ITS AMERICA

ITS America Connected Vehicle Privacy Brief:

How Direct V2X Technologies Improve Safety and Efficiency While Protecting Privacy

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Today's transportation systems are not just pavement and road signs. Instead, they rely on digital information and communications to improve safety and mobility. Modern vehicles are connected, meaning they can both communicate and receive information digitally – and future vehicles will communicate with each other and the surrounding infrastructure.

Connected vehicle technologies enhance transportation systems by allowing vehicles to communicate with each other and with roadside infrastructure, increasing their situational awareness and thus improving road safety, traffic management, and overall mobility through real-time data sharing and responsive alerts. This connectivity offers numerous benefits, including safer journeys, reduced congestion, and more efficient travel.

However, this increasingly connected, and technology-enabled environment begs the question – **What information are vehicles sharing, and how does it impact you?** Maintaining data privacy is critical to gaining public trust and upholding security in all modes of transportation. Connected transportation technologies pave the way for innovation and significantly enhance safety and efficiency. Balancing privacy and security with innovation is crucial for the successful implementation of these advanced systems.

This document outlines the privacy aspects of direct vehicle-to-everything (V2X) connectivity systems and identifies the efforts manufacturers are implementing to maintain strong consumer data privacy and security protections.

There are two primary types of **connected vehicle** communications:

- **Direct Vehicle-to-Everything (V2X) Systems:** These systems, which can be factory-installed or installed after the purchase of the vehicle, use a specialized radio frequency to directly communicate with other cars or infrastructure. The ability to transmit data very quickly, in real-time makes Direct V2X best suited to prevent crashes by prompting alerts to drivers and providing real-time responses. This designated frequency that Direct V2X systems use is known as the "safety band," and there are no costs associated with the exchange or communication of data in the safety band.

- **Network Vehicle-to-Everything (V2X) Systems:** These systems use cellular connections to communicate driver alerts and information such as notification of road construction ahead that are not reliant on immediate, split-second information updates. Such systems can be built into the vehicle and are available when you drive off the dealer's lot; others can be bought as aftermarket devices, or the smartphone that you bring in the vehicle can serve this role. When they are built into the vehicle, they are part of the vehicle's telematics system. Telematics systems use cellular networks to transmit data between your vehicle and the manufacturer for the purposes of enhancing vehicle operations (software updates, diagnostics), safety (notification of crashes), and driver mobility experience (mapping data, road closures). Aftermarket systems and your smartphone can connect to the cloud and enable a variety of services, e.g., via an application on your smartphone. All of these Network V2X systems use cellular service providers, so there are fees for communication.

- This brief focuses on the consumer privacy implications of Direct V2X communications systems. Today, these systems are most often installed on vehicles owned by government agencies, but one day soon, these may come as standard equipment on new personal vehicles.

Direct V2X communications enhance road safety by:

- **Preventing Crashes:** Direct V2X systems prevent crashes by allowing vehicles to exchange information regarding their movements with one another and with roadside systems (e.g., traffic signals and signs). This information can be shared with drivers through visual, audible, or haptic cues. By communicating with roadside infrastructure and other vehicles, V2X technology can alert drivers in real-time about changing conditions or oncoming vehicles. For example, a driver will receive an alert if they risk running a red light or if an unseen vehicle might enter an intersection simultaneously, allowing the driver to slow down or stop safely to avoid a collision.

- **Providing Safety Information:** Direct V2X systems provide safety information for things that drivers cannot see. Drivers have a lot of information at their fingertips but cannot see behind obstacles or around corners. This system communicates information to the driver about pedestrians in crosswalks and movements of vehicles beyond the driver's line of sight like vehicles or pedestrians approaching from around a corner or parked car. The ability to receive timely alerts allows drivers to safely take mitigating actions to avoid collisions or last-minute maneuvers, reducing crashes and improving overall road safety.

- **Providing Real-Time Updates on Road and Traffic Conditions:** Direct V2X systems provide real-time updates on road conditions and traffic situations. For example, V2X technologies alert drivers about icy roads, construction zones, or traffic jams, allowing them to safely navigate variable conditions or detours or adjust their routes accordingly. Allowing drivers to make informed decisions about their routes enhances safety and optimizes travel efficiency by reducing congestion and improving traffic flow. Moreover, the system can coordinate with emergency vehicles, ensuring they receive green lights at intersections and allowing them to reach their destinations faster, further contributing to a smoother and more efficient travel experience for everyone on the road.

How is your privacy and security protected?

It is common for concerns to arise regarding privacy and security with new technologies. V2X systems are no exception. However, to feel confident that your privacy and security are protected when using these technologies, it is essential to understand what V2X technologies are and what they are not.

- First and foremost, **V2X technologies <u>are not</u> tools for tracking individuals or vehicles.** They do not collect information about where you go or when you go. The primary function of these systems is to enhance road safety by sharing data about traffic conditions, vehicle movements, or road hazards. This data exchange happens in real-time and is solely focused on preventing crashes, reducing congestion, and improving travel.
- **V2X systems <u>do not</u> transmit personally identifiable information (PII)**. While preventing crashes requires that vehicles or their drivers know where other vehicles or other road users are – it does not require providing the identity of vehicles or drivers to accomplish this. This means that information about the vehicle (i.e., make, model, color, plate number, VIN, etc.) and the driver (i.e., name, license, address, etc.) are <u>not</u> transmitted in safety messages. This ensures that your privacy remains intact while benefiting from the safety and efficiency advantages these systems provide.
- **Direct V2X messages <u>do not</u> have permanent identifiers**, significantly limiting the risk of tracking the extended path of a vehicle. This is a fundamental aspect of the technology, designed to ensure that the privacy of drivers and their vehicles is always protected. Because these systems do not transmit identifiable information, they prevent potential misuse of data and maintain anonymity while still providing critical safety information.
- **V2X technologies in vehicles <u>do</u> use a unique vehicle identifier when requesting a service**. In cases where a vehicle is requesting a service, such as the payment of a toll or a fire engine asking for a green light at a signal, these vehicles send a specific identifier

about the vehicle. The vehicle owner would knowingly opt into this system, revealing the vehicle's identity. Vehicles not requesting a service such as this remain anonymous.

- **Direct V2X systems do employ advanced security techniques to protect the data being exchanged.** Each message is accompanied by a unique digital certificate that verifies its authenticity and source, similar to the technology used to protect your credit card information in secure online transactions. This ensures that the messages sent and received are from reliable sources and have not been tampered with.
- **V2X technologies are not designed to sell your data to third parties.** This means that your data is used exclusively for the purposes of road safety and enhanced driving experience, without being commercialized or misused.
- **V2X technologies do prioritize privacy and security by design.** The systems are built to prevent crashes and improve travel without using personal data. As such, V2X system designers developed and standardized a fundamentally privacy-preserving communications system, making them one of the most privacy-preserving systems ever developed.

As Direct V2X technology continues to develop, it holds the promise of becoming standard equipment in new vehicles, further promoting safer and more efficient roadways. The commitment to privacy and security within these systems is a testament to the careful consideration given to protecting consumers while leveraging advanced technology for the public good.

For more information on V2X as a technology and how it contributes to a safer transportation system, visit these additional resources at www.itsa.org:

- A Blueprint for Transportation Technology
- ITS America National V2X Deployment Plan
- V2X Decoded Frequently Asked Questions
- Beyond 5.9 V2X Deployment Plan
- Future of V2X in 5.9 GHz Report