Connecting Australia's agricultural landscape

Discussion paper

December 2021

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Document release date: 17 December 2021

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1 About this document

This document seeks feedback regarding the establishment of a quality assurance mark to support on-farm connectivity for Australian agriculture.

1.1 Background

The Australian agriculture sector has set itself the ambitious target of increasing the farm-gate value of production to $100 billion by 2030; this is an objective backed by **nbn**. Research suggests that the 'unconstrained adoption' of digital agriculture could add up to $20.3bn per year to the value of the Australian agriculture sector[1]; **nbn** research found that three quarters of this value uplift can be driven by internet-enabled digital agriculture[2].

1.2 Purpose

The purpose of this discussion paper is to explore options and seek feedback about the possibility of developing a Quality Assurance (QA) Mark (the Mark) for network extension devices to support agricultural Internet of Things (IoT) and in-paddock connectivity, and the proposed assessment criteria that would underpin the Mark.

Working with industry, **nbn** is committed to helping our farmers save time, grow productivity and make more informed decisions. To achieve this objective, **nbn** is seeking feedback from industry to support the development of a QA mark to assist farmers to understand the opportunity to extend the coverage of their home-based **nbn**™ network connection to their farm machinery, buildings and wider landscape with confidence.

1.3 Objective

To support the increased and accelerated adoption of digital agriculture in Australia, **nbn** proposes that a Mark be established to assist consumers select the infrastructure necessary to extend connectivity beyond the farmhouse and into the paddock.

Research shows that the 'unconstrained adoption' of digital agriculture could add up to $20.3bn to the value of Australian agricultural production, per year, by 2030; research by **nbn** found that $15.6bn of this annual value increase could be attributed to internet-enabled digital agriculture. With connectivity essential to the wider-spread adoption of the devices necessary to unlock and capture this value, **nbn** considers it necessary to assist farmers and land managers to understand how to extend otherwise place-based **nbn**™ network connectivity beyond the farmhouse and across an agricultural landscape.

The objective of the Mark is to assist producers understand the capabilities of a device to enable investment in the right type of telecommunications infrastructure to support each farm business' digital adoption plan.

1.4 Scope

The scope of the Mark that **nbn** may explore includes:

[1] Accelerating precision agriculture to decision agriculture, Australian Farm Institute, November 2018
[2] Connecting Australia Future of Farming, November 2020

- independently-assessing devices used in the extension, repeating or meshing of private network connections in agricultural settings
- Potentially provide a visual cue to consumers about the capability of the device
- Potentially include a colour-code and/or rating based on a series of criteria about the device, providing consumers with guidance about product characteristics.

nbn will be exploring the options for how a product could potentially carry the Mark. This may include requirements for independent testing and verification, as well as adherence to branding criteria which may be established by **nbn**. Further detail about the Mark is contained in this document.

nbn has proposed a number of options and the outline of concepts for the Mark in this paper. These options and proposals are exploratory for discussion purposes. They are not approved or endorsed to proceed. Implementation would be subject to further due diligence, compliance factors and approvals.

1.4.1 In scope

Assessment of network extension, meshing or repeating devices which can be used to extend the reach of an **nbn**™ network connection beyond a connected premise for personal use. The proposal will need to consider and ensure compliance with any existing fair use policies of **nbn**. The extended signal must continue to be available only to the purchaser of the **nbn**™ network signal that is being extended.

1.4.2 Out of scope

For the purposes of this discussion paper and the proposed concept, consideration is limited to network extension devices which enable on-farm connectivity (as outlined at 1.4.1).

Examples of products which are not within the scope of the Mark include, but are not limited to

- Internet of Things devices
- Probes
- Monitors
- Sensors

And other such devices which are connected to or enabled by an extended network.

This proposal does not contemplate the creation of any new **nbn**™ products.

1.5 Audience

nbn seeks feedback from stakeholders involved in the agriculture sector, including but not limited to:

- Farmers
- Peak industry and advocacy bodies
- Agtech industry vendors
- Retail Service Providers
- Research institutions

1.6 Related documents

Document		Owner and link
[1]	Connecting Australian Agriculture	https://www.nbnco.com.au/content/dam/nbn/documents/about-nbn/reports/reports-and-publications/connecting-australian-agriculture-report.pdf
[2]	National Farmers' Federation 2030 Roadmap	https://nff.org.au/wp-content/uploads/2020/02/NFF_Roadmap_2030_FINAL.pdf
[3]	Connecting Australia's agricultural landscape	https://www.nbnco.com.au/blog/business/connecting-australias-agricultural-landscape
[4]	To the farmhouse and beyond: connecting Australian ag	https://www.nbnco.com.au/blog/business/to-the-farmhouse-and-beyond-connecting-australian-ag
[5]	Reaping the benefits: ag set for $15.6 billion boost	https://www.nbnco.com.au/blog/business/reaping-the-benefits-ag-set-for-15-6-billion-boost

2 What is on-farm connectivity

Enabling on-farm connectivity could allow Australia's farmers to take advantage of up to $15.6bn in additional pre-farm gate value, attributable to the adoption of internet-enabled digital agriculture[3].

2.1 Connecting to the nbn™ network

In December 2020, the Australian Government declared that the National Broadband Network was built, with more than 11.9 million premises across Australia ready to connect to the **nbn**™ network[4]. **NBN** Co, the company which built and now operates the **nbn**™ network, is an Australian Government-owned Government Business Enterprise which operates the wholesale **nbn**™ network; in accordance with the Statement of Expectations, **NBN** Co provides access to Retail Service Providers (RSPs) on a non-discrimination access basis. Australians wishing to connect to the wholesale **nbn**™ network must purchase a product from an RSP.

At present, farmers can access the internet via multiple means, including a home-based **nbn**™ network connection through a service provider and/or via mobile telephone networks. Research from the National Farmers' Federation suggests that on-farm data connectivity (from a mobile network) can be unreliable[5]; a report by the Australian Broadband Advisory Council (ABAC) Agritech Expert Working Group found that 'salt and pepper' connectivity was limiting the adoption of digital agriculture practices in Australia[6].

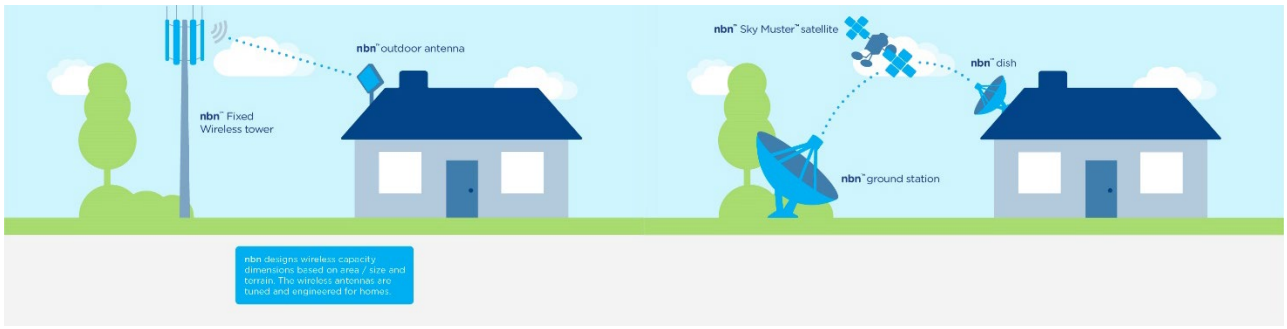
The **nbn**™ network combines various technologies to connect Australians to fast broadband via service providers. More than 78 per cent of Australians living in regional areas are connected to fixed line technologies, and the balance are supported by **nbn**™ Fixed Wireless or **nbn**™ Satellite products, commonly known as **nbn**™ SkyMuster, **nbn**™ SkyMuster Plus or **nbn**™ Business Satellite Service (BSS).

The **nbn**™ Satellite platform helps Australians across the country to access fast wholesale broadband services. A recent report found that Australia is the only continent on earth to have access to fast broadband across the entire landmass[7].

Consumers wishing to connect to the **nbn**™ network should engage a Retail Service Provider of their choice to discuss connectivity solutions in their location.

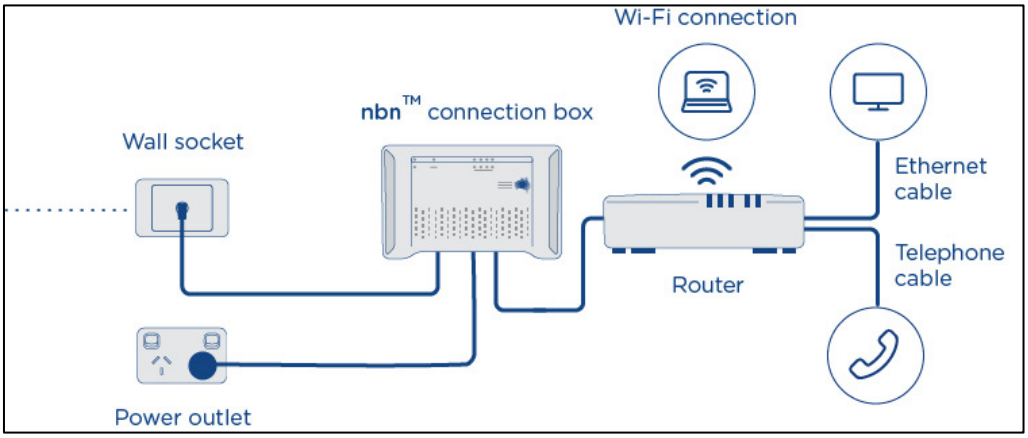
[3] **nbn™** Connecting Australia research, https://www.nbnco.com.au/blog/business/reaping-the-benefits-ag-set-for-15-6-billion-boost
[4] The Hon Paul Fletcher MP, Media Release, https://minister.infrastructure.gov.au/fletcher/media-release/nbn-declared-built-and-fully-operational
[5] National Farmers' Federation, Submission to the Regional Telecommunications Review, September 2021, https://nff.org.au/wp-content/uploads/2021/10/NFF-submission-to-RTIRC-2021_final.pdf
[6] Report of the Australian Broadband Advisory Council AgriTech Expert Working Group, https://www.infrastructure.gov.au/sites/default/files/documents/agri-tech-expert-working-group.pdf
[7] Bureau of Communications, Arts and Regional Research, "Working paper - Economic impacts of ubiquitous high speed broadband: agriculture sector", May 2021, https://www.infrastructure.gov.au/media-centre/publications/working-paper-economic-impact-ubiquitous-high-speed-broadband-agriculture-sector

For many agricultural customers in Australia, connectivity to the **nbn**™ network is available via **nbn**™ Fixed Wireless or **nbn**™ Satellite, as demonstrated below.



*Left: **nbn**™ Fixed wireless; Right: **nbn**™ Satellite*

To access fast broadband via the **nbn**™ network, a customer is required to purchase a connection to the **nbn**™ network via a Retail Service Provider (RSP); thereafter, the RSP will arrange for **nbn** to connect the customer's property to the network via either fixed line, **nbn**™ Fixed Wireless or **nbn**™ Satellite (at no cost to the customer[8]). As the operator of the wholesale network, **nbn** is responsible for making the connection to the premises/property; once connected, the customer can then connect a modem and any other devices to the network to utilise the connected, fast broadband capabilities of the **nbn**™ network.



The figure above sets out a typical **nbn**™ Fixed Wireless in-home connection (the set up for **nbn**™ Satellite services is similar). As a wholesaler, **nbn** is responsible for delivering a signal to the **nbn**™ connection box, as depicted above. Thereafter, it is a customer's responsibility to connect a router or modem to enable other devices to access the internet.

It is envisaged that the Mark may potentially be applied to products which might be connected to the router or modem via an ethernet cable (per diagram above) that enable the extension of the signal beyond any home-based wifi capability of a residential-grade router or modem.

[8] For **nbn**™ Business Satellite Service (BSS) VISP and ABSL3 customers purchasing products from their RSP, see Section 12 of this document for further information: https://www.nbnco.com.au/content/dam/nbnco2/2019/documents/sell/other/nbn-bss-ila-discounts-credits-and-rebates-list-20190930.pdf

Under standard terms and conditions, a customer's residential **nbn**™ network connection is provided solely for the use of the customer and not for so-called 'public broadcast', meaning that a network connection cannot be made available for 'open source' access for the general public. The proposed Mark does not alter this arrangement; it is expected that while devices connected to a router or modem and used to extend a signal will enable access to an **nbn**™ network connection signal across a wider area, it will only be for the use of that customer and their farm business.

2.2 Why is network extension important?

Extending coverage across a landscape enables farmers to, amongst other things:

- install 'Internet of Things' devices (eg. sensors and monitors in soil, on fixed infrastructure and on livestock),
- keep machinery connected to enable real-time monitoring and reporting, and
- overcome communications blackspots.

According to a recent National Farmers' Federation survey, a majority of Australian farmers surveyed are accessing the internet at home via an **nbn**™ Fixed Wireless or **nbn**™ Satellite product[9]. More than half of those surveyed claim that they use mobile data to connect to the internet outside the main residence; one quarter claim there is no broadband connection beyond the main residence. Of those surveyed, around half claim that less than 50 per cent of their property has 'constant or reliable mobile network coverage'. The survey also found that concerns about the speed and capacity of telecommunications networks was a key impediment to the wider-spread adoption of digital agriculture.

In 2020, **nbn** issued an Expression of Interest for Retail Service Providers (RSPs) to participate in a trial of solar-powered connectivity solutions capable of supporting agricultural internet of things (IoT) needs. The trial has continued throughout 2021 and will conclude on 31 January 2022. The purpose of the trial was to demonstrate the ability of the **nbn**™ network to support agricultural IoT needs in a solar-powered environment, and to inform future wholesale product development.

Two projects were supported under this trial:

- In western Victoria, an **nbn**™ Fixed Wireless connection was installed in a paddock; the network termination device was solar-powered and freestanding. The **nbn**™ network connection supported the use of high-bandwidth applications, such as voice calling and video streaming, to support on-farm productivity in an area of limited mobile coverage.
- In southern Western Australia, an **nbn**™ Business Satellite Service (BSS) connection supported the deployment of a remote weather station. Powered by solar, the device enabled the in-field collection, storage and transfer of real-time weather information to local farmers and weather authorities.

These two projects demonstrate the ability of the **nbn**™ network to support agricultural connectivity in places where other networks may have limited availability. End users with an interest in deploying these solutions should speak to an RSP for further information about the suitability of this solution to their business needs.

[9] National Farmers' Federation Regional Telecommunications Review, 30 September 2021, p14

The **nbn**™ network is capable of supporting connectivity beyond the farmhouse. Through the purchase and installation (at the end users' own expense) of network extension devices, an otherwise home-based **nbn**™ network connection may be extended beyond one building or premise to connect, for example:

- sheds,
- workshops,
- other farm buildings (dairy, shearing shed, etc),
- farm machinery and equipment, or
- landscape,

provided that the extended signal continues to be available only to the purchaser of the **nbn**™ network signal being extended.

In an increasingly digitally-connected and enabled world, access to telecommunications is no longer a luxury; in agriculture, the increased emergence of cloud-based platforms and mobile applications requires connectivity in-paddock as well as at home. With the availability of the **nbn**™ network, in-paddock connectivity can be supported in many different ways. Beyond the extension of an **nbn**™ network signal from fixed premises, **nbn**™ Satellite connectivity can be deployed in many locations and, as demonstrated in western Victoria, an **nbn**™ Fixed Wireless connection can be deployed where network coverage is available.

Research by the National Farmers' Federation found that many producers have experimented with network extension devices, with mixed success[10]. Analysis by Goanna Ag found that livestock producers were willing to invest up to $5,000 in on-farm connectivity solutions[11].

2.3 What role can nbn play?

To assist the adoption of digital agriculture, extending connectivity across the Australian landscape is essential. Helping to educate consumers about the capability of network extension devices is necessary to enable more producers to feel confident in their investment decisions.

If adopted, the Mark will form part of a suite of digital capacity-building tools, including:

- **nbn**™ Online Skills Check and Resources (OSCAR) – OSCAR was developed by **nbn** and it enables an individual to assess their digital capability, measured by: online knowledge; device usage; data and e-safety; and online communications. After the assessment, the user is provided with a benchmarking score and pointed to a resource library containing information about pathways to improve digital capability. The tool is free to use.
- Digital Readiness Assessment Tool – The Digital Readiness Assessment Tool was developed by the Australian Government to help identify what a business is doing well and where the business can improve when it comes to digital maturity. Capability is measured across seven areas: customer; operations; data and analytics; technology; risk, privacy and cybersecurity; digital capability and culture; and digital strategy and innovation.

[10] National Farmers' Federation, Submission to the Regional Telecommunications Review, September 2021, https://nff.org.au/wp-content/uploads/2021/10/NFF-submission-to-RTIRC-2021_final.pdf

[11] Alicia Garden, "Understanding the value of farm specific sensors with LoRaWAN", September 2021, https://www.mla.com.au/globalassets/mla-corporate/research-and-development/final-reports/2021/p.psh.1046-final-report.pdf

- AgTech Finder – AgTech Finder, an initiative of the Food Agility CRC, is Australia's most comprehensive AgTech database featuring products and companies servicing broadacre, livestock, and horticulture. Product listings include: pricing model; installation process; number of units sold; energy source; connectivity requirements; compatibility with other products; who owns the data; and how data will be kept private.

nbn considers that the Mark will complement these existing products, assisting consumers to understand how to provide connectivity across a landscape to enable the connection of the technology necessary to improve productivity in line with industry's future needs.

Increasing consumers' awareness of the capability of the **nbn**™ network to go beyond the farmhouse and to connect other buildings and equipment across the farm is important to **nbn**.

3 Mark design considerations

nbn is exploring a Mark to potentially offer customers a visual confirmation of the capability of a network extension device to support agriculture IoT needs. It is envisaged that the Mark could also potentially offer products a rating informed by an external, independent assessment of the product against established criteria.

Feedback regarding the following matters is being sought.

3.1 Connectivity solution

Subject to industry feedback, it is proposed to offer different grades/styles/colours of the Mark depending upon the type of connectivity supported, possibly including but not limited to:

- Low power, low bandwidth to support low packet data transfer
- High bandwidth supporting voice and video capabilities

Feedback requested:

- Are the connectivity solutions (3.1) in this document appropriate?
- If no, what other categories should be included?

3.2 Proposed certification criteria

To further support the proposal, **nbn** is seeking input from industry to assist us in our investigation and design of the relevant criteria and any necessary criteria-weightings that will support development of the Mark.

Set out below are suggested criteria to form the potential rating component:

- What is the device capable of supporting[12]:
  - High or low bandwidth data/streaming requirements
  - Wi-Fi calling
  - Video streaming
- Connectivity protocol
  - Point to point
  - Mesh
- Power consumption
  - Supply requirements
- Range
- Latency
- IP rating
- Dimensions and weights/portability

[12] An end customer's experience, including the speeds actually achieved over the **nbn**™ broadband access network, depends on the **nbn**™ access network technology and configuration over which services are delivered to their premises, whether they are using the internet during the busy period, and some factors outside of **nbn's** control (like their equipment quality, software, chosen broadband plan, signal reception, or how their provider designs its network). Speeds may also be impacted by the number of concurrent users on the **nbn**™ Fixed Wireless network, including during busy periods. Satellite end customers may also experience latency.

- Connection capability to nbn™ network
  - Capable of connecting to nbn™ Fixed Wireless
  - Capable of connecting to nbn™ Satellite
  - Capable of connecting to nbn™ Fixed Line
  - Not suitable for nbn™ network connection

Feedback requested:

- Are the listed certification criteria (3.2) adequate?
  - If no, are additional criteria required?
  - If no, should a listed criterion be removed?
  - Any further comments?

3.3 Verification process

It is anticipated that for companies seeking to have their devices carry the Mark, those companies will be required to supply a device for independent, third-party verification and testing; this process will determine the product's assessment alongside the agreed criteria and potentially provide an independently-verified score/rating.

The testing process will not be considered an endorsement of the product by **nbn** or any third party or provide any warranty about the product's suitability, capability or in field operability.

It is anticipated that the Mark would exist until such time as industry agrees that the market is sufficiently mature to cease the need for such a certification scheme. A product will only require testing on one occasion to carry the Mark. However, should the product's characteristics change, including any relevant updates to product firmware, the vendor may be requested to resubmit the product for testing and verification. Each model of a product will require individual accreditation.

Costs for the external testing may or may not be recovered from the product vendor, this will be determined at a later stage in the development of the Mark.

Feedback requested:

- Do you have any comments on the proposed verification process (3.3)?
- Do you see any issues with vendors meeting the costs of product testing?

3.4 Go to market strategies

As a condition of a product carrying the Mark, accredited products will be listed on a website enabling consumers to assess the product's capabilities relevant to their own on-farm requirements. Other characteristics, not directly related to product capability (per section 3.2), may also be appropriate to be included on the website. Examples of these include, but are not limited to:

- Plug and play capability
- Compatibility with the Australian Farm Data Code
- Sustainability of product design and manufacturing process
- Manufacturer warranty
- User interface/dashboard to control operation

Conditional upon a product carrying the Mark would be compliance with **nbn**™ Brand Guidelines if there is any use of the **nbn** name and any associated imagery/artwork with the product. These are yet to be developed. Further, **nbn** does not propose to individually market particular or specific products which would carry the Mark. It could be explored as to whether the products could be listed on a third-party website, where consumers could find general merchandising and support materials for the Mark, its application and use. This would extend to point of sale information in retail settings, information for use on product vendors' websites and other arrangements as agreed with the vendor, and **nbn** if applicable.

Feedback requested:

- Are the listed product characteristics (3.4) adequate?
  - If no, are additional characteristics required?
  - If no, should a listed characteristic be removed?
  - Any further comments?
- Do you have any comments regarding the go to market approach (3.4)?

3.5 Additional information

While the style of the Mark proposed is yet to be finalised, it is anticipated that the design will incorporate well-known and easily recognisable characteristics to provide customers with valuable insights and information informing their product selection. This could be nbn™ branded or not – the options are still being explored. Industry may be further consulted in the final design of the Mark.

In this early stage of development, **nbn** is considering combining two well-known types of consumer-facing accreditation styles into the proposed Mark, being:

- Australians are familiar with **star rating** systems, used to demonstrate energy, water and other efficiency or quality characteristics of a product. It is proposed that a Mark could potentially carry an easy-to-identify star rating system informed by the testing process outlined above.
- A colour-coded badge is also proposed to enable consumers to visually differentiate between high and low bandwidth-type products. This would be similar to the 'Digital switch' campaign which was conducted in the early 2000s in preparation for the switch from analogue to digital television. At the time, products could carry one of three logos giving the consumer visual information about a device containing an inbuilt digital receiver capable of displaying standard or high definition picture, or that the device required a set top box to receive a digital signal.

The size of the Mark and information it contains will be determined in consultation with industry.

Feedback requested:

- Do you have any comments about matters not already covered in this Discussion Paper?

4 Response

To inform the further development of the Mark, **nbn** seeks your feedback about the various criteria canvassed in part 3 of the paper. Your comments are sought, with particular reference to the following:

1. Are the connectivity solutions (3.1) in this document appropriate?
    a. If no, what other categories should be included?
2. Are the listed certification criteria (3.2) adequate?
    a. If no, are additional criteria required?
    b. If no, should a listed criterion be removed?
    c. Any further comments?
3. Do you have any comments on the proposed verification process (3.3)?
4. Do you see any issues with vendors meeting the costs of product testing?
5. Do you have any comments regarding the go to market approach (3.4)?
6. Do you have any comments about matters not already covered in this Discussion Paper?

Feedback is requested by Friday 11 February 2022 and can be sent to connectingaustralianagriculture@nbnco.com.au. All submissions will be treated confidentially and not shared beyond **nbn** without the express consent of the submission authors.

To facilitate further discussion and feedback, **nbn** proposes to hold briefing sessions to discuss the proposal. These sessions, anticipated to take place in early February, will be externally facilitated and will be held with particular to certain parts of industry. Registration will be required.