SURFSeq 5000*

High-throughput Sequencing Platform

Fast · Cost-effective · Efficient · Scalable

Company Introduction

GeneMind Biosciences

Explore Life's Mysteries for Better Healthcare

Established in 2012, GeneMind Biosciences Co., Ltd. is headquartered in Luohu, Shenzhen, with more than 10,000 square meters of working space including R&D lab and GMP production line.

Specializing in the independent R&D and manufacturing of molecular diagnosis technology platform centered on sequencing system, GeneMind is committed to working with genetic testing service providers and life science research institutions to build an industrial ecosystem that serves human life and health.

Milestones

July 2012
GeneMind founded

September 2014
Pioneering the independent development of sequencers

September 2018
New headquarters in Luohu, Shenzhen

April 2020
GenoLab M* Engineering Prototype

October 2020
GenoLab M* Sequencer Launches

September 2022
MrLH-96 Launched

November 2022
Launch of FASTASeq 300* Sequencing Platform

September 2023
SURFSeq 5000* Launched

*Unless otherwise informed, GeneMind sequencing platform and related sequencing reagents are not available in the USA, Canada, Australia, Japan, Singapore, Western Europe and Nordic countries yet.
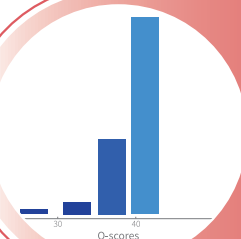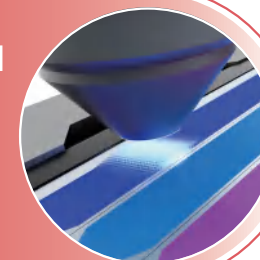
SURFSeq : Key Functionalities

Wide range application

Dual flow cell to support 5 different modes/run

Compatible with most common used applications

Ulter-high sequencing speed

FCM PE150≤24h

Flexible FQ upload node, no need to wait for one flow cell finish the run

Good data quality

Balanced mode: Q30≥90%, Q40≥85%
Enhanced mode: Q30≥95%, Q40≥90%

Q-scores

Lower start-up cost
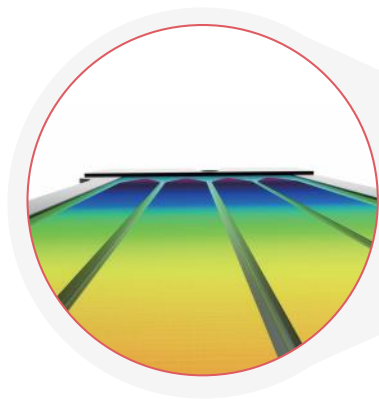
Wide range selection for sample volume in one run

Most cost-effictive for each sample

Product Innovation

Patterned array flow cells enable 2X higher density of signals

HyEND advanced surface amplification technology makes over 80% utilization rate of each flow cell

Supports real-time FastQ generation to allow customers to obtain data from different applications of the same sequencing run

SURFSeq 5000* Specification

Specification								
Flow cell	Lane	Throughput (Reads/FC)	Type	Read Length	Data output[1] (FC×2)	Balance Mode	Enhanced Mode	TAT[2]
FCM	4	500 M	100cycles	SE100	50 Gb × 2	Q30≥90% Q40≥85%	Q30≥95% Q40≥90%	12 hr
				PE50	50 Gb × 2			12 hr
			200cycles	PE100	100 Gb × 2			18 hr
			300cycles	PE150	150 Gb × 2			24 hr
FCH	4	2000 M	50cycles	SE50	100 Gb × 2			14 hr
			100cycles	SE100	200 Gb × 2			21 hr
				PE50	200 Gb × 2			21 hr
			200cycles	PE100	400 Gb × 2			26 hr
			300cycles	PE150	600 Gb × 2			30 hr
FCP	4	3600 M	50cycles	SE50	180 Gb × 2			16 hr
			100cycles	SE100	360 Gb × 2			24 hr
			200cycles	PE100	720 Gb × 2			32 hr
			300cycles	PE150	1080 Gb × 2			38 hr

Main Features

Two flow cell with 5 different sequencing modes

Support one or two flow cell in a time

Obtain data in real-time at high-speed

RFID recognize cartaidge information

Individually addressable flow cell lanes with manual onboard independent lane loading

User-friendly interface to easily switch read/index sequence

Obtain data in batches based on different applications in one run

Automatical post-run wash

1.The percentage of bases above Q30 and run time is the average of an internal standard library over the entire run. The actual performance is affected by factors such as sample type, library quality, and insert fragment length.
2.Run time was calculated based on dual flow cell mode, and includes sample loading, sequencing, base calling and data processing.

SURFSeq 5000* application

Application	Read length	Data/sample	FCM*1	FCM*2	FCH*1	FCM*1+FCH*1	FCH*2
			500 M	1000 M	2000 M	2500 M	4000 M
WGS	PE150	120Gb/sample	1	2	4	5	8
Targeted panel (FFPE)	PE150	5Gb/sample	25	50	100	125	200
Targeted panel (ctDNA)	PE50	10Gb/sample	4	8	16	20	32
RNAseq	PE150	10Gb/sample	12	25	50	62	100
WES	PE150	10Gb/sample	12	25	50	62	100
Single cell	PE150	60Gb/sample	2	4	8	10	16

Note:Recommended date output and sample numbers are only for reference,actual application will require optimisation adjustments.

*Unless otherwise informed, GeneMind sequencing platform and related sequencing reagents are not available in the USA, Canada, Australia, Japan, Singapore, Western Europe and Nordic countries yet.

Application summary

PE 150
30 runs data

Q 30 ≥ 92%

Output reads ≥ 2300 M

Multi-application comparison testing among different platforms(Competitor A and Competitor B)

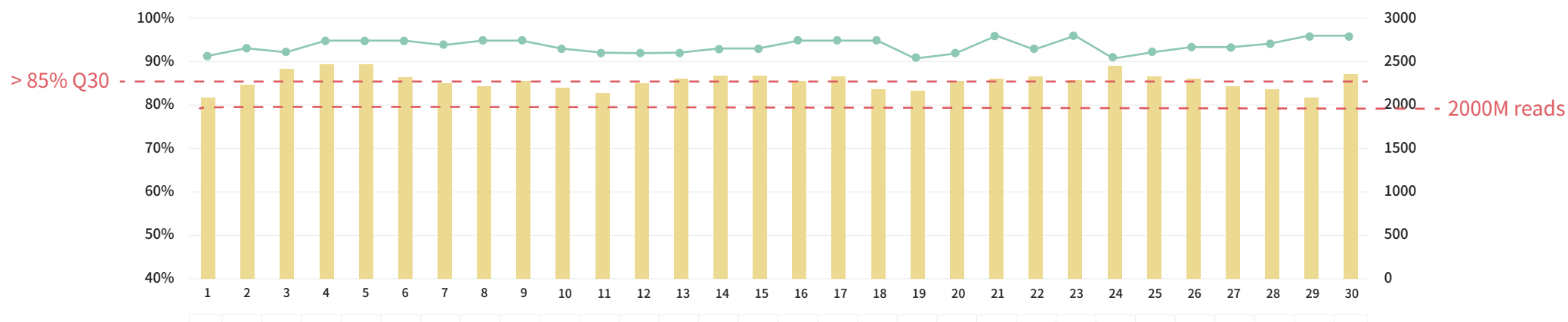| WGS	WES
Panel	RNA
mNGS	WGBS

Summay reports

30 runs data quality statistic analysis(FCH PE150)			
Indicator	**Mean**	**SD**	**CV**
Output Reads	2300 M	150 M	10.2%
Q30	92.3%	3.0%	3.2%

Application-WGS（Human）

- Sample type:Human standard library
- Library:5 WGS PCR-Free libraries
- Sequencing platform:SURFSeq 5000*(SF), Competitor A(CA)
- Read length:PE150
- Data analysis:100×effective reads/sample for deep analysis

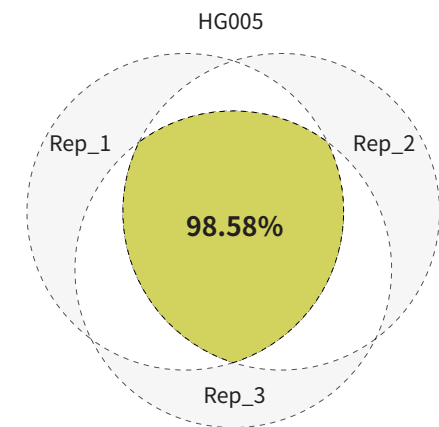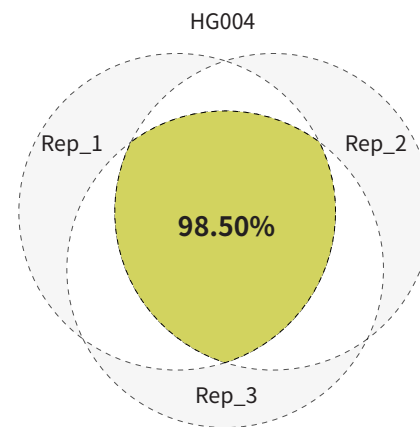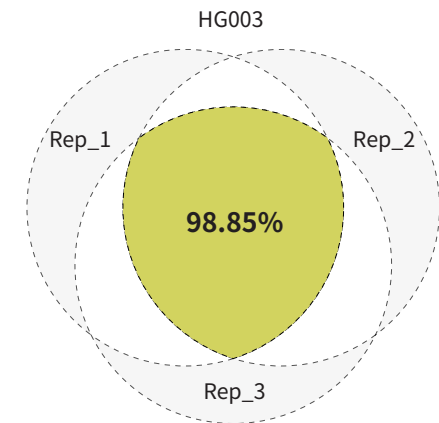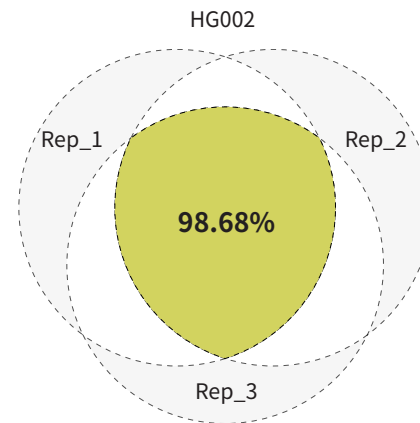|	Sample ID	Raw Q30%	Mapping Ratio	Error Ratio
HG001	SF_1	93.8%	99.9%	0.18%
	CA_1	92.2%	99.6%	0.19%
HG002	SF_2	93.9%	99.9%	0.19%
	CA_2	92.8%	99.6%	0.19%
HG003	SF_3	93.6%	99.8%	0.17%
	CA_3	92.9%	99.5%	0.19%
HG004	SF_4	94.1%	99.6%	0.18%
	CA_4	92.6%	99.2%	0.19%
HG005	SF_5	93.7%	99.8%	0.18%
	CA_5	92.6%	99.5%	0.20%

Conclusion: High data quality of WGS samples ensures accurate SNV (>99%) /InDel calling (>95%).

SNV F1-Score — SURFSeq 5000, Competitor A

InDel F1-Score

96.50% — SF
93.25% — CA
90.00%

99.00% 99.25% 99.50%
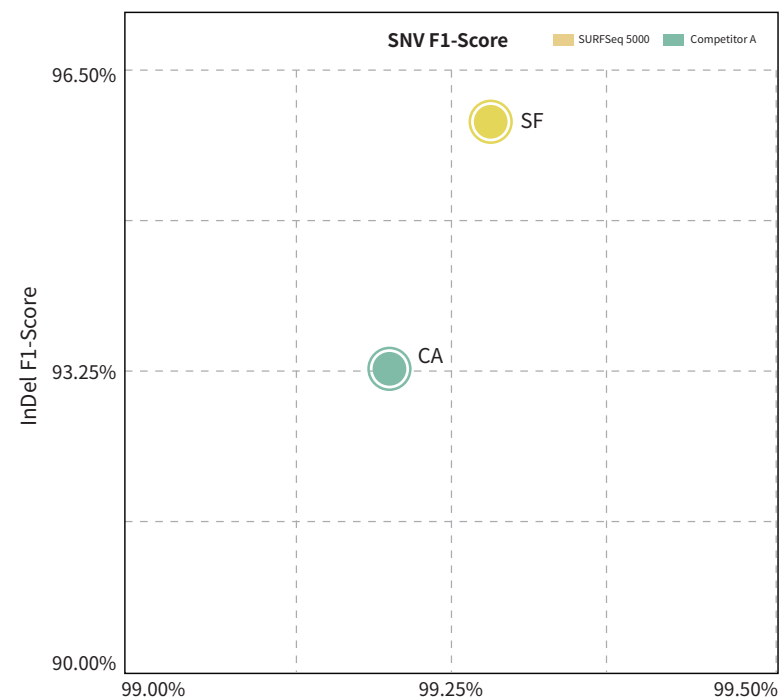
Application-WGS（Human）

Conclusion: SNV/InDel detection in all samples showing a high consistency (>98%) in different batches.

HG001

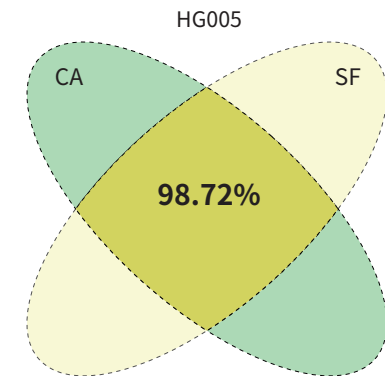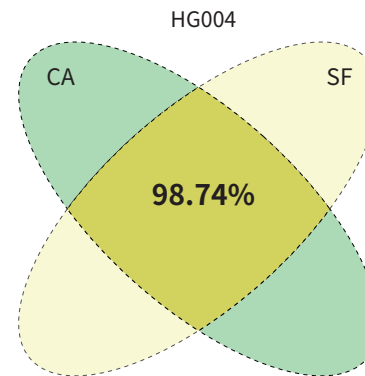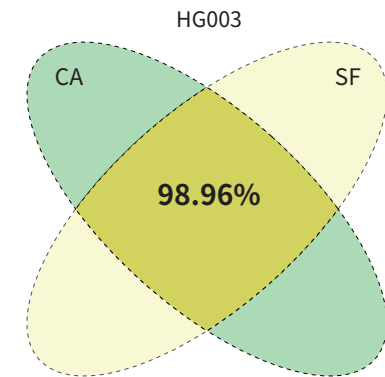Rep_1 Rep_2

98.44%

Rep_3

HG002

Rep_1 Rep_2

98.68%

Rep_3

HG003

Rep_1 Rep_2

98.85%

Rep_3

HG004

Rep_1 Rep_2

98.50%

Rep_3

HG005

Rep_1 Rep_2

98.58%

Rep_3
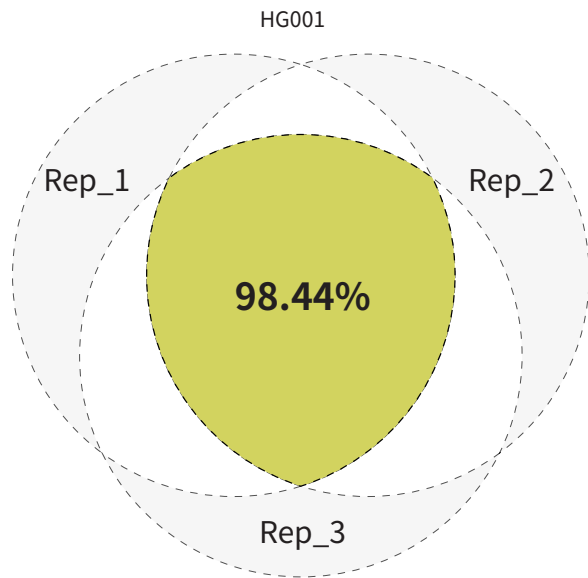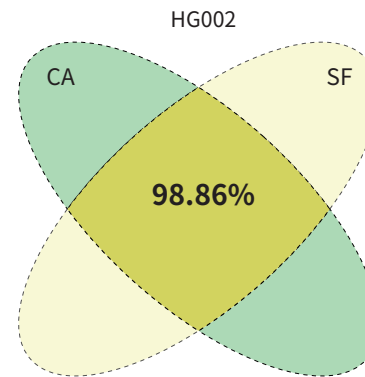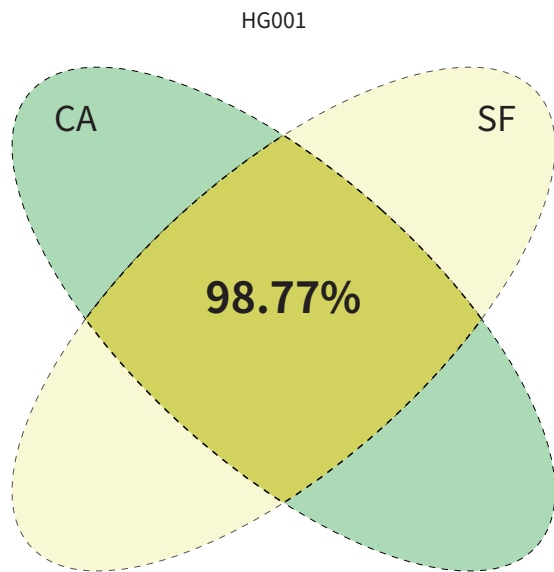
Application-WGS（Human）

Conclusion: The SNV/InDel result is quite comparable between SF and CA platform (>98%).

HG001

CA   SF

98.77%

HG002

CA   SF

98.86%

HG003

CA   SF

98.96%

HG004

CA   SF

98.74%

HG005

CA   SF

98.72%

Application-WGS (Animal)

- Sample type: Four chicken WGS standard libraries
- Sequencing platform: SURFSeq 5000*(SF), Competitor B(CB)
- Read length: PE150
- Analysis: 26Gb/sample for deep analysis

Sample ID	G_1		G_2		G_3		G_4	
Platform	SF	CB	SF	CB	SF	CB	SF	CB
Raw Q30	95.9%	91.9%	95.2%	91.0%	95.5%	90.3%	96.1%	90.8%
Mapping Ratio	99.7%	99.6%	99.7%	99.7%	99.7%	99.7%	99.7%	99.7%
Coverage ≥1×	98.9%	99.3%	99.2%	99.2%	99.3%	99.3%	98.9%	98.9%
Mean Coverage	25.6X	25.8X	25.4X	25.8X	25.3X	25.8X	25.6X	25.8X
SNP	6624k	6683k	6802k	6874k	6625k	6703k	6746k	6839k
InDel	871k	881k	890k	905k	878k	893k	892k	908k

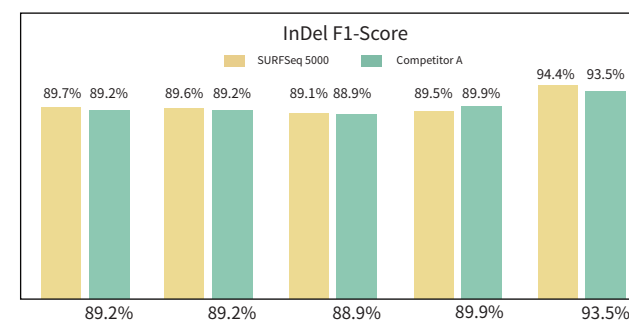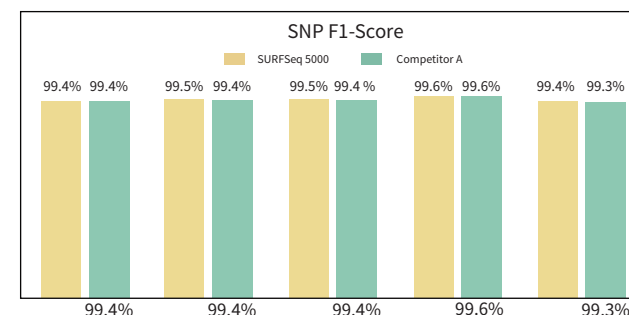SNP and InDel results

G_1	G_2
G_3	G_4
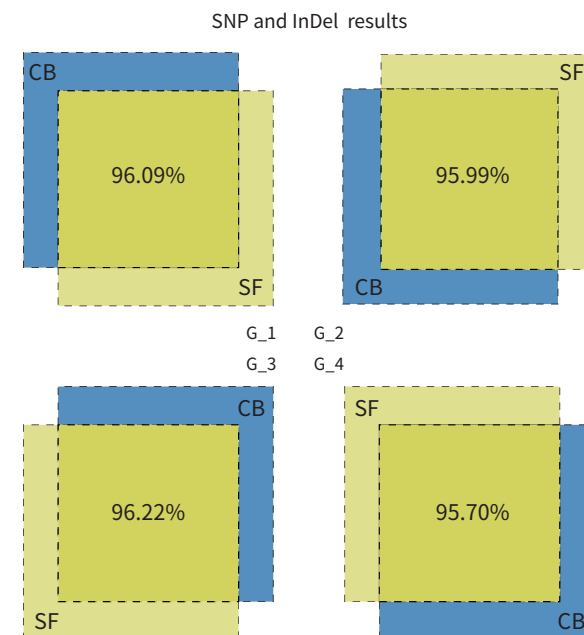
Conclusion: Q30 is higher than Competitor B.As for the mapping rate，coverage，SNP and Indel detection results are quite comparable with competitors.

Application-WES

- Sample type:5 Human WES libraries
- Library prep:Agilent SureSelect Human All Exon V6
- Sequencing Platform:SURFSeq 5000* (SF), Competitor A(CA)
- Read length:PE150
- Analysis:100×effective reads/sample for deep analysis

Sample ID	HG001		HG002		HG003		HG004		HG005	
Platform	SF	CA	SF	CA	SF	CA	SF	CA	SF	CA
Raw Q30	90.9%	94.9%	91.3%	94.9%	90.8%	94.6%	91.4%	94.8%	90.9%	94.7%
Mapping Ratio	99.9%	99.8%	99.9%	99.8%	99.9%	99.8%	99.9%	99.8%	99.9%	99.8%
Coverage ≥10×	99.0%	99.3%	99.2%	99.4%	98.6%	98.5%	99.0%	99.2%	98.2%	98.0%
Coverage ≥30×	93.3%	93.6%	93.1%	92.7%	89.1%	87.2%	93.3%	92.9%	87.0%	85.4%

SNP F1-Score

SURFSeq 5000   Competitor A

99.4% 99.4%	99.5% 99.4%	99.5% 99.4%	99.6% 99.6%	99.4% 99.3%
99.4%	99.4%	99.4%	99.6%	99.3%

InDel F1-Score

SURFSeq 5000   Competitor A

89.7% 89.2%	89.6% 89.2%	89.1% 88.9%	89.5% 89.9%	94.4% 93.5%
89.2%	89.2%	88.9%	89.9%	93.5%

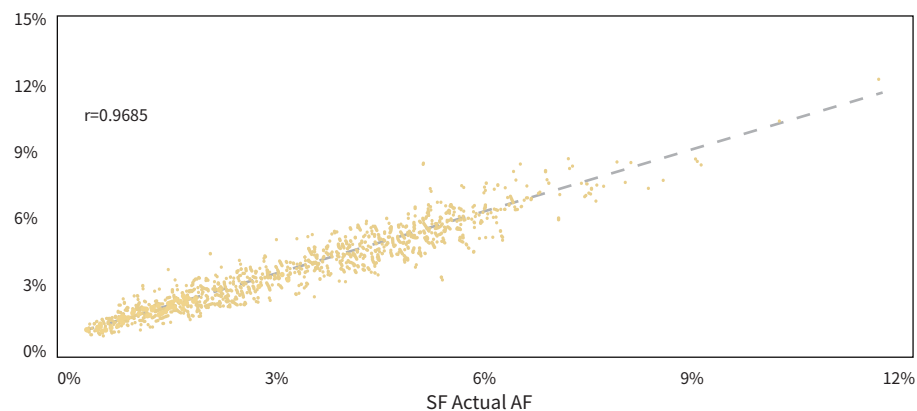**Conclusion:**Q30 is a little bit lower than Competitor A.As for mapping rate，coverage，SNP and Indel detection results are quite comparable with competitors.

Application-Target commercial panel

- Sample typr:Four Standard panels (0.5%,1.0%, 2.0%, 5.0%)
- Library prep:iGeneTech TargetSeq Pan-Cancer Panel and Twist cfDNA Pan-Cancer reference standard
- Sequencing platform:SURFSeq 5000* (SF), Competitor A(CA)
- Read length:PE150
- Analysis:20Gb/sample to do deep analysis

Conclusion:SURFSeq 5000* showing a quite comparable results with Competitor A in the low frequencing mutation detection.

| Statictics result of variants calling							
Variant_Recall	SNV_Recall (227)				InDel_Recall (215)		
VAF	0.50%	1.00%	2.00%	5.00%	1.00%	2.00%	5.00%
SF	99.0%	99.6%	99.6%	99.6%	68.6%	88.5%	89.8%
CA	99.1%	99.6%	99.6%	99.6%	69.8%	86.1%	89.8%

r=0.9685
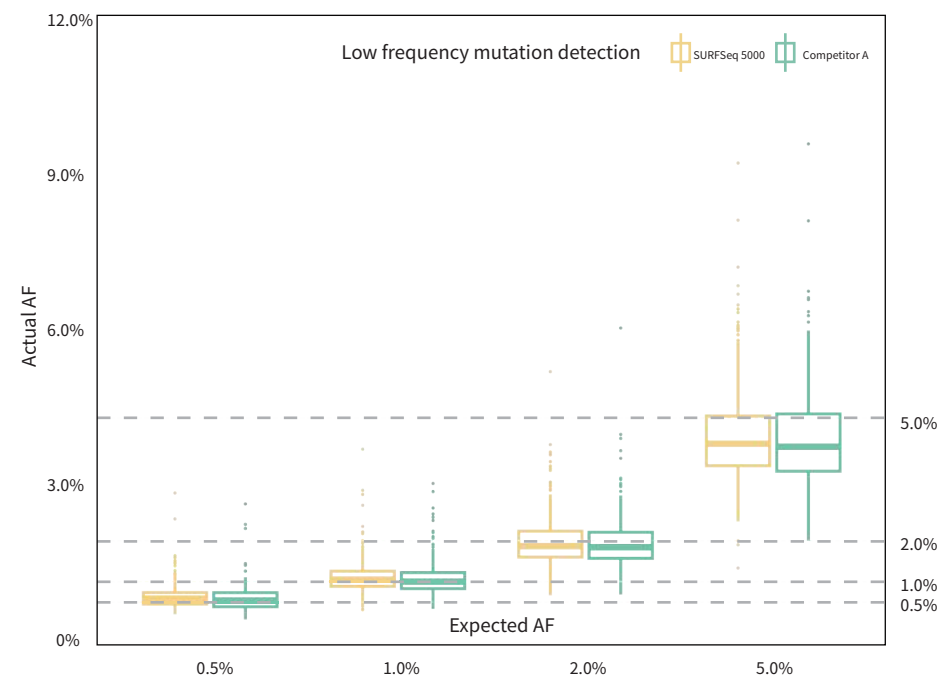
Application-WGBS

- Samlp type:GIAB HG001
- Library prep:WGBS library
- Sequencing platform:SURFSeq 5000* (SF), Competitor A(CA)
- Read length:PE150
- Data analysis:120Gb/sample for deep analysis

Conclusion:SURFSeq 5000* performs better than CA platform in Q30, mapping rate and duplication rate results. Methylation level analysis, SURFSeq 5000* showes excellent performance on intra-platform repeatability and consistency.

summary peport					
Platform	SF (0% Balance Library)			CA (Pooling with WES)		
Sample ID	SF_1	SF_2	SF_3	CA_1	CA_2	CA_3
Raw_Q30	93.81%	94.17%	93.01%	88.23%	91.18%	90.22%
Mapping Ratio	80.04%	81.53%	81.25%	78.10%	78.88%	75.68%
Duplication Ratio	15.20%	19.40%	20.00%	21.50%	21.80%	19.60%
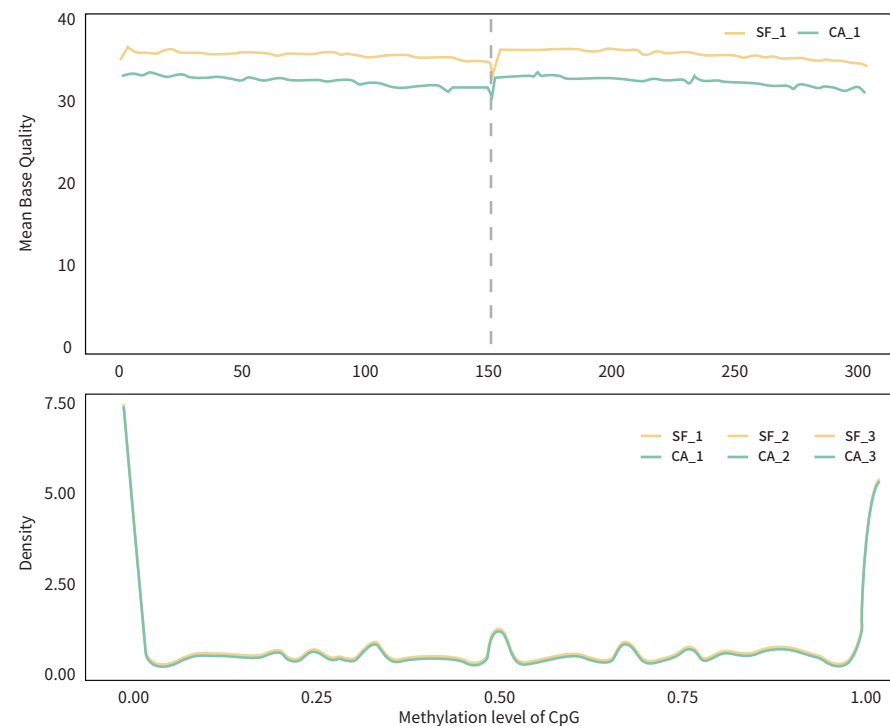
Application-RNAseq

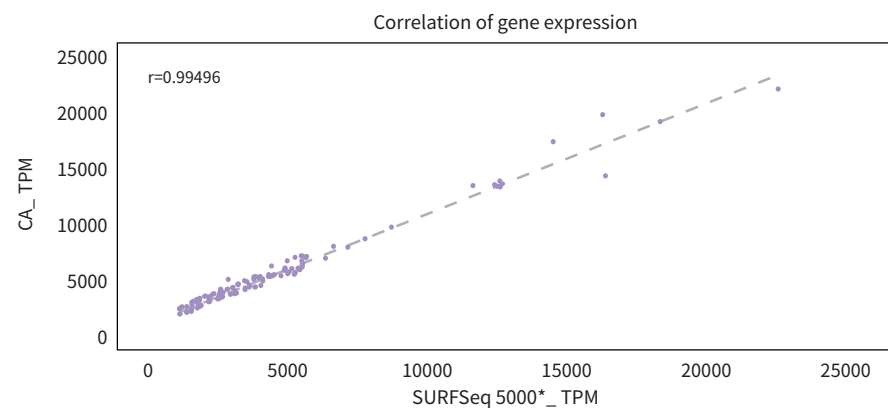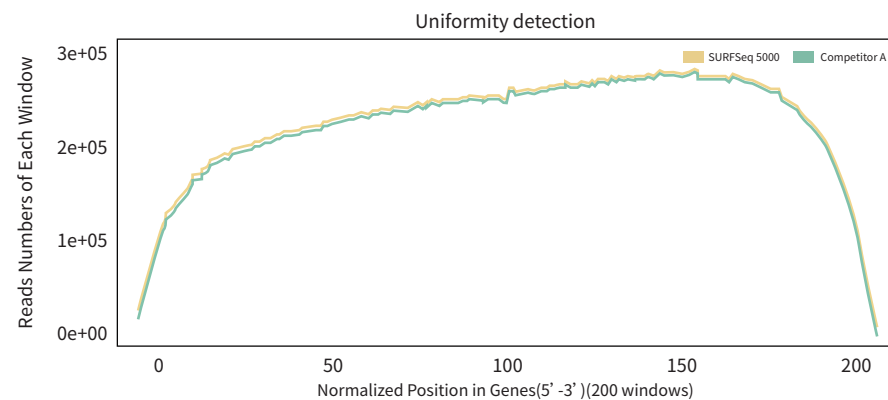- Sample type:5 UHRR (Universal Human Reference RNA) standard libraries
- Sequencing platform:SURFSeq 5000* (SF), Competitor A(CA)
- Read length:PE150
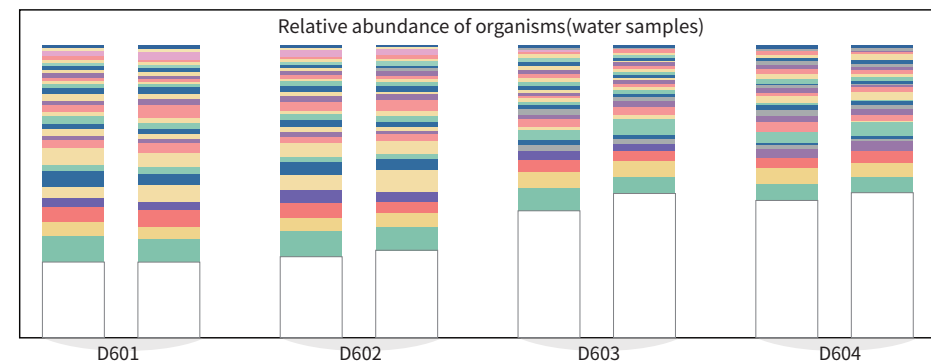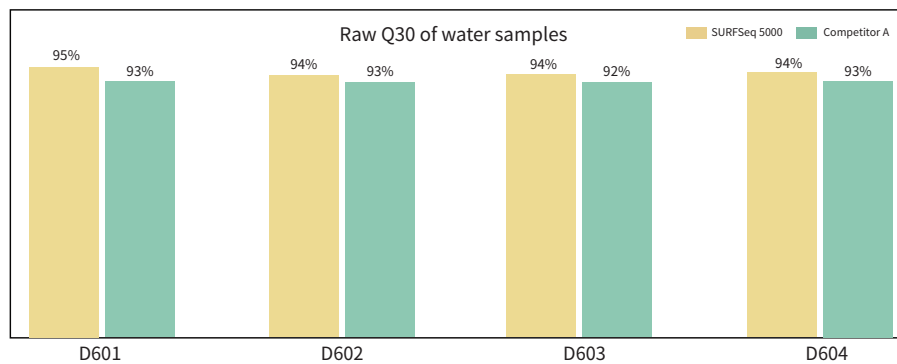- Data analysis:12Gb/sample for deep analysis
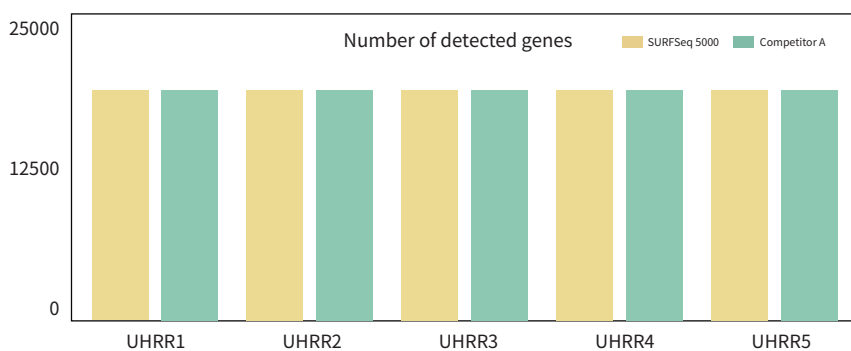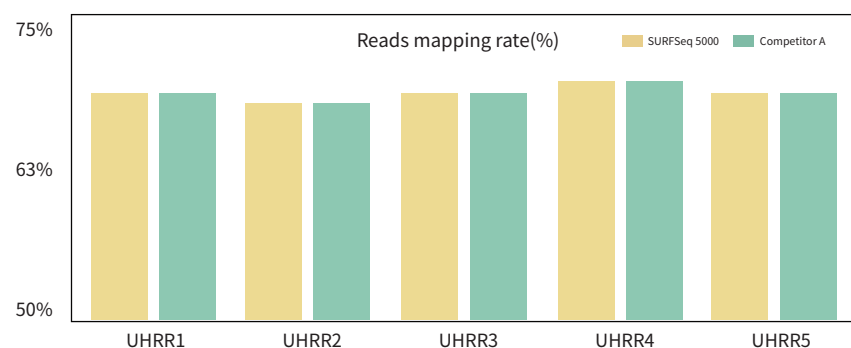
Conclusion: Mapping reads，detected gene numbers and the uniformity of transcription coverage are similar in two platforms. The correlation of gene expression reaches to 0.99，showing a high consistency.

Application-mNGS

- Sample type:Soil，water
- Library:8 mNGS libaries
- Sequencing platform:SURFSeq 5000*(SF), Competitor A(CA)
- Read length: PE150
- Data analysis:10Gb/sample for deep anaysis

Conclusion:SURFSeq 5000* Q30 and relative organism abdundance tested results are comparable to CA platform, showing a quite good data performance.

Raw Q30 of soil samples — SURFSeq 5000 | Competitor A

	D101	D102	D103	D104
SURFSeq 5000	95%	95%	94%	94%
Competitor A	94%	93%	94%	94%

Relative abundance of organisms(soil samples) — D101, D102, D103, D104

Raw Q30 of water samples — SURFSeq 5000 | Competitor A

	D601	D602	D603	D604
SURFSeq 5000	95%	94%	94%	94%
Competitor A	93%	93%	92%	93%

Relative abundance of organisms(water samples) — D601, D602, D603, D604
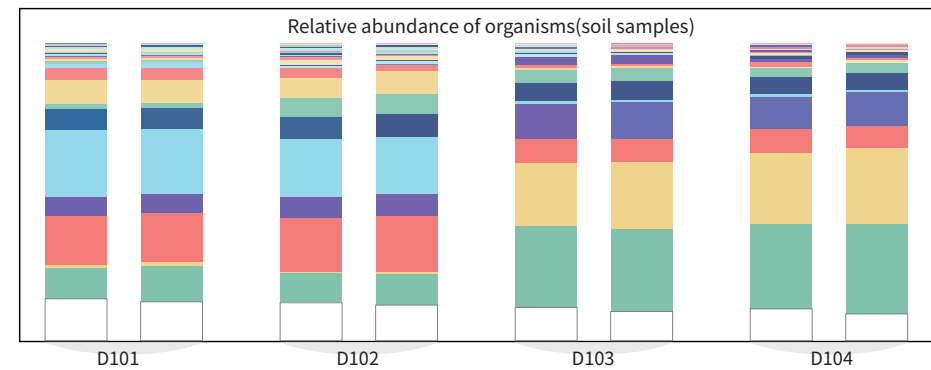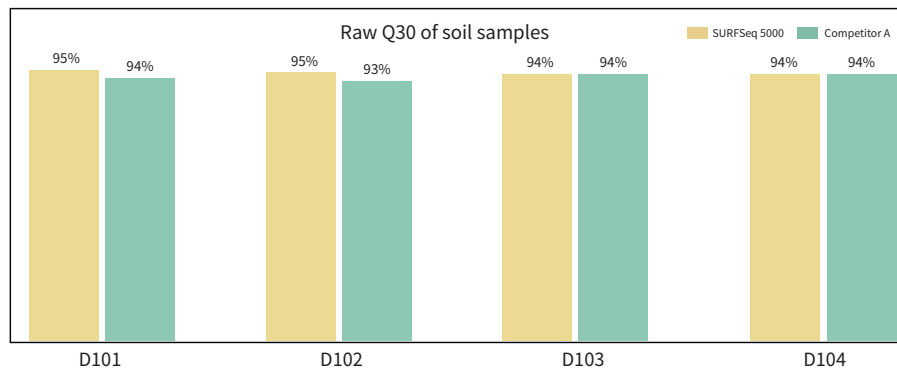
Intellectual Property & Qualifications
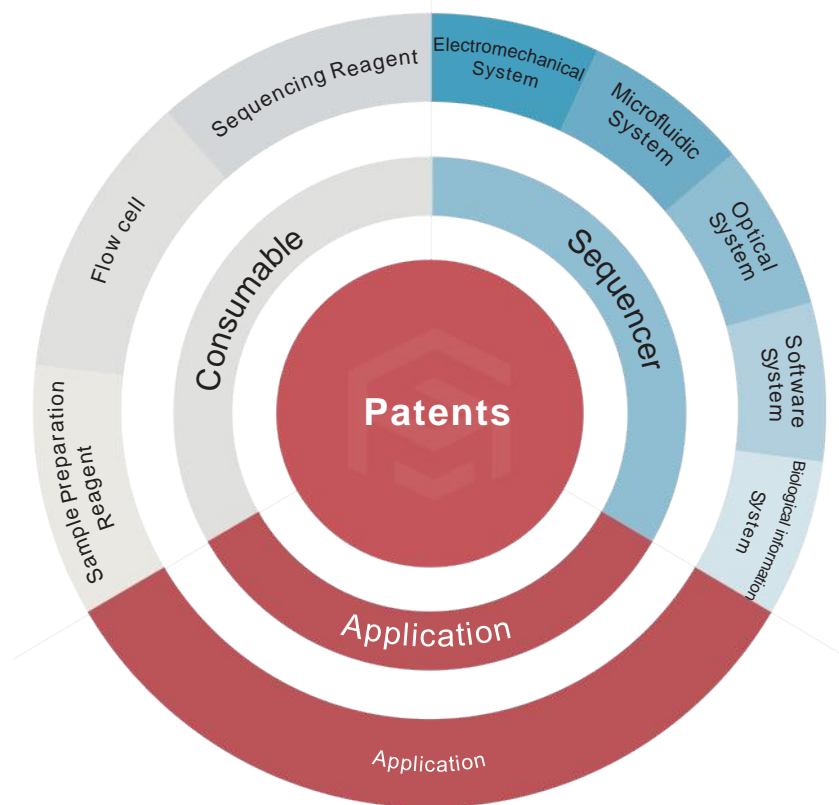
Sequencing systems are multidisciplinary specialities that combine optics, fluids, algorithms, chemistry and molecular biology. Since its establishment, GeneMind has been specializing in the independent R&D and manufacturing of molecular diagnosis technology platform centered on sequencing system. We have continuously innovated and accumulated a lot of intellectual property rights in the underlying technologies such as instrument hardware, reagent, flowcell and software algorithms.

As of October 2024, GeneMind has more than 400 granted domestic and foreign patents, and has successfully obtained ISO 13485 medical device quality management system certification. The sequencer, reagent kits and other products have also received CE certification, NMPA medical device approval.

400+
Patents granted

ISO 13485:2016
Quality Management System Certification

80+
NMPA approval/ CE IVD registration

40+
Academic papers

*Unless otherwise informed, GeneMind sequencing platform and related sequencing reagents are not available in the USA, Canada, Australia, Japan, Singapore, Western Europe and Nordic countries yet.

Independent Research & Development

In addition to the innovative breakthroughs in sequencer development, GeneMind has also realized the independent R&D and production of core materials such as enzymes, nucleotide analogues, fluorochrome and flowcell. The company has the ability to develop and manufacture the total solution of "instrument-reagent-flow cell-software" independently, and are able to provide customers total solution with good quality, low cost and short delivery time.

The total area of R&D and production in use is nearly 10,000 square meters, with sequencer production factory, GMP reagent kit production line, flow cell laboratory, organic synthesis laboratory and enzyme engineering laboratory. The designed annual capacity of sequencer is 1000 units and the annual capacity of kits is 2.4 million tests.

● Sequencer Production Line
Designed with annual production capacity of 1000 sequencers

● Flow cell Lab
In-house production of sequencing flowcell

● Organic Synthesis Lab
Able to synthesize our own nucleic acid and fluorochrome

● Reagent Kits Production Line
Designed as a GMP workshop to produce kits for 2.4 million tests annually

● Enzyme Engineering Lab
Independent research and development of core enzyme
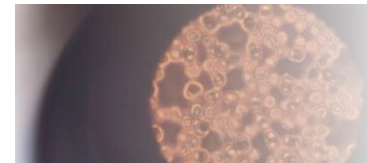
Applications

- Reproductive Health
- Genetic & Rare Diseases
- Pathogen Detection
- Oncology
- Animal Genomics
- Agrigenomics

Product Information

Product Type	Product Code	Product Name	Specification
Sequencer	SQ00025	SURFSeq 5000 Sequencing System Set	SURFSeq 5000
	SQ00026	SURFSeq 5000 Dx Sequencing System Set	SURFSeq 5000 Dx
Reagents	S000351	SURFSeq 5000 Sequencing Kit V2.0 （FCM 100cycles ）	FCM 100cycles
	S000356	SURFSeq 5000 Sequencing Kit V2.0 （FCM 200cycles ）	FCM 200cycles
	S000358	SURFSeq 5000 Sequencing Kit V2.0 （FCM 300cycles ）	FCM 300cycles
	S000272	SURFSeq 5000 Sequencing Kit V2.0 （FCM 600cycles ）	FCM 600cycles
	S000360	SURFSeq 5000 Sequencing Kit V2.0 （FCH 50cycles ）	FCH 50cycles
	S000365	SURFSeq 5000 Sequencing Kit V2.0 （FCH 100cycles ）	FCH 100cycles
	S000367	SURFSeq 5000 Sequencing Kit V2.0 （FCH 200cycles ）	FCH 200cycles
	S000369	SURFSeq 5000 Sequencing Kit V2.0 （FCH 300cycles ）	FCH 300cycles
	S000371	SURFSeq 5000 Sequencing Kit V2.0 （FCP 50cycles ）	FCP 50cycles
	S000373	SURFSeq 5000 Sequencing Kit V2.0 （FCP 100cycles ）	FCP 100cycles
	S000375	SURFSeq 5000 Sequencing Kit V2.0 （FCP 200cycles ）	FCP 200cycles
	S000377	SURFSeq 5000 Sequencing Kit V2.0 （FCP 300cycles ）	FCP 300cycles
	S000329	SURFSeq 5000 Dx Universal Reaction Kit for Sequencing	SURF FCM 100cycles
	S000330	SURFSeq 5000 Dx Universal Reaction Kit for Sequencing	SURF FCM 200cycles
	S000331	SURFSeq 5000 Dx Universal Reaction Kit for Sequencing	SURF FCM 300cycles
	S000270	SURFSeq 5000 Dx Universal Reaction Kit for Sequencing	SURF FCM 600cycles
	S000332	SURFSeq 5000 Dx Universal Reaction Kit for Sequencing	SURF FCH 50cycles
	S000333	SURFSeq 5000 Dx Universal Reaction Kit for Sequencing	SURF FCH 100cycles
	S000334	SURFSeq 5000 Dx Universal Reaction Kit for Sequencing	SURF FCH 200cycles
	S000335	SURFSeq 5000 Dx Universal Reaction Kit for Sequencing	SURF FCH 300cycles
	S000336	SURFSeq 5000 Dx Universal Reaction Kit for Sequencing	SURF FCP 50cycles
	S000337	SURFSeq 5000 Dx Universal Reaction Kit for Sequencing	SURF FCP 100cycles
	S000338	SURFSeq 5000 Dx Universal Reaction Kit for Sequencing	SURF FCP 200cycles
	S000339	SURFSeq 5000 Dx Universal Reaction Kit for Sequencing	SURF FCP 300cycles

Specification	
Dimensions	1090 mm×690 mm×810 mm
Weight	240 kg
Power	2000 VA
Power requirement	100 -240 V ~, 50/60 Hz
Operating environment	Temperature：19 ℃-25 ℃ Humidity：20%-80% relative humidity (no-condensing) Altitude：below 3000 meter
Computer	CPU：Intel Xeon Gold 6342 Memory：256 GB Hard Drive 1：2 TB SSD Hard Drive 2：17 TB HDD System：Windows10 x64

*Unless otherwise informed, GeneMind sequencing platform and related sequencing reagents are not available in the USA, Canada, Australia, Japan, Singapore, Western Europe and Nordic countries yet.

GeneMind Biosciences Co., Ltd.

Technical support hotline: **+86-400-822-3660**

Website: en.genemind.com   Email: info@genemind.com

Address: Room 502A/502B/602, Luohu Investment Holding Building, 112 Qingshuihe 1st Road, Luohu District, Shenzhen, Guangdong, China