

## **5GAA, BMW Group, Ford and Groupe PSA Exhibit First European Demonstration of C-V2X Direct Communication Interoperability Between Multiple Automakers**

- *Companies team up with Qualcomm and Savari to showcase C-V2X's advanced performance for safety, traffic efficiency and autonomy*
- *Exhibition includes communication between vehicles, motorcycles and infrastructure, showing commercial readiness for industry deployments as early as 2020*

**PARIS — July 10, 2018** - The 5G Automotive Association (5GAA), the BMW Group, Ford Motor Company (NYSE: F), and Groupe PSA -- in association with Qualcomm Technologies, Inc., a subsidiary of Qualcomm Incorporated, and Savari, Inc. -- announced today Europe's first live demonstration of C-V2X direct communication technology operating across vehicles from multiple auto manufacturers. The live demonstration also featured a live showcase of C-V2X direct communication technology operating between passenger cars, motorcycles, and roadside infrastructure. C-V2X is a global solution for vehicle-to-everything (V2X) communication in support of improved automotive safety, automated driving and traffic efficiency.

The demonstration exhibited the road safety and traffic efficiency benefits of using C-V2X for Vehicle-to-Vehicle (V2V) collision avoidance, as well as Vehicle-to-Infrastructure (V2I) connectivity to traffic signals and Traffic Management Centers (TMC). C-V2X was operated using real-time direct communications over ITS spectrum and demonstrated its ability to work without cellular network coverage, and underscores its commercial readiness for industry deployment as early as 2020. Superior performance and cost-effectiveness compared to other V2X technologies, along with forward-compatibility with 5G, make C-V2X direct communications a preferred solution for C-ITS applications.

Six demonstrations were shown including: Emergency Electronic Brake Light, Intersection Collision Warning, Across Traffic Turn Collision Risk Warning, Slow Vehicle Warning and Stationary Vehicle Warning, Signal Phase and Timing / Signal Violation Warning and Vulnerable Road User (pedestrian) Warning. The vehicles involved included two-wheel e-scooters provided by BMW Group, and automotive passenger vehicles provided by Ford, Groupe PSA, and BMW Group, all of which were equipped with C-V2X direct communication technology using the Qualcomm® 9150 C-V2X chipset solution. V2X software stack and application software, along with roadside infrastructure, were provided by industry leader, Savari.

C-V2X is globally supported by a broad automotive ecosystem, which includes the fast growing 5GAA organization. The 5GAA involves over 85 global members comprised of many leading automakers, Tier-1 suppliers, software developers, mobile operators, semiconductor companies, test equipment vendors, telecom suppliers, traffic signal suppliers and road operators.

Cellular modems will be key to the C-V2X deployment in vehicles to support telematics, eCall, connected infotainment and delivering useful driving/traffic/parking information. As C-V2X direct communication functionality is integrated into the cellular modem, C-V2X solutions are expected to be more cost-efficient and economical over competing technologies, and benefit from accelerated attach rates. C-V2X direct communication field validations are currently underway in Germany, France, Korea, China, Japan and the U.S.

C-V2X currently stands as the only V2X technology based on globally recognized 3<sup>rd</sup> Generation Partnership Project (3GPP) specifications, with ongoing evolution designed to offer forward compatibility with 5G. C-V2X also leverages and reuses the upper layer protocols defined by the automotive industry, including the European Telecommunications Standards Institute (ETSI) organization. C-V2X includes two complementary transmission modes:

- **Direct communication** as shown in this demonstration for V2V and V2I use cases
- **V2N network communication**, which leverages mobile operators for connectivity and delivers cloud-based services, including automated crash notification (ACN, as

mandated by eCall), hazard warnings, weather conditions, green light optimal speed advisory (GLOSA), parking spot location, and remote tele-operation to support automated driving, to name a few.

*“This demonstration builds on the successful C-V2X showcase we organised with our members Audi, Ford and Qualcomm in Washington DC in April,”* said Christoph Voigt, Chairman of 5GAA. *“We are excited to witness the growing momentum behind this life-saving technology and to see our members working together to deploy C-V2X, and to make it hit the road as soon as possible.”*

*“The BMW Group introduced the first C-ITS use cases already in 2013 with the market introduction of the BMW i3. Today most of envisaged C-ITS use-cases are already institutionalized. With the implementation of C-V2X, the BMW Group accomplishes the last set of the puzzle with a practical path to C-ITS showing quick benefits,”* said Christoph Grote, Senior Vice President Electronics, BMW Group.

*“With its ability to safely and securely connect vehicles, along with its evolution into 5G, C-V2X is integral to Ford’s vision for future transportation in which all cars and infrastructure talk to each other,”* said Thomas Lukaszewicz, Manager Automated Driving, Ford of Europe. *“We are very encouraged by preliminary test results in Europe and elsewhere which support our belief that C-V2X direct communications has superior V2X communication capabilities.”*

*“We’re moving forward with seamless communication between cars and their environment for enhancing road safety, as well as our customers’ safety,”* said Carla Gohin, Group PSA’s Vice President for Research and Advanced Engineering. *“Following the first European C-V2X direct communications demonstration we hosted with Qualcomm Technologies last March, we’re pleased to work with leading automotive and technology companies today to highlight that C-V2X interoperability is a reality.”*

*“This demonstration of interoperability between multiple automakers is not only another milestone achieved towards C-V2X deployment, but also further validates the commercial viability and global compatibility of C-V2X direct communications for connected vehicles,”*

said Enrico Salvatori, senior vice president & president, Qualcomm Europe and MEA. *“We look forward in continuing to work alongside leaders in the automotive industry, like the 5GAA, BMW Group, Ford, Groupe PSA and Savari, to help advance the automotive industry’s shift towards a safer, connected and more autonomous future.”*

*“As one of the V2X pioneers, our company is extremely pleased to continue to help enable the next step in the V2X revolution that we helped start back in 2008,”* said Ravi Puvvala, CEO of Savari. *“For the last year and a half, the Savari team has worked diligently alongside the dedicated C-V2X engineers in the 5GAA partnership. The resulting string of increasingly impressive demonstrations is continuing to convince the world that C-V2X will soon be deployed around the world.”*

### **About 5GAA**

The 5G Automotive Association (5GAA) is a global cross-industry organization of companies from the automotive, technology and telecommunications industries (ICT), working together to develop end-to-end solutions for future mobility and transportation services.

Created in 2016, the Association is comprised of over 90 members whose mission is to develop, test and promote communications solutions, initiate their standardization and accelerate their commercial availability and global market penetration, to address society’s connected mobility and road safety needs with applications such as automated driving, ubiquitous access to services and integration into smart city and intelligent transportation. For more information, visit 5GAA’s [website](#), [LinkedIn](#) and [Twitter](#) pages.

### **About the BMW Group**

With its four brands BMW, MINI, Rolls-Royce and BMW Motorrad, the BMW Group is the world’s leading premium manufacturer of automobiles and motorcycles and also provides premium financial and mobility services. The BMW Group production network comprises 30 production and assembly facilities in 14 countries; the company has a global sales network in more than 140 countries. In 2017, the BMW Group sold over 2,463,500 passenger vehicles and more than 164,000 motorcycles worldwide. The profit before tax in the financial year 2017 was € 10.655 billion on revenues amounting to € 98.678 billion. As of 31 December 2017, the BMW Group had a workforce of 129,932 employees. The success of the BMW

Group has always been based on long-term thinking and responsible action. The company has therefore established ecological and social sustainability throughout the value chain, comprehensive product responsibility and a clear commitment to conserving resources as an integral part of its strategy.

Facebook: <http://www.facebook.com/BMWGroup>

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Google+: <http://googleplus.bmwgroup.com>

### **About Ford Motor Company**

Ford Motor Company is a global company based in Dearborn, Michigan. The company designs, manufactures, markets and services a full line of Ford cars, trucks, SUVs, electrified vehicles and Lincoln luxury vehicles, provides financial services through Ford Motor Credit Company and is pursuing leadership positions in electrification, autonomous vehicles and mobility solutions. Ford employs approximately 202,000 people worldwide. For more information regarding Ford, its products and Ford Motor Credit Company, please visit [www.corporate.ford.com](http://www.corporate.ford.com).

### **About Groupe PSA**

Groupe PSA designs unique automotive experiences and delivers mobility solutions to meet all customer expectations. The Group has five car brands, Peugeot, Citroën, DS, Opel and Vauxhall and provides a wide array of mobility and smart services under the Free2Move brand. Its 'Push to Pass' strategic plan represents a first step towards the achievement of the Group's vision to be "a global carmaker with cutting-edge efficiency and a leading mobility provider sustaining lifetime customer relationships". An early innovator in the field of autonomous and connected cars, Groupe PSA is also involved in financing activities through Banque PSA Finance and in automotive equipment via Faurecia. Find out more at [groupe-psa.com/en](http://groupe-psa.com/en)

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## **About Qualcomm**

Qualcomm invents breakthrough technologies that transform how the world connects and communicates. When we connected the phone to the Internet, the mobile revolution was born. Today, our inventions are the foundation for life-changing products, experiences, and industries. As we lead the world to 5G, we envision this next big change in cellular technology spurring a new era of intelligent, connected devices and enabling new opportunities in connected cars, remote delivery of health care services, and the IoT — including smart cities, smart homes, and wearables. Qualcomm Incorporated includes our licensing business, QTL, and the vast majority of our patent portfolio. Qualcomm Technologies, Inc., a subsidiary of Qualcomm Incorporated, operates, along with its subsidiaries, all of our engineering, research and development functions, and all of our products and services businesses, including, the QCT semiconductor business. For more information, visit Qualcomm's [website](#), [OnQ blog](#), [Twitter](#) and [Facebook](#) pages.

## **About Savari, Inc.**

Savari seeks to make the world's roadways and vehicles automated and safer by deploying advanced wireless sensor technologies and software. Savari builds software and hardware sensor solutions for automotive car manufacturers, the automotive aftermarket and smart cities. The company pioneered V2X radio technology, which is crucial for vehicles to achieve Level 4 and Level 5 of automation. The technology allows vehicles to share data with other vehicles, traffic lights and smartphones. With more than 150 man-years of V2X learning and development and 15 million-plus miles per year of public testing, Savari is a leader in V2X technology. Savari is headquartered in Santa Clara, Calif., and has offices in Detroit, Mich., Munich, Germany, Seoul, Korea and Bengaluru, India. For more information, visit [savari.net](http://savari.net).

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Qualcomm 9150 C-V2X chipset is product of Qualcomm Technologies, Inc. and/or its subsidiaries

# C-V2X

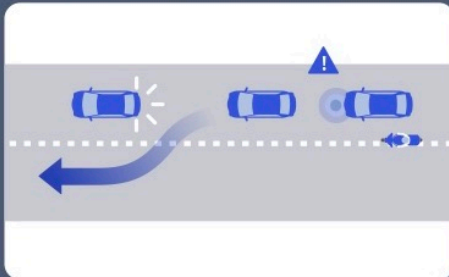
Transforming road safety

The 5G Automotive Association (5GAA), BMW Group, Ford, Groupe PSA, Qualcomm and Savari demonstrated today Cellular Vehicle-to-Everything (C-V2X) readiness for deployment as early as 2020. C-V2X direct communication is designed to allow cars to communicate with other vehicles, motorcycles, infrastructure and pedestrians without the involvement of a cellular network.

Here are six scenarios featuring this breakthrough technology.

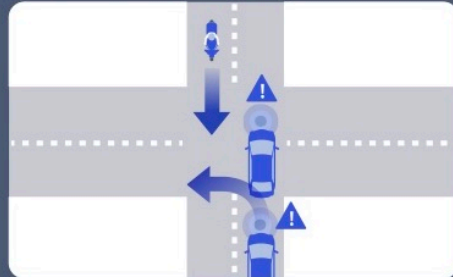
## Emergency Electronic Brake Lights

Designed to prevent rear-end crashes



## Across Traffic Turn Collision Risk Warning

Designed to improve traffic safety



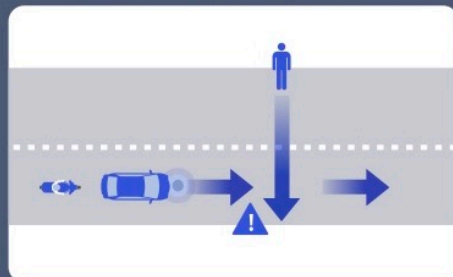
## Signal Phase and Timing

Communicated to the driver



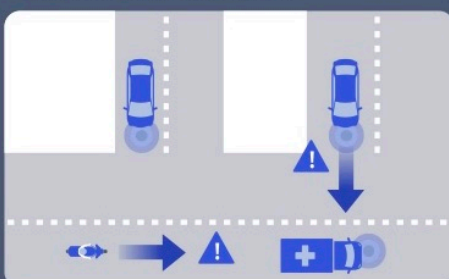
## Vulnerable Road User Protection

When pedestrians & cyclists are present



## Intersection Collision Warning

Designed to improve traffic safety



## Stationary Vehicle Warning

Designed to prevent rear-end crashes

