



TELSTRA CORPORATION LIMITED

Department of Communications Consultation on the Design of the Australian 5G Innovation Initiative

11 December 2020



Executive Summary

Telstra commends the Australian Federal Government for the 5G Innovation fund initiative. As a key contributor to the global development of the 3GPP engineering specification for 5G and host of the global 3GPP event on the Gold Coast in 2018 to formally ratify the 5G standard, Telstra regards 5G as an essential foundation of Australia's economic and social future as well as to our own business success.

We believe the Government's 5G Innovation Initiative is well timed. Australia is among the world leaders in 5G deployment with growing levels of coverage resulting from the considerable investment by all three mobile network operators (MNOs). Further, the technology itself is maturing with 3GPP Release 16 standards now commonplace in network equipment. We consider the Initiative will achieve the best return for all stakeholders if it focuses on leveraging the unique abilities of 5G networks to solve business problems that cannot be solved using earlier generations of mobile technology. We consider that funding the deployment of new 5G network coverage would not be an optimal use of the program's funding.

We also consider that grant proposals that bring together complementary adjacent technologies such as artificial intelligence, the Internet of Things (IoT), Machine Learning and Digital Twins present the best opportunity for this program to demonstrate the capabilities of 5G. One aspect we recommend the department could consider is funding a set or sets of projects where each individual project forms a component of a larger solution using some of these adjacent technologies. This could help to demonstrate the synergistic effect of drawing together multiple complementary technologies to create new solutions to unlock previously unimaginable productivity gains.

Finally, we consider it vital to have a clear definition of 5G to guide applications and avoid the risk of funding initiatives that could be adequately served by 4G (or other) types of network technology. Many initiatives, especially IoT initiatives with low data volume requirements or modest numbers of devices can be delivered on existing 4G networks. The only internationally agreed, standardised definition of 5G is managed by ITU, and only the 3GPP-based standards are applicable to the Australian market for 5G public networks. Accordingly, we expect that selection criteria for projects under the 5G Innovation Initiative will ensure that 3GPP-based technology will underpin projects.



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01 Introduction

We welcome the opportunity to respond to the Department of Communications' *Consultation on the Design of the Australian 5G Innovation Initiative Round One*. 5G is an essential future component of Australia's growth and economic prosperity, and we commend the government for taking this initiative to identify and drive the adoption and use of 5G in Australia.

Our submission is structured as follows:

- Section 02 sets out Australia's leadership in the deployment of 5G and why the government's 5G Innovation Initiative is timely;
- Section 03 sets out our views on maximising the benefit from the program, including why multi-faceted partnerships involving industry sector participants, MNOs and hyperscalers are important to show the true capability of 5G; and
- Appendix 1 contains answers to the questions from the discussion paper.

02 Australia's leadership in 5G underpins the Innovation Initiative

Australia is a world leader in 5G, and Telstra has a long track record of 5G research, development and engineering firsts in all generations of mobile network deployment underpinning our global leadership. Building on our extensive history, we have established a number of market facing 5G lab facilities in Melbourne (the Telstra Labs), at Southport in Queensland (the 5G Innovation Centre – built in collaboration with Ericsson) and most recently in Toowoomba in Queensland (at the AATLIS¹ precinct in partnership with the FKG Group²). These Telstra facilities can support the full end-to-end 5G experience across both sub 6 GHz and mm-wave radio, edge processing and enhanced 5G network switching and transmission into the Telstra domestic and international core networks.

As Australia's leading mobile network operator, our roll-out of commercial 5G network infrastructure across Australia is already well advanced and will continue. Our own 5G network infrastructure capability is complemented by that of many key global technology partners such as Ericsson, Microsoft, Cisco and Amazon. Together with Telstra's own in-house Telstra Purple professional services capability, our vision goes beyond connectivity so that our customers can thrive in building, operating and maintaining complex technology solution ecosystems which can leverage fixed and wireless networks.

We anticipate that DITRDC will receive many responses to the discussion paper, followed by submissions in February 2021 for grant funding for a range of exciting, innovative and commercially viable 5G projects. Telstra stands ready to work with the Government to prioritise projects in a way which ensures they can be activated and delivered using Telstra's 5G network capability. We also stand ready to work with industry and government organisations who wish to build solutions for the 5G innovation trial program, and we would be happy to engage with those who do not meet the criteria for grant funds to explore ways in which we can support them directly.

¹ See <https://aatlis.com.au/>

² See <https://www.fkg.com.au/about/>



03 Obtaining the best return from the 5G Innovation Initiative

Australians and the Australian economy will receive the greatest benefit if the 5G Innovation Initiative is accurately targeted with an emphasis on new innovative 5G use cases with the potential for enhancing productivity across industry sectors and/or delivering significant benefits to Australians.

Outcomes will be maximised by ensuring the assessment criteria for future grant proposals are appropriate. To this end, we believe there are four important considerations that should be baked into the assessment criteria:

- Initiatives qualifying for the program should solve genuine business needs so that the program doesn't just fund the deployment of 5G infrastructure or testbeds;
- Initiatives should include complementary technologies such as AI, IoT and big data analytics to showcase inspiring examples where 5G draws together these adjacent technology capabilities in ways that would not be possible under previous mobile network generations or using fixed networks;
- Initiatives should include 5G capabilities such as edge compute and network exposure functions in 5G's service-based architecture that are not available in earlier network generations; and
- This will require an unambiguous definition of 5G, which should be the 3GPP standards to leverage existing 5G network capability.

3.1. Focus on genuine business solutions, not on delivering 5G infrastructure or testbeds

We observe from the discussion paper that the emphasis of the initiative is on industrial and enterprise uses cases, rather than consumer use cases, and we agree with this focus, as consumer applications for 5G will evolve naturally. It is very important that the government uses the assessment criteria to identify meaningful business issues or propositions that are solved by 5G, rather than simply funding deployment of 5G network infrastructure or testbeds. Australia is among the world leaders in 5G deployment with all three network operators well advanced in 5G deployment, and options also exist for non-MNO's to both acquire spectrum suitable for 5G applications and deploy the necessary equipment required for applied use cases (if necessary). Simply funding 5G deployment would not be an optimal use of the program's funding.

We acknowledge the Government's interest in 5G applications serving the arts and tourism. We believe the creative application of 5G in these areas can make a significant contribution to the restoration of post-COVID civic vibrancy and economic recovery.

3.2. 5G draws together a larger ecosystem of complementary technologies

5G is a technology with the potential to be transformational for Australian society, especially when applied in industrial and enterprise settings. 5G is not just about spectrum bands and base stations, it's about drawing together other complementary technologies such as the Internet of Things (IoT), data hubs, Artificial Intelligence, Machine Learning, Digital Twins and more in ways that were simply not possible in earlier generations of mobile networks. Combining 5G with these adjacent technologies will give rise to new applications and use cases that seamlessly integrate mobility with these adjacent technologies.



It is vital the assessment criteria for the 5G Innovation Initiative include the use of these technologies as well. Truly novel and transformative initiatives will include many or even all these technologies in the solution, and we consider the assessment criteria should be weighted in favour of initiatives that draw all these components together. We consider a hypothetical example in our answer to consultation question 5.

We note that funding a full ecosystem potentially requires many millions of dollars, which is well outside the remit of the 5G Innovation Initiative. While the assessment criteria need to be weighted towards ideas that test the full ecosystem of adjacent technologies, we recognise it is highly likely they will need to be scaled up from the initial pilot under the funding program using ongoing private sector funding.

3.3. Initiatives must demonstrate new capabilities unique to 5G networks

Modern technology solutions deliver business value by orchestrating the collection of data and turning this into real-time, historical or predictive insights using algorithms. Data emerges from other systems and / or devices specifically organised to sense the real world (movement, temperature, location, humidity, damage, etc) and convert this information into data. Modern wireless and fixed communication networks move the data from point of origin to an ingestion point for processing which can be at the 'edge', near the edge or in a cloud (private or public) compute platform. Thus, an end-to-end ecosystem is designed, built, implemented and supported to deliver functionality to support a business use case.

In considering opportunities for 5G business or industrial applications that truly demonstrate the potential of 5G, it will be necessary to explore the full network architecture to ensure all key elements of a full 5G ecosystem are present. For example, in a manufacturing or warehousing facility with extensive automation, ultra-low latency wireless connectivity is likely to be required, and this solution will also need to consider data switching and routing, edge / cloud compute platforms and applications to route messages for ingestion and processing.

5G is more than just 5G RAN and / or 5G edge compute but includes an entirely new core transmission network architecture which interconnects with existing local and global carrier networks. Telstra considers that 5G Innovation fund grant applications should be evaluated against assessment criteria weighted in favour of applicants whose proposed trial scenarios demonstrate a full end-to-end ecosystem incorporating 5G networks.

3.4. 5G is defined by 3GPP standards

As we have stated, the focus of the 5G Innovation Initiative should be to demonstrate the incremental capabilities of 5G, not just the capabilities of earlier generations of mobile technology. Many initiatives, especially IoT initiatives with low data volume requirements or modest numbers of devices can be delivered on existing 4G networks. Thus, the assessment criteria will require a clear definition of 5G to guide applications, otherwise there is a risk of 4G initiatives being funded.

The only internationally agreed, standardised definition of 5G is managed by ITU, and aligns to a specific set of requirements. There are only three technologies that the ITU recognises meet the definition for 5G, and of these, only 3GPP-based technologies are applicable to the Australian market for 5G public networks. Accordingly, we the selection criteria for projects under the 5G Innovation Initiative should focus on 3GPP-based technology to underpin projects.



Appendix 1: Answer to questions in the consultation

This appendix contains answers to questions raised in the discussion paper.

1. Do you have any comments on the types of use cases that the Initiative is seeking to support?

The consultation lists as a key program principle that “Grants will support the testing and trialling of 5G equipment”.³ We are interested to understand whether “5G equipment” means 5G network equipment or 5G end user-terminal equipment? We recommend use cases for testing 5G network equipment should not be considered within the scope of the program as the goal of the program is developing 5G commercial applications and not development/deployment of 5G network infrastructure. The program should focus on use cases that test 5G end user-terminal equipment.

We recognise it may be necessary to use grant funds to purchase some network equipment to enable the trial of 5G applications, but we consider that funds should not be used to support testing of 5G infrastructure or network equipment.

2. What are the technical, regulatory or other barriers to implementing 5G use cases? If you have identified barriers, can you suggest ways these barriers could be overcome?

We have not identified any regulatory barriers, either specific to the telecommunications sector, or in the regulatory frameworks of other industry sectors where 5G could be demonstrated that would impede case studies and demonstrations under this initiative.

In the longer term, we consider there is regulation that will need to be updated to enable some industry sectors to realise the full potential of 5G. Examples would consider the operation of drones beyond visual line of sight and the operation of autonomous vehicles, and work is already underway in both of these areas to modernise regulation. This modernisation does not need to occur for the purposes of the 5G Innovation Initiative.

3. What are your views on the level of maturity of 5G applications available to be trialled, and are there particular sectors where it will be possible to demonstrate 5G's productivity benefits?

Many aspects of 5G technology are now reasonably mature, while other aspects are still evolving. Capabilities such as high-capacity throughput using mm-wave are now mature, and Telstra has been conducting a considerable amount of mm-wave testing ahead of the proposed 26 GHz spectrum auction in April 2021.

At the same time, some aspects of 5G technology such as Ultra Reliable Low-Latency Communications URLLC are still some way off. We consider it prudent that the Government is running the 5G Innovation Initiative in two rounds, with the timing of the second round tailored to take advantage of these forthcoming 5G capabilities.

³ Consultation paper, p.5.



We do not have a view on any sectors that are better placed to demonstrate 5G's productivity benefits, although, we support the Department's view that it would be good to see initiatives in either tourism or the arts.

4. What locations offer the best opportunities to deliver 5G projects, and are there any barriers to delivering projects in particular locations or geographic regions?

We have established several market-facing 5G lab facilities in Melbourne (the Telstra Labs), at Southport in Queensland (the 5G Innovation Centre – built in collaboration with Ericsson) and most recently in Toowoomba in Queensland (at the AATLIS precinct in partnership with FKG Group). These Telstra facilities can support the full end-to-end 5G experience across both sub 6 GHz and mm-wave radio, edge processing and enhanced 5G network switching and transmission into Telstra core domestic and international networks.

Telstra has also deployed extensive 5G commercial coverage,⁴ as have other MNOs, which we consider means there are no substantial barriers to delivering 5G projects in any location or geographic region.

We do note there is potential benefit in clustering like or related use cases together in “hubs” so they can leverage each other’s experience, skills, resources and infrastructure where appropriate. Depending on the mix of the proposals received, we recommend the Government consider this as a strategy to maximise the outcomes for its investment.

5. Given the quantum of funding, what type and scale of projects could the Initiative appropriately support?

We agree with the Government’s proposal that \$0.5m-\$1.0m per project is the right size for projects of 12-18 months duration. Expanding on the point we made in section 3.2 about 5G drawing together a larger ecosystem of complementary technologies, one aspect we recommend the department could consider is funding a set of projects where each individual project forms a component of a larger solution. For example, if there was an application for Artificial Intelligence to leverage 5G to remotely control machinery, and a separate agriculture IoT project that uses 5G in new innovative ways, funding the two projects with an expectation or requirement that they link together could demonstrate synergistic effects of these complementary technologies.

As we noted in section 3.1, Australia is among the world leaders in 5G deployment with all three network operators well advanced in 5G deployment. We consider that using funding from the 5G Innovation Initiative to fund 5G network deployment would not be an optimal use of the program’s funding.

6. What are your views of the proposed requirements for joint applications, grant agreements, grant value and the payment structure of the Initiative? Are there other program requirements that should be considered?

As outlined in section 3.2, in order to demonstrate truly novel and innovative initiatives under this program, it will be important to bring together aspects such as artificial intelligence, data analytics, and

⁴ Telstra 5G coverage is available at <https://www.telstra.com.au/coverage-networks/our-coverage>



more. We consider that partnerships will be an integral component of any grant applications that demonstrate new, compelling uses of 5G. See also our response to question 5.

7. Do you have any comments on the eligibility requirements, including the types of applications eligible for funding, the funding of network infrastructure, and whether the criteria will encourage participation from a variety of applicants?

We do not have any comments on the eligibility requirements or types of application that should be considered. We have noted our views on the funding of network infrastructure in section 3.1 and in response to consultation questions 1 and 5.

8. In what timeframe could projects under the Initiative be feasibly implemented?

We consider projects funded under the 5G Innovation Initiative should be of around 12-18 months duration. This length of time should be sufficient to deploy user equipment or other complementary technology required for the scenario, and then for the trial to execute and results be obtained. Allowing projects of longer duration may result in loss of focus on the prime purpose of the 5G Innovation Initiative, which is to show case the productivity and business benefits 5G can bring. We expect the Government, like the communications industry, will want to promote these examples as soon as possible. We consider the Government should open applications early in 2021, with a view to completing the assessment and announcing successful applicants under Round 1 before the middle of 2021.

9. What do you consider are the best ways to promote 5G use cases within industry sectors and more widely? Do you anticipate any barriers to sharing case studies?

Working closely with communications industry bodies such as AMTA, the IoTAA or Communications Alliance and with industry bodies such as the Rural Research and Development Corporations (RDCs) in agriculture, the Australian Logistics Council and the Australian Trucking Association in freight and logistics would be a highly effective way to promote 5G use cases to potential adopters in key industry sectors. It will be important to identify the appropriate industry bodies and associations in each target sector such as agriculture, health, transport, manufacturing tourism and the arts and to encourage them to be involved as directly as possible in relevant projects and to act a conduit to diffuse the learnings to their constituency.

We do not anticipate any barriers to sharing case studies arising from the 5G Innovation Initiative.

10. Do you have any comments on the proposed assessment criteria, including their ability to support a variety of projects from diverse applicants?

The proposed Assessment Criteria appear to be generally suitable for the 5G Innovation Initiative.



11. Should the program have any specific limits on what qualifies as technology that operates using 5G? If so what would these limits be?

We consider it vital to have a clear definition of 5G to guide applications and to avoid the risk of initiatives adequately served by 4G (or other) networks being funded. Many initiatives, especially IoT initiatives with low data volume requirements or modest numbers of devices can be delivered on existing 4G networks or other mature network technologies. The only internationally agreed, standardised definition of 5G is managed by ITU, and aligns to a specific set of requirements. Only 3GPP-based technologies are applicable to the Australian public mobile network market, and the selection criteria for projects under the 5G Innovation Initiative should be framed accordingly. Further detail on this point can be found in section 3.4.