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Overseas ADAS and Autonomous Driving Tier 1 Suppliers Report, 2022

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Overseas ADAS Tier1 Suppliers Research: The gap between suppliers has widened in terms of revenue growth, and many of them plan to launch L4 products by 2025

Germany enacted Autonomous Driving Act in July 2021. Through its new legislation, Germany has become the first country in the world to allow L4 autonomous vehicles onto public roads without requiring a human backup safety driver behind the wheel. Application scenarios include: shuttle buses, short-distance public transport in urban areas, logistics between distribution centers, demand-oriented off-peak passenger transport in rural areas, first/last mile passenger or cargo transport, automated parking of dual-mode vehicles.

Japan's government planned to amend traffic laws to allow L4 autonomous vehicles to drive on some roads and ask lawmakers to approve the change as early as March 2022. Under the revised law, a license system will be introduced for operators of transport services using autonomous vehicles with L4 autonomy. Operators will be required to assign a chief monitor who can supervise the operation by riding a car or through remote control and can command multiple vehicles simultaneously. Japan aims to achieve L4 by 2025, which would allow private cars and delivery trucks (platooning) to operate on expressways, as market-oriented application.

In March 2022, the U.S. Department of Transportation's National Highway Traffic Safety Administration (NHTSA) issued the "Occupant Protection Regulations for Automated Vehicles", stating that fully autonomous cars no longer need to be equipped with traditional manual control devices such as steering wheels, brakes or accelerator pedals. The United States plans to realize the market-oriented application of L3 passenger cars in low-risk driving environments such as urban commuting, and L4 passenger cars on expressways (like going on/off ramps, autonomous lane change) by 2025.

In July 2022, Shenzhen, China issued "Regulations on Administration of Intelligent Connected Vehicles in Shenzhen Special Economic Zone", allowing L3 autonomous vehicles to be tested and demonstrated on open roads in administrative areas with relatively sound CVIS infrastructure.

Application Planning for Autonomous Driving in Some Countries/Regions

Countries /regions	2025	2030
China	<ul style="list-style-type: none"> L2 and L3 sales volume should account for more than 50%. L4 should begin to enter the market. 50% of new cars should be installed with C-V2X terminals. Passenger cars: L3 on expressways and traffic congestion, and L4 in valet parking. Freight trucks: L3 on expressways, L4 in expressway platooning and limited scenarios. Buses: L3 in limited scenarios such as BRT, and L4 in limited scenarios like closed areas 	<ul style="list-style-type: none"> L2 and L3 sales volume should account for more than 70%. L4 sales volume should make up 20%. All new cars should be installed with C-V2X terminals. Passenger cars: L4 on suburban roads and urban roads. Freight trucks: L4 on urban roads and expressways. Buses: L4 on urban roads (city buses).
U.S.	<ul style="list-style-type: none"> L3 passenger cars should run in low-risk driving environments such as urban commuting. L4 passenger cars should operate in restricted areas such as expressways, including access to and exit from ramps and lane changes. Low-speed (≤25 mph) autonomous minivans above L4 should work in limited areas, with the total weight of less than 3000 pounds. L4 low-speed (≤25 mph) autonomous shuttle buses facilitate residents' "last 1 kilometer" mobility. 	---
EU	---	<ul style="list-style-type: none"> L3 in Traffic jam: ≤60km/h, including autonomous following, lane change, autonomous braking. L3 in high-speed scenarios: ≤130km/h, including lane change, autonomous braking. L4 amid safe autonomous following: ≤130km/h, without driver intervention. L4 in high-speed scenarios: valet parking, shuttle buses (without remote monitoring), buses. L4 in urban mixed traffic scenarios: automated parking, enclosed areas for low-speed work, last mile transport of people and goods in residential areas, buses on predefined routes, etc. Rural roads: emphasis on application of AEB, LDW, ACC, steering and LCA
Japan	<ul style="list-style-type: none"> Marketization of L4 AD of private cars and delivery trucks (platooning) on expressways. More than 40 L4 AD services should be achieved, only with remote monitoring and control, such as small manned car mobility, taxi services in urban areas, etc. 	---
South Korea	<ul style="list-style-type: none"> In 2024, L4 will be partly commercialized. In 2027, L4 will be fully commercialized on main roads nationwide. 	By 2030, autonomous vehicles should account for 50% of all new cars on the road in South Korea

Source: Government Documents of Countries/Regions

The ADAS business of major Tier 1 suppliers maintains rapid growth and they vigorously deploy L3/L4 products

In 2021, a number of Tier 1 suppliers saw the sales related to autonomous driving swell by more than 10% year-on-year. For example, ZF's Electronics & ADAS Division earned sales of EUR1.84 billion, a year-on-year increase of 17.9%; the sales of Magna's Power & Vision Division jumped 17.0% year-on-year to USD11.34 billion; Veoneer secured sales of USD869 million from active safety, a year-on-year spike of 39.3%.

Tier1	Sales/revenue in 2021								
	Sales/revenue in 2021		Division in charge of autonomous driving			Asia-Pacific			
	Sales/revenue	YoY	Division in charge of AD	Sales/revenue	Proportion	YoY	Sales/revenue	Proportion	YoY
Bosch	EUR78.748 billion	10.1%	Mobile Vehicle Solutions	EUR45.3 billion	57.50%	7.6%	EUR24.5 billion	31.1%	12.9%
Denso	JPY5.5 trillion	11.7%	Smart Mobile Electronics	JPY1.4 trillion	24.60%	6.6%	JPY1.5 trillion in Asia	27.6%	16.6%
ZF	EUR38.31 billion	17.5%	Electronics & ADAS	EUR1.84 billion	4.80%	17.9%	EUR9.4 billion	24.5%	15.3%
Magna	USD36.02 billion	11.0%	Energy and Vision	USD11.34 billion	31.50%	17.0%	-	-	-
Continental	EUR31.86 billion	-5.6%	Autonomous Driving and Safety	EUR7.559 billion	23.70%	0.8%	EUR7.029 billion	22.1%	4.2%
Valeo	EUR17.26 billion	6.0%	Comfort and ADAS	EUR3.417 billion	19.80%	6.0%	EUR2.26 billion in China	16.0%	5.0%
Aptiv	USD15.62 billion	19.5%	Advanced Safety and User Experience	USD4.056 billion	26.00%	13.5%	USD4.829 billion	30.9%	23.9%
Veoneer	USD1.657 billion	20.7%	Active Safety/Autonomous Driving	USD869 million	52.40%	39.3%	USD450 million	27.2%	30.3%

The ADAS business of major Tier 1 suppliers maintains rapid growth and they vigorously deploy L3/L4 products

Bosch plans to mass-produce the domain controller DASy 2.0 supporting L3/L4 in 2022, spawn L3 driving solutions in 2023, and launch the domain controller DASy+Cloud in 2025.

Denso aims to achieve sales of JPY500 billion in ADAS field in 2025. In terms of products, mass production of L3 and L4 products will be accomplished in 2023 and 2025 respectively.

In 2021, **Continental** recorded EUR 7.559 billion in the revenue of its autonomous driving and safety business, accounting for 23.7% and edging up 0.8% year-on-year which was lower than that of its competitors. Continental will mass-produce L4 autonomous driving products for urban roads in 2023, and L5 products after 2025.

In 2021, **Valeo** Comfort & Driving Assistance Systems Business Group garnered EUR3.417 billion in revenue with a year-on-year spike of 6%, of which autonomous driving contributed EUR1.9 billion or 56%. The ADAS sales will reach EUR4 billion in 2025, with CAGR of 20.5%. Valeo says SCALA 3, the third-generation MEMS solid-state LiDAR released by Valeo in November 2021, which will be commercialized in 2024, offers 12 times better resolution, three times longer range and a viewing angle that is 2.5 times wider than the second-generation. SCALA 3 supports L3 autonomous driving below 130km/h.

Tier1	Perception layer									Decision layer	Solution		Product planning
	Vision					Ultrasonic Radar	Radar	Lidar	Domain controller		Parking Solution	Driving Solution	
	Monocular camera	Multinocular-camera	Surround view camera	Rear view camera	Internal view camera								
Bosch	√	√	√		√	√	√	Under development	√	√	√	Bosch plans to mass-produce the domain controller DASy 2.0 supporting L3/L4 in 2022, spawn L3 AD solutions in 2023, and launch the domain controller DASy+Cloud in 2025	
Denso	√	√	√			√	√	√		√	√	In terms of products, mass production of L3 and L4 products will be accomplished in 2023 and 2025 respectively	
ZF	√	√	√		√		√	√	√	√	√	In 2022, L2+-L4 driving & parking integrated solution coPILOT was launched. The computing platform ProAI supporting L2-L5 will be unveiled in 2024.	
Magna	√		√		√	√	√	√	√	√	√	L4 AD solution MAX4 has been installed in Jeep Grand Cherokee for testing	
Continental	√	√	√	√	√	√	√	√	√	√	√	Continental will mass-produce L4 AD products for urban roads in 2023, and L5 products after 2025	
Valeo	√		√			√	√	√	√	√	√	SCALA 3, the third-generation MEMS solid-state LiDAR, will be commercialized in 2024. Valeo is developing and testing Drive4U, a L4 AD solution for urban roads	
Aptiv	√						√	Under development	√			Mass production of multi-domain controllers for L3 and above in 2022, mass production of L4 autonomous commercial vehicle solutions in 2024, and mass production of L5 AD solutions and products in 2035	
Veoneer	√	√			√		√	Under development	√		√	-	

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