M1 and NTU Singapore ink partnership to develop Singapore's first 5G C-V2X research testbed and trials

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M1 Limited (M1) and Nanyang Technological University, Singapore (NTU Singapore) are collaborating to integrate 5G technology into cellular vehicle-to-everything (C-V2X) research testbeds and trials – first of its kind in Singapore – as part of Singapore's ongoing transition into a global innovation hub for research in connected mobility.

C-V2X communications are used to enhance safety by relaying real-time traffic navigation and hazard information to users in advance. It can send traffic warning notifications at road junctions, which helps optimise road usage by reducing travelling time and minimising the risk of accidents.

M1 will provide the infrastructure for a 5G connected mobility testbed and trial by deploying three 5G base stations for C-V2X communications at the NTU Smart Campus. The increased capacity and capabilities of the network will deliver ultra-fast and reliable low-latency communications over a wider coverage area. The network's radio efficiency is further improved by massive Multiple-Input Multiple-Output that can support hundreds of sensors on-board vehicles including transport infrastructure such as traffic lights.

This also allows industry partners to co-design and co-deploy 5G connected mobility solutions for a range of safety-critical use cases such as collision avoidance, real-time traffic routing, and network security. C-V2X equipment will be installed in shuttle buses and autonomous vehicles that ply the NTU Smart Campus.

This enables vehicle localisation tests in a real-world environment and 5G network assessment for C-V2X communications. Industry partners will also be invited to explore the integration of this technology with autonomous vehicles, traffic infrastructure and unmanned aircraft systems.

Supporting Singapore's push towards 5G urban connected mobility development, Minister of Communications and Information, Mr S Iswaran, announced the launch of the NTU Connected Smart Mobility Testbed to research, develop, and demonstrate new 5G connected mobility solutions alongside industry. This S$24 million testbed which spans the 200-hectare NTU Smart Campus, pulls together several successful development and tests of transportation technologies using the international car-to-car wireless standard for vehicular use.

Mr Denis Seek, Chief Technical Officer, M1, said, "By being Singapore's first to deploy a 5G network for C-V2X communications, this trial will serve as a live testbed for M1 to develop its technical competency and strengthen its readiness in harnessing new 5G technologies and infrastructure development. The partnership with NTU also underscores the significance of developing and attracting students to participate in experimental 5G connected mobility C-V2X projects, nurturing them to become future technology innovators and leaders for Singapore's Smart Nation journey."

NTU Vice President for Research Professor Lam Khin Yong, said, "NTU is a world leader in smart mobility solutions and has partnered top companies like Volvo, the BMW Group, the Bolloré Group's Blue Solutions, and MobilityX, to develop innovative technologies for autonomous vehicles, electric vehicles and multi-modal mobility solutions. As such, the university is in a prime position to accelerate advanced mobility solutions on the NTU Smart Campus, especially the emerging V2X technology. Our partnership with M1 will leverage the ultra-fast 5G cellular communications technology and integrate them into our existing V2X testbed which will enhance overall safety and reliability as notifications can be sent to users almost immediately. A cornerstone in the future of smart transportation, V2X technologies will also optimise road usage by reducing travelling time and minimising the risk of accidents for a safer and more reliable commute."

Mr Lim Kok Kiang, Assistant Managing Director, Singapore Economic Development Board said, "The NTU Connected Smart Mobility Testbed exemplifies Singapore's vision to be at the global forefront of developing innovative and impactful solutions for smart urban mobility. With world-class research universities and a rich ecosystem of industry players, Singapore is the ideal location for innovation partnerships to co-create and commercialise the next generation of mobility solutions."

To-date, NTU has completed 12 V2X research projects with leading industry partners. For example, NTU researchers have developed an early warning system for vehicles. It provides drivers with advance alerts on-road hazards such as when another car stops unexpectedly or when a passenger opens the vehicle door by accident. Together with Continental and Schaeffler, NTU also developed a V2X communications system that connects vehicles to e-scooters or e-bikes. It allows drivers and users of personal mobility devices (PMDs) to detect one another.

Besides cellular communications technologies for vehicles on land, NTU is also working on the development of drone air traffic management. This will give better localisation and positioning to the drones, and ensure a smoother stream for high-definition video.

M1 has also made significant headway into 5G development and trials, and recently won a 5G Trial Tech Call from Infocomm Media Development Authority (IMDA) and PSA Corporation Ltd (PSA) to study 5G performance and capabilities for port applications, including tele-remote control of port equipment and enhancement of automated guided vehicles (AGV) operations in the middle of this year.

M1 also recently signed a memorandum of understanding (MOU) with the Singapore University of Technology and Design (SUTD) to embark on a joint research partnership around the remote operation of tactile robots using 5G technology. These 5G trials further strengthen the nation's 5G ecosystem, while driving Singapore's Smart Nation transformation journey.

Mr Tan Kiat How, Chief Executive, IMDA said, "I am encouraged to see our industry partners working together to develop impactful services that bring benefit to our businesses and consumers. I hope to see more partners join us to co-create an innovative, vibrant 5G ecosystem in support of Singapore's Digital Economy,"