



GOVERNMENT GAZETTE

OF THE

REPUBLIC OF NAMIBIA

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No. 7860

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General Notices

COMMUNICATIONS REGULATORY AUTHORITY OF NAMIBIA

No. 342

2022

NOTICE IN TERMS OF REGULATION 7 OF THE REGULATIONS REGARDING RULE-MAKING PROCEDURE, COMMUNICATIONS ACT, 2009

The Communications Regulatory Authority of Namibia in terms of regulation 7 of the Regulations Regarding Rule-Making Procedures published under Government Gazette No. 4630, General Notice No. 334, dated 17 December 2010, herewith gives notice that it will hold a public hearing regarding:

1. **The Regulations Prescribing the Universal Service Levy**, as published in Government Gazette No. 7860; General Notice No. 343 dated 25 July 2022.

DATE: 08 August 2022

TIME: 09H00-12H00

VENUE: TBC

Members of the public are invited to make oral submissions at the aforesaid public hearing subject to the following:

1. Any person desirous to make oral submissions at the aforesaid public hearing must deliver written notice thereof to the Authority not later than 5 days before the date of the hearing. Such written notice must be accompanied by concise statement setting out the basis and rationale of the oral submissions.
2. Oral submissions made at the aforesaid public hearing must -
 - (a) include a statement of the name and contact details of the person making the oral submissions and the name and contact details of the person of entity on whose behalf the oral submissions are made, if different;
 - (b) be clear and concise.
3. The aforesaid notice of oral submissions and concise statement must be delivered to the Authority either physically or electronically as follows:
 - (a) By hand to the head offices of the Authority, namely Communications House, 56 Robert Mugabe Avenue, Windhoek;
 - (b) By post to the head offices of the Authority namely Private Bag 13309, Windhoek; or
 - (c) By electronic mail to the following address legal@cran.na.

**H. M. GAOMAB II
CHAIRPERSON OF THE BOARD
COMMUNICATIONS REGULATORY AUTHORITY OF NAMIBIA**

COMMUNICATIONS REGULATORY AUTHORITY OF NAMIBIA

No. 343

2022

**NOTICE OF INTENTION TO MAKE REGULATIONS PRESCRIBING
THE UNIVERSAL SERVICE LEVY UNDER SECTIONS 56 AND 129**

The Communications Regulatory Authority of Namibia, in terms of sections 56 and 129 of the Communications Act, 2009 (Act No. 8 of 2009), and the Regulations regarding Rule-Making Procedures published in Government Gazette No. 4630, General Notice No. 334 dated 17 December 2010 -

- a) publishes this Notice of Intention to Make Regulations Prescribing the Universal Service Levy under sections 56 and 129 of the Communications Act as set out in Schedule 1; and
- b) sets out the concise statement of the reasons and purpose for the proposed regulations in Schedule 2.

The public may make oral submissions on the proposed regulations to the Authority, at a time, date and place notified by the Authority.

The public are hereby invited to make written representations, comments, communications and submissions (hereafter collectively called “submissions”) to the Authority within thirty (30) consecutive days from the date of publication of this notice in the *Gazette*, in the manner set out below for making of written submissions.

All written submissions must -

- a) contain the name and full contact details (physical and postal address, email address and telephone or cell phone number) of the person making the written submissions and the name and similar contact details of the person for whom the written submission is made if different; and
- b) be clear and concise.

In the event where any person making a submission wishes to designate any information contained in such submission as confidential, such information must be clearly marked as “confidential”. Notwithstanding, if the Authority is of the opinion that information is not confidential it will inform the person thereof thereby -

- a) allowing the person to withdraw the information from the rule-making proceedings;
- b) agreeing with the person that it will not be treated anymore as confidential information; or
- c) requesting a hearing on the issue of confidentiality to be conducted in accordance with section 28 of the Communications Act.

All written submissions must be send or submitted to be received by the Authority on or prior to the due date anticipated above in any of the following manners -

- a) by hand to the head office of the Authority, namely Communications House, 56 Robert Mugabe Avenue, Windhoek;
- b) by post to the head office of the Authority, namely Private Bag 13309, Windhoek, 9000; or
- c) by electronic mail to the following address: legal@cran.na.

H. M. GAOMAB II
CHAIRPERSON OF THE BOARD
COMMUNICATIONS REGULATORY AUTHORITY OF NAMIBIA

SCHEDULE 1**PROPOSED UNIVERSAL SERVICE LEVY REGULATIONS:
COMMUNICATIONS ACT, 2009**

The Communications Regulatory Authority of Namibia, in terms of sections 56 and 129 of the Communications Act, 2009 (Act No. 8 of 2009), makes the Regulations set out in this Schedule.

Definitions

1. In these Regulations, any word or expression to which a meaning is assigned in the Act, has the same meaning and unless the context indicates otherwise -

“licensee” means the holder of a telecommunications licence or deemed to hold such licence as contemplated in terms of section 45 of the Act;

“universal service levy” means the levy contemplated in section 56 of the Act as imposed under these Regulations;

“the Act” means the Communications Act, 2009 (Act No. 8 of 2009), as amended from time to time; and

“these Regulations” means these Universal Service Levy Regulations as amended from time to time.

Submission of documents to the Authority

2. Whenever documents are required to be delivered to the Authority, such documents must be delivered physically or electronically -

- (a) by hand-delivering them to any employee of the Authority at its principal place of business, being Communication House, No. 56 Robert Mugabe Avenue, Windhoek;
- (b) by post mailed to Private Bag 13309, Windhoek;
- (c) by electronic mail sent to operations@cran.na; or
- (d) in any other manner or to any other address specified in writing by the Authority from time to time.

Universal service levy

3. (1) The universal service levy is payable by the licensees subject thereto that if the universal levy payable by a licensee is less than N\$ 500, such licensee must pay the amount of N\$ 500.

(2) The universal service levy set out in Annexure A is indicated in Namibian dollar.

(3) Unless otherwise determined by the Authority, the universal service levy must be paid by means of electronic transfer or direct deposit into the Universal Service Fund.

(4) A licensee must annually, no later than six months after such licensee’s financial year end, submit to the Authority its audited annual financial statements or signed and sworn annual financial statements, as the case may be, subject thereto that a licensee may, at least three months before the due date for such submission, apply to the Authority in writing for an extension and the Authority may grant such extension on good cause shown.

- (5) The universal service levy is paid based on a licensee's turnover as reflected in -
- (a) the audited annual financial statements of a licensee where a licensee is required by law to have financial statements audited or where a licensee annually have its financial statements audited voluntary; or
 - (b) the annual financial statements signed and sworn by the licensee's accounting officer in the event where a licensee is not required by law to audit financial statements and does not voluntary have such financial statements audited,

subject thereto that in the event where a licensee's turnover is not accounted for separately and such licensee provides other products or services or conducts other business not regulated by or under the Act, the licensee must attach to the audited annual financial statements or annual financial statements, as the case may be, a separate statement which must -

- (i) indicate the licensee's turnover;
 - (ii) indicate the methodology used to extract and determine such turnover;
 - (iii) contain such other information as the Authority may determine; and
 - (iv) be signed and sworn to by the licensee's auditor or accounting officer, as the case may be, to be a true and correct reflection of the licensee's turnover to the best of the knowledge of such auditor or accountant.
- (6) For purposes of clarity -
- (a) turnover is the turnover of a licensee excluding value added tax;
 - (b) turnover is limited to turnover derived from services or business which may be regulated under the Act and it is the duty of a licensee to ensure the reflection of the correct turnover amount in the licensee's audited annual financial statements or signed and sworn annual financial statements, as the case may be.
- (7) (a) On receipt of a licensee's audited annual financial statements or signed and sworn annual financial statements, as the case may be, the Authority must issue the licensee with an invoice stating the amount of the universal service levy payable by such licensee.
- (b) Subject to subregulation (8), a licensee must pay the universal service levy within 30 days after receipt of the invoice.
- (8) (a) The Authority may, upon written application and on good cause shown by a licensee, authorise a licensee to pay the universal service levy in equal monthly instalments of not more than six months.
- (b) A licensee wishing to pay the universal service levy in instalments must submit such written application to the Authority together with the Audited annual financial statement or signed sworn annual financial statement.

Penalties

4. The Penalty Regulations, published in Government Gazette No. 7197 of 29 April 2020, Government Notice No. 159 of 2020, apply to any contravention of or failure to comply with these Regulations.

Amendment of regulations

5. The regulations set out in Annexure B are amended as set out in the column 3 thereof.

Transitional provision and commencement

6. (1) In the event where these Regulations commence subsequent to the start of a licensee's financial year, the universal service levy payable by such licensee is only payable on turnover derived by a licensee as from the commencement of these Regulations.

(2) These Regulations will become effective on date of publication thereof in the *Gazette*.

ANNEXURE A

(Regulation 3)

Column 1	Column 2
Licence Types	Universal Services Fund Levy
Telecommunications – Individual Comprehensive (ECNS and ECS)	Levy = MAX(500,0.5%*Turnover)
Telecommunications – Class ECNS	Levy = MAX(500,0.5%*Turnover)
Telecommunications – Class ECS	Levy = MAX(500,0.5%*Turnover)
Telecommunications – Class Comprehensive (ECNS and ECS)	Levy = MAX(500,0.5%*Turnover)
Telecommunications – Network Facilities	Levy = MAX(500,0.5%*Turnover)
Telecommunications – Non-profit (ECNS and ECS)	Levy = N\$ 500.00

ANNEXURE B

(Regulation 5)

Column 1 Government Gazette and Government Notice	Column 2 Title of Regulations	Column 3 Extent of Amendment/Repeal
Government Gazette No. 6589 of 8 May 2018 Government Notice No. 178 of 2018	Regulations Prescribing the Provision of Universal Service by Telecommunications Service Licensees	The amendment of regulation 8 by the insertion of the following subregulations after regulation 8(3): “(3A) The Universal Service Fund may additionally receive money from - (a) any donations or grants made or any other money accruing for the benefit of the Universal Service Fund from any other source; (b) any loan made to the Universal Service Fund subject thereto that interest on such loan may not exceed the prime interest rate of the banking institution where the Fund is opened.”.

SCHEDULE 2

CONCISE STATEMENT OF PURPOSE

Section 56 of the Communications Act establishes the Universal Service Fund and authorises the Authority to, by regulation and subject to the rule-making procedure, impose a universal service levy payable to the Universal Service Fund. Sections 23(1), 23(2), 23(6) and 23(9) of the Communications Act (as amended in 2020) apply with the necessary changes to the Authority when imposing the universal service levy. Section 56(3A) states that the universal service levy may not exceed more than 5% of the annual turnover of a licensee/service provider. Readers are advised to also take note of the Regulations Prescribing the Provision of Universal Service by Telecommunications Service Licensees as published in the Government Gazette No. 6589 of 8 May 2018, General Notice No. 178 of 2018 (obtainable from CRAN's website www.cran.na).

Based on the above provisions of the Communications Act (as amended) factors which the Authority must consider when determining the size of the universal service levy are:

- the minimum set of services prescribed under section 57(1) of the Communications Act;
- the subsidies to be paid to licensees under section 57 of the Communications Act;
- any under- or over-recoveries by the Universal Service Fund (not applicable to the first imposition of the universal service levy);
- any other matter which the Authority deems relevant;
- the impact of the universal service levy on the sustainability of business and ensure that it does not have an unreasonable negative impact on such sustainability;
- ensure predictability, fairness, equitability, transparency and accountability in the determination and imposition of the universal service levy;
- the alignment of the regulatory service levy with regional and international best practices;
- to avoid, as far as possible, income from the universal service levy in excess of what is required;
- the necessity to manage any risks in the communications industry associated with the imposition of the universal access levy;
- any other fees, levies or charges which the providers of communication services are required to pay under the Communications Act.

Together with this Notice of Intention to make Regulations Prescribing the Universal Service Levy, the Authority published its Report on its Universal Access and Services (UAS Report) dated September 2021. The UAS Report echoes the objectives of the National Broadband Policy for the Republic of Namibia: 2019 – 2029 as referenced in the UAS Report. It is not the purpose of this Concise Statement of Purpose to summarise the UAS Report but rather to capture the main aspects thereof. Readers are encouraged to obtain the UAS Report from CRAN's website and review it in conjunction with this Notice of Intention to Make Regulations.

Summarised the UAS Report addresses:

- A gap analysis covering access, usage and affordability falling under the Authority's supervision;
- Comparative analyses of broadband speeds in African countries, the various regions in Namibia, broadband Namibian population coverage and price competition and affordability of Namibia service providers in comparison with UN Broadband Commission targets;
- The role of the various stakeholders, licensees and Ministries to contribute towards the achievement of broadband policy objectives;
- Identified Universal Service Fund interventions which could be funded through the universal service levy such as the upgrade of existing RAN sites and the roll out of new RAN sites and the impact thereof on communities.

Based on the identified Universal Service Fund interventions and analyses, the estimated subsidy for the 36 new RAN sites and 122 upgraded RAN sites, is N\$ 25 million for the first year and N\$ 20 million in subsequent years. Based on the ICT sector revenues for 2020, this requires a universal service levy of 0.5% on licensees' turnover to cover the cost of the Universal Service Fund.

The formula for calculating the universal service levy works as follows:

Provision of examples:

$$\text{MAX}(500, 0.005 * 100,000) = \text{N\$ } 500$$

$$\text{MAX}(500, 0.005 * 1,000,000) = \text{N\$ } 5,000$$

$$\text{MAX}(500, 0.005 * 100,000,000) = \text{N\$ } 500,000$$

$$\text{MAX}(500, 0.005 * 2,000,000,000) = \text{N\$ } 1,000,000.$$

UAS Study Draft Report

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Introduction

This study looks into universal access and service as envisaged by the National Broadband Policy for the Republic of Namibia: 2019-2029. The goal of the National Broadband Policy is to achieve reliable and affordable broadband access infrastructure services for all. The policy is based on the following guiding principles:¹

- “Ensure equitable access to broadband for all Namibians irrespective of geographical location, gender, age among others (Universal access and usage of ICTs).
- Facilitate the adoption of a wide variety of technologies as long as they are affordable, interoperable, resource efficient and contribute to socio-economic transformation.
- Promotion of Broadband for socio-economic development in the application of e-services in all sectors of the economy.
- Development of the ICT industry by promoting investment and innovation.
- Ensure that Namibia approaches and implements broadband initiatives in harmony with other national development programmes and regional frameworks.
- Facilitate the development and rollout of broadband infrastructure and services that respond to the dynamic nature of the economy.
- Realize the critical mass in terms of human, technological and financial resources necessary for effective deployment and usage of broadband infrastructure and services (Capacity Building).”

The four policy objectives of the policy are listed in the table below.

Objective		Detail
1	To ensure universal access to broadband infrastructure and services	Provide quality and affordable broadband countrywide
2	To promote the development of content, applications and innovation	Enable the use of e-application in government and other sectors of the economy to improve service delivery
3	To support efforts aimed at capacity building, create awareness and reducing the digital divide	Drive demand and stimulate public and private sector innovation and investment
		Improve digital literacy
		Promote the continued development of the broadband ecosystem
4	To provide an enabling environment for broadband deployment,	Create an enabling policy, legislative and regulatory environment for broadband deployment.
		Promote consumer protection through appropriate regulations

Table 1: Policy objectives of the National Broadband Policy for the Republic of Namibia: 2019-2029.

¹ <https://gazettes.africa/archive/na/2020/na-government-gazette-dated-2020-08-14-no-7308.pdf>

The policy uses the following broadband definition: “The minimum download speed of 2Mbps as a broadband entry level, which shall be reviewed with the aim to increase the download speeds as per country basis in line with targets contained in the broadband plan. The definition of broadband coverage includes geographical and population coverage for telecommunication networks and coverage of the population for broadcasting. Specifically, and for the purpose of this Policy, broadband is defined to mean a minimum of **2 Mbps download speed available to 80% of the population.**”

Gap Analysis

Generally, various stakeholders and ministries are required to contribute towards the achievement of the broadband policy objectives. This study focuses on the infrastructure aspects of mobile broadband, namely access, usage and affordability, which fall under CRAN’s supervision.

- **Access** is measured via population coverage. For nationwide coverage, only mobile 4G or better is suitable as an indicator in the short to medium term. Fibre to the Home (FTTh) may become a suitable indicator in the future. 3G in Namibia is too slow to be counted as broadband with average speeds of around 1Mbps.
- **Usage** is measured in speed (Mbps). The faster the average download speed, the more services can reasonably be accessed. Streaming requires, for example, a higher download speed than emails. Also, video conferencing requires higher upload speeds than video streaming, which mostly requires fast download speeds.
- **Affordability** will be measured as the price for a broadband user basket as a percentage of average individual income. The UN Broadband Commission sets the target at less than 2% of Gross National Product per month for 1GB.² This study sets the bar higher at 20GB per month.

This chapter measures Namibia’s broadband infrastructure against the target of a minimum of 2Mbps download speed available to 80% of the population at national, regional and constituency level.

3G Coverage is not broadband in Namibia

26 countries in Africa had faster average broadband speeds than Namibia. Not only is the average download speed in South Africa three times the speed of Namibia, but most SADC members also have faster broadband services, including Angola, Zimbabwe, Lesotho, Eswatini, Tanzania, Madagascar and Mauritius. Namibia’s ICT sector is characterised by state ownership and insufficient competition. This has meant insufficient investment in last-mile connectivity, most notably mobile 4G broadband, low quality of service and high end-user prices.

Ranking	Country	Mean download speed (Mbps)	Unique IPs tested	Total tests
1	Madagascar	18.00	19,883	85,638
3	South Africa	14.04	1,269,432	10,194,970
5	Lesotho	7.43	172	261
6	Mauritius	7.28	8,998	44,681
7	Zimbabwe	6.92	3,076	9,150
18	Tanzania	4.54	20,582	117,255
19	Eswatini	4.51	845	2,253
22	Angola	4.15	9,311	19,299
23	Malawi	4.07	802	3,460
26	Seychelles	3.96	734	3,020

² <https://www.itu.int/en/mediacentre/Pages/2018-PR01.aspx>

Ranking	Country	Mean download speed (Mbps)	Unique IPs tested	Total tests
27	Namibia	3.91	4,291	8,163
Source		https://www.cable.co.uk/broadband/speed/worldwide-speed-league/		

Table 2: 2020 Broadband speed ranking for Selected SADC countries

Namibia's 3G is not broadband based on the definition in the Broadband Policy. The average download speed on 3G is 1 Mbps. 4G speeds are reasonable at 19.33 Mbps. Surprisingly, Kunene and Kavango West had the fastest 4G download speeds, among all of Namibia's regions. However, that can be explained by low 4G device penetration. With a low number of 4G devices within the coverage footprint, each device can use more of the available throughput.

Region_Name	Average Mbps 3G	Average Mbps 4G
Kunene	1.08	28.88
Kavango West	1.08	26.69
Omaheke	0.92	24.15
Omusati	1.20	23.91
Otjozondjupa	1.16	23.69
Kavango East	1.27	23.40
!Karas	0.95	23.19
Hardap	0.93	22.91
Ohangwena	1.08	22.44
Zambezi	1.24	22.16
Oshikoto	1.05	20.91
Oshana	1.08	20.44
Erongo	1.06	19.24
Khomas	1.07	17.93
Namibia	1.08	19.33

Table 3: Mobile quality of service KPIs

Broadband Population Coverage

MTC and Telecom Namibia have extensive network coverage in all of Namibia's regions. Both MTC and TN are national mobile broadband operators, covering all of Namibia's regions, while MTC clearly has a larger footprint. Population coverage for Namibia is 89% for 3G and 79% for 4G, which is low compared to South Africa and even the Southern African averages. Nine out of 14 regions had 4G population coverage of below 80%. Kunene, Kavango West and Omaheke had less than 50% 4G population coverage.

Table 4: Population Coverages

	4G Population coverage	Policy Objective	People not covered by 4G
Kunene	33%	Below	73,110
Kavango West	40%	Below	55,271
Omaheke	48%	Below	41,581
Zambezi	60%	Below	41,985
Kavango East	69%	Below	50,734
Otjozondjupa	72%	Below	45,866
Hardap	72%	Below	26,711
!Karas	73%	Below	24,113
Oshikoto	73%	Below	57,636
Omusati	82%	Above	48,504
Ohangwena	90%	Above	26,486
Erongo	92%	Above	17,616
Oshana	96%	Above	7,533
Khomas	96%	Above	17,447
Namibia	79%	just below	534,593

Affordability misses UN Broadband Commission's targets

There is very little movement in the Namibia's mobile market in terms of price competition. Figure 6 displays the price of the cheapest product for 1GB prepaid data per month from MTC and TN Mobile. MTC increased its prices since Q1 2015, for the first time ever. The cheapest product from MTC that qualifies for the 1GB basket per month is Aweh o Yeah, costing for 30 days N\$ 123.71. The cheapest product from TN Mobile is JIVA with N\$ 147.86 for 30 days.

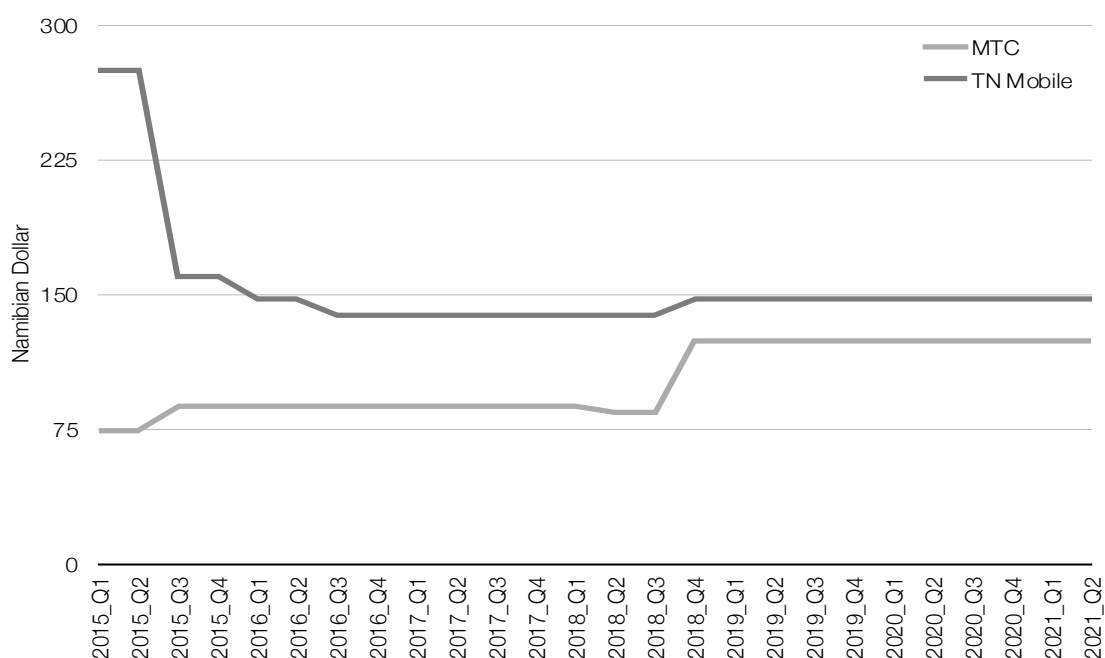


Figure 1: Lowest price for 1GB prepaid per month prepaid in N\$

TN Mobile is cheaper for larger usage baskets than MTC. For the 20GB basket per month TN's Jiva Supreme with a 10GB data allocation for 7 days at N\$246.43 was the cheapest in Q2 2021 (see Table 5). The cheapest product from MTC for 20GB per month is dramatically more expensive with N\$ 783.64 for the 10GB per week data top-up.

Product		Validity Days	Bundled data	Bundled Social media	Price N\$ excl VAT	Price per month including VAT	Monthly Data allocation
TN Mobile	Unlimited per month	30	125,000		999.00	1,148.85	125,000
TN Mobile	Unlimited per week	7	29,167		299.00	1,473.64	125,000
TN Mobile	Unlimited per day	1	4,167		49.00	1,690.50	125,000
TN Mobile	100GB per month	30	100,000		3,299.00	3,793.85	100,000
MTC	5GB for 3 days	3	5,000		85.00	977.50	50,000
TN Mobile	50GB per month	30	50,000		1,999.00	2,298.85	50,000
TN Mobile	Jiva Supreme	7	10,000	2000	50.00	246.43	42,857
MTC	10GB per week	7	10,000		159.00	783.64	42,857
TN Mobile	40GB per month	30	40,000		1,599.00	1,838.85	40,000
MTC	1GB per day	1	1,000		31.00	1,069.50	30,000
TN Mobile	20GB per month	30	20,000		1,049.00	1,206.35	20,000
MTC	15GB per month	30	15,000		1,069.00	1,229.35	15,000
MTC	Aweh o Yeah	7	3,000		42.06	207.30	12,857
MTC	Aweh o Yeah	7	3,000	1000	46.86	230.95	12,857
MTC	Aweh Super	7	3,000	700	53.00	261.21	12,857
TN Mobile	10GB per month	30	10,000		849.00	976.35	10,000
TN Mobile	Jiva Plus	7	2,000	500	35.00	172.50	8,571
TN Mobile	Jiva Surf	7	2,000	500	40.00	197.14	8,571
TN Mobile	Jiva	7	1,500		30.00	147.86	6,429
TN Mobile	5GB per month	30	5,000		399.00	458.85	5,000
MTC	Aweh o Yeah	7	1,000		25.10	123.71	4,286
MTC	Aweh Gig	7	1,000	500	32.00	157.71	4,286
MTC	3GB per month	30	3,000		353.00	405.95	3,000
TN Mobile	2GB per month	30	2,000		199.00	228.85	2,000
MTC	1.5GB per month	30	1,500		235.00	270.25	1,500
TN Mobile	1GB per month	30	1,000		139.00	159.85	1,000
MTC	Aweh Prime	7	200	200	32.00	157.71	857
MTC	800MB per month	30	800		139.00	159.85	800
TN Mobile	600MB per month	30	600		99.00	113.85	600
MTC	400MB per month	30	400		85.00	97.75	400

Product		Validity Days	Bundled data	Bundled Social media	Price N\$ excl VAT	Price per month including VAT	Monthly Data allocation
TN Mobile	300MB per month	30	300		35.00	40.25	300
MTC	Aweh Go	7	50	50	13.00	64.07	214
MTC	Aweh Oka	3	20	20	7.00	80.50	200
TN Mobile	100MB per month	30	100		23.00	26.45	100
MTC	80MB per month	30	80		20.00	23.00	80
TN Mobile	60MB per month	30	60		15.00	17.25	60
TN Mobile	40MB per month	30	40		10.00	11.50	40
MTC	40MB per month	30	40		13.00	14.95	40
TN Mobile	20MB per month	30	20		5.00	5.75	20

Table 5: Prepaid Products

Namibia is far from the UN Broadband Commission objective of 2% of GNI per capita for 1GB per month. At a national average, 1GB per month makes up 4.4% of average expenditure per capita per month. In Kavango West, Kavango East and Zambezi it is even above 10%.

	Annual Consumption per capita 2015/2016	Inflation factor	Estimated Monthly Consumption per capita 2021	Cheapest product available in % of monthly per capita consumption	
				1GB per month	20GB per month
Kunene	14,059	1.29	1,506	8.2%	16.4%
Kavango West	12,006	1.29	1,286	10.4%	19.2%
Omaheke	20,992	1.29	2,248	6.0%	11.0%
Zambezi	12,446	1.29	1,333	10.1%	18.5%
Kavango East	12,091	1.29	1,295	10.3%	19.0%
Otjozondjupa	25,051	1.29	2,683	5.0%	9.2%
Hardap	35,675	1.29	3,821	3.5%	6.5%
!Karas	32,760	1.29	3,508	3.8%	7.0%
Oshikoto	19,352	1.29	2,072	6.5%	11.9%
Omusati	14,484	1.29	1,551	8.6%	15.9%
Ohangwena	18,082	1.29	1,936	6.9%	12.7%
Erongo	42,752	1.29	4,579	2.9%	5.4%
Oshana	28,541	1.29	3,057	4.4%	8.1%
Khomas	58,807	1.29	6,298	2.1%	3.9%
Namibia	28,434	1.29	3,045	4.4%	8.1%

Table 6: Price of 1GB and 20GB s share of expenditure.

The high broadband prices in Namibia are due to a lack of competition and thus are outside of the scope of a Universal Service Fund. One way the USF can be used to alleviate the high prices for the poor is by paying for Wi-Fi for schools and clinics. This way teachers and health care workers are able to use the Internet for skills upgrade and remote support. Students and patients could also be granted Wi-Fi access and Wi-Fi could be made available to everyone in the community after hours.

Conclusion

Various stakeholders and ministries are required to contribute towards the achievement of the broadband policy objectives. Table 7 lists potential solutions and the responsible stakeholders for Namibia's broadband ecosystem.

	Challenge	Solution	Responsibility	Time frame
First Mile	Namibia has good connectivity to all of its neighboring countries and is also connected via a submarine cable system (WACS).	Land an additional submarine cable.	Telecom licensees with potential support from UAS fund	5-10 years
Middle Mile	While Nampower's market entry is lowering the cost of national backhaul, the majority of RAN sites are still only backhauled via microwave.	It will be uneconomical to backhaul all RAN sites via fibre. The aim could be to expand fibre network to limit microwave backhauling to only a single hop.	Telecom licensees with potential support from UAS fund	1-5 years
Last Mile	Average 3G speed is below the broadband policy requirement	Migrate all RAN sites to 4G with the aim to switch off 3G. This will require an increase in 4G device availability throughout Namibia. A way to facilitate this is to exempt 4G feature and smartphones from VAT and import duties	Ministry of Finance and Ministry of ICTs	1-5 years
		Facilitate last mile competition by waiving the Namibian shareholding requirement.	Ministry of ICTs and CRAN	1-5 years
		Facilitate last mile competition by implementing innovative spectrum management regime (see eg BOCRA)	CRAN	1-5 years
	4G population coverage misses the 80% target	Increase 4G coverage by incentivizing new RAN sites through demand stimulation in the form of Wi-Fi for clinics and schools. This overcomes the 4G handset issue and makes Internet access available to those that need it most and are least likely to be able to afford it.	UAS fund	1-5 years

Table 7: Translating policy targets into KPIs

While access is nearly meets the policy objective, the ability to use mobile broadband for most Namibians is curtailed by high cost and slow 3G speeds. Namibians without a 4G capable handset can only use 3G services for mobile Internet access. For those living outside of 4G coverage areas, there is also no incentive to buy a 4G capable handset.

		Measures
Access	4G population coverage is nearly 80%. Ideally, it should be at 98%. However, on regional level, 4G population coverage is below 50% for three regions.	New RAN sites and upgrade of existing RAN sites to 4G.
Usage	Average 3G mobile download speeds are around 1Mbps and thus only at half of the required 2Mbps speed to be classified as broadband.	Wi-Fi for institutions allows teachers, students, health care staff and patients to access 4G speeds without a 4G handset.
Affordability	Prices for 1GB per month cost twice the target 2% of GNI per capita per month (estimated by consumption per capita per month)	Wi-Fi paid for by the USF would alleviate the affordability barrier for some.

Table 8: Summary assessment for access, usage and affordability

USF Interventions

The USF could be used to subsidise another submarine cable, build out national fibre networks and extend mobile broadband coverage. The more projects the USF undertakes, the more funds are required and the higher the USF fee needs to be. CRAN has taken the position that it will use the USF funds as little possible but as much as necessary. Given that the 4G population coverage target has nearly been reached, the first phase of the USF will focus on new RAN sites to provide 4G coverage to secondary schools and clinics that currently are outside of 3G or 4G coverage.

GIS based selection of interventions. The selection of interventions centered around educational institutions that are secondary or higher and clinics that were not covered by 4G signal. These were then split into two groups, those within a 12km radius of a RAN site and those without any RAN sites close by.

- **Upgrade to 122 RAN sites required.** 227 institutions have no 4G coverage but have a RAN site close by so that they can receive 4G coverage through a RAN site upgrade. In total, 122 sites need to be upgraded to cover these institutions.³
- **36 New RAN sites required.** 49 institutions do not have a RAN site within 12km. New RAN sites were placed using QGIS to safeguard that these institutions would have good 4G coverage through the new RAN sites. The exact location of new RAN sites is not cast in stone and can be discussed with the party winning the tender, subject to the institutions being covered.

36 New RAN Sites

The main principle for the RAN site rollout is the stimulation of demand. The USF will pay for 4G routers with uncapped data to secondary and vocational schools and clinics in areas with insufficient coverage. At the same time, paying for Wi-Fi for institutions provides anchor tenants for a new RAN site and may make uneconomical sites economical. If the demand stimulation is not enough to lift the demand above the cost of a RAN site, then a direct subsidy will be required for an operator to invest.

³ Six RAN sites are already included in a MTC universal service obligation(USO) Notice 435 GG 7609 27 Aug 2021, which also cover seven institutions.

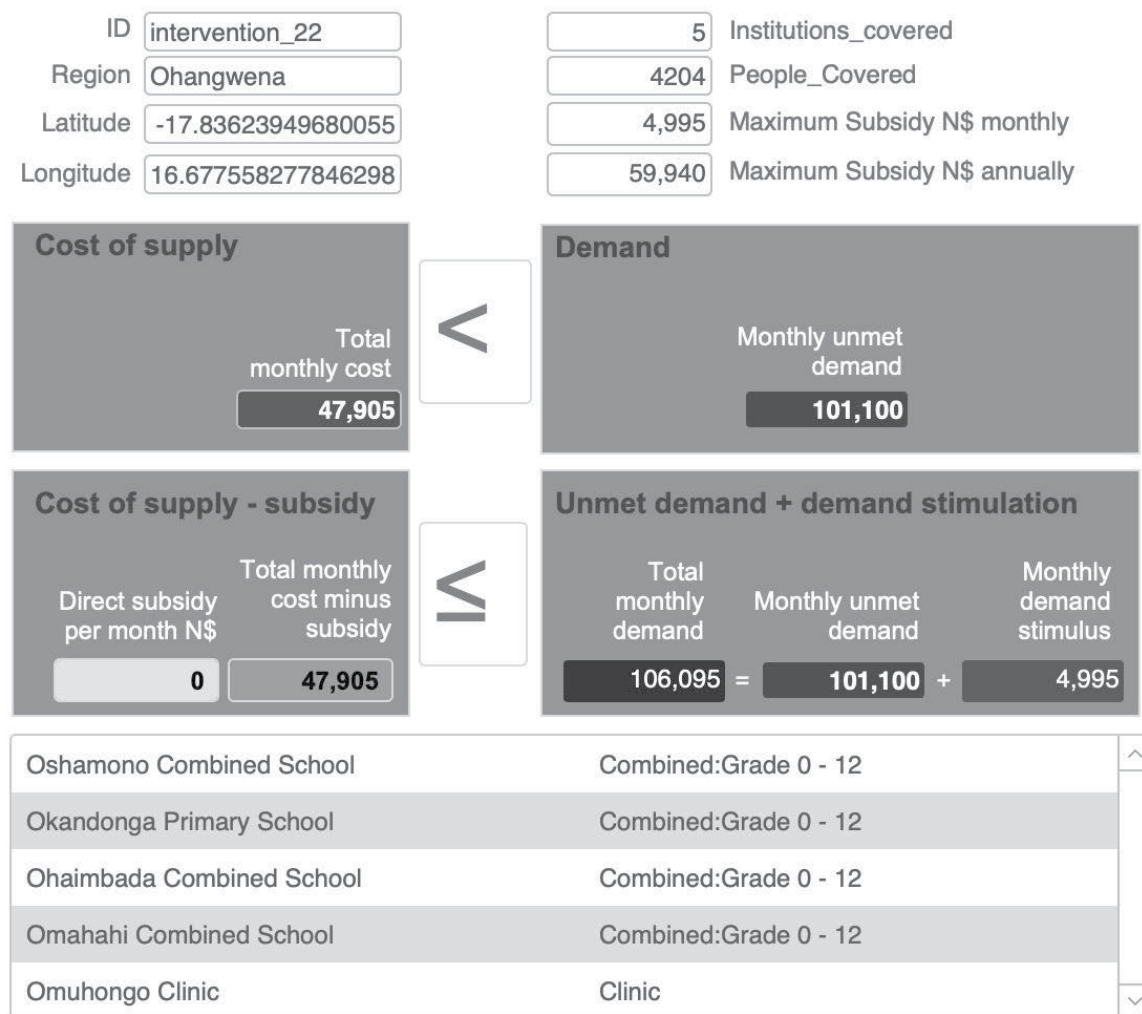


Figure 2: Example of a profitable new RAN site that does not require a direct subsidy

Direct subsidies are only offered if unmet demand and demand stimulation are not enough to tilt the balance towards profitability. Intervention 22 serves as an example where the unmet demand is already higher than the cost of a new RAN (Figure 2). However, the institutions within the reach of the RAN site will receive free Wi-Fi paid for by the USF in any case. A new RAN site costs N\$47,905 per month, the total demand, including demand stimulation is N\$ 106,095.

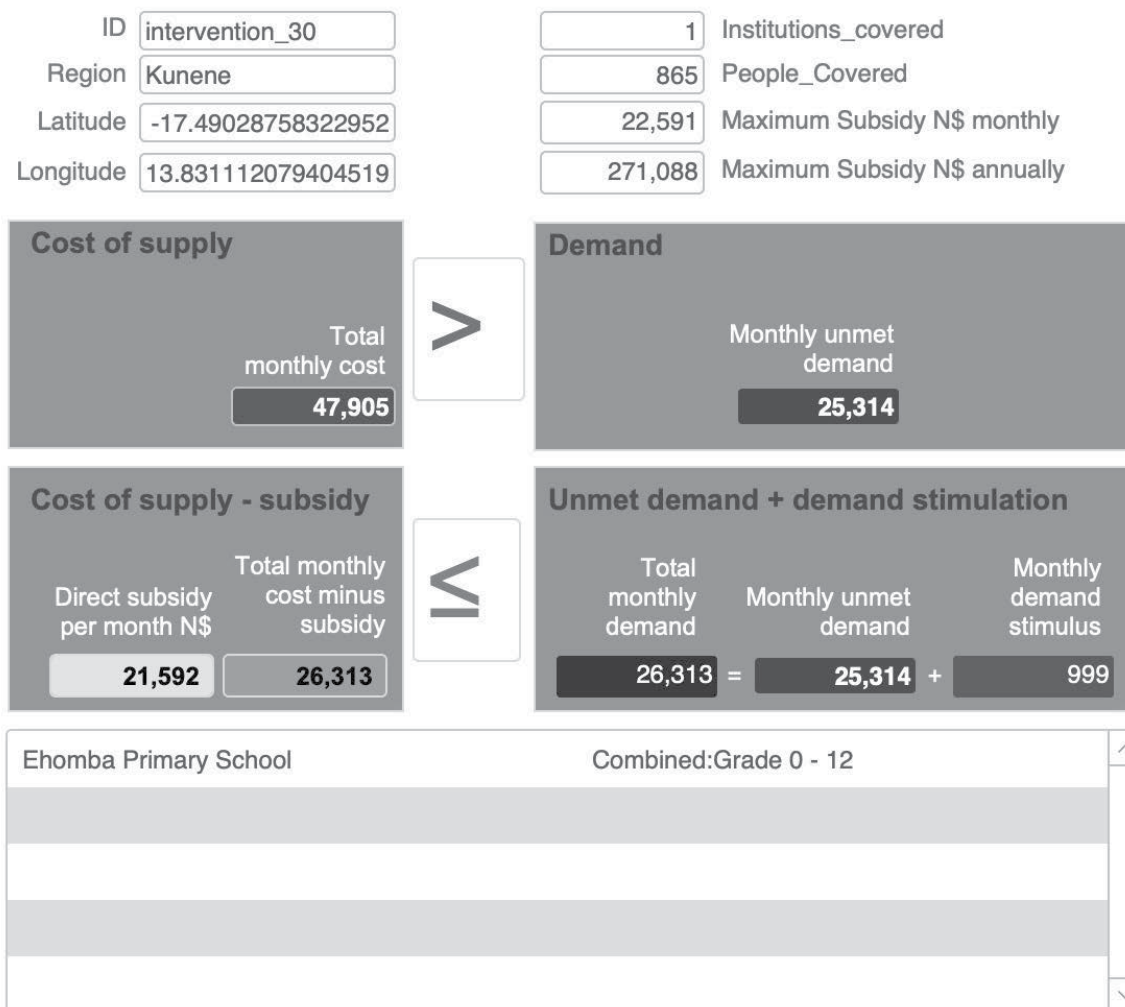


Figure 3: Example for a new RAN site that requires a direct subsidy

Figure 3 provides an example where the unmet demand and the demand stimulation are not enough to cover the monthly cost of a new RAN site. Only 865 people live within a 12 km radius of the new site and based on the average communication expenditure established by the National Household Income and Expenditure surveys (NHIES) would only generate N\$ 24,314 per month. Thus a direct subsidy is required to make the new RAN site profitable.

Region	Latitude	Longitude	Covered by RAN site		Maximum Subsidy		
			People	Institutions	Monthly	Annually	Economic Life
Kunene	-17.490288	13.831112	865	1	22,591	271,088	1,897,619
Kunene	-18.229378	13.273973	882	1	22,107	265,282	1,856,976
Kunene	-18.070718	13.394683	566	1	31,353	376,239	2,633,671
Kunene	-18.681668	13.936942	866	2	22,566	270,796	1,895,571
Kunene	-20.423619	15.179720	632	1	29,406	352,871	2,470,098
Kunene	-20.678719	15.378636	455	1	34,579	414,953	2,904,668
Ohangwena	-17.498330	17.511324	2,577	1	999	11,988	83,916
Ohangwena	-17.477809	16.966205	4,694	1	999	11,988	83,916

Region	Latitude	Longitude	Covered by RAN site		Maximum Subsidy		
			People	Institutions	Monthly	Annually	Economic Life
Ohangwena	-17.823108	16.965974	2,852	1	999	11,988	83,916
Ohangwena	-17.836239	16.677558	4,204	5	4,995	59,940	419,580
Ohangwena	-17.726070	16.818094	2,748	2	1,998	23,976	167,832
Ohangwena	-17.467569	16.441258	8,412	2	1,998	23,976	167,832
Oshikoto	-18.176468	17.205476	908	1	19,461	233,534	1,634,738
Oshikoto	-18.136068	17.451386	393	1	35,591	427,098	2,989,686
Oshikoto	-18.091212	16.836966	6,113	3	2,997	35,964	251,748
Oshikoto	-18.186118	16.569437	8,795	1	999	11,988	83,916
Oshikoto	-18.381438	16.414031	10,382	2	1,998	23,976	167,832
Kavango East	-18.018619	21.399156	7,594	2	1,998	23,976	167,832
Kavango East	-17.979459	20.354397	7,220	1	999	11,988	83,916
Zambezi	-17.771564	24.803520	1,217	1	16,746	200,950	1,406,647
Zambezi	-17.667834	24.977386	2,795	1	999	11,988	83,916
Zambezi	-17.855178	23.705185	2,613	1	999	11,988	83,916
Zambezi	-17.966108	23.446885	1,449	2	10,802	129,625	907,378
Zambezi	-17.965564	23.446096	1,450	2	10,775	129,296	905,069
Erongo	-20.764968	15.851194	168	1	29,803	357,641	2,503,489
Otjozon-djupa	-20.452622	17.777443	505	1	22,504	270,044	1,890,311
Otjozon-djupa	-19.812539	16.681137	597	1	17,848	214,172	1,499,206
!Karas	-28.129076	18.594487	696	1	999	11,988	83,916
!Karas	-27.396018	15.476364	0	1	47,893	574,718	4,023,024
Kavango West	-18.498058	19.743982	788	1	34,720	416,638	2,916,464
Kavango West	-18.528588	19.179213	2,445	1	7,002	84,019	588,135
Kavango West	-18.063863	18.917618	1,144	1	28,771	345,249	2,416,742
Kavango West	-17.872126	18.892341	4,750	2	1,998	23,976	167,832
Kavango West	-17.564091	18.460177	2,339	1	8,770	105,244	736,706
Kavango West	-17.846508	18.546298	2,807	3	2,997	35,964	251,748

Region	Latitude	Longitude	Covered by RAN site		Maximum Subsidy		
			People	Institutions	Monthly	Annually	Economic Life
Kavango West	-17.900144	19.225622	5,531	1	999	11,988	83,916
Total			102,450	49	483,258	5,799,097	40,593,677

Table 9: Details of 36 new RAN sites to be tendered

The subsidies that are calculated through the UAS portal serve as a subsidy ceiling. The RAN sites will be tendered and the tender with the lowest subsidy requirement will win the tender. Subsidy payments will be made monthly or annually.

	4G Population coverage 2021	4G Population coverage after Intervention	Change
Kavango West	40.1%	61.6%	21.5%
Oshikoto	73.1%	90.1%	17.0%
Kavango East	68.9%	78.5%	9.6%
Ohangwena	90.3%	99.6%	9.3%
Zambezi	60.4%	69.4%	9.0%
Kunene	33.3%	37.8%	4.4%
!Karas	72.7%	73.5%	0.8%
Otjozondjupa	72.0%	72.7%	0.8%
Erongo	91.9%	92.2%	0.3%
Hardap	72.2%	72.2%	
Khomas	96.3%	96.3%	
Omaheke	47.6%	47.6%	
Omusati	81.9%	81.9%	
Oshana	96.2%	96.2%	
Namibia	79.0%	83%	4.5%

Table 10: intervention impact.

The 36 New RAN sites will increase 4G population coverage by about 4.5%. Kavango West will see an increase of 21.5%, Oshikoto by 17% and Kavango East and Ohangwena close to 10%. 52 institutions will receive Wi-Fi paid for by the USF for the period of seven years. Where institutions do not have electricity, the USF will also install solar systems to power routers and charge smartphones.

122 RAN site 4G upgrades

227 institutions have no 4G coverage but have a RAN site close by can receive 4G coverage through a RAN site upgrade. In total, 122 sites need to be upgraded to cover these institutions. Of the 122 selected RAN sites for 4G upgrade, 91 are owned by MTC and 31 from Telecom Namibia/Powercom. This is mainly because MTC has a RAN site close to the institution that requires 4G coverage. If more than one site could be used to provide 4G coverage for an institution, then fibre backhaul was given priority over microwave and microwave over VSAT. Six RAN sites were selected that are backhauled by VSAT due to a lack of an alternative.

The RAN site upgrade will go on tender, site by site, i.e., 122 tenders. Any licensee with 4G spectrum and an infrastructure sharing agreement (if it does not own the site) may bid.

Assumption of no unmet demand. Since the sites to be upgraded already provide 2G and mostly also 3G signal, the assumption is that no additional income will be generated through the 4G upgrade, except the demand stimulus for the institutions that have been given Wi-Fi routers and uncapped Internet.

	Owner	Site ID	Backhaul	Site_ Longitude	Site_ Latitude
1	MTC	Aus	Fiber	16.29072	-26.65475
2	MTC	Omatjette	Fiber	15.48819	-21.03603
3	MTC	OpuwoNBC	Fiber	13.92948	-18.169
4	MTC	Warmbad	Microwave	18.76681	-28.47149
5	MTC	Berseba	Microwave	17.76758	-26
6	MTC	Koes	Microwave	19.1614194	-25.921669
7	MTC	Kalkrand	Microwave	17.5821	-24.0755
8	MTC	KleinAub	Microwave	16.62336	-23.78642
9	MTC	CorridorPOS13	Microwave	19.89108	-23.49417
10	MTC	EtusebSchool	Microwave	14.82658	-23.29996
11	MTC	Baumgartsbrunn	Microwave	16.75928	-22.61145
12	MTC	Otjivero	Microwave	17.92322	-22.33592
13	MTC	Drimiopsis	Microwave	19.06417	-22.08735
14	MTC	Spitzkoppe	Microwave	15.20656	-21.86511
15	MTC	Tubusis	Microwave	15.4613	-21.584852
16	MTC	Otjimanagombe	Microwave	19.89939	-21.44236
17	MTC	UitkomsClinic	Microwave	18.10521	-21.14439
18	MTC	Sorrissorris	Microwave	14.7977	-20.9418
19	MTC	Otjiperongo	Microwave	15.5662	-20.8798
20	MTC	GamTown	Microwave	20.8179	-20.2355
21	MTC	Bergsig	Microwave	14.07106	-20.22438
22	MTC	Fransfontein	Microwave	15.01643	-20.21235
23	MTC	Otjituuo	Microwave	18.59208	-19.63589
24	MTC	Tsumkwe	Microwave	20.50136	-19.59261
25	MTC	MangetiDune	Microwave	19.72948	-19.52065
26	MTC	OmatakoValley	Microwave	19.22716	-19.44511
27	MTC	OruvandjaiTN	Microwave	14.13732	-18.92308
28	MTC	Tsinstabis	Microwave	17.96467	-18.77503
29	MTC	Mangetti	Microwave	18.58949	-18.73531
30	MTC	Casablanca	Microwave	17.1077	-18.52124
31	MTC	Uutsathima	Microwave	14.83886	-18.45445

	Owner	Site ID	Backhaul	Site_ Longitude	Site_ Latitude
32	MTC	Onanke	Microwave	16.32011	-18.44903
33	MTC	Mpora	Microwave	19.2768	-18.42746
34	MTC	Amarika	Microwave	15.19168	-18.34473
35	MTC	Onamatanga	Microwave	14.49772	-18.34124
36	MTC	Elavi	Microwave	17.97013	-18.26099
37	MTC	DjaraDjara	Microwave	20.69526	-18.25819
38	MTC	Mbilajwe	Microwave	23.84535	-18.24179
39	MTC	Ncamagoro	Microwave	19.46332	-18.22192
40	MTC	Erago	Microwave	19.2728	-18.19984
41	MTC	Livayi	Microwave	20.98663	-18.19883
42	MTC	Baramasoni	Microwave	20.18948	-18.18653
43	MTC	Shamaturu	Microwave	21.34562	-18.15989
44	MTC	Ncuncuni	Microwave	19.77213	-18.14129
45	MTC	Kapani	Microwave	23.94762	-18.1404
46	MTC	Ncogo	Microwave	20.343138	-18.13092
47	MTC	Omakange	Microwave	14.32202	-18.11308
48	MTC	RukuraJuniorPS	Microwave	18.40733	-18.1075
49	MTC	Okasheshete	Microwave	15.86039	-18.07414
50	MTC	MburuuruPS	Microwave	18.72938	-18.06142
51	MTC	Othilu	Microwave	17.04556	-18.06086
52	MTC	Lizauli	Microwave	23.35498	-18.04872
53	MTC	Katere	Microwave	20.76139	-18.04319
54	MTC	Omega	Microwave	22.20086	-18.04025
55	MTC	Okatseidhi	Microwave	14.71803	-17.99057
56	MTC	Chinchimani	Microwave	24.115	-17.98578
57	MTC	Katenture	Microwave	21.06497	-17.96411
58	MTC	Ibbu	Microwave	24.52418	-17.95922
59	MTC	Chetto	Microwave	22.55544	-17.9512
60	MTC	Ompundja	Microwave	15.7012194	-17.908669
61	MTC	Muyako	Microwave	24.40318	-17.89373
62	MTC	Omega3	Microwave	22.89777	-17.87821
63	MTC	OnakahekeCS	Microwave	15.04063	-17.80046
64	MTC	Sibbinda	Microwave	23.81972	-17.78453
65	MTC	Kwena	Microwave	24.36456	-17.77542
66	MTC	Kaukuwa	Microwave	18.46676	-17.76819
67	MTC	Lusese	Microwave	24.69777	-17.76786

	Owner	Site ID	Backhaul	Site_ Longitude	Site_ Latitude
68	MTC	Impalila	Microwave	25.169964	-17.755336
69	MTC	Ombetele	Microwave	15.1623	-17.7536
70	MTC	Ohandungu	Microwave	13.62347	-17.74417
71	MTC	Itomba	Microwave	24.93458	-17.73121
72	MTC	ElondoEast	Microwave	15.01695	-17.72981
73	MTC	Sachinga	Microwave	24.00772	-17.70347
74	MTC	Mpungu	Microwave	18.22026	-17.64556
75	MTC	Etoto	Microwave	14.05711	-17.63681
76	MTC	Onehanga	Microwave	17.4687	-17.62265
77	MTC	Kalimbeza	Microwave	24.54338	-17.56956
78	MTC	Schuckmansburg	Microwave	24.81408	-17.55172
79	MTC	Oushake	Microwave	16.56023	-17.50687
80	MTC	Onawa	Microwave	15.06646	-17.48164
81	MTC	Ondimbwa	Microwave	15.5037	-17.472
82	MTC	Omboloka	Microwave	17.12361	-17.41033
83	MTC	WakashamaneBorderPost	Microwave	15.24646	-17.39424
84	MTC	BlueSodalite	Microwave	13.78282	-17.34934
85	MTC	Epupa	Microwave	13.24524	-17.00315
86	MTC	EBay	VSAT	15.19347	-26.89122
87	MTC	Eiseb	VSAT	20.83683	-20.60184
88	MTC	TerraceBay	VSAT	13.03953	-19.99306
89	MTC	Anker	VSAT	14.54812	-19.80102
90	MTC	Otjokavare	VSAT	14.35136	-19.05597
91	MTC	Masokotwani	VSAT	24.19991	-17.79545
92	TN	KRS0019_Bethanien		17.2381167	-26.483667
93	TN	HDP0009_Gochas		18.80995	-24.859717
94	TN	HDP0012_Kalkrand Microwave Tower		17.4877778	-23.950278
95	TN	KMS0054_Dordabis		17.669874	-22.939508
96	TN	OHE0012_BUITEPOS		19.9061167	-22.295133
97	TN	OHE0031_Epukiro		19.4219444	-21.550833
98	TN	ENG0045_Okombahe TN-GBTS		15.357974	-21.32927
99	TN	OOA0095_Okamatapati		18.214783	-20.405217
100	TN	OOA0011_Okurusu Mine Tower		16.7436167	-20.0468
101	TN	KNE0039_Ewree		14.3128624	-19.687717

	Owner	Site ID	Backhaul	Site_ Longitude	Site_ Latitude
102	TN	KNE0033_Ongava lodge		15.8728	-19.334
103	TN	KNE0048_Ontwani		13.6779083	-18.562678
104	TN	OHT0010_Omuthiya		16.5841667	-18.365278
105	TN	OHT0011_Okapuku		16.4756667	-18.2713
106	TN	OHT0037_Omuntele		16.2393	-18.2394
107	TN	OHT0047_Onyuulaye		16.5293194	-18.073819
108	TN	OVG0012_Nyangana		20.61075	-18.043467
109	TN	OVG0007_Arendsnes		19.6244444	-18.041667
110	TN	OVG0022_Shinyungwe		20.8931667	-18.035967
111	TN	OVG0011_Ndonga Linena		20.5036167	-17.9709
112	TN	OHT0049_Okankolo		16.420669	-17.961472
113	TN	OVG0003_Mupapama		20.2814667	-17.927917
114	TN	OVG0006_Mashare School		20.1375517	-17.907833
115	TN	OUI0019_Onaanda		15.3338833	-17.9075
116	TN	CAP0009_Ngoma		24.70285	-17.905083
117	TN	OVG0001_Bunya		19.3486667	-17.868367
118	TN	OUI0009_Omuthitu		15.2690333	-17.83895
119	TN	OGA0019_Epembe		16.45275	-17.784417
120	TN	OUI0005_Ombathi		15.1847833	-17.606417
121	TN	OUI0011_Omahenene		14.784038	-17.438331
122	TN	OVG0017_Katwitwi		18.4266972	-17.407972

Table 11: List of RAN sites selected for 4G upgrade.

	Owner	Site ID	Backhaul	Site_ Longitude	Site_ Latitude
1	MTC	Rietoog	Microwave	16.53611	-23.98624
2	MTC	Anabeb	Microwave	13.7281	-19.13661
3	MTC	Ncaute	Microwave	19.82445	-18.37296
4	MTC	EtangaTN	Microwave	13.03412	-17.86813
5	MTC	Mayara	Microwave	21.23167	-17.98481
6	MTC	OtjondekaTN	Microwave	14.23417	-18.62951

Table 12: Already Covered by MTC USO

The cost up upgrading 122 RAN sites is estimated be close to N\$14.2 million per year. The cost per RAN site of N\$ 800,000 is split across its economic life of seven years, leading to an annual cost of N\$115,000 per RAN site per year.

		Units	Total expected Subsidy
Maximum subsidy 4G upgrade	800,000		
Economic Life	7		
Maximum subsidy 4G upgrade per year	114,286	122	13,942,857
Demand Stimulation	999	227	226,773
Total			14,169,630

Table 13: List of RAN sites selected for 4G upgrade.

Budget and USF licence Fees

The estimated subsidy for the 36 new RAN sites and 122 upgraded RAN sites is N\$25 million in the first year and N\$20 million in subsequent years. Based on ICT sector revenues for 2020, this requires a USF licence fee of 0.5% to cover the costs of the USF.

	2020	Year						
		1	2	3	4	5	6	7
ICT sector combined revenue N\$ million	5,116							
USF requirement for 36 RAN Sites N\$ million		5.8	5.8	5.8	5.8	5.8	5.8	5.8
Upgrade of 128 RAN sites		14.2	14.2	14.2	14.2	14.2	14.2	14.2
Solar Kits at 50,000 each for 100 institutions		5						
Total		25	20	20	20	20	20	20
Implied USF licene fee	0.489%							

Table 14: Aggregated financials from the ICT sector based on AFS

The calculations are based on the maximum level of subsidy and the actual subsidy requirement can be lower. Funds that cannot be spent within three years should be returned to licensee pro rata. At the same time, the licence fee needs to be increased if larger projects are to be financed, such as landing another submarine cable or national fibre projects.

Conclusion

The interventions detailed in this study will ensure that all secondary educational institutions and health clinics in Namibia will have 4G coverage. The 36 new RAN sites will achieve the National Broadband policy target of 80% 4G population coverage. The upgrade of 128 RAN sites will push coverage to close to 95%. In total, 288 institutions will receive uncapped Wi-Fi for 7 years under this funding cycle.

The Universal Access Fund will be a separate fund and the funds will be utilized to fund digital connectivity as discussed in the document. As with the regulatory levies the levies will be reviewed every 3-5 years. The fund in terms of section 56(4)(a) the Fund will also be utilized to defray the expenses directly related to the administration, control and accounting of the ASF.

There is also a need to engage the Ministries of Education and Health to discuss the interventions and obtain their support for the proposed interventions. CRAN should also engage the Ministry of Finance on possible tax rebates to 1) reduce the cost of telecommunications equipment and 2) lower prices for smart devices to ensure that all Namibians have access to telecommunications services. Reducing or removing VAT from prepaid services might be beneficial to the Government in the long-run and assist in reducing the price of telecommunication services.

Universal access should be a collective initiative where government and the telecommunications industry work together to ensure that all Namibians have access to affordable, high quality services that will grow the economy.

Appendix:

Institutions without 4G coverage that require RAN Upgrade

	Name	Description	Latitude	Longitude
1	Amarika Clinic	Clinic	-18.345704	15.193087
2	Anichab Clinic	Clinic	-20.95132	14.83611
3	Anker Clinic	Clinic	-19.79826	14.54507
4	Aus Clinic	Clinic	-26.66366	16.25865
5	Baramasoni Clinic	Clinic	-18.18875	20.18795
6	Batubaja Clinic	Clinic	-18.20563	23.87565
7	Baumgartsbrunn Clinic	Clinic	-22.60954	16.78288
8	Bergsig Clinic	Clinic	-20.21743	14.07119
9	Berseba Clinic	Clinic	-25.993447	17.761336
10	Buite Post Clinic	Clinic	-22.28138	19.99138
11	Chetto Clinic	Clinic	-17.95305	22.55869
12	Chinchimani Clinic	Clinic	-17.98592	24.11845
13	Corridor Clinic	Clinic	-23.50667	19.89485
14	Dordabis Clinic	Clinic	-22.94869	17.66269
15	Eendombe Clinic	Clinic	-17.72159	15.09908
16	Eengolo Clinic	Clinic	-17.60821	15.07905
17	Eiseb Clinic	Clinic	-20.61416	20.84611
18	Elizabeth Bay Clinic	Clinic	-26.89481	15.19075
19	Epembe Clinic	Clinic	-17.780815	16.451074
20	Epukiro Post 3 Clinic	Clinic	-21.59764	19.4143
21	Epupa Clinic	Clinic	-17.00107	13.25286
22	Erago Clinic	Clinic	-18.19448	19.27447
23	Erwee Clinic	Clinic	-19.68746	14.3142
24	Etoto Clinic	Clinic	-17.62432	14.11459
25	Fransfontein Clinic	Clinic	-20.21424	15.01239
26	Gam Clinic	Clinic	-20.240358	20.81691

	Name	Description	Latitude	Longitude
27	Gochas Clinic	Clinic	-24.861243	18.812667
28	Harnas Lifeline Clinic	Clinic	-21.597669	19.416085
29	Ibbu Clinic	Clinic	-17.96237	24.52134
30	Impalila Clinic	Clinic	-17.766143	25.177399
31	Isize Clinic	Clinic	-17.56837	24.54387
32	Itomba Clinic	Clinic	-17.69051	24.90067
33	Kalkrand Clinic	Clinic	-24.073731	17.591174
34	Kandjara Clinic	Clinic	-18.20278	20.77468
35	Kanono Clinic	Clinic	-17.94079	24.14597
36	Kapupahedi Clinic	Clinic	-18.13315	20.3684
37	Karukuta Clinic	Clinic	-17.993814	20.577838
38	Katere Clinic	Clinic	-18.02565	20.77311
39	Klein Aub Clinic	Clinic	-23.78975	16.635776
40	Koes Clinic	Clinic	-25.931998	19.122467
41	Linyanti Clinic	Clinic	-18.07562	24.02303
42	Lisikili Clinic	Clinic	-17.55215	24.44369
43	Lusese Clinic	Clinic	-17.763833	24.694715
44	Mabushe Clinic	Clinic	-17.898742	20.375064
45	Mangetti Clinic	Clinic	-18.73734	18.58941
46	Mashare Clinic	Clinic	-17.90511	20.13861
47	Masokotwane Clinic	Clinic	-17.79703	24.20354
48	Mbalasinte Clinic	Clinic	-17.791504	25.023485
49	Mbambi East Clinic	Clinic	-17.970238	21.007553
50	Mbambi West Clinic	Clinic	-17.473395	18.470651
51	Mburu-uru Clinic	Clinic	-18.06066	18.730964
52	Mile 10 Clinic	Clinic	-18.02971	19.65333
53	Mile 30 Clinic	Clinic	-18.20073	19.48233
54	Mpora Clinic	Clinic	-18.43388	19.26583
55	Muparara Clinic	Clinic	-18.02948	18.39902
56	Muyako Clinic	Clinic	-17.887883	24.39995
57	Ncuncuni Clinic	Clinic	-18.15087	19.76812
58	Ndonga Iinena Clinic	Clinic	-17.952333	20.475003
59	Nepara Clinic	Clinic	-17.79593	18.42537
60	Ngoma Clinic	Clinic	-17.92019	24.70937
61	Nyangana Clinic	Clinic	-18.007004	20.67418
62	Ohandungu Clinic	Clinic	-17.767	13.6404
63	Okamatapi Clinic	Clinic	-20.405479	18.215185

	Name	Description	Lattitude	Longitude
64	Okatseidhi Clinic	Clinic	-17.99249	14.7177
65	Okaukuejo Clinic	Clinic	-19.329816	15.938323
66	Okombahe Clinic	Clinic	-21.35639	15.379983
67	Okorusu Clinic - Outreach	Clinic	-20.057705	16.750157
68	Oluteyi Clinic	Clinic	-17.83019	15.16555
69	Omakange Clinic	Clinic	-18.1127	14.316842
70	Omatako Clinic	Clinic	-19.438452	19.223762
71	Omatjete Clinic	Clinic	-21.053894	15.507834
72	Omboloka Clinic	Clinic	-17.408666	17.12805
73	Omega Clinic	Clinic	-18.028454	22.202487
74	Omitara Clinic	Clinic	-22.289231	17.973011
75	Omuntele Clinic	Clinic	-18.238311	16.239907
76	Onamatanga Clinic	Clinic	-18.342701	14.49775
77	Onanke Clinic	Clinic	-18.445975	16.324555
78	Onheleiwa Clinic	Clinic	-17.42147	15.4682
79	Onyuulaye Clinic	Clinic	-18.076217	16.528283
80	Orumana Clinic	Clinic	-18.25656	13.8945
81	Oruvandjei Clinic	Clinic	-18.91907	14.1067
82	Oshalongo Clinic	Clinic	-18.2925	16.37472
83	Otjimanangombe Clinic	Clinic	-21.43486	19.89589
84	Otjimuhaka Clinic	Clinic	-17.33417	13.83758
85	Otjituuo Clinic	Clinic	-19.637702	18.597399
86	Otjokavare Clinic	Clinic	-19.06461	14.34909
87	Otuani Clinic	Clinic	-18.56888	13.6875
88	Schuckmansburg Clinic	Clinic	-17.548748	24.814999
89	Shamaturu Clinic	Clinic	-18.160598	21.34376
90	Sharukwe Clinic	Clinic	-18.04542	19.75735
91	Spitzkoppe Clinic	Clinic	-21.846536	15.207598
92	Takawasa Clinic	Clinic	-17.892471	20.25593
93	Terrace Bay Clinic	Clinic	-19.99078	13.03748
94	Tsintsabis Clinic	Clinic	-18.771436	17.962577
95	Tsumkwe Clinic	Clinic	-19.593799	20.503194
96	Tubusis Clinic	Clinic	-21.58502	15.45815
97	Uitkoms Clinic	Clinic	-21.08618	18.06184
98	Utuseb Clinic	Clinic	-23.274313	14.765429
99	Uutsathima Clinic	Clinic	-18.45555	14.83749
100	Warmbad Clinic	Clinic	-28.445074	18.733527

	Name	Description	Latitude	Longitude
101	Elavi	Clininc	-18.260005	17.96861
102	Adam Steve Combined School	Combined:Grade 0 - 12	-25.93	19.1342
103	Alfa Combined School	Combined:Grade 0 - 12	-18.14167	13.92583
104	Anna Maasdorp Combined School	Combined:Grade 0 - 12	-23.926111	17.513889
105	Batubaja Combined School	Combined:Grade 0 - 12	-18.206111	23.876111
106	Bunya Combined School	Combined:Grade 0 - 12	-17.86722	19.36333
107	Eendombe Combined School	Combined:Grade 0 - 12	-17.706289	15.075963
108	Elundu Combined School	Combined:Grade 0 - 12	-17.477409	16.498556
109	Eneas Peter Nanyemba Combined School	Combined:Grade 0 - 12	-18.387226	16.482917
110	Enguwantale Combined School	Combined:Grade 0 - 12	-17.98778	15.6925
111	Epembe Combined School	Combined:Grade 0 - 12	-17.78472	16.45056
112	Epoko Combined School	Combined:Grade 0 - 12	-17.484619	15.202495
113	Etsapa Combined School	Combined:Grade 0 - 12	-17.841211	16.525109
114	Gam Combined School	Combined:Grade 0 - 12	-20.235463	20.813183
115	Hainyeko Combined School	Combined:Grade 0 - 12	-17.480439	17.108717
116	I.K.Tjimuhiva Combined School	Combined:Grade 0 - 12	-18.115	14.31597
117	Ibbu Combined School	Combined:Grade 0 - 12	-17.96333	24.52139
118	Ikelo Combined School	Combined:Grade 0 - 12	-17.87861	16.40028
119	Ishanaputa Combined School	Combined:Grade 0 - 12	-17.47361	14.72222
120	Ikaba Combined School	Combined:Grade 0 - 12	-17.69	24.903036
121	Ioma Combined School	Combined:Grade 0 - 12	-17.92972	24.63167
122	Iseke Combined School	Combined:Grade 0 - 12	-17.86361	24.479167
123	Isize Combined School	Combined:Grade 0 - 12	-17.569444	24.544167
124	Jakob Basson Combined School	Combined:Grade 0 - 12	-20.216482	14.07227
125	Kaenda Combined School	Combined:Grade 0 - 12	-17.742222	23.957778
126	Kaitsi !Gubeb Combined School	Combined:Grade 0 - 12	-25.9983	17.7727
127	Kaliangile Combined School	Combined:Grade 0 - 12	-17.759167	23.840833
128	Kanono Combined School	Combined:Grade 0 - 12	-17.940556	24.145278
129	Kapani Combined School	Combined:Grade 0 - 12	-18.13917	23.95167
130	Kasivi Combined School	Combined:Grade 0 - 12	-17.851867	19.295708
131	Kephas Muzuma Combined School	Combined:Grade 0 - 12	-19.06222	14.34778
132	King Kauluma Combined School	Combined:Grade 0 - 12	-18.48972	17.06056

	Name	Description	Lattitude	Longitude
133	Kwena Combined School	Combined:Grade 0 - 12	-17.77627	24.36719
134	Linea Nampala Combined School	Combined:Grade 0 - 12	-17.954134	16.483724
135	Linyanti Combined School	Combined:Grade 0 - 12	-18.07444	24.02222
136	Lisikili Combined School	Combined:Grade 0 - 12	-17.551667	24.443056
137	Livayi Combined School	Combined:Grade 0 - 12	-18.206944	20.989167
138	Lizauli Combined School	Combined:Grade 0 - 12	-18.048333	23.344722
139	Lusese Combined School	Combined:Grade 0 - 12	-17.76472	24.69583
140	Lusu Combined School	Combined:Grade 0 - 12	-17.878611	24.187778
141	Mabushe Combined School	Combined:Grade 0 - 12	-17.898706	20.360601
142	Makanga Combined School	Combined:Grade 0 - 12	-17.817778	23.778611
143	Malengalenga Combined School	Combined:Grade 0 - 12	-18.278889	23.796389
144	Mangetti Combined School	Combined:Grade 0 - 12	-18.733665	18.58763
145	Mashare Combined School	Combined:Grade 0 - 12	-17.90556	20.13778
146	Masokotwani Combined School	Combined:Grade 0 - 12	-17.796389	24.203889
147	Mbalasinte Combined School	Combined:Grade 0 - 12	-17.79167	25.025
148	Mupapama Combined School	Combined:Grade 0 - 12	-17.892786	20.25651
149	Muyako Combined School	Combined:Grade 0 - 12	-17.889444	24.399722
150	Naiti Combined School	Combined:Grade 0 - 12	-17.546561	15.226818
151	Namiyundu Combined School	Combined:Grade 0 - 12	-17.555	24.865833
152	Nankuntwe Combined School	Combined:Grade 0 - 12	-17.578611	24.917222
153	Ncagcu Primary School	Combined:Grade 0 - 12	-18.02833	19.655
154	Ncamagoro Combined School	Combined:Grade 0 - 12	-18.197692	19.479912
155	Ndiyona Combined School	Combined:Grade 0 - 12	-18.04028	20.70139
156	Ndonga Linena Combined School	Combined:Grade 0 - 12	-17.9525	20.469444
157	Ndoro Memorial Primary School	Combined:Grade 0 - 12	-17.851389	22.913333
158	Nsundwa Combined School	Combined:Grade 0 - 12	-17.64667	24.87556
159	Ntara Combined School	Combined:Grade 0 - 12	-17.848007	19.250698
160	Nyambali Combined School	Combined:Grade 0 - 12	-18.243975	16.238073
161	Nyangana Combined School	Combined:Grade 0 - 12	-18.00722	20.67417
162	Nyondo Combined School	Combined:Grade 0 - 12	-18.003056	20.617778
163	Ofilu Combined School	Combined:Grade 0 - 12	-18.058119	17.029936
164	Oikokola Combined School	Combined:Grade 0 - 12	-17.42056	15.55056
165	Okafa Combined School	Combined:Grade 0 - 12	-17.448394	14.746815

	Name	Description	Latitude	Longitude
166	Okamatapati Combined School	Combined:Grade 0 - 12	-20.402687	18.21461
167	Okangororosa Combined School	Combined:Grade 0 - 12	-18.404839	16.539187
168	Okathitu Combined School	Combined:Grade 0 - 12	-17.65965	15.00035
169	Oluteyi Combined School	Combined:Grade 0 - 12	-17.828529	15.164104
170	Omafa Primary School	Combined:Grade 0 - 12	-17.41978	14.82359
171	Omahila Combined School	Combined:Grade 0 - 12	-17.560199	15.096045
172	Omapopo Combined School	Combined:Grade 0 - 12	-17.977184	15.409873
173	Ombathi Combined School	Combined:Grade 0 - 12	-17.625317	15.175204
174	Omboloka Combined School	Combined:Grade 0 - 12	-17.40944	17.12417
175	Omulunga Combined School	Combined:Grade 0 - 12	-17.90111	16.44139
176	Onakamwandi Combined School	Combined:Grade 0 - 12	-18.02528	15.79528
177	Ondeka Combined School	Combined:Grade 0 - 12	-17.4136	15.12778
178	Ondjamba Combined School	Combined:Grade 0 - 12	-18.174106	16.255146
179	Onelago Combined School	Combined:Grade 0 - 12	-17.45972	15.13446
180	Ongolo Combined School	Combined:Grade 0 - 12	-17.60829	15.07697
181	Onyuulaye Combined School	Combined:Grade 0 - 12	-18.07444	16.52778
182	Orumana Combined School	Combined:Grade 0 - 12	-18.258128	13.89479
183	Oshamukweni Combined School	Combined:Grade 0 - 12	-17.654928	17.546083
184	Oshikulufitu Combined School	Combined:Grade 0 - 12	-17.551762	15.139746
185	Oshipumbu Combined School	Combined:Grade 0 - 12	-17.96472	15.76944
186	Otjerunda Combined School	Combined:Grade 0 - 12	-18.20139	14.00611
187	Oukwandongo Combined School	Combined:Grade 0 - 12	-17.407	14.87136
188	Pyamukuu Combined School	Combined:Grade 0 - 12	-17.75479	15.15227
189	Rucara Combined School	Combined:Grade 0 - 12	-18.01889	20.73056
190	Sachinga Combined School	Combined:Grade 0 - 12	-17.701944	24.013889
191	Schmelenville Combined School	Combined:Grade 0 - 12	-26.5156	17.1586
192	Schuckmansburg Combined School	Combined:Grade 0 - 12	-17.55083	24.81444
193	Shamangorwa Combined School	Combined:Grade 0 - 12	-17.961389	21.039167
194	Shitemo Combined School	Combined:Grade 0 - 12	-17.98306	20.53722
195	Sikubi Combined School	Combined:Grade 0 - 12	-17.745833	23.891944
196	Tsintsabis Combined School	Combined:Grade 0 - 12	-18.77111	17.96194
197	Tuguva Combined School	Combined:Grade 0 - 12	-17.42139	18.43972

	Name	Description	Lattitude	Longitude
198	Uuhahe Primary School	Combined:Grade 0 - 12	-17.78444	16.39028
199	Uukuma Primary School	Combined:Grade 0 - 12	-18.240938	16.166122
200	Uutsathima Combined School	Combined:Grade 0 - 12	-18.46722	14.82972
201	Tsumkwe Combined School	Combined:Grade 0-12	-19.590074	20.501805
202	Bethanien Health Centre	Health Centre	-26.49937	17.14969
203	Bunya Health Centre	Health Centre	-17.859607	19.3574
204	Mahenene Health Centre	Health Centre	-17.45048	14.786381
205	Mangetti Dune Health Centre	Health Centre	-19.518774	19.735012
206	Mpungu Health Centre	Health Centre	-17.66507	18.23136
207	Sesfontein Health Centre	Health Centre	-19.12411	13.61323
208	Sibbinda Health Centre	Health Centre	-17.78509	23.82119
209	Nyangana District Hospital	Hospital	-18.00372	20.676525
210	Epukiro Post 3 Junior Secondary School	Junior Secondary: Grade 8 - 12	-21.601667	19.4175
211	Otjiperongo Junior Secondary School	Junior Secondary: Grade 8 - 12	-20.86472	15.57861
212	Shedile Junior Secondary School	Junior Secondary: Grade 8 - 12	-17.41806	15.47028
213	Impalila Junior Secondary School	Junior Secondary: Grade 8- 12	-17.777222	25.188611
214	P.I. Groenewald Junior Secondary School	Junior Secondary: Grade 8- 12	-24.861111	18.794722
215	Oshikondailwa Junior Primary School	Junior:Grade 0-10	-18.09006	16.94503
216	Dibasen Junior Secondary School	Senior Secondary: Grade 4 - 12	-21.365278	15.37444
217	Ecumenical Community Senior Secondary School	Senior Secondary: Grade 8 - 12	-26.0019	17.7686
218	Himarwa Iithete Junior Secondary School	Senior Secondary: Grade 8 - 12	-17.678385	18.229697
219	Linus Shashipapo Senior Secondary School	Senior Secondary: Grade 8 - 12	-18.031667	20.789722
220	Mafwila Senior Secondary School	Senior Secondary: Grade 8 - 12	-17.920833	24.709722
221	Mokganedi Tlhabanello High School	Senior Secondary: Grade 8 - 12	-22.092222	19.05
222	Negumbo Senior Secondary School	Senior Secondary: Grade 8 - 12	-17.89627	15.347677
223	Rev.Juuso Shikongo Secondary School	Senior Secondary: Grade 8 - 12	-18.253196	16.233492
224	Saint Charle Lwanga Secondary School	Senior Secondary: Grade 8 - 12	-17.46722	14.81444

	Name	Description	Latitude	Longitude
225	Sikosinyana Senior Secondary School	Senior Secondary: Grade 8 - 12	-17.785	23.823333
226	Simataa Senior Secondary School	Senior Secondary: Grade 8 - 12	-17.98833	24.11778
227	Klein Aub Special School	Technical: Prevocational	-23.794722	16.633889

Institutions without 4G coverage covered by MTC USO

	Name	Description	Latitude	Longitude
1	W.J.D. Cloete Junior Secondary School	Junior Secondary: Grade 8 - 12	-23.968333	16.557778
2	Elias Amxab Combined School	Combined: Grade 0 - 12	-19.12551	13.617809
3	Etanga Clinic	Clinic	-17.8677	13.02564
4	Otjondeka Clinic	Clinic	-18.6303	14.23431
5	Rietoog Clinic	Clinic	-23.967782	16.559829
6	Ncaute Clinic	Clinic	-18.37218	19.82942
7	Max Makushe Senior Secondary School	Senior Secondary: Grade 8 - 12	-17.991389	21.34333

Institutions without 4G coverage that require a new RAN site

	Name	Description	Latitude	Longitude
1	Nakabolelwa Combined School	Combined:Grade 0 - 12	-17.825	24.83694
2	Muzii Combined School	Combined:Grade 0 - 12	-17.644444	25.024167
3	Masida Combined School	Combined:Grade 0 - 12	-17.85517	23.7052
4	Sacona Combined School	Combined:Grade 0 - 12	-17.965556	23.446111
5	Diyana Combined School	Combined:Grade 0 - 12	-18.018611	21.399167
6	Neyuva Combined School	Combined:Grade 0 - 12	-17.905399	20.395774
7	Namavambi Combined School	Combined:Grade 0 - 12	-17.815984	18.886804
8	Yinsu Combined School	Combined:Grade 0 - 12	-17.804296	18.596926
9	Simanya Combined School	Combined:Grade 0 - 12	-17.5325	18.52417
10	Onashiye Junior Primary School	Junior:Grade 0 - 10	-18.13606	17.45139
11	Hamunyela Combined Primary School	Combined:Grade 0 - 12	-18.18611	16.56944
12	Onamishu Combined School	Combined:Grade 0 - 12	-18.11139	16.81722
13	Oshamono Combined School	Combined:Grade 0 - 12	-17.82389	16.59306
14	Okandonga Primary School	Combined:Grade 0 - 12	-17.8767	16.64721
15	Ohaimbada Combined School	Combined:Grade 0 - 12	-17.8403	16.7299
16	Omutwewomhedi Junior Primary School	Combined:Grade 0 - 12	-17.8231	16.965977

	Name	Description	Latitude	Longitude
17	Evale Combined School	Combined:Grade 0 - 12	-18.079064	16.883508
18	Lazarus Haufiku Combined School	Combined:Grade 0 - 12	-17.413116	16.966208
19	Shimbode Combined School	Combined:Grade 0 - 12	-17.41173	16.438344
20	Ondjabayonghalu Combined School	Combined:Grade 0 - 12	-17.726062	16.818097
21	Omahahi Combined School	Combined:Grade 0 - 12	-17.76647	16.72288
22	Niigambo Combined School	Combined:Grade 0 - 12	-18.382753	16.411209
23	Ehomba Primary School	Combined:Grade 0 - 12	-17.49028	13.83111
24	Ombombo Combined School	Combined:Grade 0 - 12	-18.675023	13.927686
25	Braunfels Agricultural High School	Agr.College: Agricultural School	-20.42361	15.17972
26	Sachona Clinic	Clinic	-17.9661	23.4469
27	Shadikongoro Clinic	Clinic	-18.015949	21.406619
28	Muveve Clinic	Clinic	-17.84691	19.22876
29	Katjinakatji Clinic	Clinic	-18.52858	19.17922
30	Gewatjinga Clinic	Clinic	-18.49805	19.74399
31	Okarundu Clinic	Clinic	-20.452613	17.777448
32	Sikarosompo Clinic	Clinic	-17.891802	18.515369
33	Yinsu Clinic	Clinic	-17.803462	18.579659
34	Nzinze Clinic	Clinic	-17.821051	18.902561
35	Gcaruhwa Clinic	Clinic	-18.009383	18.918701
36	Hedimbi Clinic	Clinic	-18.17646	17.20548
37	Olukula Clinic	Clinic	-17.464278	17.507924
38	Epinga Clinic	Clinic	-17.411461	16.437418
39	Omuhongo Clinic	Clinic	-17.82694	16.5925
40	Onamishu Clinic	Clinic	-18.108662	16.814148
41	Amilema Clinic	Clinic	-18.38143	16.414034
42	Queen Sofia Clinic	Clinic	-19.81253	16.68114
43	Ongongo Clinic	Clinic	-18.07071	13.39468
44	Otjiu Clinic	Clinic	-18.22937	13.27397
45	Ombombo PHC Clinic	Clinic	-18.68166	13.93694
46	Okongwe Clinic	Clinic	-20.67871	15.378637
47	Daktari Rehab Centre	Rehab Centre	-20.764959	15.851196
48	Gabis Clinic	Clinic	-28.129063	18.594493
49	Sedadic Clinic	Clinic	-27.42732	15.40956