

# Remote Keyless Entry (RKE) & Passive Keyless Entry (PKE) Systems Market

Forecast to grow from \$ 2,298M in 2023 to \$ 4,909M in 2030. An average CAGR of 11.5%.



## Description

- Keyless entry systems allow you to lock and unlock your vehicle without a mechanical key. There are four technologies: **Remote Keyless Entry (RKE)**, **UWB (Ultra-Wideband)**, **Bluetooth LE (2.4GHz)**, and **RFID (NFC)**.
- **Remote Keyless Entry (RKE)** is a legacy keyless entry system. It includes an RF receiver in the vehicle which receives the signal from a key fob, demodulates it, and sends it to the CPU. The CPU then sends a command to lock or unlock the vehicle over a CANBus network.
- The market segment is moving from a simple wireless RF connection between a key fob and the vehicle to systems with increased security and more features such as measuring the distance between the key and vehicle. **UWB** and **Bluetooth LE** provide this.
- Advanced features include using your Smart Phone as a key known as **Phone-as-a-Key (PaaK)** or “digital key”, remote parking, Passive Keyless Entry (PKE), and Passive Entry Passive Start (PEPS).
- The system consists of a central module and several satellite modules distributed throughout the body of the car for unlocking and locking. The satellite modules collect data such as RSSI (Relative Signal Strength Indicator) or angle using **Bluetooth AoA (Angle-of-Arrival)** to determine the key location relative to the vehicle. The vehicle is then opened automatically (passively) when the key approaches the vehicle.

## Drivers

- Increasing demand to use Smart Phones to access vehicles and building.
- Increasing demand for high-end technology for convenient vehicle entry.

## Customer Challenges & Opportunities

- A design focus is to have low power consumption for longer battery life.
- Performance in noisy environments.
- Abracon's antenna optimization services can verify or help optimize the antenna and RF Front End performance.

Description & Requirements	Frequency & Timing Control	RF & Antenna	Power & Magnetics
Antenna for Key Fob	N/A	<a href="#">UWB (6.2... 8.2GHz)</a> <a href="#">ACG0301U</a> (chip)  <a href="#">UWB (3.7... 4.2GHz)</a> <a href="#">ACG0502U</a> (chip)  <a href="#">Bluetooth LE</a> <a href="#">ACAG0201-2450-T</a> (chip) <a href="#">PRO-OB-607</a> (Stamped metal) <a href="#">APARN1204-S2450</a> (patch)  <a href="#">433.92MHz</a> <a href="#">ACAG1204-433-T</a> (chip)	N/A
Antenna for Vehicle	N/A	<a href="#">UWB (6.2... 8.2GHz)</a> <a href="#">ACG0301U</a> (chip)  <a href="#">UWB (3.7... 4.2GHz)</a> <a href="#">ACG0502U</a> (chip)  <a href="#">Bluetooth LE</a> <a href="#">ACAG0201-2450-T</a> (chip) <a href="#">PRO-OB-607</a> (stamped metal) <a href="#">APARN1204-S2450</a> (patch)  <a href="#">433.92MHz</a> <a href="#">ACAG1204-433-T</a> (chip)  <a href="#">NFC (RFID)</a> <a href="#">AFAR3026-SN</a> (PCB)	N/A
Timing for Receiver	<a href="#">32.768kHz Crystals</a> <a href="#">ABS05</a> (1.6 x 1.0mm) <a href="#">ABS06</a> (2.0 x 1.2mm) <a href="#">ABS07AIG</a> (Auto. 3.2 x 1.5mm)  <a href="#">MHz Crystals</a> <a href="#">ABM11AIG</a> (2.0 x 1.6mm) <a href="#">ABM8AIG</a> (Auto. 3.2 x 2.5mm) <a href="#">ABM12W</a> (1.6 x 1.0mm) <a href="#">ABM13W</a> (1.2 x 1.0mm)	N/A	N/A
Power Supply	N/A	N/A	<a href="#">Power Inductors</a> <a href="#">AOTA</a> (mini molded) <a href="#">ASMPH</a> (SMD chip) <a href="#">ASMPM</a> (SMD chip)
Common Mode Filtering			<a href="#">Common Mode Choke (CMC)</a> <a href="#">ACMS-Q</a> (auto, signal line)
RF Inductors for circuit-tuning, impedance matching, filtering or as high frequency choke.	N/A	N/A	<a href="#">RF Inductors</a> <a href="#">AIMC</a> (SMD chip) <a href="#">AIML</a> (SMD chip) <a href="#">ATEC</a> (Thin Film Chip)