2024 RTIRC submission - 1st July 2024

███████████████████

Whilst some modest steps have been taken towards improving rural telecommunications since the 2021 Hartsuyker Review; there is still much to do.

Blackspot funding, so loved by Governments of all stripes, is but a drop in the ocean when compared to rural customers mobile connectivity woes, as are 'luck of the draw Government schemes', providing funding to roll out a bit more random nbn network, here and there.

The Government **is** lauded for the *National Audit of Mobile Coverage[1],* funding that encourages farmers to *technically overcome poor mobile coverage and improve farm technology*[2] and *network hardening*[3].

Table of Contents

---

[1] https://www.infrastructure.gov.au/media-communications-arts/better-connectivity-plan-regional-and-rural-australia/national-audit-mobile-coverage

[2] https://business.gov.au/grants-and-programs/on-farm-connectivity-program

[3] https://www.infrastructure.gov.au/media-communications-arts/phone/mobile-network-hardening-program

Recommendations

Recommendation 1. - Take appropriate actions for the lasting success of this review

That the **2024 committee and Chair** be the judge of the success of the 2021 Hartsuyker Review, by judging each recommendation under the following categories

- Crickets
- Maybe/ Partial
- Well underway or Completed

and take appropriate actions to ensure that this review's recommendations are acted upon seriously by the incumbent Government with lasting and where necessary, legislated solutions.

Recommendation 2. - USO services

That **the Minister**

1. Urgently review the delivery of USO voice services to ensure that USO regional and remote customers may connect to the same reliable telecommunications services and redundancy afforded customers within the mobile and fixed line footprint. Many believe that **terrestrially based voice services** are the only technologies that can deliver secure and reliable services for the vast majority of remote Australians. Mature, trusted and reliable terrestrial technologies include ducted, ploughed fibre and fixed wireless.
   Note: There may be a number of (generally community based) localities that may be unserviceable with truly redundant telecommunications. These locations must be clearly identified and suitable solutions agreed with that community.
2. Review the USO voice service specification to specifically:
   a. Identify network and technology solutions that **maintain a USO service during local power failure**; noting that Telstra continues to offer a partial in-home battery back-up solution for priority assist customers whilst nbn has abandoned their FTTP in-home battery back-up.
   Note: For those within the mobile footprint, a mobile phone offers local power failure immunity. The same power failure immunity must be extended to all Australians.
   b. **Legislate a minimum USO service availability**. Community advocacy groups advise that **99.99%** service is the minimum acceptable service availability.
3. Conduct rigorous scientific research into **LEO satellite service availability and suitability** for voice connectivity at multiple representative locations around Australia versus fixed wireless and FTTP.
4. In the light of Telstra's recent six-month investigation into the impact of rain fade on Starlink services and Comms Day 8th May reporting that '*LEO rain fade is a myth'*; that Government charge the ACCC with providing a **detailed availability report** on **all** USO delivery technologies monitored by the ███ Knows Whitebox program i.e. Starlink, nbn FW and nbn fixed line, noting the cause of degradation or loss, the period of degradation (from the first service interruption to the last service interruption), the impact of technology upgrades and any seasonal or weather-related influences.
   Note: There is potential to combine Recommendations 1, 3 and 4.
5. Understand that rural lives are just as valuable as those in the 'big smoke'.

Recommendation 3. - Direct to Device or D2D

Whilst the delivery of D2D is in the hands of private network operators, **the Minister** must endeavour to provide clarity, protection and direction for D2D customers by providing:

1. Accurate detail of the D2D service capability,
2. The likelihood of D2D international roaming,
3. The likely D2D time scale, as investment in alternative satellite phone technologies are an expensive and long-term commitment,
4. Customers likely financial obligation to secure a working D2D service,
5. Consumer protections for this cutting-edge technology.

Recommendation 4. - nbn Fault Resolution

That **the Minister** as nbn's shareholder direct nbn to improve its service assurance performance for all faults. Whilst nbn in recent times has relaxed some of the more extreme customer obligations in order to actually accept a fault, there still much to do. The following suggestions may be worthy of investigation.

1. Whilst understanding that nbn is a Layer 3 provider, there may be scope for nbn Plus services (nbn Fixed Wireless Plus and Sky Muster Plus have Layer 2 characteristics), to test from each nbn POI to the customer router and definitively confirm connectivity reliability. Connectivity reliability is the most frequent symptom of customer service degradation.
2. There may be an opportunity to further rationalise and strengthen nbn's RSP service tools, particular for nbn's regional customers, where truck rolls are expensive.
3. There may be an opportunity (by software upgrade), for existing nbn customer CPE to perform regular performance testing that mirrors the Starlink Customer Premises Equipment (CPE) and the Sam Knows white box. **And if not for the current CPE revisions, that it becomes convention, for future nbn CPE**.
4. nbn Artificial Intelligence (AI) assisted fault finding and service performance testing should be investigated as part of the nbn service assurance solution; freeing staff to focus on more complex faults.
5. **That meaningful nbn performance KPIs are developed that measure real customer performance experience**; to wit, the current nbn Fixed wireless KPI's that continually paint the rosiest of pictures whilst customers struggle with poor peak time performance and congestion.
6. **To ensure the highest possible reliability and to minimise service assurance intervention, extend the FTTP footprint to all ADSL towns and that ploughed fibre is used to replace ploughed copper** (most ploughed copper was installed in the 70's and 80's), as the COCO deadline draws to a close.

Recommendation 5. - 3G network closure

That **the Minister**

1. Ensures that Telstra provides 4G connectivity wherever 3G coverage previously existed and with improved performance.
2. Reviews and subsequently mandates a National Mobile Network coverage map, such that each MNO adheres to a common and easily understood and nationally defined standard.
3. Investigates and prosecutes misleading telecommunication provider advertising and customer coercion.

4. Invoke legislation similar to recent FCC legislation[4] (pictured), to ensure that Australian broadband internet providers display information similar to nutrition labels on food products in plain English.
5. Ensure continued future funding for the Government's Farm Connectivity Program.

Recommendation 6. - NGWL and HCRC services

That **the Minister** investigate the current NGWL and future USO transitions to

1. Ensure that when current and future USO customers are transitioned to new technologies that the customer is kept fully informed and supported throughout the transition process and that any new technology delivered is appropriate, reliable and standardised.
2. Request Telstra to determine if 4GFW VoIP will continue to provide a satisfactory service during times of 4G network overload and stress.
3. For the NGWL to 4GFW upgrade, request that Telstra investigate if the Telstra 4GFW Pico repeater towers can simultaneously support 4G B28 and 5G N5 and if so, that customer CPE is the 5G compliant e.g. *Telstra 5G Home Broadband Modem Model number AW 1000* or similar.

Recommendation 7. - Customer advocacy and Funding

1. That **the Minister** ensure that all Government telecommunications working groups continue to includes representative grass roots community members, particularly when seeking information and representation from the 'Telcos'.
2. That clear KPI's are established to measure government telecommunication funding to identify the benefit, success or failure of funded projects.

---

[4] https://www.fcc.gov/broadbandlabels

1. Review the 2021 Review's success of implementation and act for the success of this review

The 2021 **Hartsuyker Review** delivered the following twelve recommendations:

1   Adopt a longer-term strategic approach to regional digital infrastructure and skills. The Committee recommends the development of a long-term investment and planning framework for digital infrastructure and regional digital capability. This includes increased coordination and investment between the Australian, state and territory governments and other relevant sectors to address connectivity in the regions.

2   Enhance the scale of Government investment in regional connectivity. The Committee recommends that the Government continues, but significantly strengthens and enhances, its commitment to large-scale multi-year connectivity investments. This recognises the increased importance of digital infrastructure as a critical foundation to grow the digital economy and support regionalisation.

3   Implement a regional telecommunications resilience fund. The Committee recommends that the Government commits to a substantial Regional Telecommunications Resilience Fund, targeted towards initiatives to improve emergency and network resilience across vulnerable communities, enhancing funding for the Strengthening Telecommunications Against Natural Disasters (STAND) package, including the Mobile Network Hardening Program.

4   Conduct trials of emerging connectivity technologies and services. The Committee recommends that the Government fund innovation trials to validate the value and reliability of new technology solutions able to address broadband and mobile coverage across regional, rural and remote Australia.

5   Build connectivity literacy and digital capability among regional users. The Committee recommends that the Government continues to commit to the provision of accessible and independent information for regional consumers, business and local government.

6   Expand and enhance the NBN Co regional fixed wireless network. The Committee recommends that NBN Co commits to providing holistic upgrades to their regional fixed wireless network to allow (more) users to access faster network speeds and minimise network congestion.

7   Implement and enforce network performance and reliability standards across all wholesale and retail services. The Committee recommends that the Government develops and enforces minimum wholesale and retail service, performance and reliability standards appropriate for each service type (fixed and landline, mobile, fixed wireless, satellites).

8   Continue and reform existing Universal Service arrangements for the future. The Committee recommends that:
    • there is strong and pressing need for USO reform to address the substantial ongoing stress on current infrastructure due to ageing technology
    • the reformed arrangements allow for a technology agnostic approach to USO service delivery, providing it exceeds the existing reliability standards of the current solution.

9   Improve the information available to consumers about mobile services. The Committee recommends that the Government ensures measures are undertaken to increase the accuracy and transparency of mobile network quality and coverage information, including network congestion. This includes measures to collect and standardise mobile network coverage information and develop a tool to empower consumers to compare network performance and service availability.

10   Encourage shared network access and innovative funding for regional mobile. The Committee recommends that preference is given to Government funded mobile infrastructure providing shared network access. This includes a particular focus in the design of the Mobile Black Spot Program

11   Place continued focus on the digital needs of Indigenous communities. The Committee recommends, that in consultation with Indigenous organisations and communities, the Government continues to focus on needs of Indigenous Australians living in regional, rural and remote areas surrounding access, affordability and digital ability.

12   Improve communications affordability for vulnerable groups in regional areas. The Committee recommends the removal of data charges for low-income and income support recipient consumers in regional, rural and remote Australia accessing all Australian, state and territory government services, to improve the affordability of telecommunications for these users.

2. There are in excess of 300,000 active USO services provided by Telstra with Government support. Some 150,000 are in imminent danger of transitioning to a poorer performing non-terrestrial service.

The number of active USO services has rapidly declined over recent years, some by customer choice, but much by Telstra 'persuasion' to use a mobile connection. Of the current active USO services some **0.3%** are satellite based i.e. the vast majority of USO services are terrestrially connected. The USO service total is comprised of a handful of fibre to the premises (FTTP), ducted and direct ploughed copper landlines, wireless (HCRC and NGWL) and the aforementioned satellite.

Historically, terrestrial services have provided essential connectivity and reliability with the copper exchange connected landline cited to achieve the **five nines** 'gold' standard of dial tone **availability**. Each of the current Telstra USO terrestrial technologies offer low latency, good quality and for the most part, dependable reliability. For many; landlines offer an essential lifeline in times of emergency. Importantly a vast majority of the current landlines are supported by exchange or infrastructure batteries that maintain service during times of local power outage. To this end, **Telstra offer their priority support customers a battery pack that supports their Wi-Fi /modem /router for up to four hours**, in the event of a power outage. Extraordinarily, from the 26th May, 2024, **nbn no longer provide an in home FTTP battery back-up service**.

> Note: There is a technically creative terrestrial proposal using LTE-M[5] to renew the life of the aging, at the time world class HCRC network[6], that has apparently fallen on deaf ears.

Cognisant that Telstra's Copper Continuity Obligation (COCO) expires in 2032 and that emerging low orbit satellite technologies are now offering appealing and apparently cost-effective technologies for the provision of selected voice services, Telstra is currently deploying a technician installed *USO Starlink*

---

[5] https://www.infrastructure.gov.au/sites/default/files/submissions/avst-powertec-communications-pty-ltd_0.pdf
[6] http://www.coxhill.com/trlhistory/media/The Phone Goes Bush.pdf

Voice service[7] at selected premises, for the same generic landline monthly rental as other terrestrial USO services.

It is likely that the Telstra USO Starlink Voice solution will be applied to those:

a. already on satellite (the 0.3%)
b. selected transitioning Telstra USO NGWL customers and
c. those on HCRC and ageing copper and wireless infrastructure that Telstra sees as unfit or are unwilling to maintain.

In early May 2024 Telstra published a report on **Starlink availability** and the impact of **rain fade**. Telstra recorded Starlink service availability at seven locations over six months, including the rainy season in Australia's tropical north. Overall availability and availability during periods of rain was recorded.

The seven Telstra test locations are identified on the average annual rainfall map of Australia below.
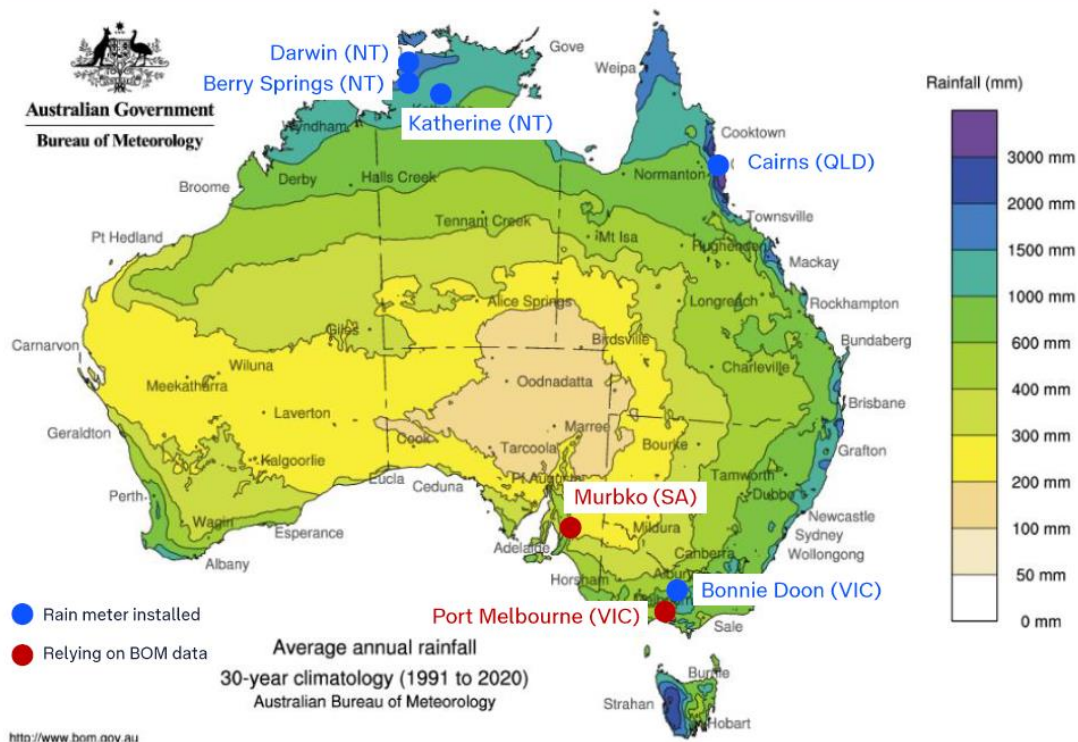
Over the seven sites, Telstra observed a maximum service interruption of **7.6 minutes** at Katherine NT. It is unclear if this interruption was due to rain or another cause.

---

[7] https://www.telstra.com.au/help/critical-information-summaries/personal/home-phone/telstra-upfront-home-phone-plans/satellite-voice-powered-by-starlink

Telstra observed that, *"While availability was lower during rain, it had little/ no statistically relevant impact on the overall availability"* and that *"Starlink's availability compares favourably with copper and in particular CAN Radio, even in the tropics"*.

Whilst both statements may be true; the reason that rainfall is not statistically relevant is that Starlink's overall availability is poor; whilst comparing Starlink availability to badly maintained ageing copper and CAN radio, **be clearly beyond the pale**.

With access to seven customer ACCC Sam Knows white box data; the following compilation of Telstra Starlink (7), ████████ Starlink (5) and ████████ nbn fixed wireless (2) availability was developed.

Summary

Starlink % Availability

SL **Sam Knows** (FW is green), vs SL **Telstra** last six months

Location	Availability	Unavailability
Camooweal Qld 4724	99.47	0.53
Alpha Qld 4724	99.66	0.34
Katherine NT	99.69	0.31
Darwin NT	99.70	0.30
Berry Springs NT	99.70	0.30
Trayning WA 6488	99.74	0.26
Limestone Crk Qld	99.75	0.25
Gloucester NSW 2422	99.76	0.24
Calca SA 5671	99.78	0.22
Cairns Qld	99.83	0.17
Murbko SA	99.85	0.15
Bonnie Doon Vic	99.92	0.08
Oberon NSW	99.93	0.07
Port Melbourne Vic	99.99	0.01
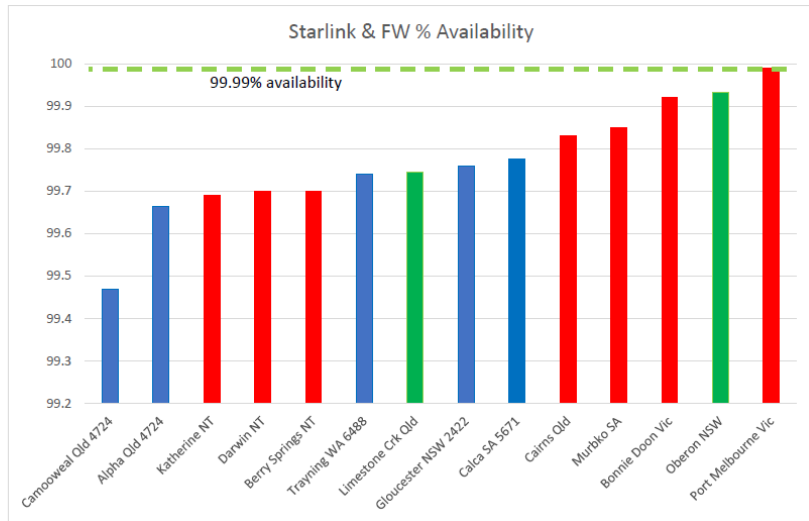
Compared to real ACCC ████████ customer data, there is considerable disparity with the Telstra availability records.

> Note: Sam Knows does **not** record unavailability during a local power outage. Local power failure is a key availability factor for remote localities.

It is important to note that Starlink is interrupted by a variety of causes as well as rain fade. Below is monthly Sam Knows data for the Gloucester service above, showing a continued background of failure outside the summertime east coast storm season.
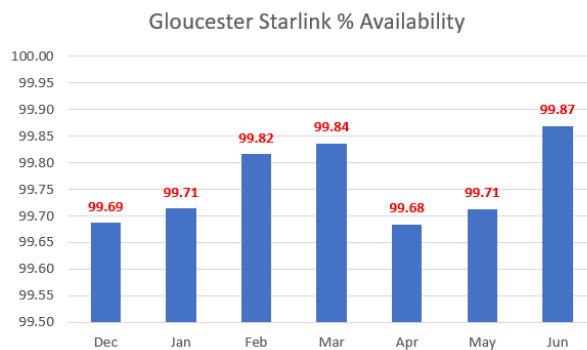
**A word of caution** for those relying on the quarterly *ACCC Measuring Broadband*[8] report to ascertain service availability. The ACCC's availability statistics ignore service outages between midnight and 5.00am; claiming this is the usual window for network upgrade. Whilst that may be statistically sound for the purpose of the ACCC report, take pity on the poor USO voice caller, desperately trying to reach 000 in this time window.

Availability for a USO service must always be calculated 24/7 and **include local power failure**, if the service is dependent on local power.

It is also important to note that whilst Sam Knows white box nbn fixed wireless availability is comparatively poor, particularly in Queensland, it is likely impacted by the current nbn fixed wireless upgrade program. The following monthly chart identifies how a couple of bad months disrupts the average.
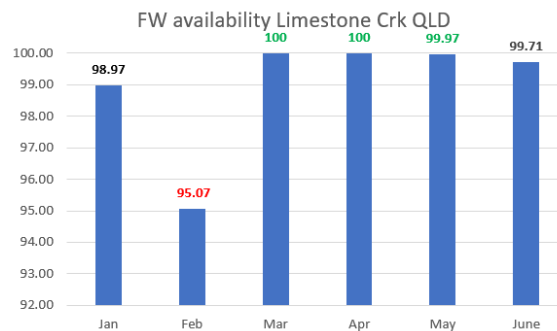
At the Oberon nbn fixed wireless site, nbn network or CPE upgrade is almost certainly the cause for disruption to this service. In the six-month period there were four days of poorer availability, two days each in the poor months of February and May.
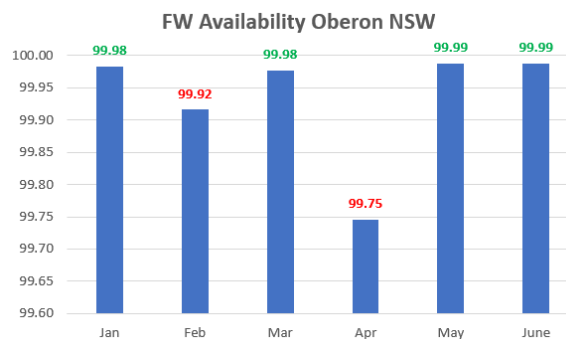
Whilst the Telstra report provides some insight into LEO service availability, **LEO availability and performance, requires further detailed research and benchmarking to ensure its suitability as a USO service**, particularly when deployed remotely, where satellite voice backed by satellite internet provides no redundancy.

---

[8] https://www.accc.gov.au/by-industry/telecommunications-and-internet/telecommunications-monitoring/measuring-broadband-australia-program/latest-performance-report

Without rapid Government intervention, Telstra will continue to roll-out a poorly tested satellite technology solution and the 0.3% currently on non-terrestrial satellite may quite rapidly expand to 50%, or some 150,000 USO services with a Telstra USO Starlink Voice service[9].

> Note: This group of 150,000 customers is beyond the reach of the default terrestrial SIP provider's (nbn) terrestrial services.

Why is this a problem?

A satellite land line backed by satellite internet (most likely offered by the same provider), offers no redundancy in times of emergency. Consumer groups have long identified the weakness and variable reliability of satellite solutions due to storm down time, foreign ownership, disruption in times of conflict and the sheer complexity of delivering the service with multiple points of failure. Satellite solutions have no power redundancy in times of local power outage and due to the considerable power requirement of these services (50 - 100 Watts), customer generator back-up is the only viable means of supporting the service.

Rainfall induced disruption to LEO services, occur as rain rates increase. Due to the impact of rain fade in the tropics, nbn will generally avoid using mm 5G bands (24.25 - 29.5 GHz) for its fixed wireless network; instead relying on minimally impacted midband frequencies. Starlink utilises Ku band for the customer link and Ka band for the base station link. Ka band (27 GHz to 40 GHz) is more susceptible to rain fade than Ku band (12 to 18 GHz), as the following chart identifies.
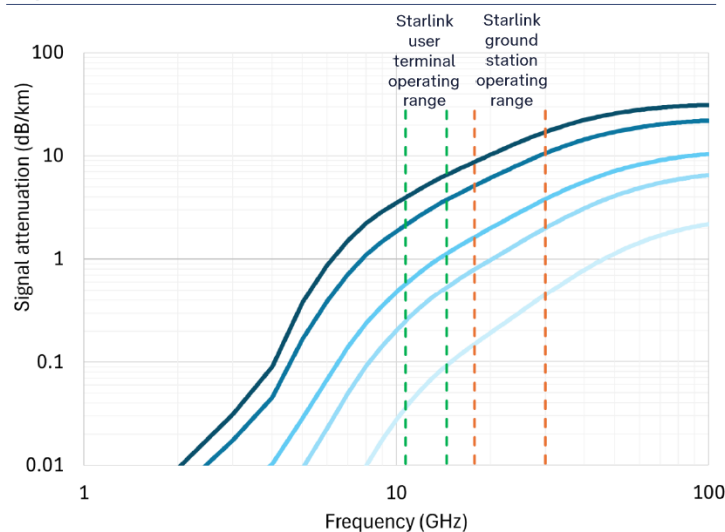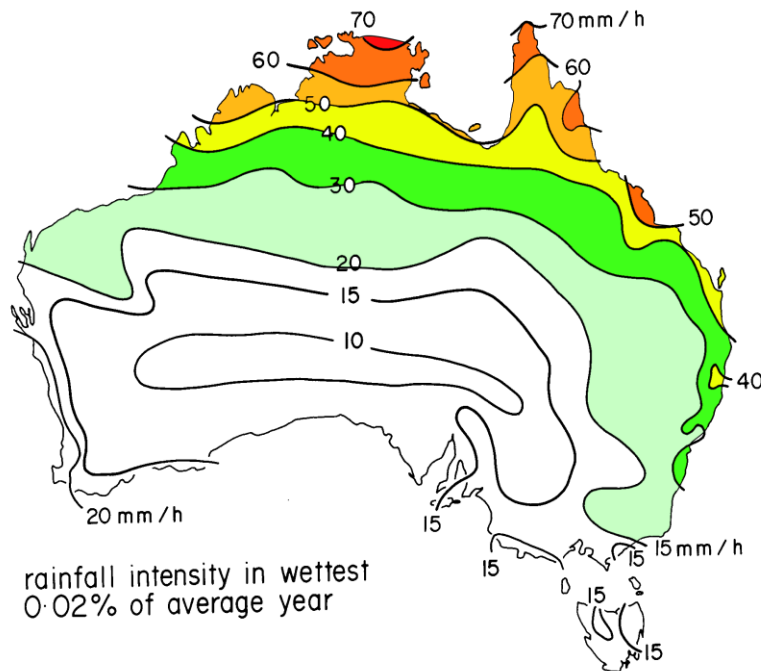

Source Telstra LEO rain fade report

The rainfall intensity map[10] of Australia below, identifies those areas that experience 20mm or greater rainfall intensity.

---

[9] Refer independently to USO table 'Telstra services outside the NBN fixed-line footprint (Confidential)
[10] A BOM sourced map see http://www-das.uwyo.edu/~geerts/cwx/notes/chap10/oz_heavy_rain.html

The map above shows the intensity in millimetres per hour during the wettest 0.02% of an average year, i.e. over the wettest consecutive period of 105 minutes (1). It is obviously most in the monsoonal north of Australia, high along the east coast, and least in the arid southern inland. The rate of 70 mm/h, as observed in Darwin, represents a fall of 123 mm over 105 minutes. The area of least intensity is displaced to the south relative to the most arid regions of Australia, because in the northern interior most rain results from short-lived heavy rain events.

The rainfall intensity map identifies (colour gradient) those areas with periods of rainfall greater than 20mm/hr in the wettest 0.02% of the year. These are the area's most vulnerable to LEO rain fade.

High rainfall intensity is likely for a significant area of Australia's landmass. The incidence and risk of extended LEO outage, escalates as rainfall intensity increases.

User Experience From long experience on the Mid North Coast of NSW, rainfall in excess of 20mm per hour can degrade and fail a LEO service. Following is the record from Sam Knows for a Starlink rain event at Gloucester NSW on the 21st February 2024.

Whilst the total outage time for this event was recorded by Sam Knows as **7 minutes 48 seconds** the rain event resulted in a total of eight smaller disconnections over a **~15-minute period**. Thus, the effective down time was more than double the recorded outage time. This phenomenon (on/ off rainfall induced outages over a long period), explains why **Telstra's rain fade availability data does not represent the customer rain fade outage reality**.

It also explains why actual Starlink users in the tropics, advise of unserviceable periods, during fain, in excess of one hour.
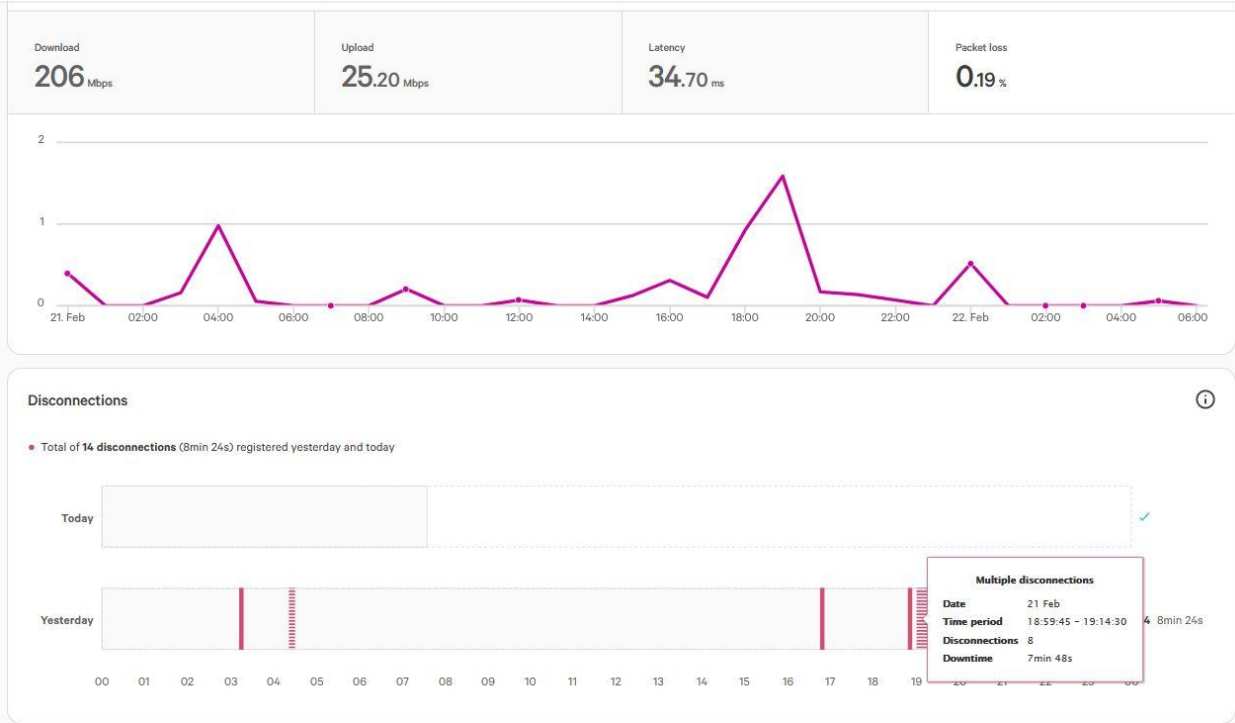
The rainfall intensity (rain rate) for this event peaked at 75.6mm/hour, on my home rain gauge.
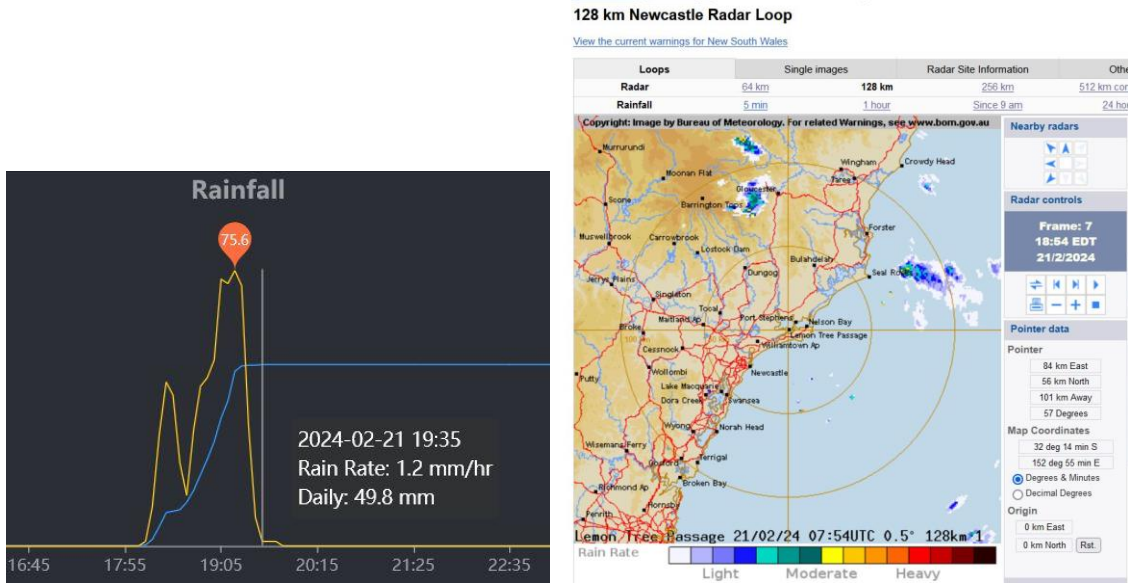
Interestingly, the rain event does not look overly threatening on the BoM radar.

Also see **Case Study 5** where a Starlink outage lasting 30 minutes is accurately reported.

USO service Availability

Consumer advocacy groups are calling for a USO service availability of greater than **99.99%**.

99.99% equates to a service downtime of **1.01** minutes per week.

See a service availability percentage table below[11].

Percentage calculation

Availability is usually expressed as a percentage of uptime in a given year. The following table shows the downtime that will be allowed for a particular percentage of availability, presuming that the system is required to operate continuously. Service level agreements often refer to monthly downtime or availability in order to calculate service credits to match monthly billing cycles. The following table shows the translation from a given availability percentage to the corresponding amount of time a system would be unavailable.

Availability %	Downtime per year[note 1]	Downtime per quarter	Downtime per month	Downtime per week	Downtime per day (24 hours)
90% ("one nine")	36.53 days	9.13 days	73.05 hours	16.80 hours	2.40 hours
95% ("one nine five")	18.26 days	4.56 days	36.53 hours	8.40 hours	1.20 hours
97% ("one nine seven")	10.96 days	2.74 days	21.92 hours	5.04 hours	43.20 minutes
98% ("one nine eight")	7.31 days	43.86 hours	14.61 hours	3.36 hours	28.80 minutes
99% ("two nines")	3.65 days	21.9 hours	7.31 hours	1.68 hours	14.40 minutes
99.5% ("two nines five")	1.83 days	10.98 hours	3.65 hours	50.40 minutes	7.20 minutes
99.8% ("two nines eight")	17.53 hours	4.38 hours	87.66 minutes	20.16 minutes	2.88 minutes
99.9% ("three nines")	8.77 hours	2.19 hours	43.83 minutes	10.08 minutes	1.44 minutes
99.95% ("three nines five")	4.38 hours	65.7 minutes	21.92 minutes	5.04 minutes	43.20 seconds
99.99% ("four nines")	52.60 minutes	13.15 minutes	4.38 minutes	1.01 minutes	8.64 seconds
99.995% ("four nines five")	26.30 minutes	6.57 minutes	2.19 minutes	30.24 seconds	4.32 seconds
99.999% ("five nines")	5.26 minutes	1.31 minutes	26.30 seconds	6.05 seconds	864.00 milliseconds

In my opinion and based on rainfall intensity alone, LEO services cannot sustain 99.99% and are unsuitable for the >20mm/hour areas identified in the rainfall intensity map.

> Note: Rainfall intensity is the only true predictor of rain fade. For example, Tasmania's west coast has amongst the highest annual rainfall in Australia; but only moderate rainfall intensity. LEO services here are unlikely to experience significant rain fade.

> Note: A Sam Knows White Box provides more detailed data when compared to the generic service assurance data provided by a Starlink service.

Mobile Coverage and the USO Those with mobile coverage and a terrestrial internet source have access to one mobile service (often three for emergency calling) and a terrestrially based internet service that supports Wi-Fi calling and other App based voice connectivity

The future of the USO service delivery methodology is of grave concern for those beyond the mobile footprint. A terrestrial based USO voice service that replaces the current terrestrial service, is, I believe, the only methodology that offers true redundancy for remote and rural Australia.

Two space-based services do not offer redundancy.

---

[11] https://en.wikipedia.org/wiki/High_availability#Percentage_calculation

3. For regional and remote mobile users beyond the reach of the terrestrial mobile networks; satellite Direct to Device (D2D) offers a tantalising, but to date, vague solution

Mobile D2D LEO satellite constellations 500Km to 2,00Km above the earth's surface, mimic terrestrial mobile towers. A Federal Government Committee, *The Low Earth Orbit Satellite Working Group* was established and published its findings[12] in February 2024. Disappointingly, the reports five recommendations shed little light on how developments in this technology will benefit Remote and Regional Australia. Moreover, the technology explanations and recommendations are vague at best, and possibly erroneous at worst.

Rather than a *glassy eyed think tank* of LEO possibilities, regional folk require clarity on when, how and the cost of the D2D.

When will D2D arrive, will they need a new phone, will they need a new plan and will they need to change MNO's if they are early adopters?

The recent failure of the *Thuraya* satellite in Australia sheets home the vulnerability of D2D communications sending shockwaves through remote communities who now possess a $1500 '*Thuraya brick'*.

Currently, *Lynk*, *AST* and *Starlink* are vying for the lucrative SMS/ voice D2D mobile market. *Sateliot* is already providing services in the 5G IoT space[13].

A recent article (March 2024) discusses the challenges facing D2D evolution[14]. It indicates …

> *The reason for this lack of standardization is the rather limited scope of release 17 of 3GPP, which should have set the standards for 5G TN/NTN multi-connectivity. However, it is limited to only transparent satellite access nodes. This excludes any regenerative capabilities to compensate in the NTN 5G Core Network and Radio Access Network (RAN) for satellite-related issues such as long propagation delays, large Doppler effects, rain fading and so on. As a result, release 17 will at best facilitate interworking between 5G TNs and NTNs. But that leaves full TN/NTN multi-connectivity for future releases 18, 19, 20 and onward.*

> *However, the new direct-to-device LEO-sat constellations will be launched and become commercially available long before that date. As such, each D2D LEO-sat provider will develop and implement its own separate, proprietary and dedicated Core Network and RAN solutions best suited to make their services connect seamlessly with unmodified 5G user equipment.*

and

---

[12] https://www.infrastructure.gov.au/sites/default/files/documents/low-earth-orbit-satellite-working-group-2023-chairs-report-19april2024.pdf
[13] https://sateliot.space/en/
[14] https://spacenews.com/direct-device-leo-satellite-service-providers-collaborate-bundled-enterprise-services/

Where one LEO-sat operator provides its services only as a stand-alone — without integration with terrestrial 5G services — another operator offers this terrestrial-satellite integration by connecting the mobile network operator's core networks directly to its satellite RAN. Meanwhile, others propose a generic roaming model. As such, it will be virtually impossible for operators and resellers to manage the whole LEO-sat service range consistently and efficiently.

4. Anecdotally, nbn continues to demonstrate poor fault accountability whilst deploying complex fault resolution processes, which frustrates and confuses customers.

nbn is the default SIP (Statutory Infrastructure Provider). nbn wholesales 'last mile' internet connectivity and RSPs (Retail Service Providers) link the nbn 'last mile' connectivity and their own networks to deliver an end-to-end retail internet service. The RSP's most basic responsibilities are service assurance, billing and overall management of the end-to-end service.

Service assurance for complex faults such as high latency, slow speeds, drop-outs and intermittency, often become a revolving door nightmare for the customer, their RSP and nbn. The problem is worse for more isolated rural customers connecting to nbn Fixed wireless and nbn Sky Muster. Should the nbn service fail, they may not have an alternate connectivity medium.

The very first hurdle the customer must face is establishing, with their RSP, that their fault exists and its magnitude.

nbn cannot test and measure the end-to-end service and nbn service tools utilised by the RSP are equally deficient.

Almost invariably when a fault persists and after much nbn *pontification*; the RSP (on nbn approval) will organise a nbn truck roll with the customer, for on-site investigation by a nbn technician. Unfortunately, the nbn technician is usually only focused on the nbn leg of the service and rarely looks at the end-to-end service e.g. RSP or user provided in-home equipment is often a key problem contributor.

Contrast nbn's service assurance to Starlink. When any problem arises, the Starlink customer engages with an AI assisted text service, which immediately checks the customers service performance parameters including speed, availability, latency, site obstruction etc. AI or customer support then manages the fault resolution, rapidly providing a solution; which anecdotally, is prompt and entirely satisfactory for almost all customers.

Chalk and cheese.

5. The Telstra 3G closure for regional and remote customers has been troubling.

Whilst the issue of handsets that support 4G and emergency calling has made headlines, there is much frustration and disquiet in rural communities surrounding the 3G closure.

Telstra promises *equivalent coverage for 4G over 3G*, but many believe this is a misleading term as it may simply mean adding additional 4G coverage at some locations, whilst decreasing coverage at others.

The original Telstra deadline for 3G shutdown was 30th June.

Telstra extended the 3G closure to 30th August, claiming poor 'customer preparation' as the reason for the two-month extension. Hence one must assume that by now Telstra has well and truly completed all necessary 4G upgrades?

Well no.

Over the last six months, using the Telstra mobile coverage website[15]; 3G vs 4G coverage maps of thirteen locations around Australia was sporadically recorded. These locations are Alpha Qld, Anglers Rest Vic, Barrington NSW, Broken Hill NSW, Broome WA, Charters Towers Qld, Kunanurra WA, Mid North Coast NSW, Conargo NSW, Esperance WA, Katherine NT, Oberon NSW and Port Lincoln SA.

Below is just one example, displaying the current 3G vs 4G coverage comparison for Alpha, Central Queensland as at 28th June 2024.

---

15 https://www.telstra.com.au/coverage-networks/our-coverage
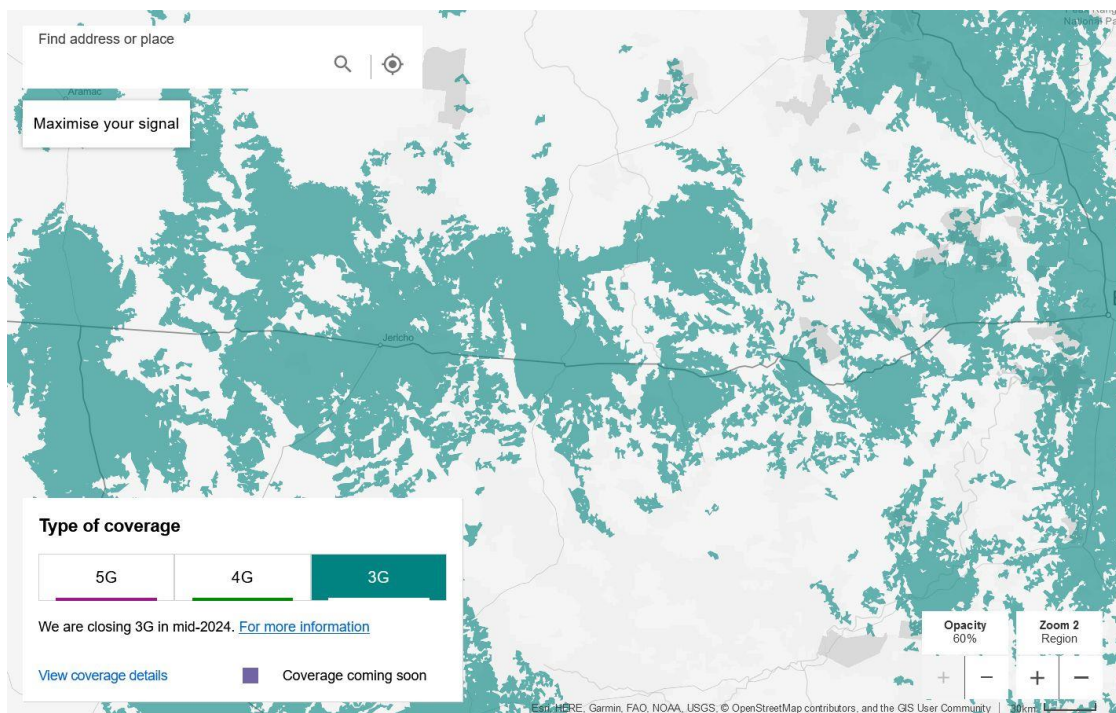
Alpha 3G handset only coverage as at 28th June 2024
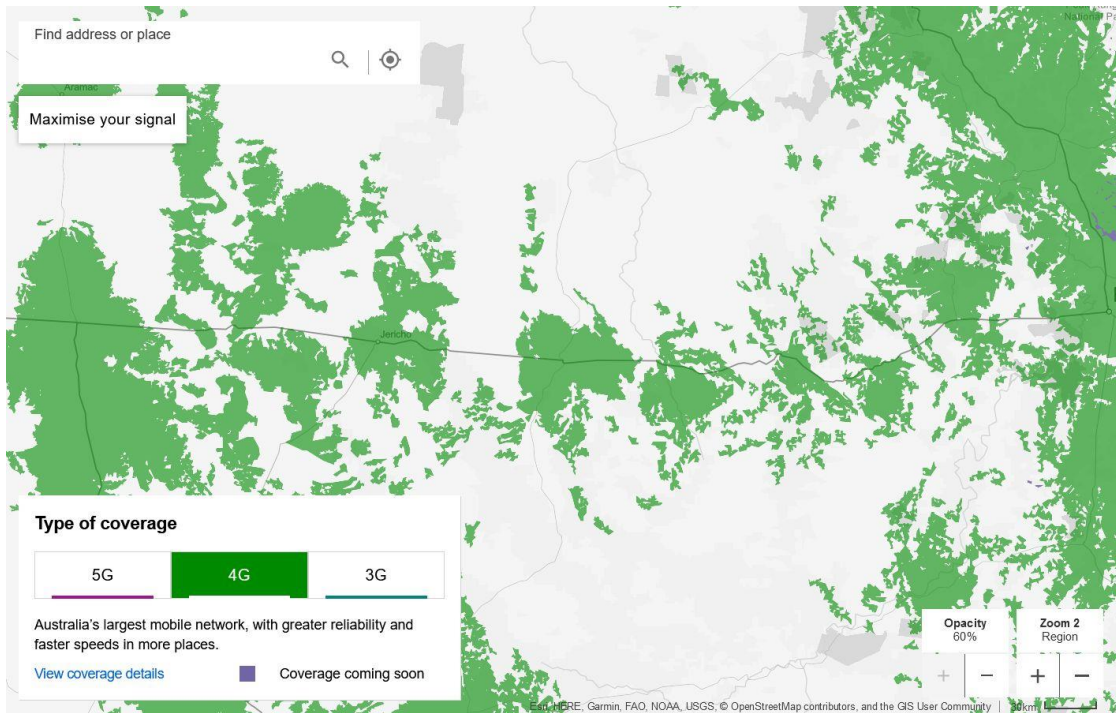
Alpha 4G handset only coverage as at 28th June 2024

Properties surrounding Alpha, like many regional communities nationally, have relied on NextG Wireless Loop (NGWL or 3G voice) for out-of-town landline services. Telstra are currently transitioning the NGWL network to 4GFW voice, however if the above map is any indication, they have some way to go. Please see **Issue No. 5** for further discussion regarding the **NGWL transition**.

Whilst Telstra mapping may lag actuality by some six weeks, it appears clear that there currently remain significant disparities in the national 4G vs 3G coverage.

On Farm equipment Many regional premises rely on externally mounted high gain antennas and Nextivity Cel-Fi repeaters to provide a satisfactory in-home mobile service. These repeaters have extended the mobile coverage considerably for those that have invested in this technology. The original Cel-Fi units do not support 4G and many units require re-configuration for 4G service. In all cases, older 3G (850Mhz) roof mounted antennas are unsuitable for 4G reception. This has necessitated the upgrade of older Cel-Fi installations (at the owner's expense) by qualified technicians or Telstra. In addition, land holders must carefully check their on-farm monitoring and surveillance technology to ensure 4G compatibility.

The recent (now fully committed) Federal Government grants available for farm connectivity is acknowledged[16]. A future funding program to continue this work would be greatly appreciated by rural landholders.

Understandably with such a large technology change, things fall through the cracks.

---

[16] https://business.gov.au/grants-and-programs/on-farm-connectivity-program

Misunderstanding of antennas, Cel-Fi repeaters and poor and difficult to navigate mobile coverage mapping has led to numbers of customers reaching out for help. Telstra (the main mobile service provider for rural customers), as a generalised comment, fails badly in resolving these fundamental connectivity problems. Customers have resorted to escalating problems to the Minister and media before meaningful action is finally taken by Telstra.

See **Case Study 6 and 7**.

Mobile mapping Mobile mapping and coverage statistics provided by the mobile network operators is uncalibrated.

    a.   When a carrier claims coverage of population or landmass just what does this mean?
    b.   Does one just need a mobile handset, or does one require an external antenna to meet the claimed coverage and what sort of antenna is required?

For the Telstra coverage map, a location can generally be found by input of a residential or locality address. In the following example, the location is identified by a marker per this search for '*Barrington Tops'.*

The map identifies adequate 3G and 4G coverage for that location marked by a pin. However, that may not be the precise location you require. You may wish to zoom out to view the surrounding area. Or you may wish to see service coverage with an external antenna called intriguingly called '*Maximise your Signal'.*

There are no specifications for the 'device' used to '*Maximise your Signal'* and you may wonder just what that box regarding *outdoor* and *indoor* coverage is indicating?

In any case the moment you close the box or zoom out the location, the pin location marker is gone. You no longer have a reference for your search!
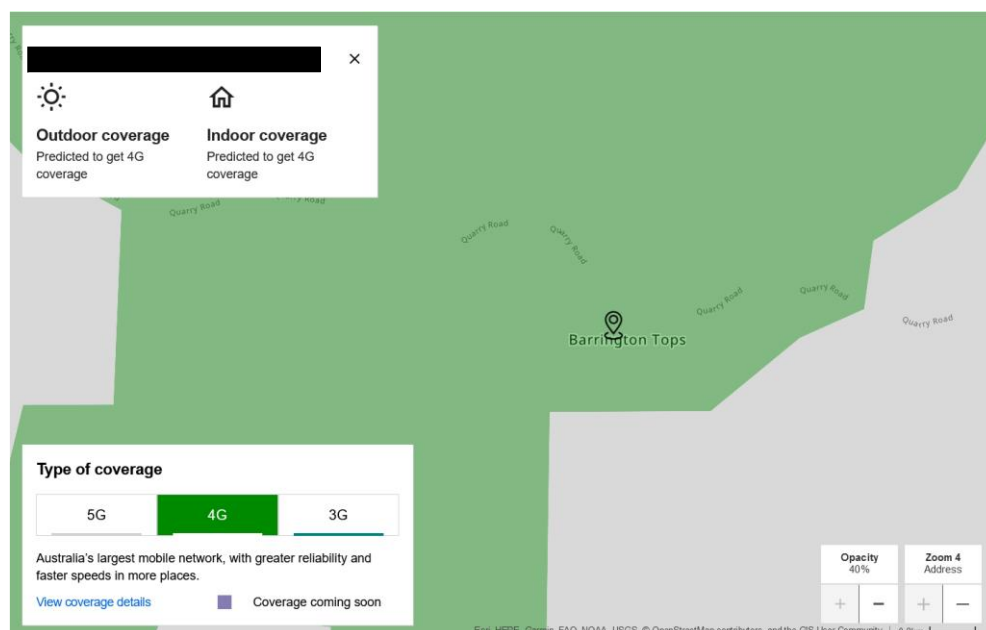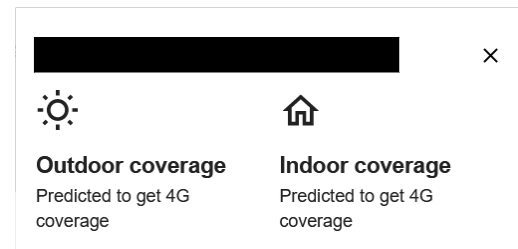
As a consequence, the Telstra mobile coverage map is meaningless to many and simply too clumsy and cumbersome to readily use.

Put simply the Telstra mobile coverage map appears to be designed to obfuscate and confuse.

In addition, major MNO broadband advertising and advice is misleading; as none of the major RSPs and mobile operator RSPs retail nbn Sky Muster. This can result in a trusting but misled customer signing up for an unreliable mobile data service or plan and device.

6. Consequential to the 3G shutdown the Telstra USO NextG Wireless Loop (NGWL) migration is much troubled indicating problems for future USO service transitions

NGWL is delivered over an extensive Telstra 3G mobile network that provides in excess of **5,000** quality voice and data services to many remote properties. NGWL uniquely uses '3G voice' for the service. '3G voice' ensures voice priority during times of network congestion and the customer experience is reportedly good. The customer premise NGWL modem is essentially a 'mobile phone in a box', with a standard telephone handset interface.

NGWL leverages the 3G mobile backbone network using tower mounted 'mobile repeaters' (or boosters) to considerably extend the mobile footprint. Mobile repeaters are reliable and low cost, but by design 'thin route' i.e. they do not support many customers or significant bandwidth.

NGWL was first rolled out in around 2008 and has provided some sixteen years of service; as has the HCRC network, first rolled out in 1984 as DCRS. NGWL and HCRC are both bespoke Telstra networks that have worked remarkably well.

> Note: With some **9,000** HCRC customers, another USO migration potential train wreck, is just around the corner.

Telstra inexplicably left the NGWL migration to the very last minute.

Following a series of consumer group-initiated Telstra NGWL migration Webinars in early April 2024, customers **first learnt** of the two possible service migration outcomes.

a. A new thin route 4G voice and data service similar to NGWL, called 4G Fixed Wireless or **4GFW**.
b. A satellite Starlink voice and data service called **Starlink Voice**.

In late May 2024, despite the earlier proposed 3G shutdown of 30th June 2024, many NGWL customers were yet to be migrated.

For **4GFW** customers there are two Telstra plans available; Upfront Home Phone Plan for $50 per month (with 2GB of data) and Upfront Starter Plan (with 50GB data allowance) for $65 per month. Telstra advise

that if the data quota is exhausted the data service is capped at 256kbps; however, the 4GFW voice service will be maintained.

For NGWL customers transitioned to **Telstra Starlink Voice**, there appears to be one 'voice only' plan for $50 per month with no data allowance. **To date, attempts to clarify the Telstra NGWL Telstra Starlink Voice offer are unanswered**.

Telstra has established an 1800 contact number for NGWL transition support but for many callers, Telstra (somewhat incredibly), was unable to clarify what voice service they would receive. There was also confusion about the level of support that transitioned priority assist customers would receive. Once the service is transitioned NGWL customer support reverts to standard Telstra fault reporting. In the past NGWL customers had a unique support contact number.

Typical NGWL network infrastructure.
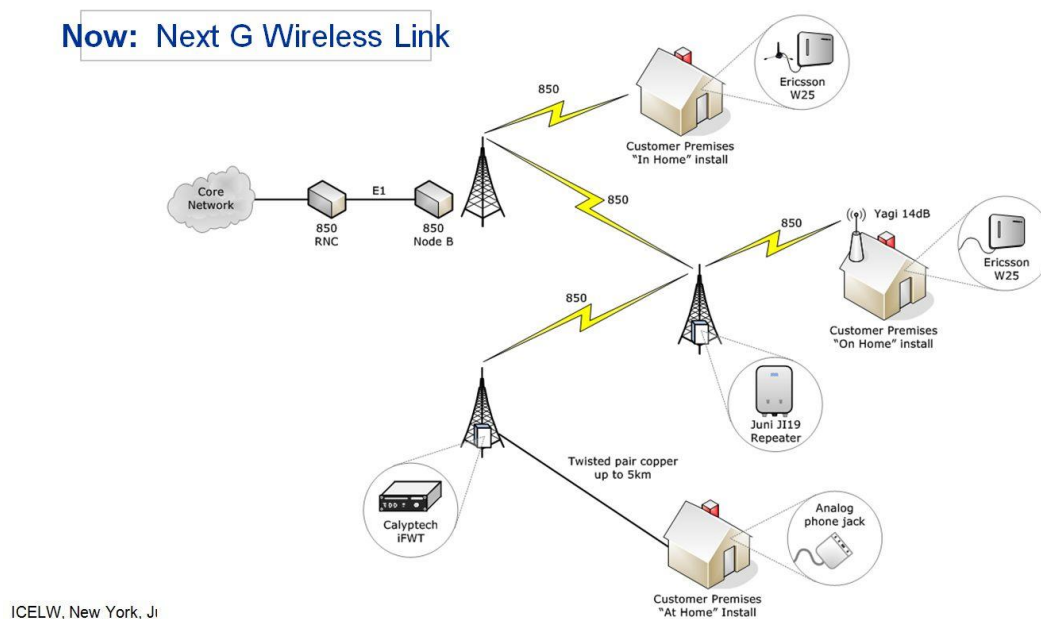
NGWL customers are served:

    a. via the core mobile network (850 node B)
    b. via a 3G repeater tower (Juni J119)
    c. via a ploughed copper landline and repeater tower (Calyptech IFWT), as these premises are out of range of the 3G footprint.

The replacement 4GFW network utilises the same NGWL infrastructure with upgraded 4G equipment and antennas. The concept of core network and repeater network coverage is replicated.

It appears that customers with an NGWL copper landline extension (Calyptech IFWT) will be transitioned to non-terrestrial satellite Starlink Voice, rather than retain their copper landline service.

> **Note:** The copper landline is relatively new Telstra infrastructure (2008 onwards) and will provide many more years of reliable service. In order to reinstate the copper landline for in the 4GFW

environment, it requires that the 'in home' Telstra Wi-Fi modem is installed at the tower. The existing copper landline then connects to the voice port of the Telstra Wi-Fi modem at the tower as it did for the 3G Calyptech IFWT. The customers' existing handset will work exactly as it did for NGWL. This is a straightforward technical solution using existing infrastructure and simpler and considerably more reliable than an untested Starlink voice installation.

For NGWL customers transitioned to 4GFW, the customer requires a technician visit where the existing external 3G antenna is replaced with one that is 4G compatible. The 3G modem is replaced with the latest Telstra 4G Wi-Fi modem and the external antenna is connected via coaxial cable. For some customers without an external antenna this is a 'self-install procedure'.

A standard telephone handset connects to the voice port on the Wi-Fi modem.

A **potential problem** for the Telstra 4GFW USO service is that the voice service is provided via Telstra VoIP and not via 4G VoLTE. 4G VoLTE has voice priority during times of network overload. It is understood that Telstra VoIP cannot benefit from this 4G network feature and that in times of network overload, the voice service may degrade or fail altogether, a potentially significant problem to which NGWL and HCRC networks were immune.

A **further problem** is the equipment used by Telstra to upgrade the 3G Pico repeaters to 4G. At some sites (perhaps not all), Telstra have installed legacy Nextivity Cel-Fi GO G31 boosters as depicted below.

Background In late 2021 Telstra acquired additional 850Mhz spectrum (the old 3G band) and are refarming this frequency band for 5G NR 850Mhz.

This is true for the core mobile radio sites that feed the NGWL Pico repeater sites where both 4G B28 700Mhz (20Mhz B/W) and 5G N5 850Mhz (14.9Mhz B/W) will be broadcast following the 3G shutdown.

To recap, following Telstra's 3G shutdown, Telstra towers will broadcast both low band 4G and low band 5G at considerably increased bandwidth (B/W).

Increased bandwidth provides both speed and capacity for users, Customer handsets will acquire either 4G or 5G or (for late model handsets) aggregate both carriers, for a very considerable speed boost over the old 3G service, where 4G/5G signal strength is sufficient.

The problem The Cel-Fi GO G31 installed at Pico sites support a single band at a time and currently do not support NR 850Mhz. Even if they could be updated to support NR 850Mhz (likely) they can't boost both 700 and 850 at the same times. They only select 'the best frequency' i.e. one only.

In order to maintain the 4GFW service, the current PICO repeaters will be locked by Telstra, to B28 4G only.

To realise the best possible outcome for rural customers in the old NGWL footprint, the latest Cel-Fi GOs that boost multiple bands supporting both 4G 700Mhz and 5G 850Mhz, should be installed at the 4GFW repeater sites.

Without this simple upgrade, there is a considerable waste of excellent Telstra infrastructure with rural customers denied a valuable mobile bandwidth boost.

Below is a typical NGWL network diagram identifying the key components discussed above.
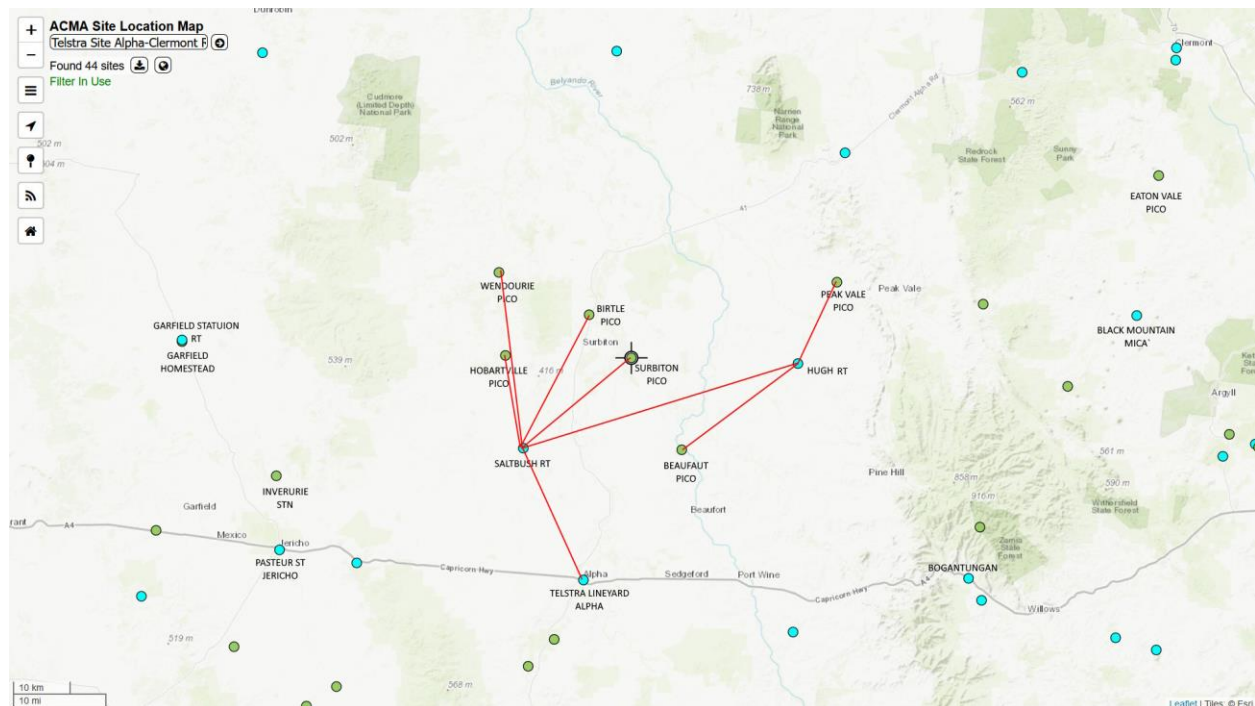
Confusion NGWL customers report much confusion with transition plans, procedures and report poor practice whilst being transitioned. Technicians are ill prepared and there are instances requiring a new home 4G antenna, without the proper kit available.

See the Appendix - NGWL transition customer Case Study 1, 2, 3 and 4.

See the Appendix - Photos of typical NGWL and HCRC infrastructure.

7. The critical role and importance of consumer advocacy

Without concerted consumer advocacy and tireless customer interaction by key consumer groups much of the great strides in meeting rural connectivity goals and much of the content and direction of this very submission would remain unknown or conveniently buried from sight.

Consumer advocacy groups continue to provide invaluable monitoring and policing of poor and inaccurate consumer information. Recent examples are correction of misleading CIS documents and the reorganisation of Telstra's 3G closure information to provide a more customer friendly resource.

True consumer engagement is important; after all we are the customers and doesn't the customer always know best?

Appendix

Case Study 1

Telstra Starlink Voice Disinformation - Bundaberg

We live in the Bundaberg region of Queensland. About a month ago, we set up Starlink internet, after experiencing terrible ADSL internet for two years with Telstra. It was working much better and faster than Telstra internet, so we decided to cancel the Telstra internet service, but wanted to keep our Telstra landline (the Telstra ADSL Internet and Telstra Landline were bundled together), so we messaged Telstra and explained this. The Telstra customer service rep offered us a bundle for $125 per month which included "Starlink and Homephone", which we thought sounded great, but a little too good to be true.

This bundle would have saved us about $70 per month. (Starlink is $140 per month, landline separate is about $50 per month). We kept asking the rep if anything would be different about the landline and they said no, but it didn't seem right.

So, we posted on Better Internet for Rural, Regional and Remote Australia (BIRRR)'s Facebook group, asking if anyone knew if there were any downsides to this offer. We received a lot of replies, and a lot of people were also interested in the answers. Eventually, someone pointed out the fact that the Telstra Starlink speeds would be capped at 50Mbps down, and another person explained that the "home phone" included in that bundle would not be the same as our current copper landline and said that if we accepted that bundle, we most likely would never get our copper landline back, 'as Telstra were trying to get rid of the copper landlines'.

We went back to check that with Telstra, and they confirmed the speed cap, and also that the home phone would not be a copper landline, that it would indeed be 'a type of VOIP using Starlink'.

We were so thankful to get accurate information from BIRRR. Had we taken the original Telstra reps information at face value, it would have probably have landed us without a copper landline for good.

At the moment we have no power generator, and there is no mobile service here either, so in a power outage, our only communication with the outside world is our copper landline.

Case Study 2

Telstra Starlink Voice Disinformation - Alpha QLD

An NGWL customer north of Alpha Queensland received the following messages from Telstra
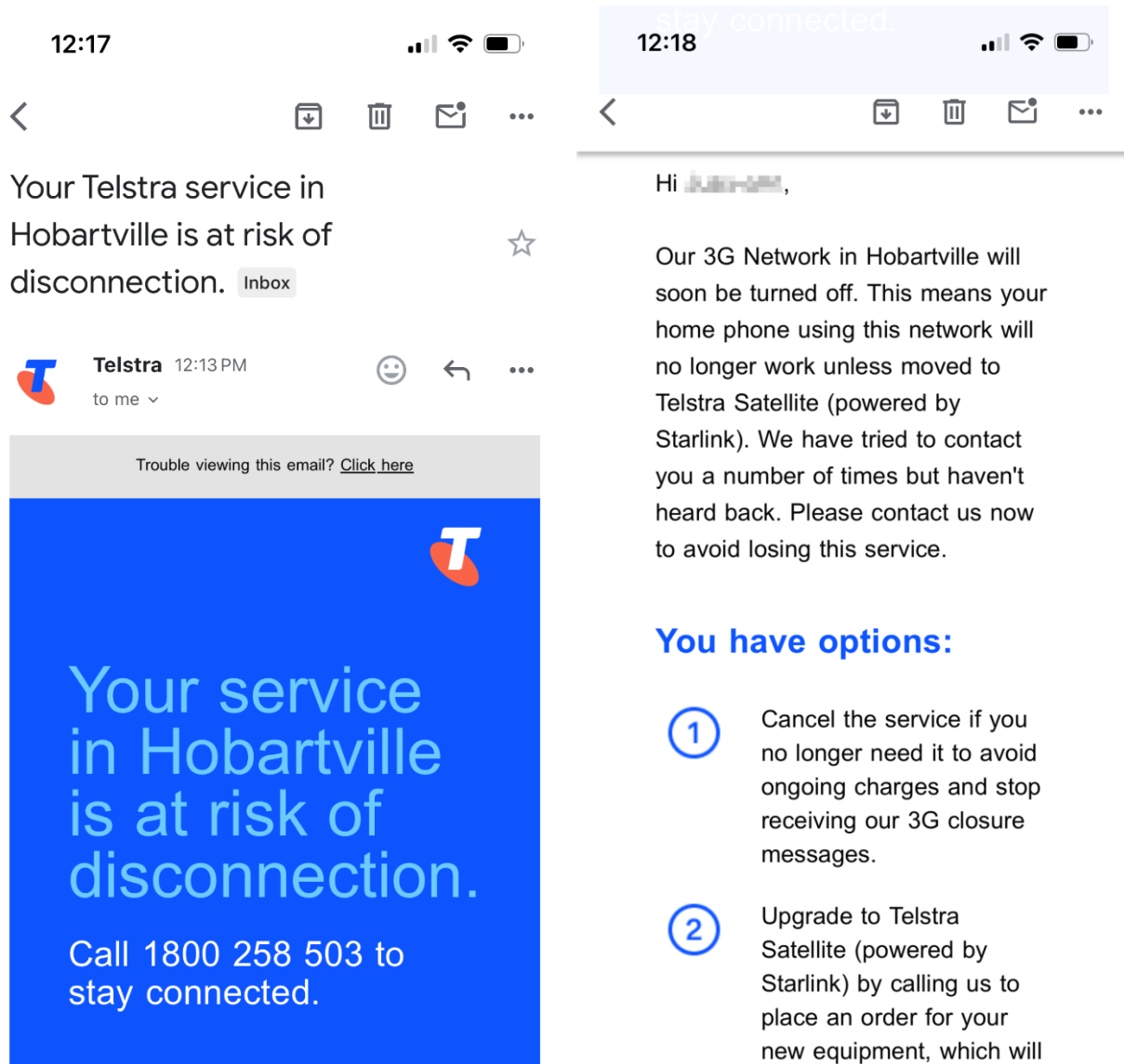
Note the hi-lighted sentence which requires 'a reliable power supply' for the service.

A Telstra technician had visited earlier to install Telstra 4GFW, but upon testing found no 4G signal.

The above message followed some days later.

The network infrastructure supporting the NGWL 3G network at Hobartville is depicted below. The red lines are microwave links.
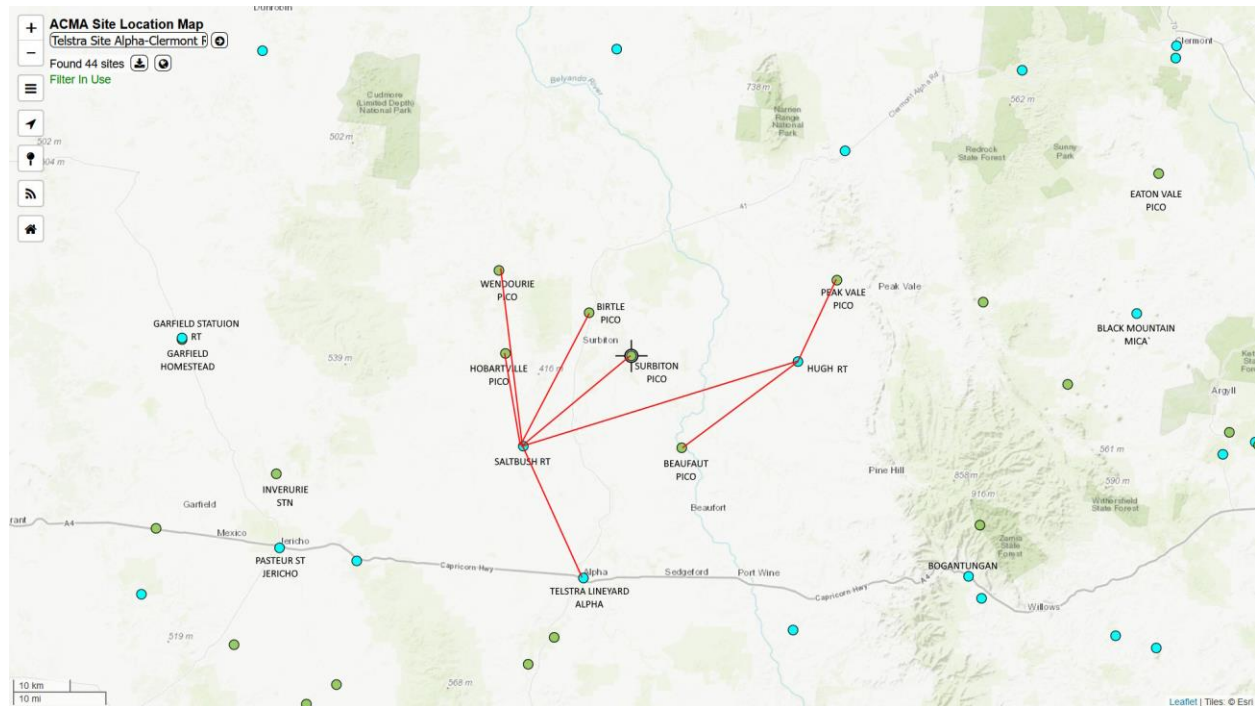
In March 2023 Telstra upgraded each of the PICO towers, including Hobartville with 4G infrastructure in readiness for the upgrade to the primary mobile radio terminals at Saltbush and Hugh.

As at the end of May 2024, the upgrades to Saltbush and Hugh are pending.

Why did Telstra visit the customer premises and wrongly advise the customer that they must transition to Starlink Voice?

The major mobile Radio Terminals will be upgraded for 4G operation and once that is complete all of the PICO stations will be live for 4G.

Telstra began the NGWL migration process too late and is either highly disorganised or culpable of planned disinformation. Either way the impact on the customer's future service is unforgivable.

This is not an isolated example. Disinformation is reportedly widespread amongst NGWL customers and it is feared that many will end up on an inferior non-terrestrial satellite service, when a reliable terrestrial 4G service will become available.

Case Study 3

Telstra Starlink Voice Disinformation - Alpha QLD

The attached message was received by a customer connected to the NGWL network north of Alpha.

The Telstra message is disinformation, as this address will receive a good 4G signal, once the primary radio terminals are upgraded.
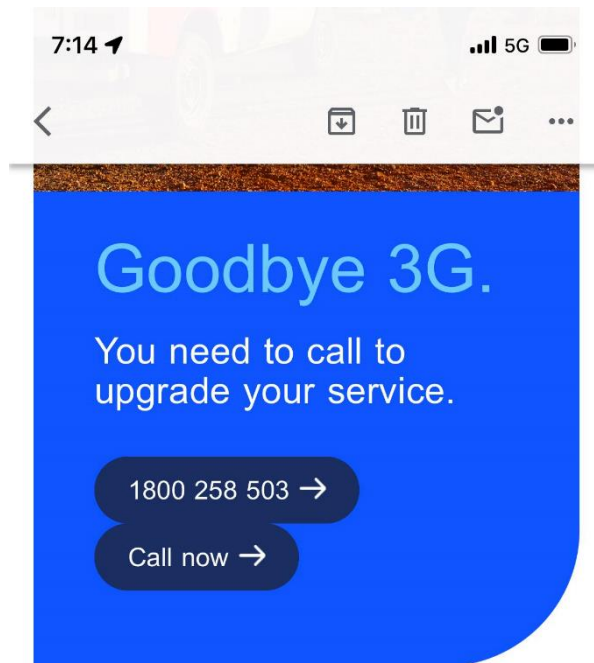
Case Study 4

Telstra HCRC Disinformation - Willows QLD

An existing HCRC customer near Willows, Queensland received the following letter from Telstra.

23 May 2024

‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖

L-565 R-2874488 E-51 I-101

CHANGES TO YOUR TELEPHONE SERVICE

Dear ▓▓▓▓▓▓,

The rural radio service at your premises may be disconnected

We wrote to you on 21/03/24 to let you know about an important update to your telephone service

We are writing to you again as our attempts to contact you in writing and over the phone have been unsuccessful.

From 21/06/24, the rural radio service you are connected to will be disconnected unless we migrate you ==to a fixed wireless solution called Next Gen Wireless Link (NGWL). NGWL is a mobile service that uses Telstra's Next G network to give you access to a fixed voice service.== To perform the migration, and maintain a working service, one of our technicians needs to visit your premises and install the required hardware.

You won't be charged any extra costs for installation or equipment that we provide for the migration, and you can keep using your existing service until you are migrated to the new technology solution. You will also remain on the same plan that you are on (unless you elect to change it), subject to a few feature changes detailed below.

If you are already in contact with us about your service migration, then you don't need to do anything else right now.

If you don't have an appointment for one of our technicians to perform the migration, please call us as soon as possible on ▓▓▓▓▓▓▓▓▓▓▓▓

Here is some additional important information that we included in our initial correspondence, about how the changes will impact you:

There will be some changes when we migrate you from your existing technology:
- ==Currently your service is powered by the network. NGWL, which is the technology we are migrating you to, requires a power supply from your residence to operate. We will provide you with battery back-up for your service, which the NGWL equipment will use in the event of a power failure. The life of the battery back-up we will be providing you will be a minimum of 4 hours, which may be less that what you are receiving now. Please be aware that in the event of a failure in power and battery back-up, your service will not work, and you will be unable to call 000. We will discuss these changes with you further over the phone and when our technician visits your premises.==
- ==There will be some features that were available with your existing technology that will not be compatible with your new technology:==

Feature	Fixed Wireless
Instant Hotline	Not compatible
Line Hunt	Not compatible
Dial Up Modem	Not compatible
Fax	Not compatible
Call Barring	No local access only barring. A higher level of barring can be requested though which may include Local access barring.

Please find enclosed the NGWL terms which contain important information about the NGWL technology you will be migrated to.

What's next for you?

Please contact us on 1800 1300 15 opt 2, 7am - 7pm AEST, Monday to Friday to arrange a suitable time for one of our technicians to visit your premises. As noted above, if we can't arrange with you to have your service migrated by the date mentioned above, your service will be disconnected.

Once a technician appointment has been booked, one of our technicians will come to your property to install the required hardware (which consists of an internal unit and an external aerial) and complete the service migration. If the installation cannot be completed on that same day, our technician will organise a second appointment with you.

Thanks for being a Telstra customer and we look forward to working with you to perform this migration at your premises.

The highlighted text identifies that this customer will soon be transferred to a NextG Wireless loop (NGWL) service. As discussed in this submission, NGWL is a Telstra 3G based service, with the current shut down planned for 30th August 2024.

The customer has no idea what and why Telstra is offering a new service.

The advice appears to be in gross error.

At this time, Telstra has not advised of HCRC shutdown or transition plans.

Case Study 5

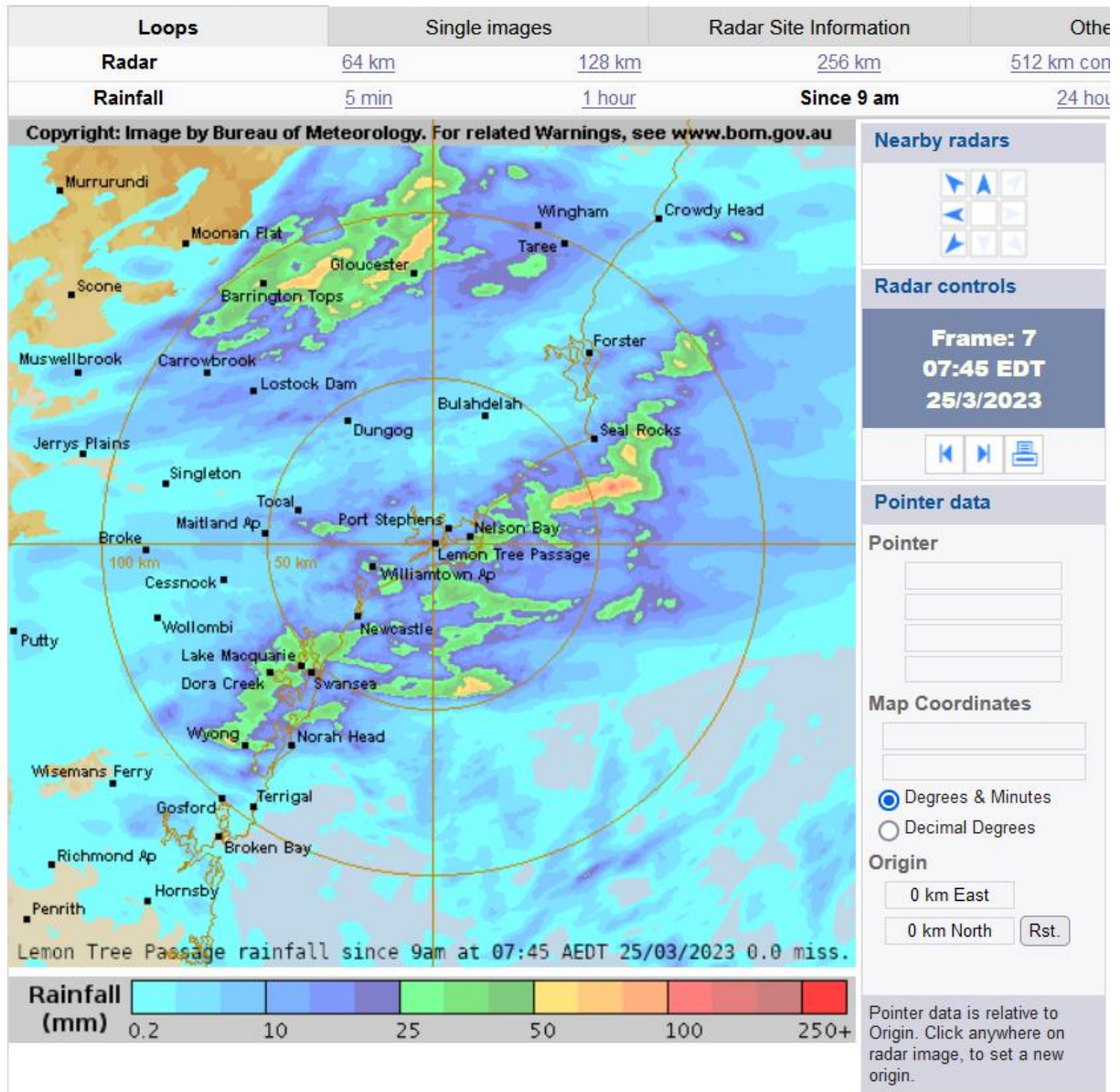**Rain Event near Gloucester NSW, 25th March 2023**

We have both Sky Muster Plus and Starlink available.

The rain event is captured in the graphic below by the Newcastle radar. The radar indicates 24hr rainfall in excess of 50mm.
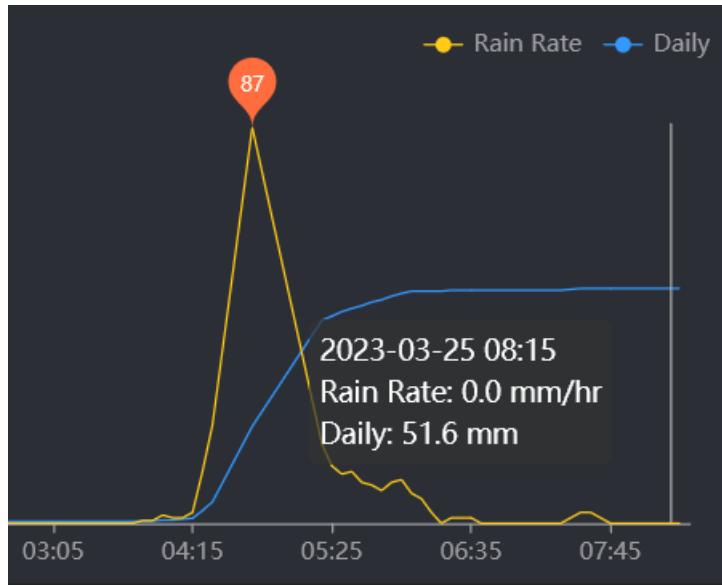
The auto rain gauge recorded the event which commenced at 4.10am through to around 6.30am.

It identifies a peak rain rate of 87mm per hour and a total rainfall of 51.0mm.

The manual rain gauge collected 55mm.

This is a typical east coast storm season event.
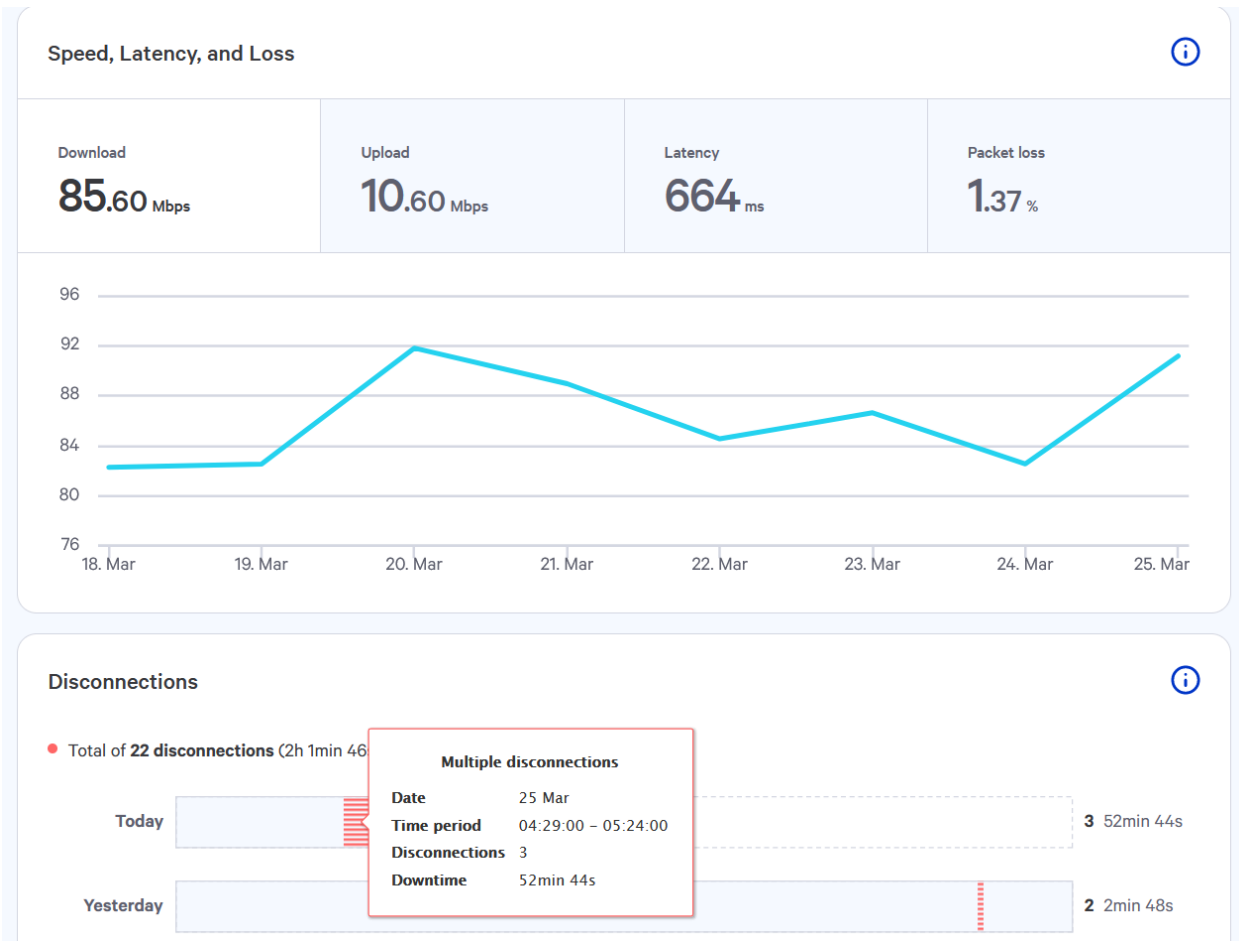

During the rain event the Sky Muster service failed for ~55 minutes. Below is the outage as recorded by Pingplotter.

The Starlink service also failed for a little over 30 minutes, as identified by it's Pingplotter chart.

Sam Knows is also available and is connected to Sky Muster Plus service.

Sam Knows accurately recorded the outage. Sam Knows is invaluable.

Importantly

The copper Telstra landline was uninterrupted, as was a solar powered 4G service, relayed from an on-farm hill (with reception) 600m distant and connected by Wi-Fi.

The solar relay connects to a Telstra tower 39Km away.

Case Study 6

█████ lives in regional Victoria. He knew about the pending 3G shutdown and configured his 4G compliant Cel-Fi appropriately for 4G reception, but found no sreception.

Checking the Telstra 4G coverage maps led to further confusion as the map identified that there was 4G coverage when using the 'maximise your signal' button. Peter had no idea what this meant as all he knew was that the 4G did not work, despite a professionally installed external antenna and Cel-Fi.

He called Telstra for help without satisfaction, wrote to the Minister and in desperation called the ABC.

The ABC interviewed Peter and escalated his problem to Telstra. Shortly after Telstra 'magically' appeared and conducted signal checks confirming an adequate 4G signal at his premises.

Telstra checked the existing external antenna and advised that it was unsuitable for the new 4G bands and upon installation of a new 4G compatible antenna, his service was restored.

Peter is happy with his new service but is very frustrated by the long and arduous path to resolution.

He knows that many will suffer the same experience.

Footnote explanation

>*3G (850Mhz and 2100Mhz) occupy a different frequency spectrum to 4G (700Mhz and 1800Mhz). Many rural locations rely on an external antenna to support their mobile connection and many require an antenna or equipment upgrade that supports 4G frequencies.*

>*Without an antenna and/or possibly equipment upgrade they will have no service when 3G is closed. There is a lack of technicians and independent advice to help consumers understand if new equipment is required.*

Case Study 7

█████ lives on the Mid North Coast of NSW.

He was vaguely aware of the 3G closure. He has a Cel-Fi Smart Antenna (purchased locally) some years ago and an external antenna (installed by Telstra). The installation provided excellent 3G service for the family mobile handsets. He uses Sky Muster for his internet service which is unsuitable for Vo Wi-Fi access.

The family relies on the mobile network for voice calls, following disruption to their landline on the neighbour's property; which James advises Telstra refused to remedy.

In recent months, the 3G service has become unreliable, with calls frequently dropping mid conversation. He reported the problem to Telstra, but after many calls there was no resolution or answer as to why his once reliable service had so dramatically degraded.

Finally, after many repeated attempts over many months, he was directed to a Telstra technical support group, who acknowledged his problem and explained that the poor 3G signal "was due to our network upgrades in readiness for the 3G closure" and suggesting, after checking their records for the site, that a new antenna would be required. Telstra provided a quotation for a new antenna installation.

A neighbour, with a telecommunications background, who experienced a dropped call from █████, offered to investigate.

He found that there was already a wideband antenna suitable for 3G and 4G installed at the property, however he considered that the coaxial cable from the antenna to the Cel-Fi, installed by Telstra, was inferior and lossy.

He also determined that the █████████ Smart Antenna, whilst supporting 3G, was unsuitable for 4G reception.

He observed a marginal 4G signal on the verandah of the home.

He advised James of a suitable new Cel-Fi GO and recommended that James either maintain contact with Telstra and request a Cel-Fi equipment and antenna upgrade, or seek a professional installation from a private provider.

James contacted Telstra who initially offered a Smart Antenna solution for $2,424. Telstra then revised this to a GO G41 and external high gain antenna with professional installation for $3,312, which includes a Rural zone surcharge of $960 for the installation component.

Given the frustration and effort on his behalf to resolve what was essentially a very basic 3G closure problem, which severely impacted his voice communications for some six months since first reporting the problem; Peter is currently seeking compensation from Teltra to reduce the cost of the upgrade.

James is paying $3,312 for a mobile service that the vast majority of Australians take for granted.

Images of HCRC customer terminals

NGWL Images