

Response to the design of the round one of the Australian 5G Innovation Initiative Consultation Paper

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Introduction

The Faculty of Engineering and Information Technology, University of Technology Sydney, specialises in research and development on wireless communications and networking. Some of our research areas include 5G, Ultra-reliable Low Latency Communications (URLLC), Internet of Things (IoT), Vehicle-to-everything (V2X) and spectrum sharing. We have a strong focus on prototyping, trials and involvement in collaborative projects with industry partners.

This submission responds to *the design of the round one of the Australian 5G Innovation Initiative* consultation paper, from a technical point of view. Our comments are listed below in response to the questions 1-2 and 6-8 in the paper.



Question 1.

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

5G aims to meet the requirements of three use case families: Enhanced Mobile Broadband (eMBB), Massive Machine Type Communications (mMTC) and Ultra-reliable Low Latency Communications (URLLC).

To its merit, the existing cellular technology is competent in meeting various user requirements. However, one of the key innovative capabilities of 5G that does not exist in the current cellular technology is URLLC. The scientific community widely believes URLLC will enable a completely new paradigm in Industry 4.0, especially in the applications of automation and smart manufacturing.

The Australian 5G Innovation Initiative shall support all three use cases, however, prioritise URLLC trials.

Question 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?

Having commercial 5G networks in Australia fosters 5G innovation. However commercial networks do not allow access to key network metrics for advanced debugging and testing in the implementation of different 5G use cases. Therefore, having access to a 5G trial network with flexibility and reconfigurability is vital for developing the use cases. It is necessary to travel to locations where 5G trial networks are available for development.

Question 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?

Joint applications with broader communities with the latest technologies and facilities will maximise the impact of the projects. It is imperative to have the involvement of major telecommunications equipment vendors to trial the most cutting-edge features of 5G in Australia. However, often the headquarters and product development branches of leading equipment vendors are located overseas.

The Australian 5G Innovation Initiative shall encourage collaborations with both local and overseas organisations. Funds shall be made available for collaborations with both local and overseas organisations.

Question 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?

Currently we have seen commercially available 5G infrastructure and devices mostly for eMBB applications. Infrastructure and end devices that support 5G URLLC and mMTC are at a relatively early phase. URLLC will benefit the Industry 4.0 sector, especially in automation and smart manufacturing. mMTC will enable smart agriculture and smart city applications. Most of the IoT devices available in the market only support 4G. Therefore, we strongly emphasise that a 5G trial will inherently require some level of research and prototyping.

In a broad collaboration with multiple organisations, it is important to travel between different venues for well-defined project related purposes such as accessing equipment/facilities and knowledge sharing. Especially, having access to 5G trial networks in other cities of Australia and some advanced 5G trial networks in other countries will be beneficial in the early stages of the trial development. This will enable the maximum potential to develop an Australian 5G trial with impact.

The Australian 5G Innovation Initiative shall include research and prototyping in the eligible categories of funding. It shall also include domestic and international travel with a well-defined purpose. The research or travel portion of the funding shall be limited to a reasonable value, which can be determined case by case.

Question 8.

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

Given the evolution plan of the 5G standardisation and the availability of the 5G equipment by telecommunication vendors, we believe the peak time of the implementation of 5G networks in different vertical applications is approaching. We need to build an end-to-end system to properly demonstrate 5G capabilities in any of the 3 focused areas: eMBB, URLLC or mMTC and also need to adapt and involve the latest technologies and equipment during the project. Therefore, a timeframe less than 1 year will be too short in practice.

The Australian 5G Innovation Initiative shall consider all activities in 1 to 3 years timeframe.