees are charged on a per station basis:

Philippines Ground Station Fees
5.00 Pesos/KHz/station (Metro Manila)
2.50 Pesos/KHz/station (Highly Urbanized Cities)
1.75 Pesos/KHz/station (All Other Areas)

So, for 1GHz the charge in Manila would be about 316,000 Kina. There does not appear to be any published guidance on exemptions to these charges but we imagine that they will apply to larger stations which are above a specific EIRP level, and not end-user equipment in individual households which have much lower EIRPs. The regulator has just awarded Starlink a licence to operate in the Philippines and we understand that they have been in contact with the Authority. Consequently, Starlink may be able to advise on any licence fees in the Philippines for end-user equipment.

The above table highlights that the Authority may wish to explore whether requirements for, or exceptions to, licence fees payments should be made for transmitters owned by end users that are communicating with satellites. Exceptions could be based on EIRP limits for end-user equipment being followed and automatic class licensing of devices at or below those limits. Some of these have been discussed previously where we have referred to the approach in New Zealand.

Fees in Malaysia

The main licence fee charge in Malaysia is turnover related. Typically, the fee is 0.5% of gross annual turnover.

INDIVIDUAL LICENCE FEE
For an Earth Station or Space Station licence all of the following are payable:
Application Fee - RM 10,000.00 per licence
Approval Fee - RM 50,000.00 per licence
Annual licence Fee - 0.5% of Gross Annual Turnover (as reflected in the licensee's audited account for the preceding year) or RM 50,000.00 (per licence) whichever is higher
In other words, about 46,000 Kina plus 0.5% of Revenue normally

ii/ Commercial or Local Presence

The requirement for an operator to have an in-country presence becomes more important as the revenues from services grow and as services become mass-market oriented. Therefore, in the past, the argument for a local presence for satellite providers was greater in relation to broadcasting services that are used by large numbers of the population.

With the arrival of mass-market two-way internet services via satellite more revenues, fees and taxes are at stake, and there is more potential for consumer harm. Consequently, the argument for a local presence increases in order to ensure that local requirements for payments to the authorities can be enforced and so that customers are able to get any problems or complaints addressed in a similar way as the customers of existing telecommunications licencees.

A corporate presence is for example required in Malaysia and New Zealand as well as in many African countries.

iii/ Network Availability

The Authority has used a Ka band (26 to 40 GHz) study as a basis of network availability of 99.54%. However, the study appears to be based on the use of VSATs communicating with GSO satellites which would tend to be capable of higher network availability. In addition, Ka ban is particularly susceptible to rain attenuation fade, and PNG has a high rate of precipitation. Therefore, this figure might be somewhat ambitious. Whatever starting point is used for Ka band, higher availability than Ka band would be expected for Ku band (12 -18 GHz) and higher availability still for L band (1 to 2 GHz).

iv/ Co-ordination with Terrestrial Services

In New Zealand, if a satellite service has a co-primary spectrum allocation with terrestrial services the satellite service must be co-ordinated with those terrestrial services. We suggest that a similar obligation is placed on LEO providers in PNG.

v/ Mandatory Coverage Obligations

The Authority suggests that mandatory coverage obligations should not apply. Since the main advantage of the LEO service is being able to reach all parts of the country, we think that this obligation can be applied subject to exceptions. A footnote could be appended to a mandatory obligation to provide service to allow for 1/ intermittent temporal coverage i.e. service may fail at certain times of the day due to a lack of available satellites; 2/ geographical lack of coverage if there is not an available satellite to cover a particular part of PNG at any time – although this seems unlikely. In the absence of these transparency requirements customers who sign up to LEO services may be under the impression that they will receive comparable, or close to comparable levels of service to fixed and mobile services.

In order to determine the extent of any coverage exceptions we suggest that the Authority requires LEO providers to provide them with coverage maps and explanations of any temporal and geographic limitations and to update them over time. This information would then be published.

Question 3: Licensing Special Rule

Question 3: Do you agree with the addition of a specific section in the 2011 Rule to clarify the terms and conditions of licence where an individual network licensee chooses to provide LEO satellite services, as set out in Attachment 1 to the Discussion Paper? If not, what changes would you recommend?

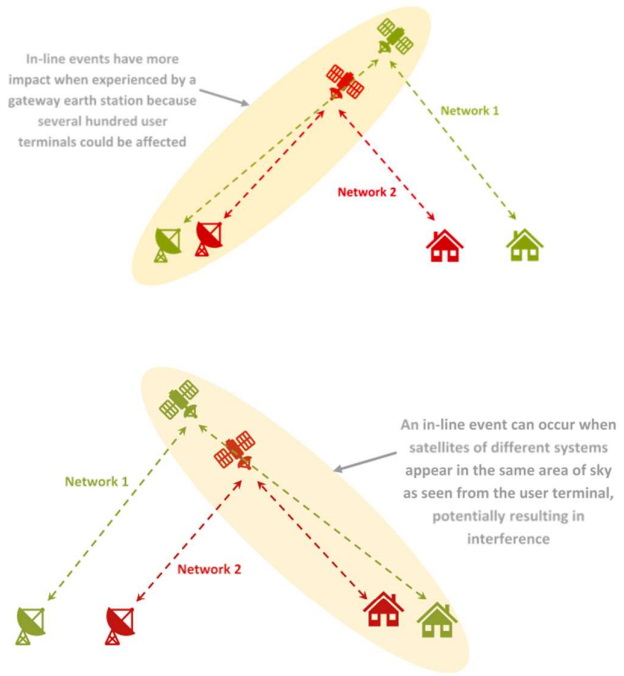
We agree with this approach. We suggest clarifying that the reference to requiring a "corporate presence" means that the LEO operator must establish a legal entity in PNG that has responsibility for compliance with its licence obligations including the payment of fees. This is consistent with what is stated in section 48 of the Act.

Question 4: LEO Constraints

Do you think that there should be some constraints on where LEO services should be permitted to be located in PNG, such as, for example, only in areas where telecommunications services are non-existent or are inadequate? Please give your reasons.

Avoiding interference is probably the greatest concern with respect to the location of LEO satellite associated facilities such as ground stations. In-line interference is an additional problem that can occur with respect to LEO satellites because they are continually moving relative to the ground. Any in-line interference that results can affect the gateway earth station or the user as can be seen in the diagrams below.

The easiest of these potential problems to control for the Authority is the position of the gateway earth station as space station spectrum use coordination is normally addressed via the ITU. In this respect we note that the Australian Communications and Media Authority (ACMA) has just launched a consultation on satellite filings and has stated that "*to avoid in-line interference events, separation of hundreds of kilometres is required between NGSO gateways*". We suggest therefore that the Authority publishes applications for gateway earth station locations and provides stakeholders with a period of time in which to object if they have concerns.



Source: Ofcom

Question 5: UAS Implications

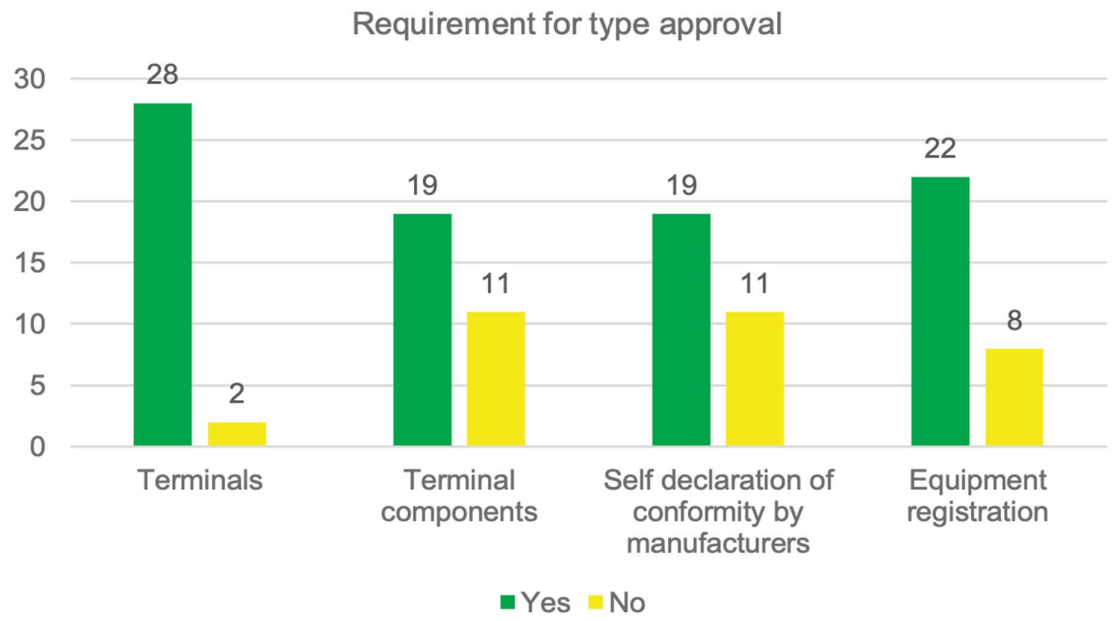
Question 5: Irrespective of the answer to Question 4, should LEO services be structured and managed within the Universal Access and Service (UAS) Scheme administered by NICTA, or be eligible for inclusion in the UAS?

We see no basis for excluding LEO satellite services from the UAS scheme if they are permitted to provide services throughout the country. Satellite licencees contribute to the Universal Service Fund in Malaysia for example based on a percentage of revenue. For LEO service providers to be excluded from the UAS scheme it would be necessary for them to provide equivalent services with equivalent quality of service and at an equivalent price to other providers nationwide as well as providing full geographic coverage. That is not possible currently.

3/ Further Comments

Equipment Approval and Registration

The large majority of 30 African countries surveyed require type approval of satellite, terminals. Equipment registration is also required in the majority of cases:



Source: African Telecommunications Union, 2022

Some form of type approval of telecommunications equipment is common in countries worldwide. This is aimed at ensuring public safety and interoperability. We understand that there may be requirements in this respect in PNG already although we cannot access the relevant pages of the Authority's website to look at this. To the extent that there is not a type approvals scheme available we suggest establishing one.

4/ Reservation of Vodafone's Rights

Please note that a lack of response to any issue in this consultation wholly or in part does not necessarily represent entire or partial agreement, nor does any position taken by Vodafone in this document mean a waiver of Vodafone's rights in any way. Vodafone expressly reserves all its rights.

Annex: Acronyms

Acronym	Meaning
AMSS	Aeronautical Mobile Satellite Service
BSS	Broadcasting Satellite Service
DTH	Direct to Home
EESS	Earth Exploration Satellite Service
EIRP	Equivalent Isotropic Radiated Power
ESIM	Earth stations on motion
ESV	Earth stations on board vessels
FSS	Fixed Satellite Service
GMPCS	Global Mobile Personal Communications by Satellite
MetSat	Meteorological satellite service
MSS	Mobile Satellite Service
NGSO	Non-Geostationary Satellite Orbit
RNSS	Radionavigation satellite service
SNG	Satellite News Gathering
SRS	Space research service
VSAT	Very Small Aperture Terminal