SWTEST

PROBE TODAY, FOR TOMORROW

2023 CONFERENCE

Automotive Semiconductors as Key Driver for Test Demand

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TechInsights

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- Probe Card Market
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TechInsights' Semiconductor Forecast Summary

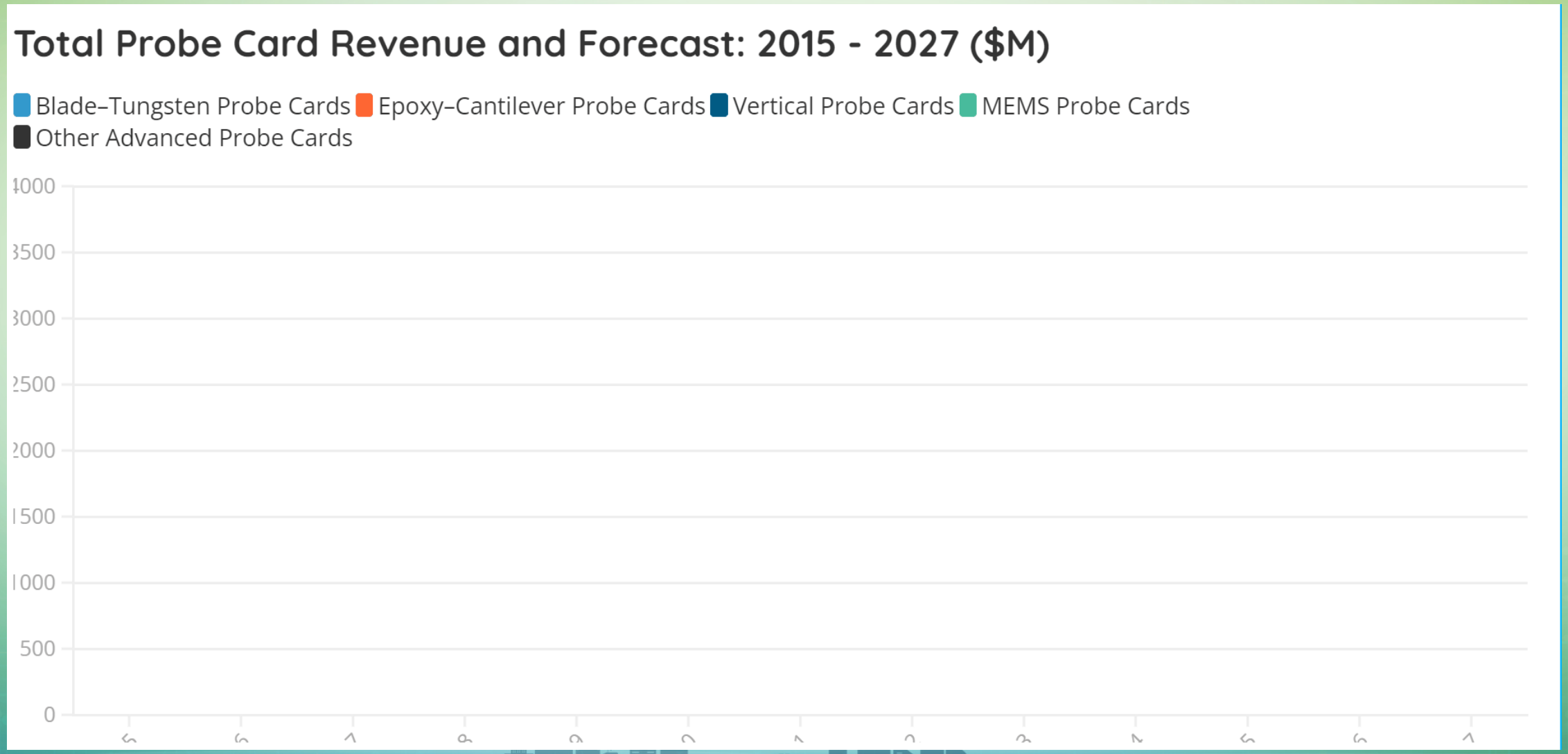
	TechInsights' Current Forecast										
Forecast as of May 2023:	**2022**	**1Q23**	**2Q23**	**3Q23**	**4Q23**	**2023**	**1Q24**	**2Q24**	**3Q24**	**4Q24**	**2024**
Semi Equipment ($B):	**$ 137.2**	$ 33.3	$ 29.5	$ 27.3	$ 27.6	**$ 117.7**	$ 28.5	$ 29.8	$ 32.9	$ 35.1	**$ 126.2**
Sequential Change	**6.2%**	-5.4%	-11.5%	-7.3%	0.9%	**-14.2%**	3.2%	4.6%	10.5%	6.5%	**7.3%**
Capacity Utilization:	**94.1%**	78.1%	77.7%	84.4%	88.9%	**82.2%**	89.1%	92.0%	93.5%	91.4%	**91.5%**
ICs ($B):	**$ 512.3**	$ 101.1	$ 103.6	$ 112.4	$ 117.5	**$ 434.6**	$ 108.8	$ 112.5	$ 123.4	$ 130.6	**$ 475.2**
Sequential Change	**4.0%**	-9.8%	2.4%	8.6%	4.5%	**-15.2%**	-7.4%	3.4%	9.7%	5.9%	**9.3%**
IC Units (BU):	**405.1**	86.9	90.4	98.3	100.2	**375.9**	96.4	101.6	107.3	109.1	**414.4**
Sequential Change	**2.7%**	-9.7%	4.1%	8.7%	1.9%	**-7.2%**	-3.9%	5.4%	5.6%	1.7%	**10.2%**
Electronics ($B) :	**$ 2,556**	$ 604.1	$ 559.6	$ 617.5	$ 713.9	**$ 2,495**	$ 614.3	$ 586.5	$ 649.5	$ 773.2	**$ 2,623**
Sequential Change	**-0.7%**	-13.0%	-7.4%	10.4%	15.6%	**-2.4%**	-14.0%	-4.5%	10.8%	19.0%	**5.1%**

Semiconductor Sales

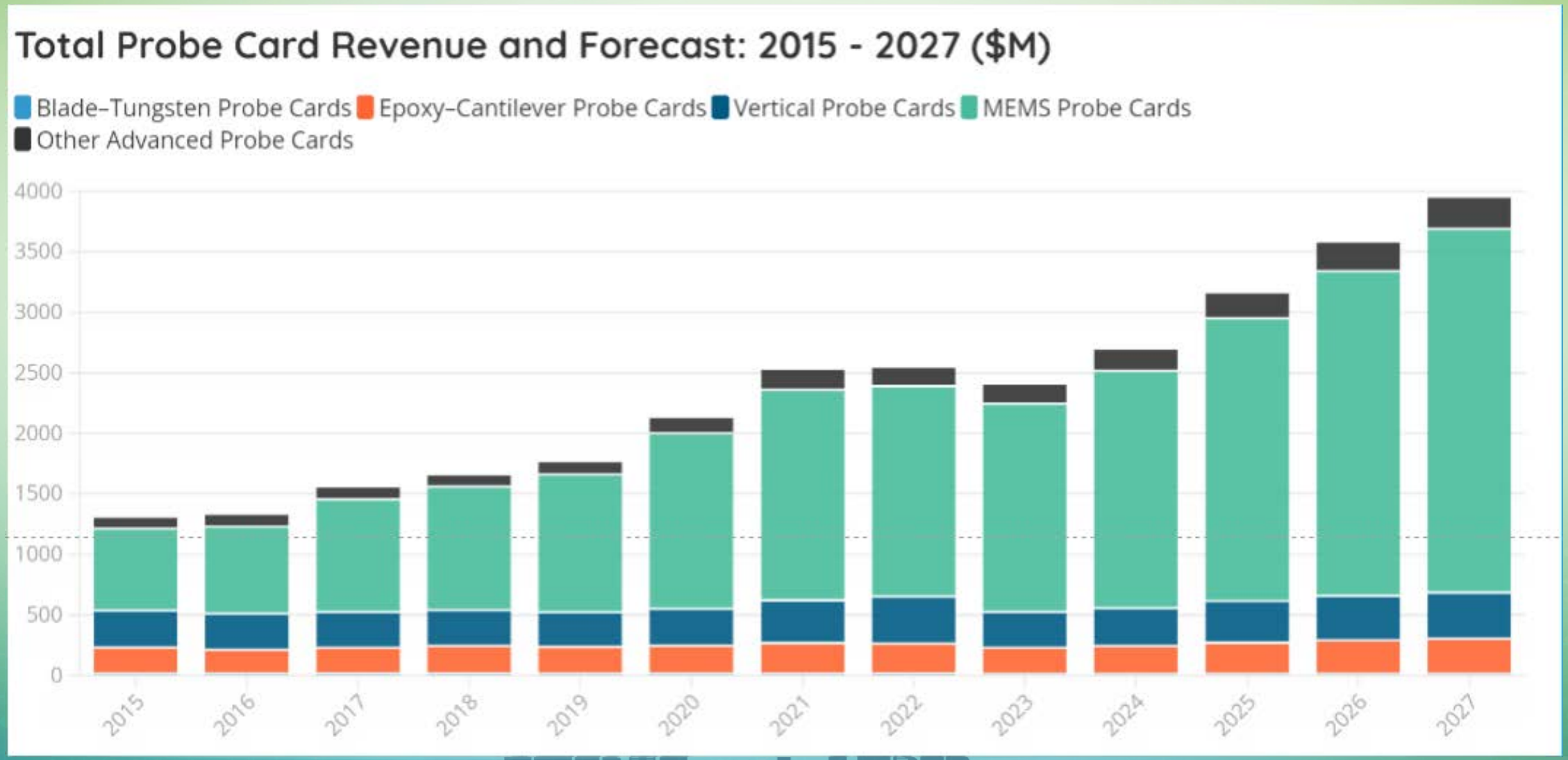
SEMICONDUCTOR SALES (worldwide sales, $B, calendar year)	2020	2021	2022	2023	2024
Analog	58	76	91	86	88
y-o-y growth	3%	30%	21%	-6%	3%
DRAM	67	96	83	53	71
y-o-y growth	7%	42%	-13%	-36%	34%
NAND	50	61	53	33	40
y-o-y growth	24%	21%	-13%	-38%	23%
MPU	62.4	68.0	59.8	47.1	52.8
y-o-y growth	11%	9%	-12%	-21%	12%
Other Logic	145	187	220	211	218
y-o-y growth	9%	29%	17%	-4%	3%
Discrete, Opto & Other	82	98	104	100	110
y-o-y growth	1%	19%	7%	-4%	10%
Total Semiconductor	465	585	612	531	581
y-o-y growth	8%	26%	5%	-13%	9%

SEMICONDUCTOR SHIPMENTS (worldwide sales, B units, calendar year)	2020	2021	2022	2023	2024
Analog	176	219	235	221	241
y-o-y growth	6%	25%	7%	-6%	9%
DRAM	19	22	20	19	20
y-o-y growth	12%	13%	-10%	-6%	9%
NAND	12	14	11	11	13
y-o-y growth	5%	14%	-17%	-5%	25%
MPU	0.6	0.6	0.6	0.5	0.5
y-o-y growth	8%	4%	-13%	-14%	10%
Other Logic	93	120	122	110	123
y-o-y growth	9%	29%	2%	-10%	11%
Discrete, Opto & Other	637	761	707	651	726
y-o-y growth	0%	20%	-7%	-8%	12%
Total Semiconductor	938	1137	1096	1011	1123
y-o-y growth	2%	21%	-4%	-8%	11%

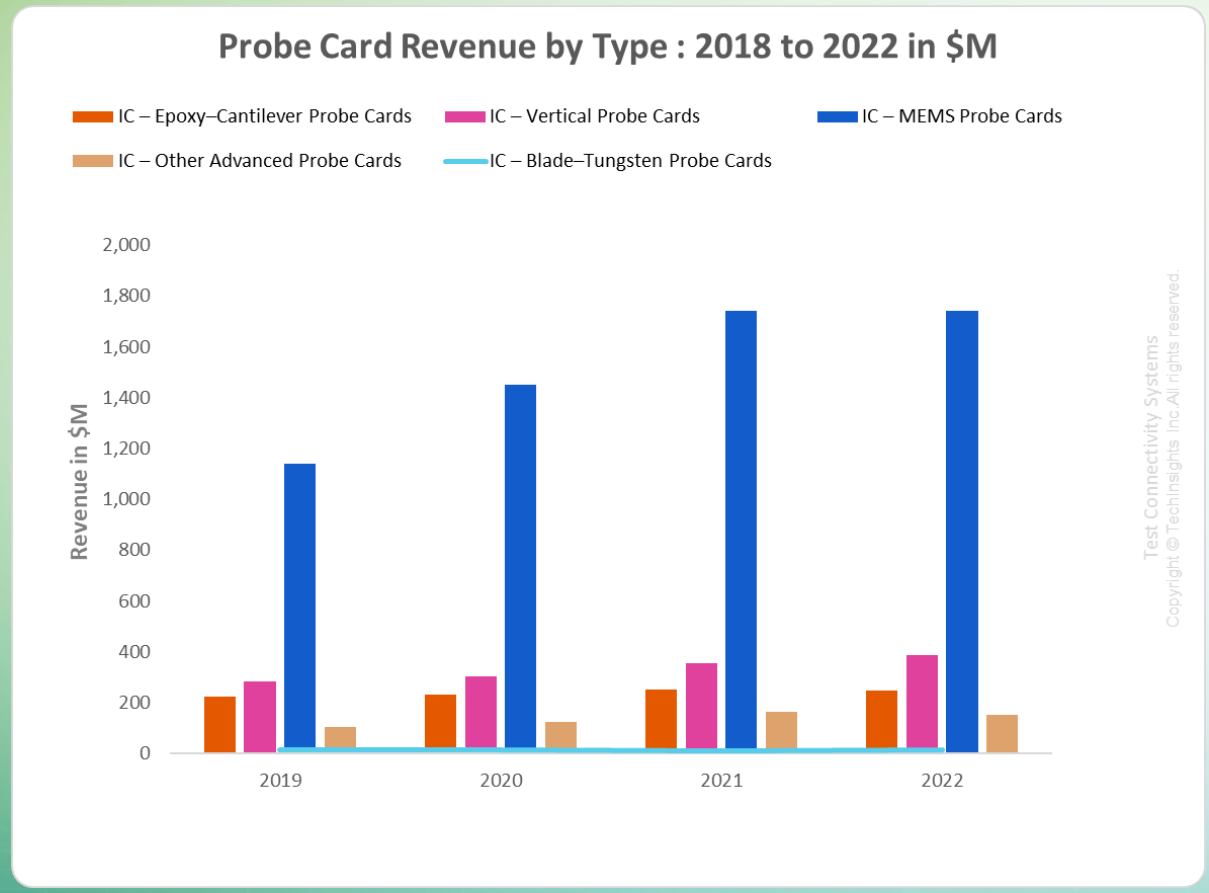
An Introduction to Probe Card Market

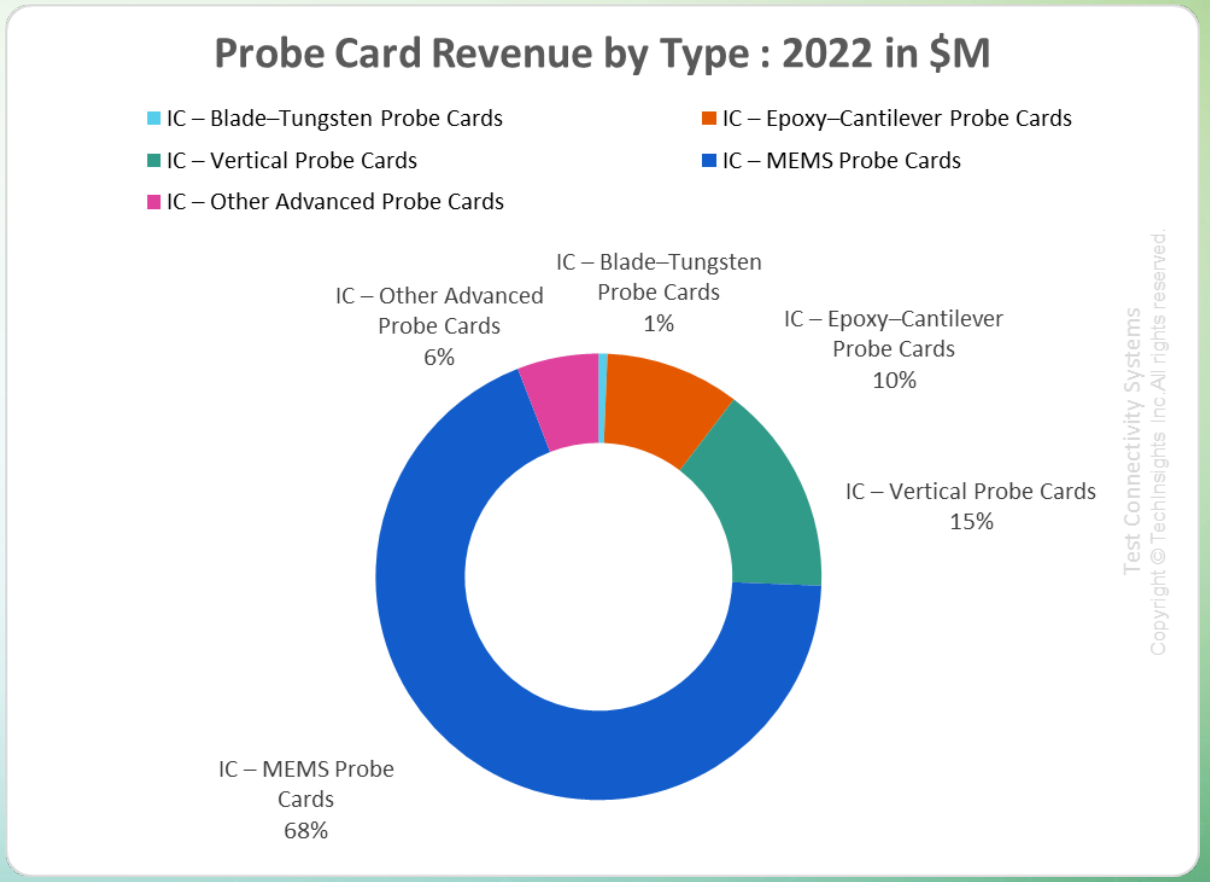


An Introduction to Probe Card Market



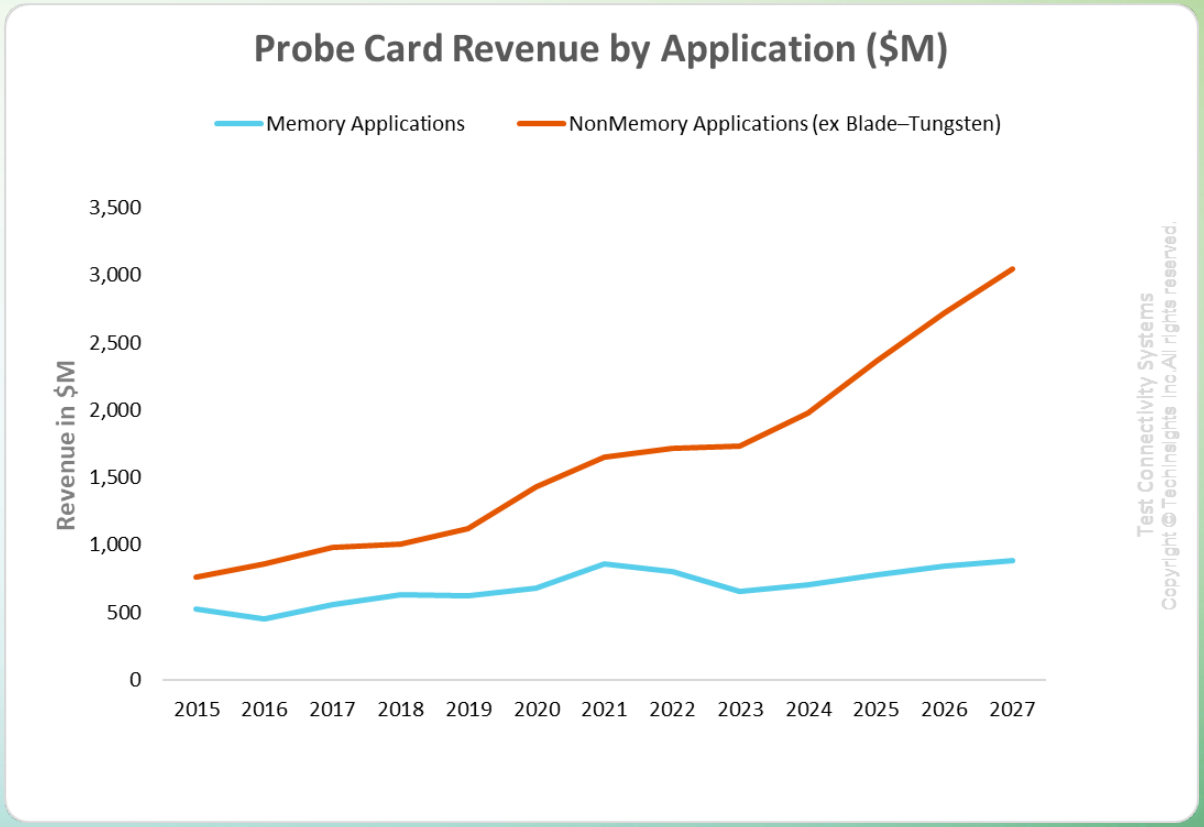
Probe Card Revenue - 2022



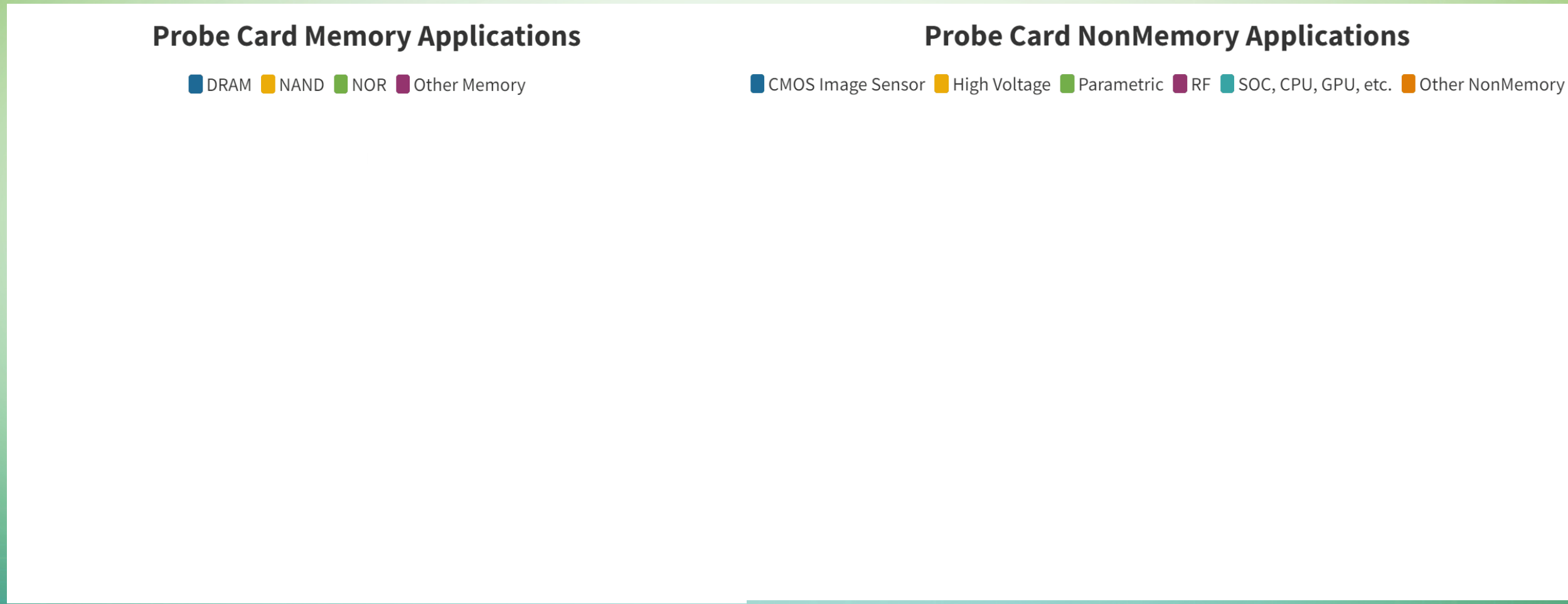


Probe Card Memory vs. Non-Memory

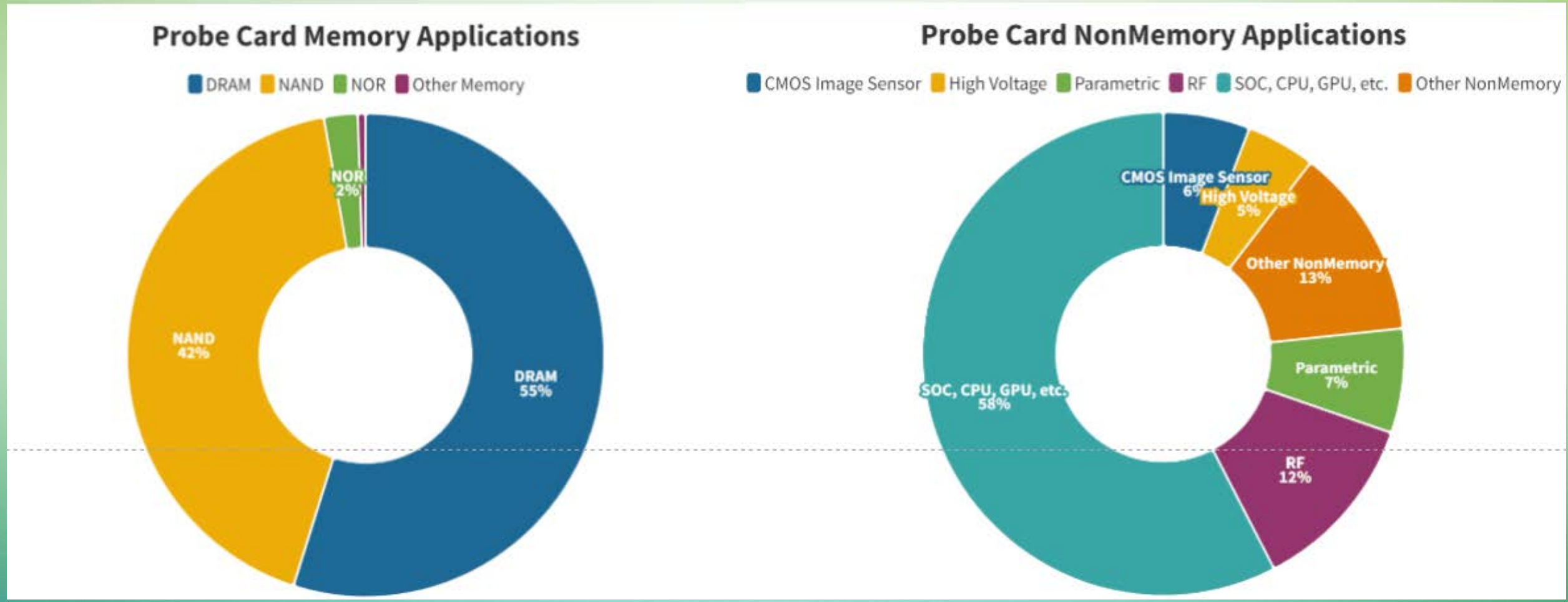
- Non-memory market is 65% and Memory Probe cards are 35% of the market
- Memory PC grew -7% and expected to have a CAGR of 1.8% in 2027
- Non-memory PC grew 4.4% with expected CAGR of 12.2% in 2027.



Probe Card Applications

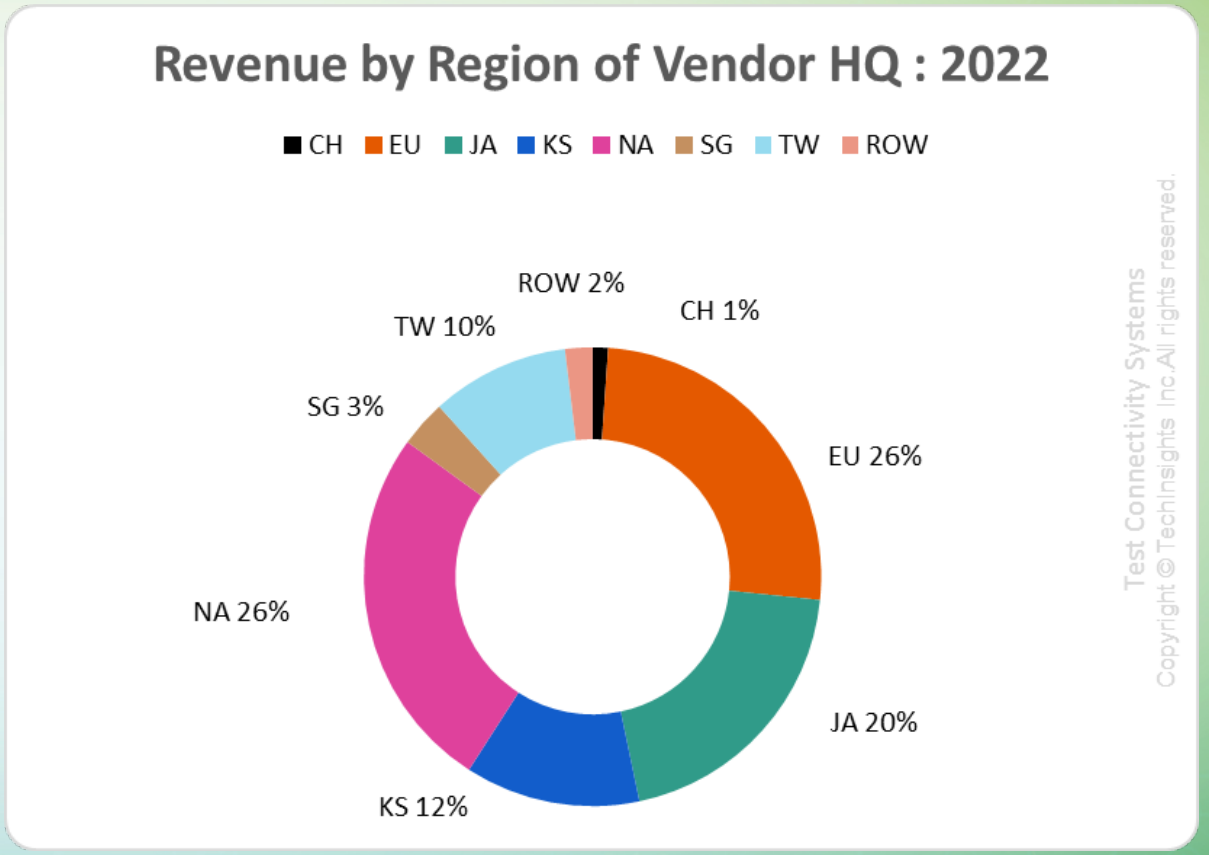


Probe Card Applications



Probe Cards Top Vendors & their HQ

Ranking	Company	Region
1	FormFactor	North America
2	Technoprobe	Europe
3	Micronics Japan	Japan
4	JEM	Japan
5	MPI Corporation	Taiwan
6	Nidec SV TCL	Singapore
7	Korea Instrument	Korea
8	TSE	Korea
9	STAr Technologies	Taiwan
10	Microfriend	Korea



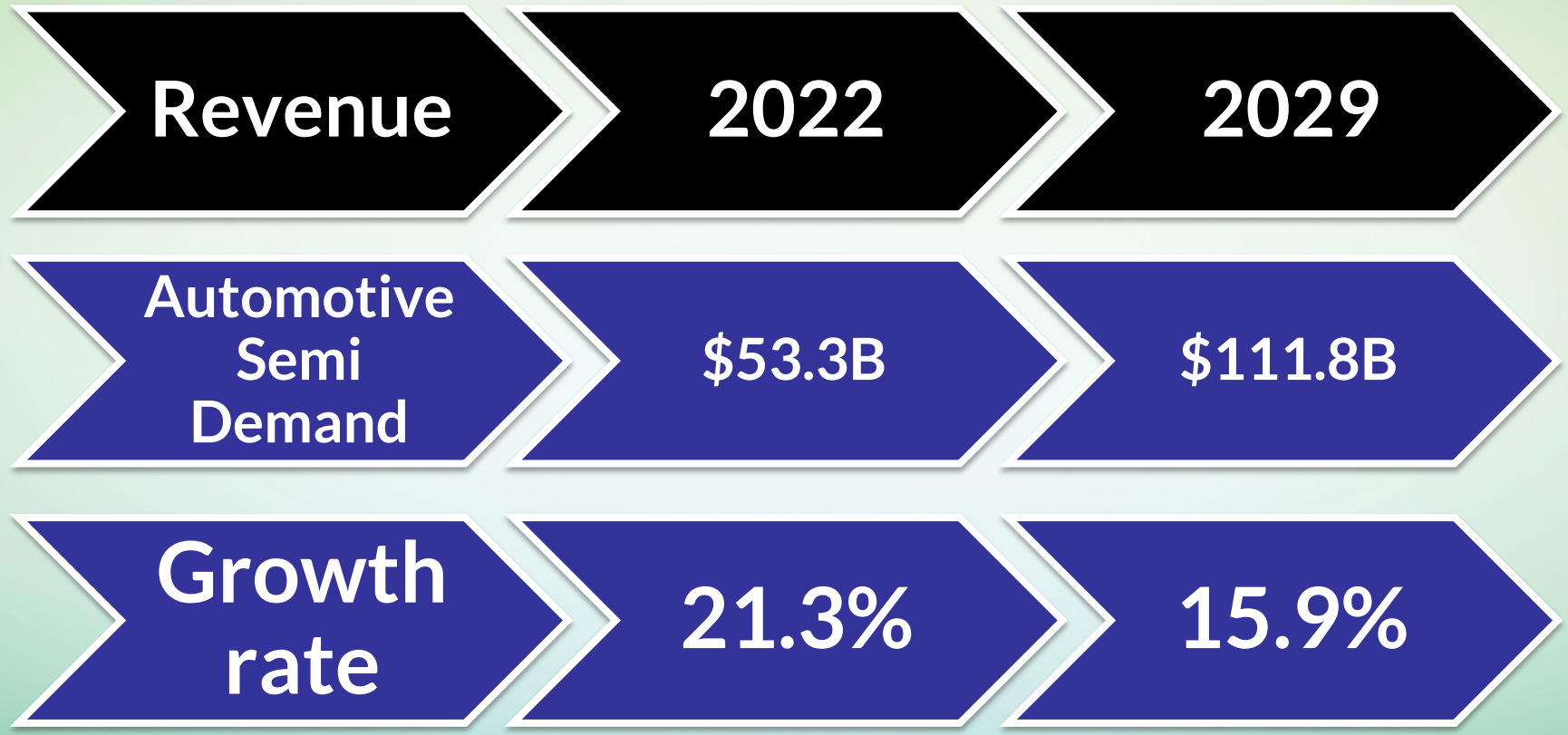
Evolution of Automotive Semiconductors

Electrification

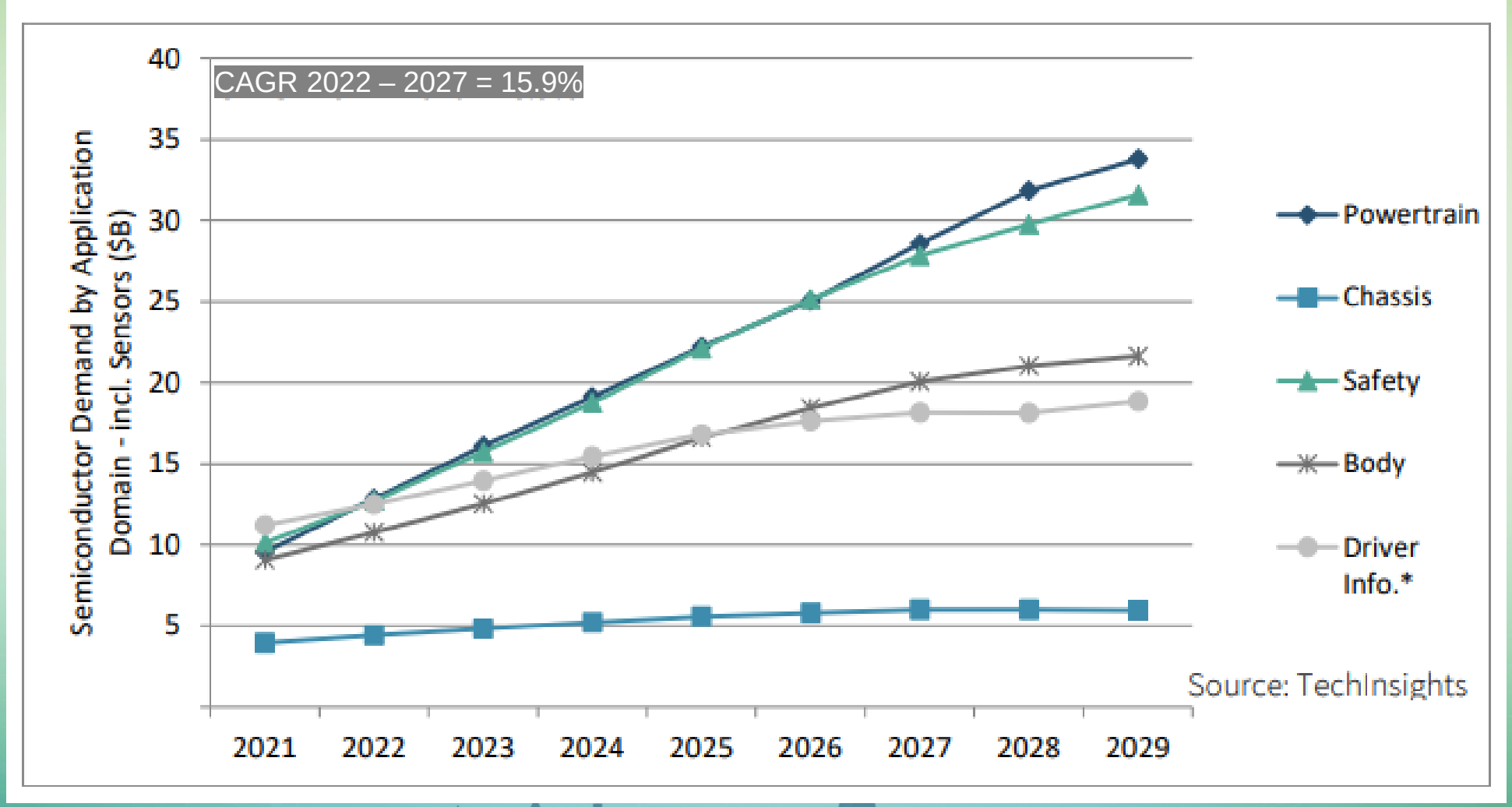
Connectivity

Autonomous

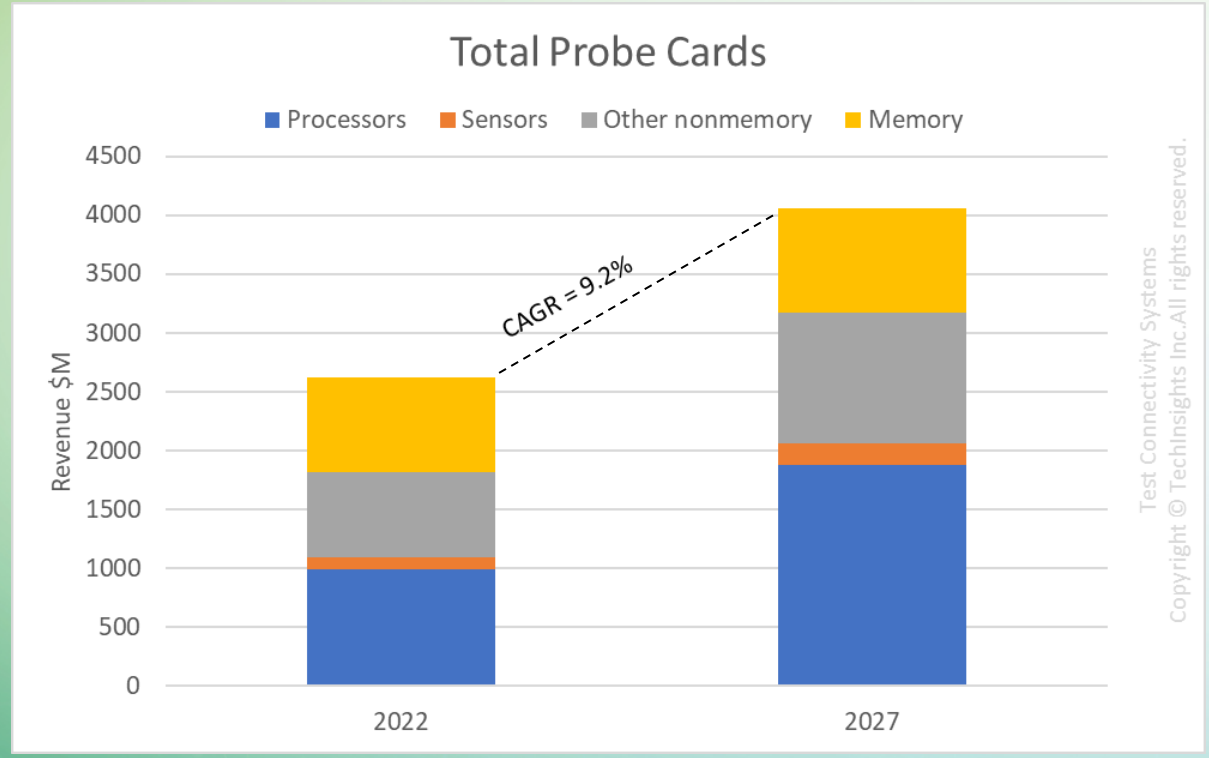
Global Automotive Market

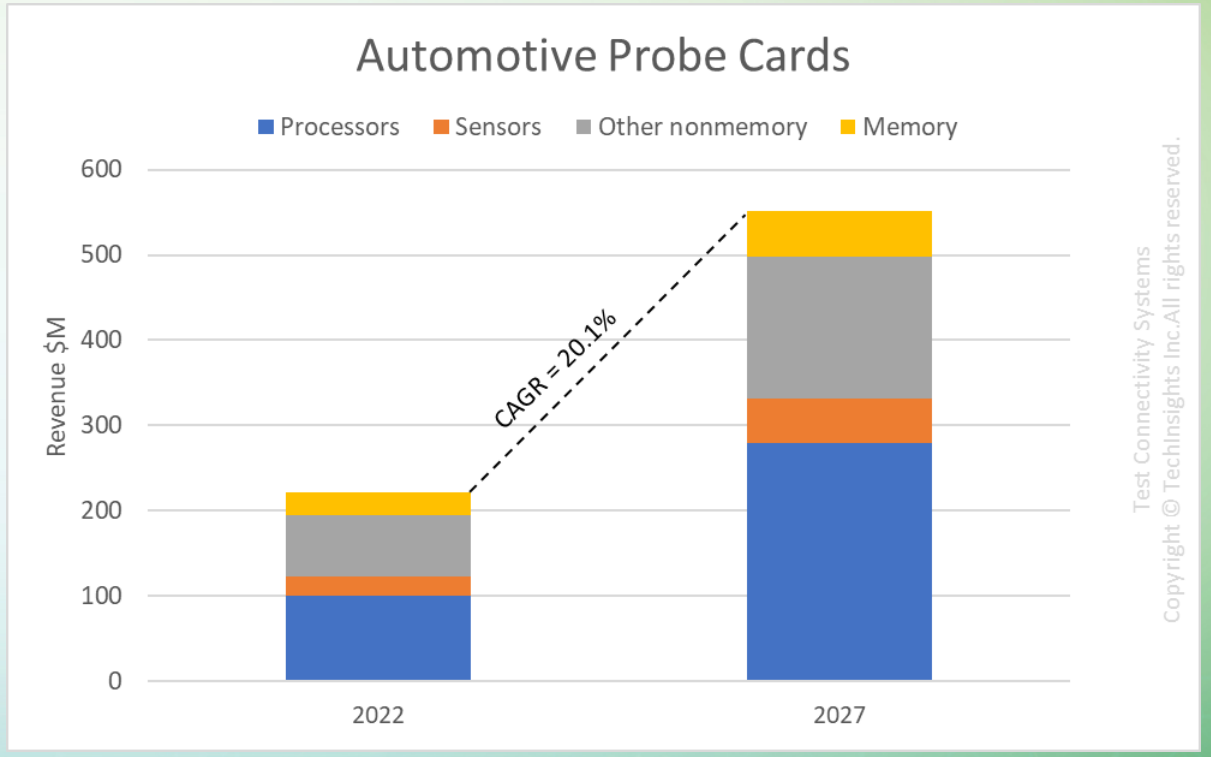


Automotive Semiconductor Demand

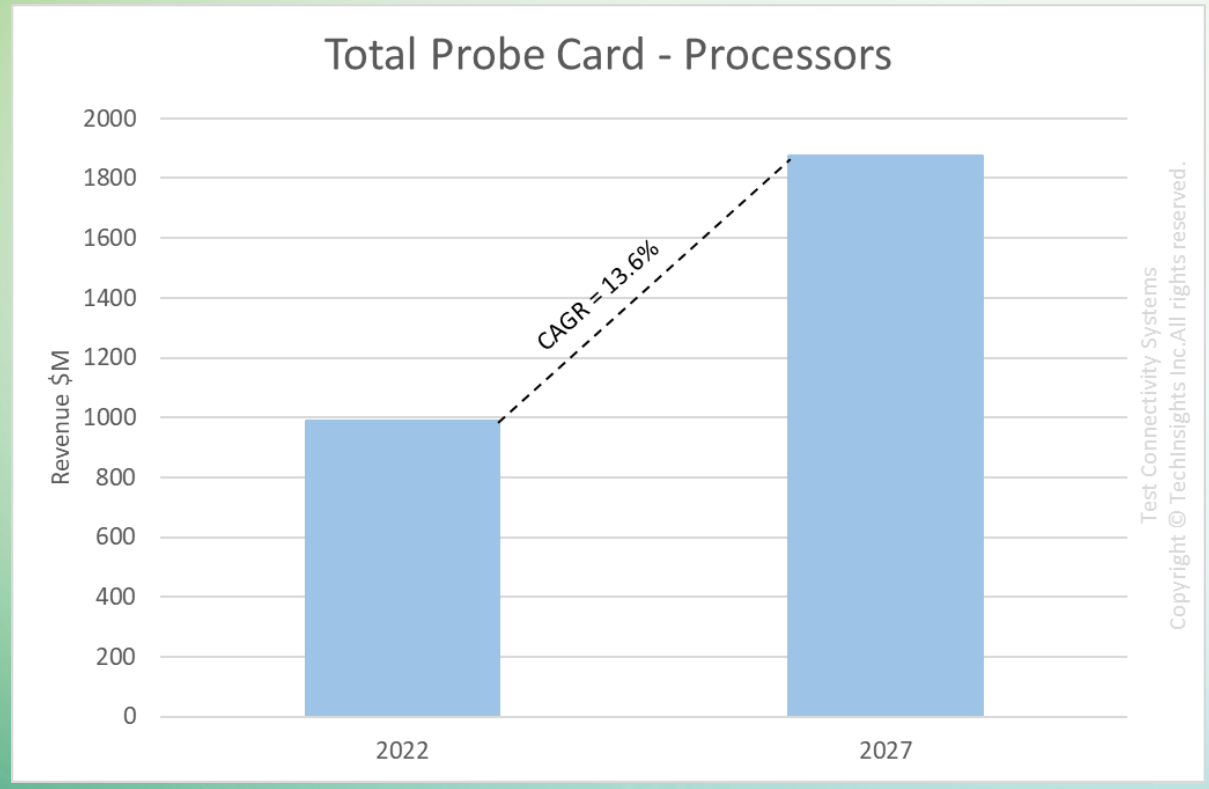


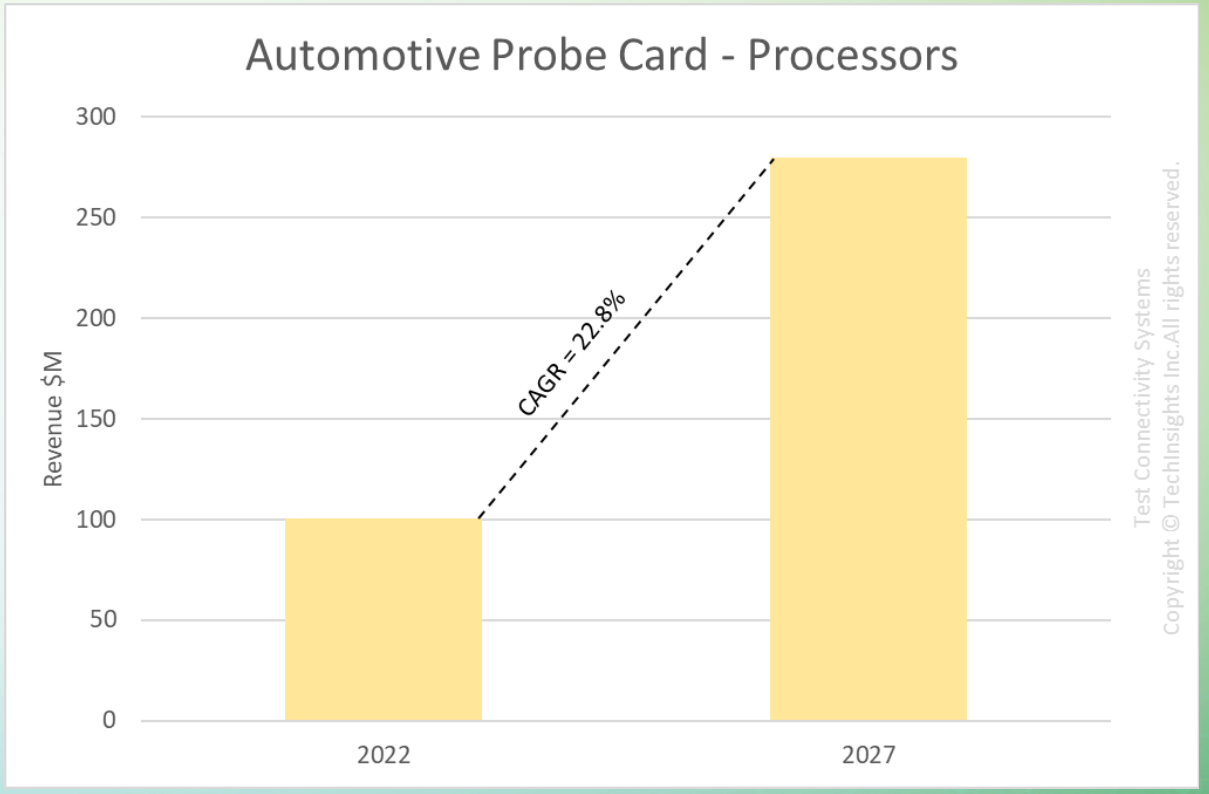
Various Segments of the market



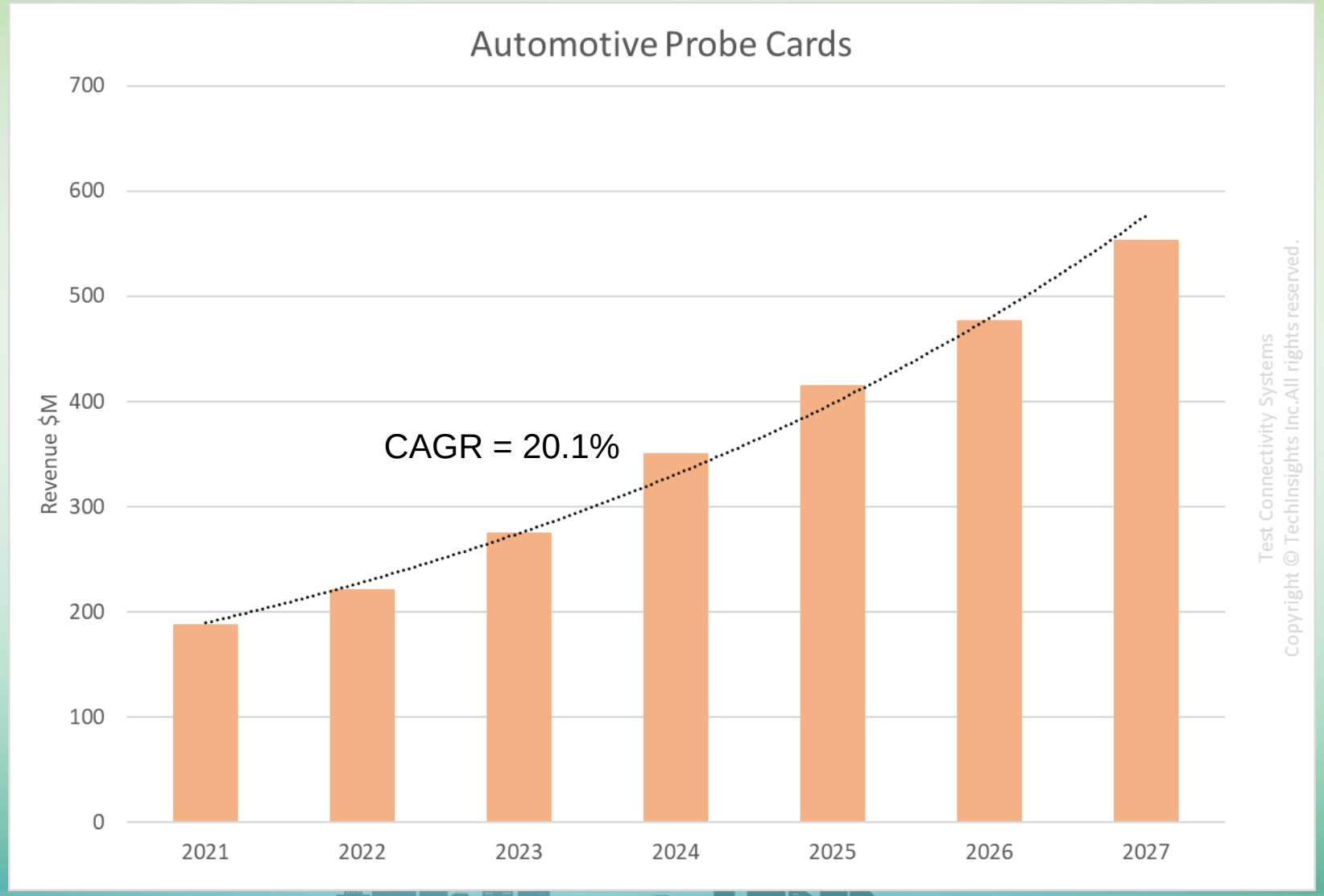


Comparison of Processor

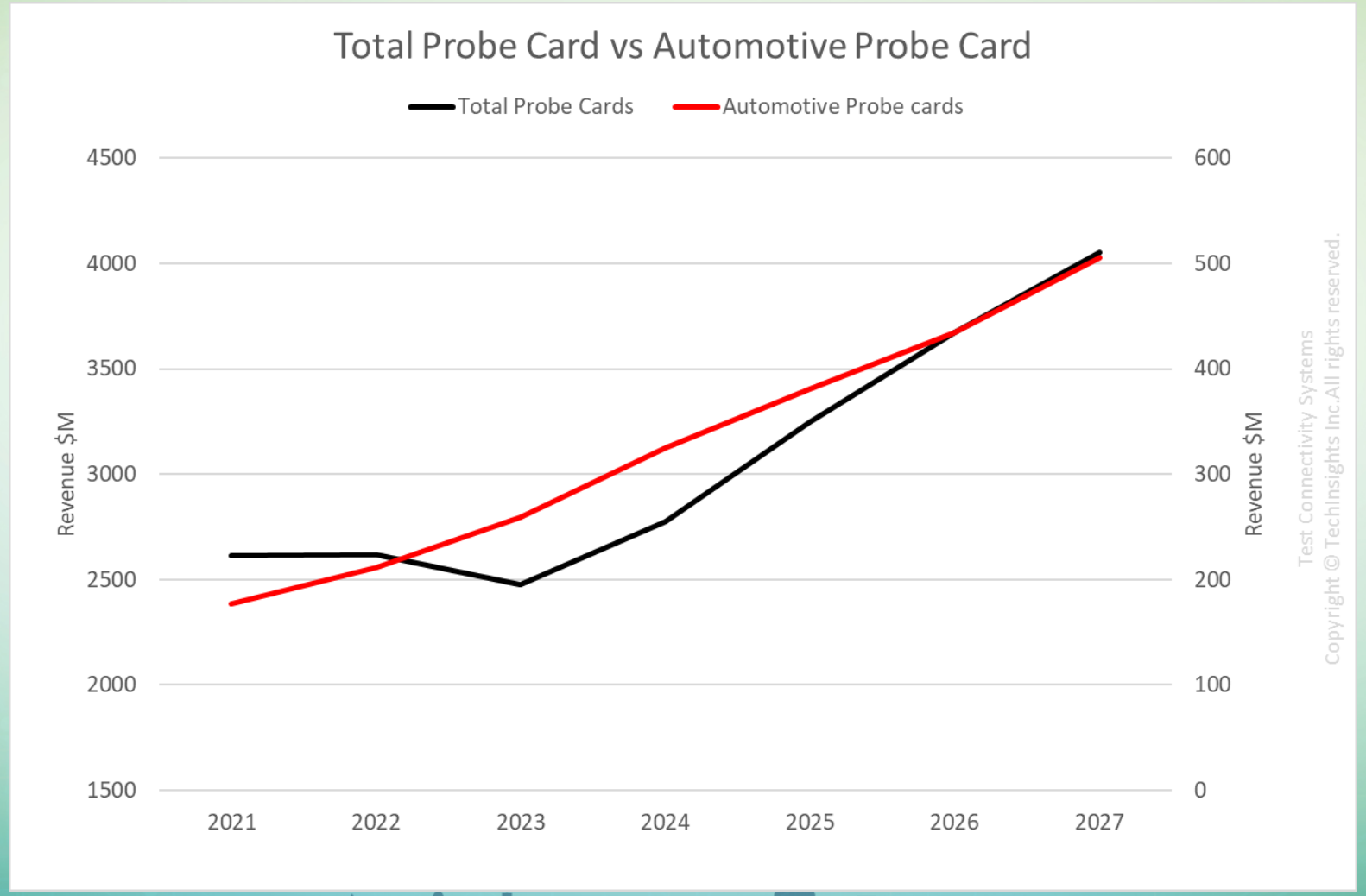




Automotive Probe Cards



Probe Cards vs Automotive Probe Cards



Conclusion

- CAGR of Automotive Probe cards from 2022 to 2027 is 20.1%, whereas that of Total Probe cards are 9.2%
- Stronger growth of Automotive Probe cards because of
  - Increase of IC content in cars, especially high-end processors
    - Rapid advancement due to increase in high-powered applications, safety devices and Electric Vehicles
  - Automotive requires higher reliability and testing
  - Increased quality requirements drives defect detection to probe
- Automotive Sector, is also driven by loud based services, AI, and IOT that will shape the future cars into service models