Description of Operation

The Passive Entry / Passive Start system is designed to allow hands free unlocking of the vehicle doors and engine starting with a push of a button. The PEPS system will provide the means to detect the presence of a keyfob by driving Low Frequency (LF) antennas mounted within the vehicle. The keyfob will respond to the 125 KHz LF challenge and the RFA module will determine the location of any of the fobs that are within LF range. To provide a countermeasure against relay attach theft, the RFA interfaces with the SAT modules (if provided) mounted within the vehicle to calculate distance to the fob using time of flight techniques. At the time of function request and after the RFA sends the 125 KHz LF signal to the fob, the SAT modules communicate with the keyfob using UWB communication to calculate the distance. Based on the fob's location using the LF data (and SAT data if provided), the base station will unlock or lock doors, open the trunk, or allow starting of the vehicle at the push of a button on the vehicle's instrument panel. A second version of the PEPS system will not have the hands free entry functions but will only support the Passive Start feature and will not have the SAT modules included. Both versions of the PEPS systems will also act as a gateway for standard RKE functions.

Remote Function Actuator (RFA) module
The RFA module is a microcontroller-based module that connects to the vehicle's wiring harness in order to interface with other body control modules to provide for the control of the vehicle's door locks, trunk release, engine start/stop, lights, alarms, and other functions. The RFA is a base station unit containing the driver circuits that are connected to LF antennas at the vehicle for the passive entry/start functions. These LF transmission functions are activated by witches built into the outside door handles and at the trunk, and by an engine push start switch on the instrument panel. The RFA receives RF responses from the programmed keyfobs for the passive and RKE functions. The RFA is responsible for decrypting the secure encoded messages from the keyfobs. The RFA uses a medium or high speed CAN interface to communicate to the vehicle bus for data and control. The RFA uses 2 LIN interface lines to communicate to the SAT modules for data and control.

There are two main versions of the RFA module:
1. Passive Entry/Start – Provides both hands free unlocking/locking of exterior doors and push button starting of the vehicle. This version also communicates with the SAT modules.
2. Passive Start Only – Provides only push button starting of the vehicle. This version does not communicate with SAT modules.

Both versions provide RKE functions. The RFA modules shall both use a single version of the application software that can be programmed to the vehicle configuration. The number of doors, left or right hand drive, use of E-Latch motors, and other features can all be configured at the vehicle assembly plant. While a Passive Entry/Start module can be configured to work on a Passive Start Only vehicle, the opposite is not true.