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China Automotive Ultrasonic Radar and OEM Parking Roadmap Research Report, 2022

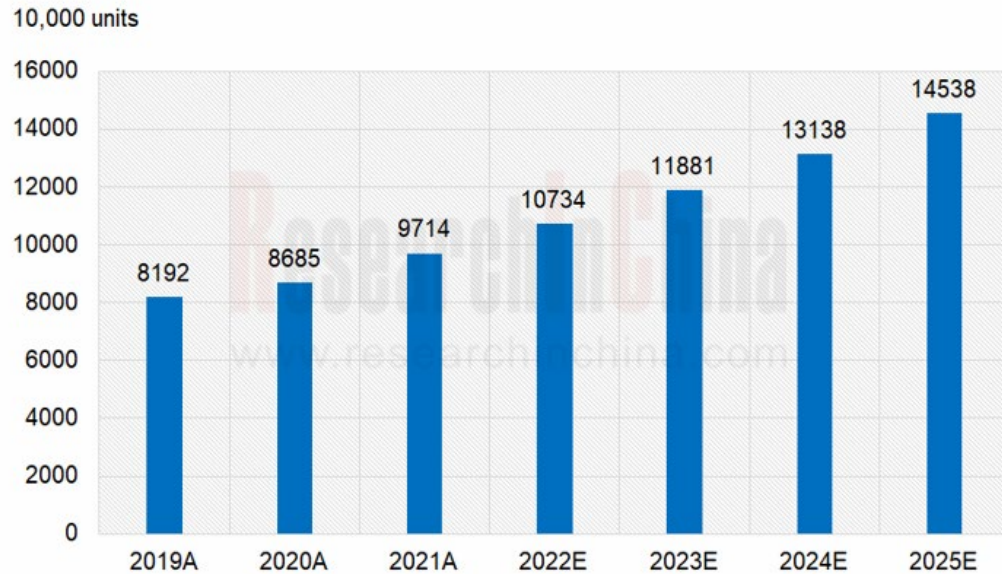
June 2022

In 2021, ultrasonic radar shipments hit 100 million units, and intelligent parking became a crucial engine

1. In 2025, China's ultrasonic radar installations will exceed 140 million units.

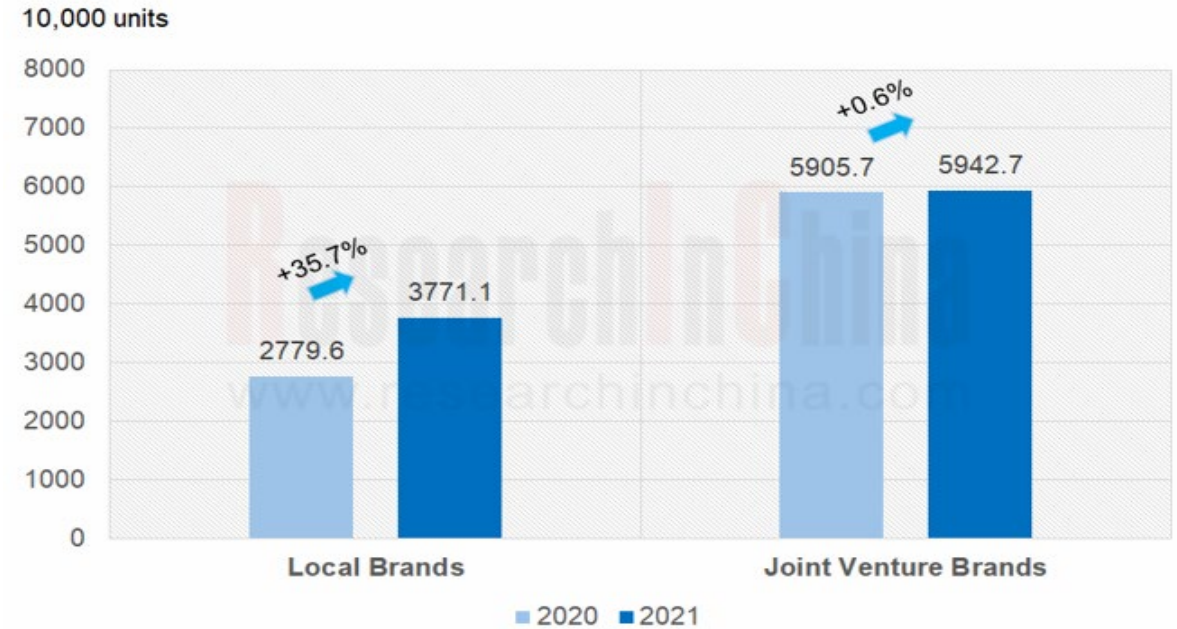
According to ResearchInChina, in 2021 China's ultrasonic radar installations in passenger cars jumped by 11.8% on the previous year to 97.138 million units, a figure projected to be more than 100 million units in 2022 and exceed 140 million units in 2025.

Installations of Ultrasonic Radars in Passenger Cars in China, 2019-2025E



Source: ResearchInChina

Ultrasonic Radar Installations and YoY Growth of Joint Venture/Local Brands and in China, 2021



Source: ResearchInChina

By auto brand in China, the installations of joint venture brands were higher than local brands, but from growth momentum, homegrown brands gained the upper hand.

In 2021, joint venture brands in China installed 59.427 million ultrasonic radars in their passenger cars, 1.6 times more than local brands (37.711 million units). In growth rate's terms, the installations of local brands surged by 35.7% from a year earlier, compared with joint venture brands (a tiny 0.6%).

Advanced automated parking solutions will be the main application scenario of ultrasonic radars

As L2+ automated driving develops, parking solutions including parking assist (e.g., ultrasonic radar-only, ultrasonic radar + surround view camera, ultrasonic radar + rear view camera, rear view/surround view camera, etc.), automated parking assist (APA), remote parking assist (RPA), and automated valet parking (AVP) are being mounted on new vehicles in China.

In 2021, in China the brands that equipped their new vehicle models with APA (including integrated APA) contained Haval, Geely and Lynk & Co; the RPA-enabled brands incorporated Changan Automobile, ARCFOX and WEY. In addition, Xpeng Motors, Hongqi, Weltmeister, and NIO were the first ones to deploy AVP solutions.

Intelligent Parking Solutions for 2021 Passenger Cars (by Model) of China's Local OEMs (Part)

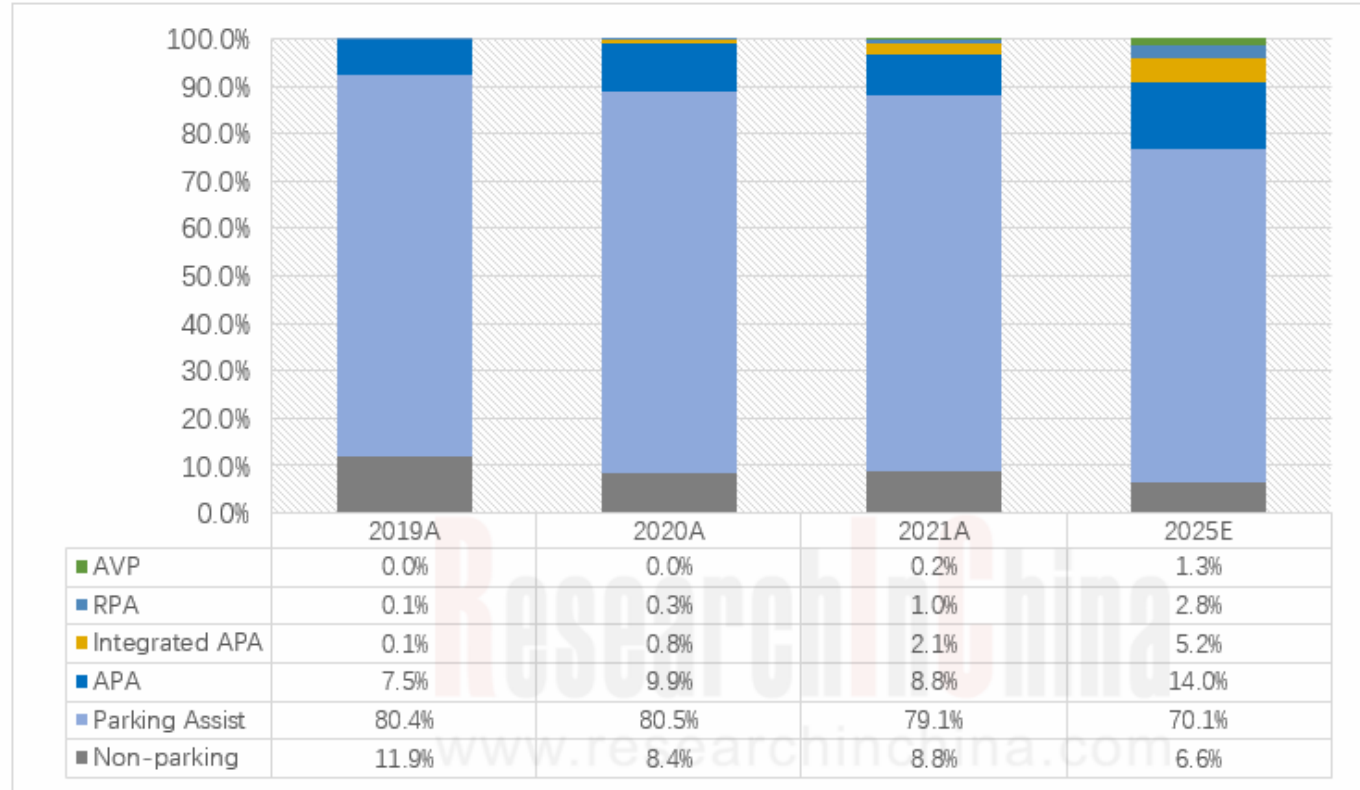
Brand	2021 Model	Parking Solutions			
		APA	Integrated APA	RPA	AVP
Haval	H6	✓	✓		
	Haval Big Dog	✓	✓		
	Haval First Love	✓			
	Haval Chitu		✓		
	Haval F7		✓		
	Haval H6S			✓	
	Haval F7x		✓		
Geely	Haval H7	✓			
	Preface		✓		
	Xingyue L	✓			
Xpeng Motors	Xingyue	✓			
	Geely ICON			✓	
Lynk & Co	Xpeng P7		✓	✓	✓
	Xpeng P5		✓		
	Lynk & Co 01	✓			
	Lynk & Co 03	✓			
	Lynk & Co 02	✓			
Changan Automobile	Lynk & Co 05 New Energy		✓		
	Lynk & Co 09	✓			
	CS75			✓	
	Changan UNI-T			✓	
WEY	Mocha			✓	
	Macchiato			✓	
	Macchiato New Energy			✓	
Hongqi	WEY VV7	✓			
	Hongqi E-HS9			✓	✓
ARCFOX	Hongqi HS7	✓			
	ARCFOX αT		✓	✓	
Weltmeister	ARCFOX αS			✓	✓
	Weltmeister W6				✓
NIO	NIO ET7				✓

Source: ResearchInChina

Parking Solutions for Passenger Cars sold in China

Our statistics show that in 2021, there were 1.787 million passenger cars equipped with the APA function in China, or 8.8% of the total; 432,000 passenger cars packed the integrated APA capability, accounting for 2.1%; 206,000 passenger cars, or 0.1% of the total, carried the RPA function.

Parking Solutions for Sold Passenger Cars in China, 2019-2025E



Note: parking assist solutions include the following types: ultrasonic radar-only, ultrasonic radar + surround view camera, ultrasonic radar + rear view camera, rear view/surround view camera, etc.

Source: ResearchInChina





Suppliers: Valeo and Bosch are leaders, and local players rise swiftly to prominence

Tier 1 suppliers such as Valeo and Bosch are monopolies in the Chinese ultrasonic radar market, of which Bosch already has 6 generations of ultrasonic radar products used in such scenarios as parking assist, side distance warning, side assistance, and emergency braking at low speeds.

In the parking field, Bosch has mass-produced APA, RPA and AVP solutions among others. Wherein, the RPA solution has been applied to production models such as Aion V and ARCFOX αT; AVP has been first available to New Mercedes-Benz S-Class, a production sedan.

Among local companies in China, Audiowell, Shenzhen Longhorn Automotive Electronic Equipment, Coligen, TungThih Electronic and Zongmu Technology are at the leading edge. Thereof, Audiowell's vehicle ultrasonic radars have undergone 4 iterations, and its fourth-generation AK2 ultrasonic radar core was unveiled in 2021, the up-to-date technology that enables L2+ AVP automated driving capability following UPA and APA. Audiowell also got the investment from Desay SV in 2021 and successfully went public on June 14, 2022.

Iteration History of Audiowell Ultrasonic Radars

Generation	1st	2nd	3rd	4th
Time	2002 to now	2019 to now	2019 to now	2021 to now
Picture				
Whether to be mainstream in the world or not	No	Yes	Yes	Yes
Whether to be mainstream in China or not	No	Yes	Yes	Yes
Features	Compliant with AKI and OEM standards	Adaptable to customers' automated assembly process	Multi-sensor fusion automated parking systems, e.g., APA/UPA	Comply with AKII standard, meet functional safety requirements and adapt to L2+ AVP automated driving capability
Technology Trend	Highly integrated, intelligent and miniaturized			

Source: Audiowell

Suppliers: Valeo and Bosch are leaders, and local players rise swiftly to prominence

As well as Audiowell, SOFTEC, Coligen, and Forvision (ThunderSoft acquired 51.48% of its shares in 2021) have also launched AK2 series ultrasonic radars, some of which have been produced in quantities.

As intelligent parking solutions like Home-AVP and AVP come out, independent controllers can no longer meet the existing needs, and the parking domain begins to integrate into the autonomous driving domain. On this basis, the driving and parking integrated solutions come into being.

So far, quite a few companies in China including Neusoft Reach, Desay SV, Freetech and iMotion have rolled out their driving and parking integrated solutions, and have secured designated OEM orders for production vehicle models.

Desay SV IPU03 domain controller having been used in Xpeng P7, enables driving and parking integration, and supports on/off-ramp and automatic lane change in highway scenarios, automatic follow in urban traffic jams, and automated parking and valet parking in low-speed scenarios.

Comparison between Desay SV IPU02/ IPU03/ IPU04 Driving and Parking Integrated Domain Controllers

	IPU02	IPU03	IPU04
Sensor Configuration	5R6V12U	R12V12U-L	5R16V12U1-3L
ADAS Level	L2+	L3	L4
Built-in Chip	TI TDA4	Nvidia Xavier	Nvidia OrinX
Computing Power (TOPS)	4-32	30	110-1016
SOP	2022	April 2020	June 2022
Parking Capabilities	AVM, APA, RPA, HPP, AVP		
Application	Geely, Great Wall Motor, GAC, Chery	Xpeng P7/P5	Li L9, SAIC, HiPhi

Source: ResearchInChina

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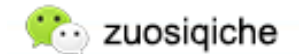
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