

C-V2X contributes to safer roads for everyone 5GAA live demo event in Berlin

Berlin, 23 May 2019 – Smart mobility technology, which we have been developing over the years, is now a reality. ‘Cellular Vehicle-to-Everything’ (C-V2X) allows vehicles to both communicate with the cloud and also directly with each other and their surroundings. Thanks to 4G LTE cellular technology, as well as the emerging 5G generation of high speed and low latency communications, traffic will be optimized, and emissions will be reduced. Emergency services will navigate smoothly and road safety for everyone, including vulnerable road users, will dramatically enhance.

At a live demo event in Berlin, the 5G Automotive Association (5GAA) presented a deep-dive into a smarter and safer mobility, giving a sneak peek of the technologies ready to be deployed. Prominent 5GAA members including **BMW Group, Daimler, Deutsche Telekom, Fraunhofer Institutes FOKUS and ESK, Ford, Huawei, Jaguar Land Rover, Nokia, Qualcomm and Vodafone**, demonstrated C-V2X Vehicle-to-Vehicle (V2V), Vehicle-to-Infrastructure (V2I) and Vehicle-to-Network (V2N) applications.

“Connected mobility standards are no longer a vision for the future,” says Maxime Flament, Chief Technology Officer at 5GAA. “The solutions on show are ready to be deployed today and have huge industry momentum based on the forthcoming 5G capabilities. C-V2X technology is a key foundation for a safe and sound driving environment for pedestrians, bicyclists, motorcyclists, cars and commercial heavy trucks. Global field testing is already in its very final stages and the first solutions are now commercially available from multiple suppliers.”

Using both direct short-range communications and mobile networks offers complementary capabilities as showcased in the demos, which involve tele-operated driving and the provision of emergency traffic information between vehicles using multi-access edge computing (MEC) functionality. All the demos use technology that is ready to be deployed.

A short summary on the 5GAA C-V2X use cases, showcased today at Berlin:

1. A. Traffic Management Solutions: Signal Phase and Timing (SPaT) and Red-Light Violation Warning (RLVW) to Vehicle

Waiting at the red light is not only time consuming, but idling, braking and accelerating release more pollutants. The communication between the traffic signal and vehicle is important to improve traffic flow, thus increasing road safety by preventing accidents. During the demo drive, a BMW Group vehicle equipped with a Qualcomm onboard unit running the Savari ITS software stack and the V2X use cases, communicates with a SWARCO traffic signal, showing C-V2X readiness across multiple vendors.

The use case enables the driver to monitor the upcoming traffic light. The center display of the vehicle shows the current signal phase and how long it will remain. In the Red Light Violation Warning (RLVW) use case, the application in the vehicle uses its speed and acceleration profile,

along with the signal timing and geometry information from the traffic signal. If the driver is likely to run a red light he/she receives a warning in the vehicle.

B. Traffic Management Solutions: Emergency Electronic Brake light (EEBL)/ Roadworks warning (RWW)

C-V2X provides the driver with information so that he or she can adapt to the upcoming traffic situation in advance. Fraunhofer FOKUS, supported by Daimler, demonstrate an Emergency Electronic Brake Light Warning: Two vehicles equipped with Huawei onboard units are accelerating, and the car ahead brakes hard. The second car instantly receives a warning, demonstrating the advantage of the low-latency C-V2X communication. Furthermore, a Huawei roadside unit communicates ongoing roadwork via C-V2X to the vehicle. Visitors experience both use cases in the car viewing the warnings on the central display.

2. Real Time Emergency Alerts: Vehicle-to-Network and Network-to-Vehicle services

Vodafone Germany and Ford show connected vehicle technology (V2X) that could alert drivers to an accident ahead, moments after it has happened (via eCall Plus). Furthermore, the system provides early warning that emergency vehicles are approaching – and which side of the road other vehicles should move towards to avoid being an obstruction. Experts believe that survival rates for road accident victims can be improved by as much as 40% if they receive treatment just four minutes more quickly.

3. Live data capture and transmission: Expanded network/Vehicle-to-Network capacities via MEC

An ultra-fast, reliable and precise dissemination of safety-relevant information can save lives. Continental, Deutsche Telekom, Fraunhofer ESK and Nokia demonstrate how information is delivered to vehicles almost real-time via a mobile network, utilizing Multi-Access Edge Computing (MEC) technology. All data is processed at the edge of the mobile network to reduce transmission time (latency). As a result, event-related data such as emergency warnings as well as high-definition map data are transmitted in milliseconds, improving driving safety on the path to fully automated driving.

4. Combined Network and Direct solution enables the pinnacle of C-V2X technology

Vodafone Group, Huawei and Jaguar Land Rover demonstrate safety critical use cases by combining different communication modes (short direct via PC5 and longer range network-based via Uu). The provision of a two-stage warning enables vehicles to be made aware of other vehicles approaching the same junction much earlier and allowing action to be taken sooner to avoid a crash. Also, the number of road accidents because of unsafe lane changes and blind spots are significant. Using C-V2X technology helps automotive OEMs keeping the cost of implementing such warnings down by not having to install additional 'one-off' radio access systems for such warnings. The demos showcased the value and readiness of C-V2X and its ability to seamlessly combine both long range and short-range direct and longer-range network communication links. Specifically, it was shown that at a T-junction – a key site for accidents – connected cars benefit from longer range cellular network communication to deliver safety-related information beyond what alone can be delivered from short-range technology.

5. Remote-operated driving

Remote-Operated Driving (ROD) smooths the path to automated vehicles, anticipating situations in which remote human operator can intervene with the driving of the vehicle. ROD is enabled by low latency communication equipment e.g. by Huawei to deliver instructions or inputs to the vehicle to help it navigate challenging scenarios. Fraunhofer Institute FOKUS, supported by Daimler, showcase the reliability ROD enables already today.

About 5GAA

The 5G Automotive Association (5GAA) is a global, cross-industry organisation with 115 members working together to develop end-to-end solutions for future mobility and transportation services. The organisation is committed to helping define and develop the next generation of connected mobility for advanced driving and automated vehicle solutions.

For more information, visit 5GAA's [website](#), [LinkedIn](#) and [Twitter](#) pages.

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