

Pioneers in Europe, Groupe PSA and Qualcomm Technologies are testing vehicle-to-vehicle communication featuring C-V2X technology

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- **What is C-V2X technology?**

C-V2X technology (Cellular Vehicle-to-Everything) is a wireless communication technology developed for the transport sector.

It allows the exchange of information between vehicles and their environment within a 1-kilometre radius. The technology can be tested thanks to the latest upgrade of the LTE standard (release 14), formalised in 2017 by telecommunications standard development organisation 3GPP.

- **What is the background to the trial?**

Groupe PSA and Qualcomm Technologies are performing Europe's first C-V2X (Cellular Vehicle-to-Everything) demonstration at the inOut digital mobility event in Rennes.

Since the beginning of their partnership in February 2017, the two companies have been testing C-V2X technology, which has been developed for use in Intelligent Transport Systems (ITS) and communications via telecommunications networks.

As we move towards 5G, C-V2X is a big step towards connected, autonomous vehicles and enhanced road safety.

- **What is the purpose of the trial?**

The idea is to carry out early-stage testing of technology for direct communication between vehicles. This type of communication can be achieved using the C-V2X standard, without going through telecom operator networks. The goal of the trial is to evaluate the performance of C-V2X technology and the ability of vehicles to communicate with each other with ultra-low latency (tens of milliseconds).



- **What types of communication are possible?**

C-V2X technology covers four types of communication: between vehicles themselves; between vehicles and road infrastructure; between vehicles and other road users (cyclists, pedestrians, etc.); and between vehicles and the network/cloud (see below).



- **How can vehicles communicate with each other?**

Each vehicle is equipped with a C-V2X cellular modem allowing it to exchange data with other vehicles within a 1-kilometre radius. The data are anonymised and protected. When data are exchanged, the driver receives a message via the dashboard screen (symbol, text, audio alert).

- **What are the benefits for the user?**

The vehicle detects potential hazards and alerts other drivers within a 1-kilometre radius in real time. The vehicle can see what the driver cannot see, and this helps improve road safety. The technology uses the free spectrum and does not involve any telecommunications costs. All data are anonymised and protected.

- **What are some concrete examples of use?**

Examples of security-related information services	
Notification of potentially hazardous road incidents	Slow or stalled vehicle warnings or traffic alerts
	Roadwork alerts
	Weather conditions
	Emergency brake warning
	Emergency vehicle warning
Road information	Traffic indication alerts (speed limits, intersections, etc.)
	Vehicle alerts when approaching an intersection
	Change of traffic lights by priority vehicles
	Optimum speed to keep getting green lights
Examples of information services extended to mobility	
Navigation	Information on the availability of charging stations
	Information on approaching pedestrians
	Availability of parking spaces (on the road or in closed car parks)
	Multimodal navigation
	Connected and cooperative navigation
	Traffic information and recommended route

- **When will the system be rolled out?**

The technology is slated to come out in 2020; it will be rolled out in the Chinese market first. This connectivity system will be needed to deploy autonomous driving.

- **What are the conditions for its implementation?**

The first step is to certify electronic equipment according to the regulations (RED, EN 302 571) to use the ITS frequency band (5.9 GHz); the choice of the standard to be deployed in Europe should also be noted (C-V2X or WIFI-ITS, which also meets the needs for direct communication between vehicles).

- **Who are the players involved?**

To foster global expansion of the C-V2X ecosystem, an inter-professional organisation known as the 5G Automotive Association (5GAA) is promoting C-V2X communications, both directly and via networks. It currently has more than 70 members worldwide, including carmakers and their suppliers, mobile telecom operators, semiconductor manufacturers, test equipment suppliers, telecom network operators and suppliers of software and STI equipment.

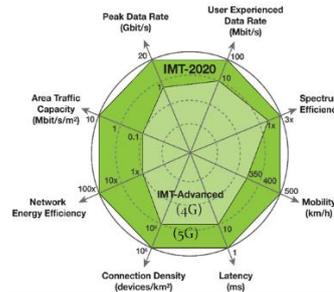
Qualcomm and Groupe PSA have joined 5GAA to promote the expansion of the C-V2X ecosystem worldwide.

- **What is the purpose of the trial at this stage?**

It enables to assess the performance of the C-V2X technology, to validate the ability of the vehicles to communicate with each other and with their environment, and also to guide the choice of standard.

- **How is the evolution of 5G compared to 4G?**

5G offers the ability to connect billions of objects, allowing information to be exchanged extremely quickly (ultra-low latency), with stellar network reliability and the use of new frequency bands to communicate.



- **What possibilities will 5G open up in the automotive industry?**

There is a growing need for high-speed, low-latency connectivity, which is a prerequisite for the applications that enable automated driving (ITS), for ADAS levels 1 and 2 (ACC, emergency braking), then levels 3, 4 and 5 for delegated driving, multimodal mobility services and over-the-air updates of on-board applications and high-speed infotainment.

The partnership and this first trial position Groupe PSA and Qualcomm as pioneers in Europe. The aim is to provide the most advanced automotive technologies via 5G.

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