

China AI

U.S. is restricting advanced GPU sales to China

On 31 Aug, Nvidia said in a regulatory filing that the U.S. has imposed new licensing requirements on shipments of certain advanced server GPU (A100 and H100) to China (including Hong Kong) and Russia. Nvidia may lose as much as US\$400mn sales to China in FY3Q22 as a result. Nvidia's GPU dominates the AI processor market with 80.6% market share in 2020, according to Omdia. We think this new rule signals an escalation in US-China tech war. Without a close substitute, this created a new hurdle for China AI development (such as AI applications, cloud computing and autonomous driving). On the positive side, this will further accelerate China AI chips R&D, benefiting fabless companies such as Cambricon (688256 CH) and Jingjia Micro (300474 CH).

■ **U.S. imposed new licensing requirements on GPU sales to China.** On 31 Aug after market close, Nvidia said in a regulatory filing that it was notified by the U.S. government last Friday that a license is required before shipping certain A100 and H100 GPU to China (including Hong Kong) and Russia. It also applies to any future Nvidia chips with performance equivalent or greater than A100. A100 and H100 are Nvidia's most advanced GPUs launched in 2020 and 2022. Nvidia does not sell chips to Russia currently. However, Nvidia said it could lose as much as US\$400mn sales to China in FY3Q22. Meanwhile, AMD spokesman told [Reuters](#) that it also has been notified of such new requirement. This will prevent shipment of its MI250 chips but MI100 chips are not affected. AMD commented that the new rules will not have material impact on its business.

■ **GPU is essential in AI training and there is no close substitute in China.** There are two types of AI processors used for 1) AI training (mainly GPU) and 2) AI Inference (can be FPGA/ ASIC). According to [Omdia](#), Nvidia has 80.6% market share in AI processors globally, based on revenue. Although China announced some breakthrough in GPU (e.g. Jingjia Micro) but none of them are advanced GPU targeting AI training, or comparable with Nvidia's GPU. Nvidia has built high barrier in AI market given its superior chip performance and developer's toolkits (CUDA).

■ **Negative to China AI development, especially in cloud computing and autonomous driving.** We think the new restrictions would significantly affect AI development in China. Under our AI universe, AI application developers such as SenseTime (20 HK), AlInnovation (2121 HK), Arcsoft (688088 CH), Hikvision (002415 CH) and Dahua (002236 CH) will be negatively impacted. Meanwhile, other AI-related sectors such as cloud computing and autonomous driving will also face a tougher path ahead.

Valuation Table

Company	Ticker	Rating	Mkt Cap (US\$ mn)	Price (LC)	P/E	EV/ sales		ROE		Sales CAGR FY21-24E
						FY23E	FY23E	FY22E	FY23E	
Hikvision	002415 CH	BUY	40,705	29.78	13.0	2.9	24.8	25.6		15%
Dahua	002236 CH	HOLD	6,522	14.84	9.7	1.3	14.9	15.5		15%
SenseTime	20 HK	BUY	10,503	2.46	n.a.	10.8	-6.0	-6.1		25%
AlInnovation	2121 HK	NR	1,500	21.05	n.a.	5.9	-29.2	-22.4		66%
Cambricon	688256 CH	NR	3,972	68.38	n.a.	26.5	-18.4	-13.6		44%
Jingjia Micro	300474 CH	NR	3,978	60.50	53.8	21.2	11.0	13.8		30%
Arcsoft	688088 CH	NR	1,597	27.15	45.8	14.3	5.9	8.7		27%

Source: Company data, Bloomberg, CMBIGM estimates

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Figure 1: Nvidia announcement regarding new license requirement on GPU export to China and Russia

On August 26, 2022, the U.S. government, or USG, informed NVIDIA Corporation, or the Company, that the USG has imposed a new license requirement, effective immediately, for any future export to China (including Hong Kong) and Russia of the Company's A100 and forthcoming H100 integrated circuits. DGX or any other systems which incorporate A100 or H100 integrated circuits and the A100X are also covered by the new license requirement. The license requirement also includes any future NVIDIA integrated circuit achieving both peak performance and chip-to-chip I/O performance equal to or greater than thresholds that are roughly equivalent to the A100, as well as any system that includes those circuits. A license is required to export technology to support or develop covered products. The USG indicated that the new license requirement will address the risk that the covered products may be used in, or diverted to, a 'military end use' or 'military end user' in China and Russia. The Company does not sell products to customers in Russia.

The new license requirement may impact the Company's ability to complete its development of H100 in a timely manner or support existing customers of A100 and may require the Company to transition certain operations out of China. The Company is engaged with the USG and is seeking exemptions for the Company's internal development and support activities.

In addition, the Company is engaging with customers in China and is seeking to satisfy their planned or future purchases of the Company's Data Center products with products not subject to the new license requirement. To the extent that a customer requires products covered by the new license requirement, the Company may seek a license for the customer but has no assurance that the USG will grant any exemptions or licenses for any customer, or that the USG will act on them in a timely manner.

The Company's outlook for its third fiscal quarter provided on August 24, 2022 included approximately \$400 million in potential sales to China which may be subject to the new license requirement if customers do not want to purchase the Company's alternative product offerings or if the USG does not grant licenses in a timely manner or denies licenses to significant customers.

Source: Nvidia

Figure 2: Nvidia's datacenter GPU product line

	P100	V100	A100	H100
Affected by the new export rules	NO	NO	YES	YES
Launch Year	2016	2017	2020	2022
Architecture	Pascal	Volta	Ampere	Hopper
Process	16nm	12nm	7nm	4nm
CUDA Cores	3584	5120	6912	16896
Performance	9.3 TFLOPS	14 TFLOPS	19.5 TFLOPS	60 TFLOPS

Source: Nvidia

Figure 3: AMD's datacenter GPU product line

	MI100	MI250	MI250X	MI210
Affected by the new export rules	NO	YES	YES	NO
Launch Year	2020	2021	2021	2022
Architecture	CDNA	CDNA2	CDNA2	CDNA2
Process	7nm	6nm	6nm	n.a.
Stream processors	7680	13312	14080	6656
Performance	23.1 TFLOPS	45.3 TFLOPS	47.9 TFLOPS	22.6 TFLOPS

Source: AMD, Reuters

Figure 4: China listed AI companies

Company		Ticker	Products	Market cap (US\$mn)	FY21 Sales (RMB mn)	FY21 Net profit (RMB mn)
AI chips (fabless)						
Cambricon	寒武纪	688256 CH	GPU	4,049	721	(825)
Jingjia Micro	景嘉微	300474 CH	GPU	3,963	1,093	293
Hygon Info Tech	海光信息	688041 CH	CPU	18,986	2,310	327
Loongson	龙芯中科	688047 CH	CPU	4,654	1,201	237
Anlu Technology	安路科技	688107 CH	FPGA	3,524	679	(31)
Unigroup Guoxin	紫光国微	002049 CH	FPGA	19,318	5,342	1,954
Fudan Microelectronics	复旦微电	688385 CH	FPGA	6,878	2,577	514
AI cloud service providers						
Alibaba	阿里巴巴	BABA US	AI cloud computing	252,601	717,289	150,578
Tencent	腾讯	700 HK	AI cloud computing	406,642	560,118	224,822
Baidu	百度	BIDU US	AI cloud computing	49,749	124,493	10,226
Kingsoft Cloud	金山云	KC US	AI cloud computing	838	9,061	(1,589)
AI application developers						
SenseTime	商汤	20 HK	AI applications	10,503	4,700	(17,140)
AIInnovation	创新奇智	2121 HK	AI applications	1,500	861	(637)
Arcsoft	虹软科技	688088 CH	AI applications	1,591	573	141
Hikvision	海康威视	002415 CH	AI applications	40,782	81,420	16,800
Dahua	大华股份	002236 CH	AI applications	6,513	32,835	3,378
Cloudwalk	云从科技	688327 CH	AI applications	2,118	1,076	(632)
iFlytek	科大讯飞	002230 CH	AI applications	12,676	18,314	1,556

Source: CMBIGM Bloomberg

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