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Global and China Passenger Car T-Box Market Report, 2022

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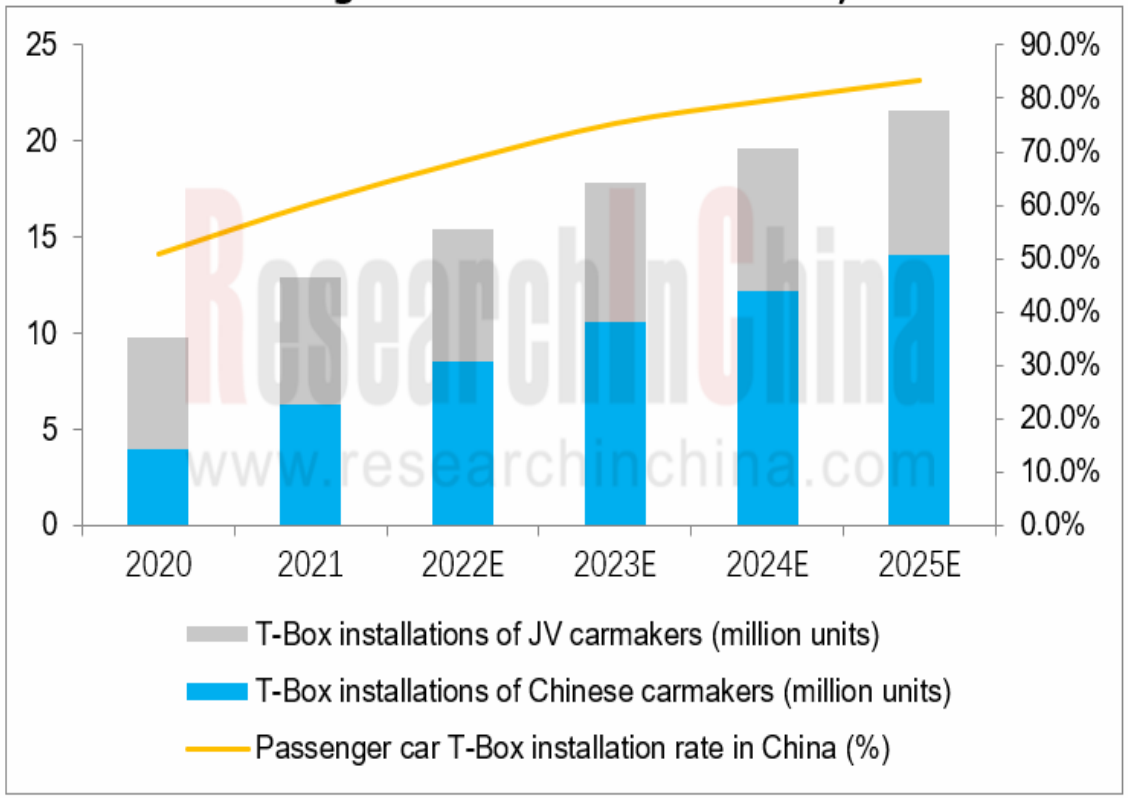
T-Box OEM Installation Rate Will Register 83.5% in China in 2025

T-Box is mainly used for the communication between vehicle and Internet of Vehicles (IoV) service platform and acts as the core hardware of OEM telematics.

In 2021, 12.94 million passenger cars were installed with T-Box by OEMs in China, a year-on-year increase of 31%; the installation rate hit 60%, up about 10 percentage points from last year. By 2025, over 20 million passenger cars will be equipped with T-Box, and the installation rate will climb to 83.5%, and. T-Box and telematics are growing indispensable to passenger cars.

In 2021, 6.301 million passenger cars of Chinese automakers carried T-Box, a year-on-year spike of 59.9%; 6.634 million passenger cars of joint venture carmakers did so, up 12.9% on a yearly basis. Chinese OEMs make much faster progress in Internet of Vehicles than JV brands.

Chinese Passenger Car T-Box Installations, 2020-2025E

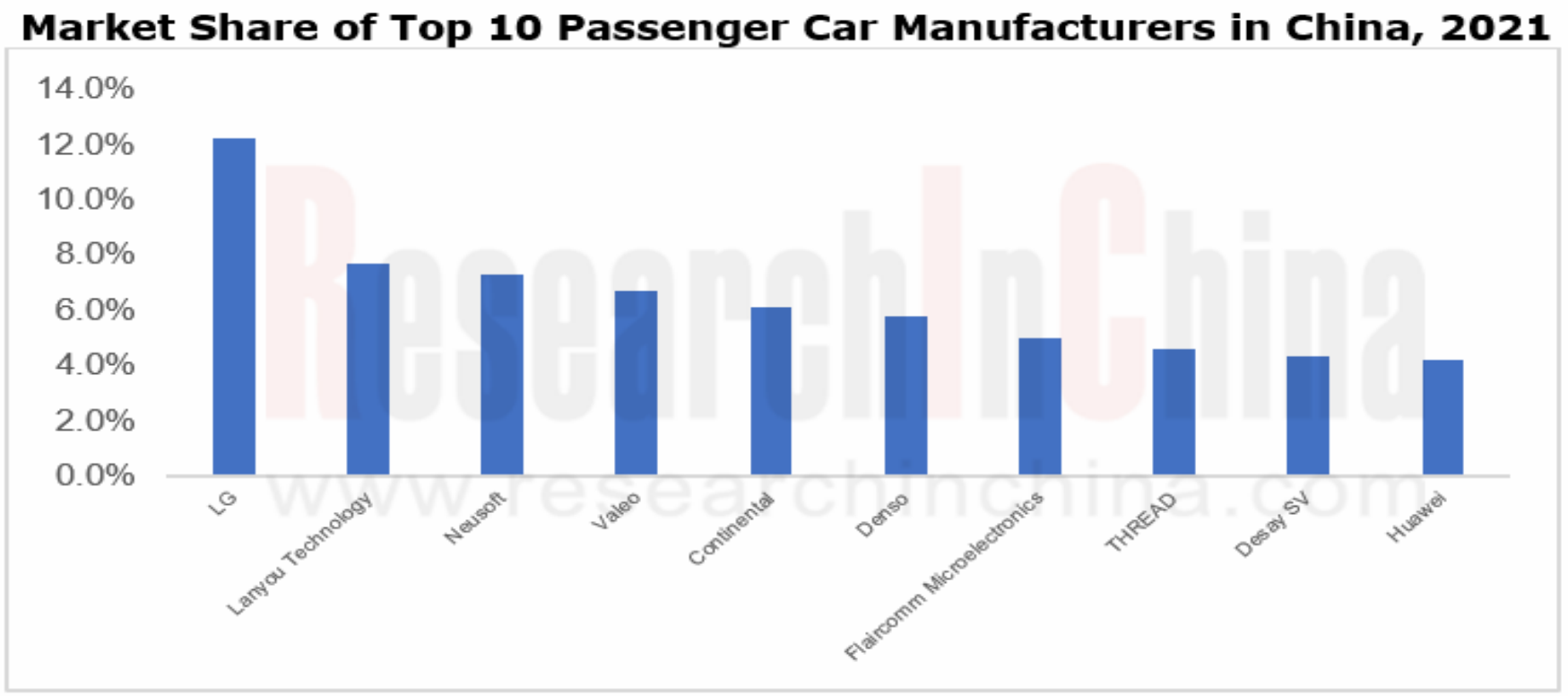


Source: ResearchInChina

T-Box installations to passenger cars will keep an uptrend, so will the installation rate, and passenger car Internet of Vehicles will be further popularized, which are contributed by the consumers' robust demand for intelligent connected vehicles (ICVs), the surge in new energy vehicle (NEV) sales, OEMs' needs for FOTA as well as regulatory requirements and other factors.

Top 10 OEMs Command 64% Market Shares

Viewed from the market structure, the top 10 T-Box suppliers in China held 64% market shares together in 2021, with LG, Lanyou Technology and Neusoft at the top. Among them, Lanyou Technology, established in 2002 with DFS Industrial Group holding its 80% stake, mainly supplies T-Box products to Nissan and Dongfeng Motor. Lanyou's T-Box was installed to one million cars in 2021. Also in 2021, Neusoft served 940,000 vehicles, mainly from Geely and Great Wall Motor. Thanks to Great Wall's high sales, Neusoft witnessed fast-growing T-Box installations in 2021.



Source: ResearchInChina

5G C-V2X T-Box Will See the Rising Market Shares (i)

In 2020, the Ministry of Industry and Information Technology of China (MIIT) granted two 5G T-Box models Network Access License. In 2021, 19 5G T-Box models secured Network Access License, making for 9.3% which jumped 8 percentage points year-on-year. From January to March of 2022, seven 5G T-Box models obtained Network Access License. The number is expected to rise throughout 2022. At present, 4G T-Box still prevails, but it will be gradually replaced by 5G T-Box in the long run.

T-Box vendors are vigorously developing T-Box products that integrate 5G, C-V2X, high-precision positioning and other functional modules to create differentiated advantages. As of March 2022, a total of 25 5G T-Box models had gained Network Access License, including one from Samsung Harman, one from Lear, six from Neusoft, three from Datang Gohigh, two from DIAS, two from Huawei, two from JOYNEXT, two from China Mobile IoT, one from HiRain Technologies, one from Lanyou Technology, one from YF Tech, one from China TSP, one from TAGE, and one from Chelutong Technology (Chengdu) Co., Ltd.

5G C-V2X T-Box of Lanyou Technology

Source: Lanyou Technology

Lanyou Technology mass-produced its 5G C-V2X T-Box in August 2021. Based on 5G, it provides high bandwidth, integrates 5G, C-V2X and centimeter-level positioning, supports 5G only and 5G+V2X dual mode, and enables at least 25 C-V2X application scenarios. Lanyou in harness with Huawei, Qualcomm, MTK, UNISOC and other platforms now boasts 5G T-Box customers such as Dongfeng Voyah, Aeolus, Nissan, and Venucia.

5G C-V2X T-Box Will See the Rising Market Shares(ii)

5G T-Box of Hirain Technologies

Source: HiRain Technologies

HiRain Technologies leverages the AP+NAD+MCU architecture for its 5G T-Box, provides multi-platform support (like Qualcomm, MTK), and presents various forms such as stand-alone type, smart antenna type, and multiple communication module integration. Functional interfaces cover 5G SA/NSA, C-V2X, CAN/CANFD, Gigabit Ethernet, dual-band GNSS, WiFi6, Bluetooth 5.2, USB, etc., and can also integrate TPMS, ETC, swap control, Bluetooth key (scalable UWB) and the like. For intelligent driving, centimeter-level positioning, parking lot/vehicle AVP, 10 Gigabit Ethernet high-speed channels and other services are available. Mass production for Dongfeng Voyah and other models has been achieved.

Neusoft's 5G C-V2X T-Box bolsters 16 application scenarios based on three mainstream platforms and V2X national standards, as well as supports 5G NSA/SA communication, L1+L5 GNSS global positioning, Gigabit Ethernet technology, C-V2X communication, CANFD communication, LIN communication, Bluetooth 5.0+ communication, WiFi 6 communication, RKE, TPMS communication and ETC, etc. In 2021, Neusoft's 5G (V2X) BOX were massively available onto New Great Wall Haval H6, ZEEKR 001 and other models.

5G C-V2X T-Box Will See the Rising Market Shares (iii)

Some companies are also developing T-Box products that support 5G C-V2X. For example, the 5G T-Box being developed by Flaircomm Microelectronics will be compatible with mainstream 5G SOC solutions at home and abroad, and support SA/NSA networking technology, 5G V2X technology, centimeter-level positioning, Gigabit Automotive Ethernet and CAN FD bus technology.

Meanwhile, OEMs have begun to mount 5G C-V2X technology on more and more new models. For instance, SAIC Marvel R is equipped with 5G V2X i-BOX, a fusion of 5G, V2X and high-precision positioning; GAC Aion V, outfitted with Huawei MH5000 5G Module, features a 100M transmission channel and enables intelligent driving with C-V2X.

5G Models of OEMs

OEMs	Passenger car models	Launch time	Sales volume in 2020	Sales volume in 2021	5G models included
NIO	ET7	Jan. 2021	-	118	All series (75kWh/100kWh/100kWh first version)
WM Motor	W6	Apr. 2021	-	7,169	W6, W6X Special Version
ZEEKR	ZEEKR 001	Apr. 2021	-	6,007	ZEEXCR 001
Voyah	FREE	Jun. 2021	-	PHEV (5,650), EV (1,141)	Full series
Human Horizons	HiPhiX	Sept. 2020	-	4,237	Full series
BYD	Han	Jul. 2020	28,773 (including about 4,000 units with optional 5G)	87,189	Han EV flagship
SAIC	MARVEL R	Feb. 2021	-	7,872	The 2021 RR PRO version and the 4WD PRO version feature an optional 5G package worth RMB30,000
BAIC	ARCFOX αT	Oct. 2020	709	3,190	Full series
	ARCFOX αS	Apr. 2021	10,709	2,816	Full series
GAC	AION V/AION V Plus	Dec. 2020	2,745	15,826	5G is only available in the models launched after December 2020. Especially, it is only available in the high-end version --- 90 ultra-long-range version. The 5G version should be opted upfront, and the price of an optional package is RMB9,600.
	Aion LX Plus	Apr. 2020	46,091	1,004	Only the models launched after January 2022 enable 5G. The 80D Max comes standard with 5G; the 80D flagship version can be equipped with an optional 5G chip. The 5G version should be opted upfront, and the price of an optional package is RMB9,600.
	Aion S Plus	Apr. 2019	-	69,220	Only the models launched after January 2022 enable 5G. The 2022 80 Smart Driving Version can be equipped with 5G network. The 5G version should be opted upfront, and the price of an optional package is RMB9,600.
Great Wall Motor	Mocha	May 2021	-	28,545	There are no 5G models for mass production. Available in the future
	HAVAL Shenshou	Dec. 2021	-	6,733	Optional AVP auxiliary package: RMB10,000, point-to-point HPA, AVP, exploratory forward, 5G, and electronic brake pumps should be optionally installed together; limited to 1.5T Premium version, 2.0T Premium version, 2.0T Premium version
BMW	iX/i4	Launched in China in Q1 2022	-	-	The 5G version was launched in California, USA

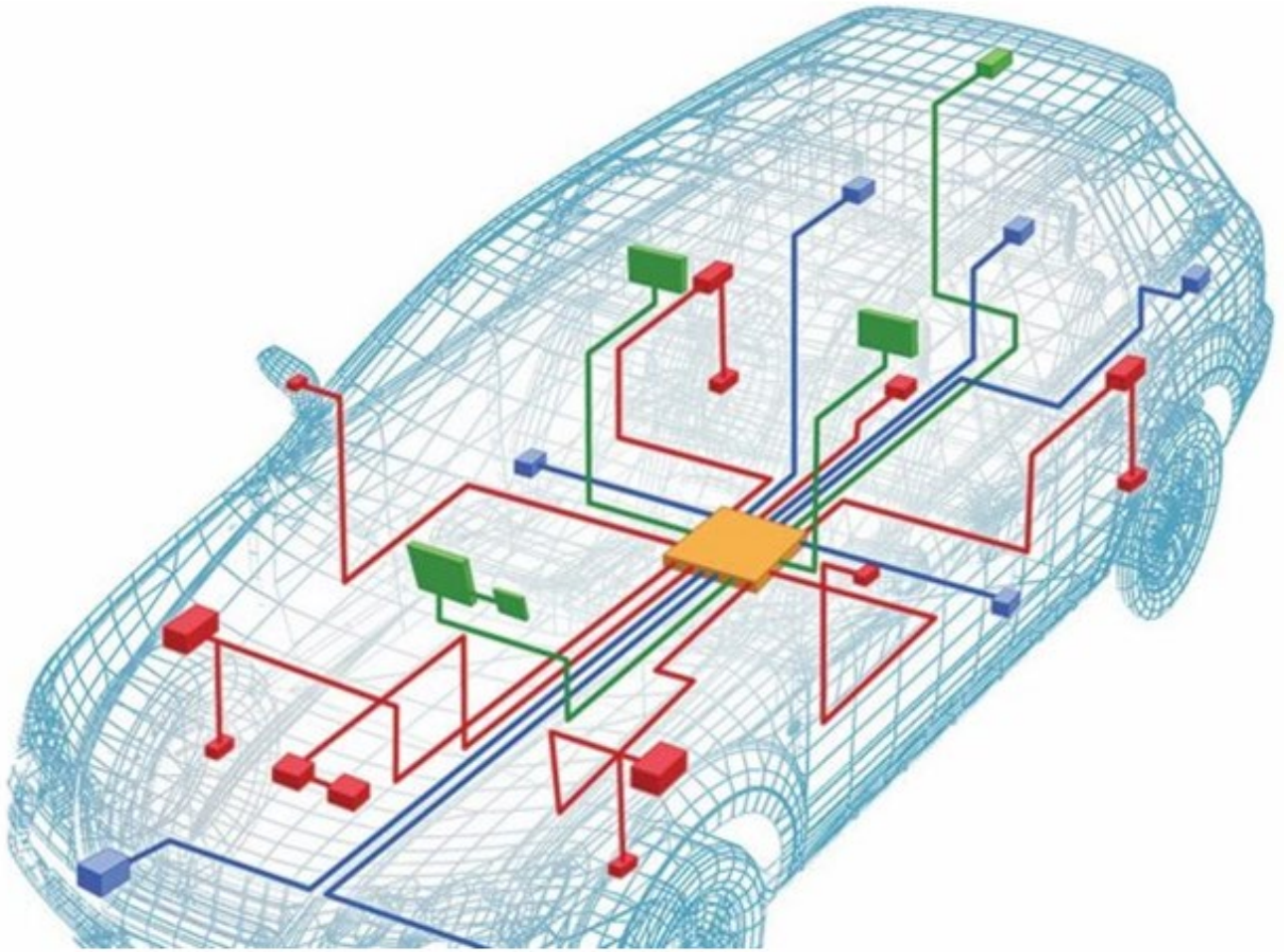
Source: ResearchInChina

Automotive Ethernet Is Expected to Replace CAN Bus and FlexRay to Become the Main Connection Method of T-Box

New automotive functions (such as automated parking system, lane departure detection system, blind spot detection and advanced infotainment system) pose higher requirements on new data bus transmission.

With the release of the new Ethernet protocol in 2021, automotive Ethernet is expected to substitute for CAN bus and FlexRay and be the main connection method of T-Box by virtue of its low cost, low power consumption, low electromagnetic radiation, and strong scalability, thus speeding up updates and calibrations of firmware and software remarkably while reducing downtime caused by vehicle system updates. BMW and GM have confirmed that they will replace the CAN bus with 10BASE-T1S in their next-generation cars.

To date, the T-Box products of leading Chinese players (Lanyou Technology, Neusoft, Flaircomm Microelectronics, HiRain Technologies, etc.) have integrated Gigabit Ethernet to efficiently handle a universe of data from intelligent connected vehicle in the future.



The Remote Vehicle Control by Mobile Apps Grows Ever Smarter (like AVP)

Automotive T-BOX is mainly used to communicate with background systems and mobile Apps so as to display and control vehicle information on the mobile Apps.

With the addition of technologies such as cloud computing and HD maps, the remote vehicle control functions on mobile Apps are constantly evolving. For example, AVP allows the driver to remotely control parking via mobile Apps in above-ground or basement public parking lots at a certain distance from their cars. WM W6 and GAC Aion V Plus have offered such a feature.

HAVP (autonomous learning parking) of WM Motor's W6

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