Response to Australian 5G Innovation Initiative—round one—discussion paper

On behalf of the key stakeholders of the Wireless Innovation Lab (WILAB), we welcome the Australian Government's investment to improve the adoption of 5G and improve unlocking of the socioeconomic benefits made possible by the 5G network and services.

WILAB is a new joint initiative of the University of Melbourne, RMIT University and industry to build innovation capacity and accelerate adoption of wireless innovations in partnership with key industry partners. Wireless Innovation LAB will create access to research competencies at both universities, activate a core innovation enabling team, and provide opportunities for training our graduates with our industry partners in the emerging digital technological domains relevant to 5G. Over the course of 2020, we have engaged with key network service providers, 5G network technology providers, technology companies with adjacent technology solutions critical to services over 5G, and end-user groups. Our submission here in response to the round-one discussion paper is based on our views as informed by extensive discussions with the WILAB stakeholders.

WILAB welcomes the $21M Australian 5G Innovation Initiative. While this scale of investment is lower in comparison with comparable investment initiatives around the globe, it can still significantly boost the adoption and unlocking of value. However, it is crucial that the Australian investment adopts a long-term vision of investing in key enablers of innovation with global opportunities and seeds activities that can benefit the future evolution of 5G to 6G as it would be a continuous improvement of wireless technologies and their adoption. Further, this strategy would kick-start innovative products and services that can reap the benefits of the evolution of wireless connectivity solutions, empowering disruption across key sectors of the Australian economy. Hence the focus of the initiative should address barriers to adoption and the creation of new and innovative products and services that can reap the current deployment of 5G, the impending high-capacity deployment based on the "new radio" version of 5G using new frequency allocations, as well as complementary technologies in new services integrating edge computing paradigms and machine learning.

This presents an opportunity to invest wisely without replicating earlier investments around the globe that have primarily focused on trials and testbeds. There is an enormous economic potential for Australian industry to accelerate innovation capacity by accessing competencies in our research institutions that will unlock innovative solutions capable of bridging the gap in the adoption of 5G. Such investments should create an ecosystem of wireless innovations for the long-term benefit of Australia and establish new ways of Australian industry, research institutions, and end-user groups to collaborate on the development and validation of new ideas with substantial economic opportunity.

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

With a number of carriers already deploying and offering 5G services, Australia could invest smartly in different types of trials and validation of new services and solutions. Such a focus would trigger an increased investment in building innovation capacity and help local industry accelerate the validation of new services and solutions. This strategy would support the adoption of the unprecedented capabilities offered by 5G and integrate complementary technologies to ensure services and solutions meet end-user requirements, that deliver efficiency and productivity gains.

(1) **Activities driving local innovation as a response to addressing a key barrier to adoption - generating value to end-users:** The integration of on-farm and off-farm sensing technologies, and data aggregation over 5G networks [ensuring coverage to selected areas] to provide farmers with tangible and timely information to assist farmers in making key decisions and demonstrating the economic value of such solutions. This should be a multi-stakeholder approach to ensure there are services and solutions [solution provider] farmers can use, there is connectivity [commitment from 5G service provider], and there is a strong focus on validation of concepts [innovation and research partners] to demonstrate outcomes [digital agriculture].

(2) **Improve sectors through new ways of doing things by creating solutions and validating them – overcoming technical barriers:** There are multiple sectors in which new and effective solutions need to be created by bringing together complementary solutions. For example, creation of digital health solutions [IT technology providers, Network operators]in the management of the most prevalent health issues [asthma management with health clinicians, researchers, and patients] and validating such solutions with appropriate clinical effectiveness and ease of use considerations. Likewise, there are significant opportunities in the construction sector towards smart buildings with a focus on smart maintenance, monitoring, and adaptation of buildings to user requirements and in the transport sector with integration of autonomous vehicles as well as improved logistics applications.

(3) **Improve innovation capacity of Australian industry by creating opportunities to access core competencies embedded within Australian research institutions and use effective ways to accelerate innovative solutions now and in the future:** Examples include the development of edge computing-based services, access high frequency radio frequency skills to design new products and create end-to-end solutions for applications in logistics, transport, disaster recovery, and defence.

Question 2

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

There are significant technical barriers for the integration of adjacent technologies toward new solutions that end-users can deploy to create value and solve real issues. There are also issues in how data can be collected, curated, and shared to make them available for decision support. Design of such solutions needs to tackle issues around data collection such that the end-user is collecting data. This is necessary that the telecom service provider isnot seen to be collecting the data and therefore the intent of data collection is clear.. There are real barriers in many SMEs and mid-tier companies to invest in innovation capacity and the scheme could provide incentives by linking these with the higher education system, providing an industry-ready talent pipeline by training them to work on real-world problems collaboratively with industry, fostering an innovation mindset and skills in problem solving and system integration. This supports the need to have a critical mass in sovereign capability. Currently, sector players have barriers to understanding the real potential of 5G connectivity. There is a lack of internal capacity to investigate adjacent technologies. There is also a need to partner with other stakeholders through exemplary projects that demonstrate the power of the innovative combination of different technology fabrics, value creation and sharing of the lessons learnt for the benefit of sectors.

Question3

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?

There are many technology solutions that have been developed in Australia which stand to benefit from local trials and end-user validation. By careful selection of projects and activities, this investment can create spring-boarding opportunities for Australian solution providers to respond to local needs and position their products in the international setting. Australian investment under this initiative should prioritise activities that adopt Australian innovations as an integral part of the proposed activity. Such benefits can be demonstrated in sectors such as agriculture, digital health, mining, logistics, manufacturing, smart cities and suburbs, transport,and defence.

Question4
What locations offer the best opportunities to deliver 5G projects, and are there any barriers to delivering projects in particular locations or geographic regions?

Connectivity has been an issue for many regions. Yet one of the key use cases has been the large-scale connectivity to devices forming the Internet of Things network. Regional deployments and test cases in agriculture and mining as well as digital health could create drivers for fast adoption as well as improved connectivity in regions. With the new radio coming up, introduction of high bandwidth 5G services in urban areas with improved coverage within the public transport could help us investigate new services in these contexts. Areas where Indigenous communities have been seeking a sensible coverage both for mobile services as well as other service delivery like health, education and remote work opportunities could be targeted.

Question5
Given the quantum of funding, what type and scale of projects could the Initiative appropriately support?

With the appropriate partnership of key stakeholders, an activation program with small investment pools of $250-500k range to medium scale investments of $1.0-1.5M would support acceleration of different types of activities within the initiative that focus on product development and technology transfer. Small investment pools could be directed towards a small partnership of validating a solution in a specific context which has significant economic opportunity to be realised in the near term. Medium scale investment could be directed towards a project that has a network of partners that will become an exemplary project within a specific sector, with translatable and sharable benefits in the form of knowledge exchange to a wider sector while having specific economic opportunity for partners involved. A very limited number of large-scale co-investments <$2M may be warranted if it makes 5G connectivity available for a geographic area with potential benefits for a wider group of end-users. By integrating research organisations as part of the bids, the benefits of sharing of knowledge can be emphasised and skill developments can be addressed adequately.

Question6
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?

It will be important to ensure that requirements are suited to the size of the investment from the program. Based on our proposed distribution of small, medium, and large-scale investments above, one-off payments for small and medium scale activities to two-staged payment for large scale activities with potential co-investments can be more appropriate. There should be opportunities for internships and the skilling of the future technical workforce to leverage the Australian Government's investment. With the appropriate criteria, this program could strengthen these opportunities and support more collaborative approaches. A major barrier has been the integration of different technologies towards solving the end-user problem or improving cost effectiveness, therefore the program should actively encourage partnerships of multiple organisations with complementary contributions. Given many applications of 5G require principled data use, appropriate ethical principles must be adopted in the activities supported by the program and the program should encourage bids to partner with appropriate organisations with suitable expertise to be part of these activities. Partnerships should include research organisations to maximise innovation potential and this should also include research licenses to access research organisations to trial applications across new frequencies of the spectrum.

Question7
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?

The eligibility requirements should encourage Australian innovation in the area of design of 5G services and applications, especially in what is considered to be 5G technology. 5G is not just about a communication link and a network. It requires a range of technologies to coalesce to design effective services. It is important to recognise this and allow a sufficient breadth of technologies to be brought together to demonstrate 5G use cases. Access to spectrum may be granted just for the duration of the project or a specific location to demonstrate use cases by a range of organisations. If the existing license or network becomes a prerequisite, it may impact the extent of Australian innovation that can be trialled through the program. Research organisations should not be left out of the criteria and should be encouraged to partner with industry through joint university-industry programs to put forward innovate use case proposals and argued cases for spectrum access privileges with ACMA.

It would be appropriate to consider 6 months to 24 months duration depending on the scale of activities. Long timeframes could delay the acceleration of innovation and making them extremely short term might incentivise projects with safe bets and disincentivise innovation. The timeframe should be optimal with a view to incentivising innovative and effective use cases with the potential to accelerate adoption and deliver broader impact to specific sectors.

The use cases need to address the barriers to adoption and therefore should ensure the right stakeholders are included as part of the use case design. Secondly, the use cases should incorporate a holistic service delivery mindset instead of just focusing on the part of the services and applications. It is important to ensure a minimum level of knowledge sharing is mandated within the use cases. Lighthouse projects that combine industry and university partnerships that focusing on use cases are ideal as they ensure the lessons learnt are broadly disseminated. There needs to be a score card with a minimum set of reportable insights from the design of use cases to ensure parties remain committed to sharing such insights. Medium to long term activities could benefit from an opportunity to provide a mid-cycle sharing. Sharing expectations also needs to be mindful of allowing protection of intellectual property and the sharing can focus on outcomes, benefits, and lessons learnt and not on the specifics of the solution that may be warranted to be protected by the parties involved.

Criterion 1 – This could be inadvertently taken as a basic compliance and it does have the elements of making the focus on sharing insights for the benefit broadly. It could be refocused around demonstrating innovative use cases and technologies of 5G and beyond.

Criterion 2 – we welcome the specific focus to "*seek to support smaller scale applications that may provide fertile ground for more novel applications of 5G technology*". In particular, it will be important to empower ACMA to invest in dynamic sharing or to allow bids to seek time specific and location specific "innovator" licenses for 5G spectrum for the purpose of demonstrating 5G technologies and use cases. Industry often uses strategic partnerships to source technology options, and it may prevent Australian innovation that may have application in 5G and even 6G. Without these initiatives enabling such activities to be brought under spotlight, they may struggle to realise the

full potential of their innovation.

Criterion 3 - It would be beneficial to make it clear that partners need to demonstrate this collectively and this may in fact allow partnerships between small start-ups and large organisations, between industry partners and research organisations, improving networking within different parts of our innovation ecosystem.

Criterion 4 – The argument for "Value for Money" could be improved by specific focus around potential impact of adoption, overcoming barriers, economic benefits of use cases to Australia.

Question11
Should the program have any specific limits on what qualifies as technology that operates using 5G? If so what would these limits be?

5G is really an integration of different technology domains beyond just the use of new spectrum and new ways of using spectrum to create connectivity with different capabilities. It integrates a range of technologies and use-cases that may require further integration of adjacent technologies to ensure the solution meets socio-economic requirements. Technologies ranging from Automation, Edge Computing, Artificial Intelligence and Machine Learning, Shorthaul and Low Power Networking, Immersive User Interfaces, Data Analytics, and others are crucial to unleashing the innovative opportunities powered by 5G connectivity. It is important to allow a flexible approach and commensurate criteria to assess the merits of innovative use-cases without preconfigured limits being imposed on the type of technologies to be considered. In many use cases, existing technologies need to be transformed and integrated with 5G New Radio capabilities to address specific sector needs.

We welcome further opportunities to engage with the program and we will look to explore avenues for WILAB to partner with the program as well as industry partners to be involved in a range of projects.

Wireless Innovation Laboratory (WILAB)