J-Style Smart Rings Test Reports

Joint Chinese Ltd
GUANGDONG YOUHONG MEDICAL TECH CO., LTD

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J-Style Testing Model:

J-Style Smart Ring 2301A (J-Style Own Algorithm)

J-Style Smart Ring 2301F (Philip Algorithm)

Part-1 Heart Rate Performance Test

(Rest & Exercise HR)
J-Style Smart Ring VS Polar H10 Chest Strap

Rest Heart Rate Test

J-Style Smart Ring （Model#2301)

VS

Polar H10

Test environment:

based on Normal Rest/Woring State

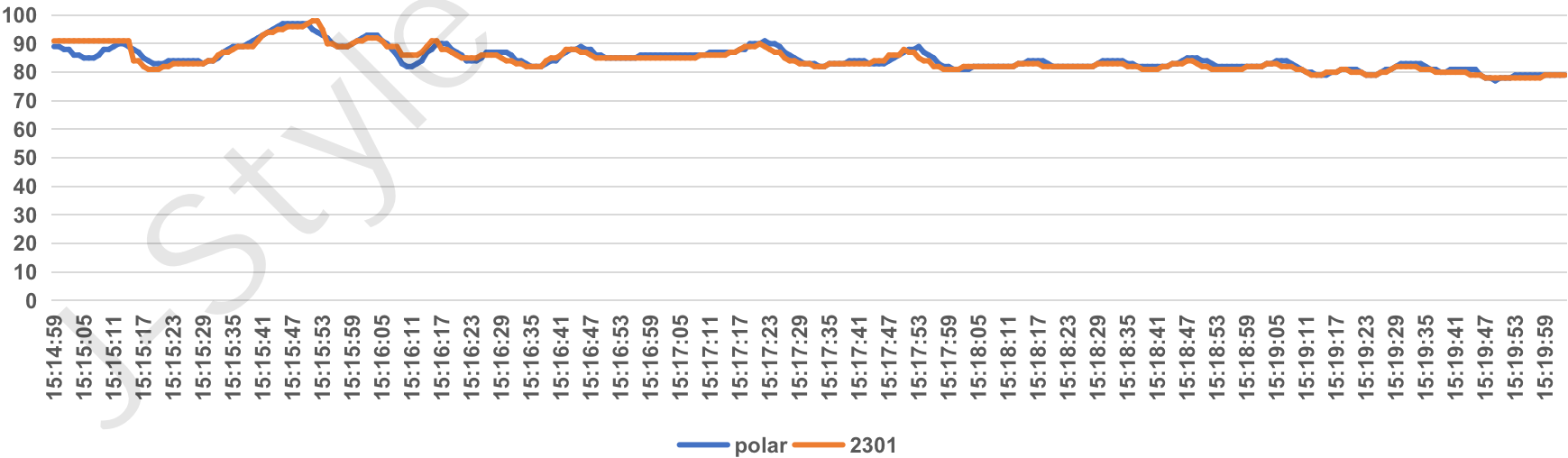**Number of test participants:**

10 people

Comparison equipment:

Polar H10 heart rate chest strap

Samples	Tester-1	Tester-2	Tester-3	Tester-4	Tester-5	Tester-6	Tester-7	Tester-8	Tester-9	Tester-10	Avg.
Avg. Variance	0.63	1.22	0.69	1.01	1.21	1.37	0.55	0.74	1.45	1.58	1.045
Percentage within variance 1	93.94%	72.73%	88.56%	79.34%	73.30%	65.47%	96.10%	88.31%	72.85%	69.54%	80.01%
Within variance 2	95.45%	90.15%	94.44%	90.82%	88.29%	83.09%	99.57%	99.13%	86.0%9	83.11%	82.41%
Within 3	97.35%	94.32%	97.06%	96.39%	94.15%	90.65%	100.00%	100.00%	90.04%	90.07%	95.00%
Within 5	98.86%	98.10%	100.00%	98.86%	96.21%	98.10%	100.00%	100.00%	92.80%	92.40%	97.53%
Within 10	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Static HR Test

Exercise Heart Rate Test

J-Style Smart Ring （Model#2301)

VS

Polar H10

Test environment: based on treadmill running

**Number of test participants:** 10 people

Comparison equipment: Polar H10 heart rate chest strap

Samples	Tester-1	Tester-2	Tester-3	Tester-4	Tester-5	Tester-6	Tester-7	Tester-8	Tester-9	Tester-10	Avg.
Avg. Variance	1.45	0.69	1.02	0.94	1.17	1.25	1.26	1.12	1.55	1.30	1.17
Percentage within variance 1	74.07%	89.42%	77.43%	81.14%	81.23%	69.85%	74.73%	73.13%	59.74%	64.97%	74.57%
Within variance 2	86.51%	99.21%	92.29%	96.29%	93.23%	85.54%	90.69%	89.20%	78.97%	86.90%	89.88%
Within 3	90.21%	100.00%	96.57%	98.57%	95.08%	93.85%	94.41%	96.40%	89.49%	94.92%	94.95%
Within 5	93.65%	100.00%	99.71%	100.00%	95.08%	97.85%	96.81%	99.47%	96.67%	99.47%	97.87%
Within 10	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Dynamic HR Test

polar — 2301
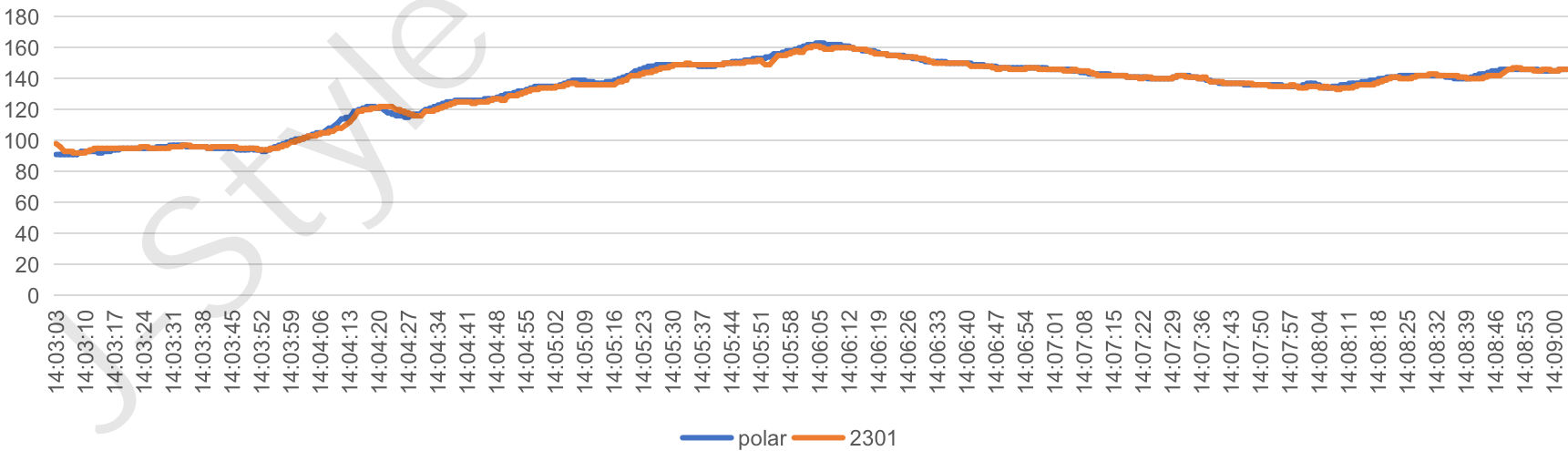
Part-2 SpO2 Performance Test

(normoxia & hypoxia test)
J-Style Smart Ring VS Masimo Oxygen Generator

SpO2 Test (normoxia test)

J-Style Smart Ring （Model#2301）
VS
Masimo Oxygen Generator

Test environment: based on Normal rest/working status

Comparison equipment: Masimo Oxygen Generator

Reference standard:

Refer to "YY 0784-2010 Medical Electrical Equipment Medical Pulse Oximeter Equipment Basic Safety and Main Performance Requirements" in 50.101 on the accuracy of oxygen saturation, the accuracy of oxygen saturation is the root mean square of a difference, and in the range of 70% ~ 100% is less than or equal to 4.0% SpO2 value.

Test Result:

Total number of tests	MAE<=4	RMSE<=4	RMSE<=6	RMSE<=9
78	89.74%	89.74%	97.44%	97.44%

No.	Hand Wearing Position	MAE	RMSE	Percentage Within 3	Within 6	Within 9	Bluetooth Packet Loss Rate	Last SpO2 value of 2301 Ring	Last SpO2 value of Masimo Machine	Difference
1	Left	2.3	2.48	97.04%	100.00%	100.00%	0.00%	97	96	1
2	Right	1.31	1.54	100.00%	100.00%	100.00%	0.00%	96	96	0
3	Left	0.59	0.77	100.00%	100.00%	100.00%	1.30%	94	95	1
4	Right	0.57	0.75	100.00%	100.00%	100.00%	0.00%	95	96	1
5	Left	0.59	0.77	100.00%	100.00%	100.00%	0.00%	95	96	1
6	Left	1.97	1.98	100.00%	100.00%	100.00%	4.14%	97	95	2
7	Left	1.61	1.71	100.00%	100.00%	100.00%	0.24%	98	96	2
8	Right	0.62	0.79	100.00%	100.00%	100.00%	0.00%	97	97	0
9	Left	1.53	1.61	100.00%	100.00%	100.00%	0.00%	97	96	1
10	Right	1	1.11	100.00%	100.00%	100.00%	0.00%	95	96	1
11	Left	1.85	2.72	81.26%	97.83%	100.00%	0.29%	96	96	0
12	Right	0.62	0.79	100.00%	100.00%	100.00%	0.48%	97	96	1
13	Left	0.3	0.55	100.00%	100.00%	100.00%	0.00%	97	97	0
14	Right	0.82	0.9	100.00%	100.00%	100.00%	0.33%	97	96	1
15	Left	0.81	0.9	100.00%	100.00%	100.00%	0.28%	97	97	0
16	Right	0.3	0.55	100.00%	100.00%	100.00%	0.00%	97	97	0
17	Right	4.18	4.68	53.30%	74.97%	100.00%	0.00%	89	97	8
18	Left	5.57	5.95	21.15%	70.39%	98.59%	0.36%	91	96	5
19	Right	9.39	9.49	0.00%	3.71%	40.47%	0.00%	91	96	5
20	Left	2.41	3.45	69.16%	95.06%	100.00%	0.00%	96	96	0
21	Right	1.05	1.2	100.00%	100.00%	100.00%	0.27%	94	96	2
22	Left	5.04	5.76	37.88%	72.25%	89.44%	0.00%	87	98	11
23	Right	0.92	1.06	100.00%	100.00%	100.00%	0.00%	97	98	1
24	Left	1.65	1.81	100.00%	100.00%	100.00%	0.00%	96	97	1
25	Right	1.03	1.35	100.00%	100.00%	100.00%	0.35%	97	97	0
26	Left	1.87	2.25	89.61%	100.00%	100.00%	2.36%	95	98	3
27	Left	1.13	1.71	92.86%	100.00%	100.00%	0.33%	95	95	0
28	Right	0.9	0.95	100.00%	100.00%	100.00%	0.00%	95	96	1
29	Left	0.8	0.89	100.00%	100.00%	100.00%	0.31%	95	96	1
30	Right	0.44	0.66	100.00%	100.00%	100.00%	0.33%	95	96	1
31	Left	0.25	0.5	100.00%	100.00%	100.00%	0.00%	95	95	0
32	Left	1.19	1.35	100.00%	100.00%	100.00%	0.33%	95	96	1
33	Right	1.26	1.38	100.00%	100.00%	100.00%	0.99%	95	96	1
34	Left	0.6	0.78	100.00%	100.00%	100.00%	1.22%	96	96	0
35	Right	1.38	1.5	100.00%	100.00%	100.00%	0.37%	95	97	2
36	Left	2.3	2.48	97.04%	100.00%	100.00%	0.00%	97	96	1
37	Right	1.31	1.54	100.00%	100.00%	100.00%	0.00%	96	96	0
38	Left	0.59	0.77	100.00%	100.00%	100.00%	1.30%	94	95	1
39	Right	0.57	0.75	100.00%	100.00%	100.00%	0.00%	95	96	1
40	Left	0.59	0.77	100.00%	100.00%	100.00%	0.00%	95	96	1

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J-STYLE Joint Chinese Ltd

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SpO2 Test (normoxia test)

J-Style Smart Ring （Model#2301)
VS
Masimo Oxygen Generator

Test environment: based on Normal rest/working status

Comparison equipment: Masimo

Reference standard:

Refer to "YY 0784-2010 Medical Electrical Equipment Medical Pulse Oximeter Equipment Basic Safety and Main Performance Requirements" in 50.101 on the accuracy of oxygen saturation, the accuracy of oxygen saturation is the root mean square of a difference, and in the range of 70% ~ 100% is less than or equal to 4.0% SpO2 value.

Test Result:

Total number of tests	MAE<=4	RMSE<=4	RMSE<=6	RMSE<=9
78	89.74%	89.74%	97.44%	97.44%

No.	Hand Wearing Position	MAE	RMSE	Percentage Within 3	Within 6	Within 9	Bluetooth Packet Loss Rate	Last SpO2 value of 2301 Ring	Last SpO2 value of Masimo Machine	Difference
41	Left	1.97	1.98	100.00%	100.00%	100.00%	4.14%	97	95	2
42	Left	4.41	4.66	26.84%	88.32%	100.00%	1.84%	92	96	4
43	Right	1.02	1.26	100.00%	100.00%	100.00%	4.31%	96	96	0
44	Left	0.37	0.61	100.00%	100.00%	100.00%	0.00%	96	96	0
45	Right	1.61	1.71	100.00%	100.00%	100.00%	0.24%	98	96	2
46	Left	0.62	0.79	100.00%	100.00%	100.00%	0.00%	97	97	0
47	Right	1.53	1.61	100.00%	100.00%	100.00%	0.00%	97	96	1
48	Left	1	1.11	100.00%	100.00%	100.00%	0.00%	95	96	1
49	Right	1.85	2.72	81.26%	97.83%	100.00%	0.29%	96	96	0
50	Left	0.62	0.79	100.00%	100.00%	100.00%	0.48%	97	96	1
51	Right	0.3	0.55	100.00%	100.00%	100.00%	0.00%	97	97	0
52	Left	0.82	0.9	100.00%	100.00%	100.00%	0.33%	97	96	1
53	Right	0.81	0.9	100.00%	100.00%	100.00%	0.28%	97	97	0
54	Left	0.3	0.55	100.00%	100.00%	100.00%	0.00%	97	97	0
55	Right	1.65	1.71	100.00%	100.00%	100.00%	0.00%	98	96	2
56	Left	2	2	100.00%	100.00%	100.00%	0.00%	98	96	2
57	Right	1	1	100.00%	100.00%	100.00%	0.00%	97	96	1
58	Left	1.01	1.01	100.00%	100.00%	100.00%	0.00%	97	96	1
59	Right	0	0	100.00%	100.00%	100.00%	0.00%	97	97	0
60	Right	0.12	0.35	100.00%	100.00%	100.00%	0.27%	97	97	0
61	Left	0.76	0.87	100.00%	100.00%	100.00%	0.00%	97	96	1
62	Right	0.73	0.86	100.00%	100.00%	100.00%	0.00%	97	97	0
63	Left	0.52	0.72	100.00%	100.00%	100.00%	0.00%	97	97	0
64	Right	1.06	1.19	100.00%	100.00%	100.00%	0.00%	97	98	1
65	Right	4.18	4.68	53.30%	74.97%	100.00%	0.00%	89	97	8
66	Left	9.39	9.49	0.00%	3.71%	40.47%	0.00%	91	96	5
67	Right	2.41	3.45	69.16%	95.06%	100.00%	0.00%	96	96	0
68	Left	0.92	1.06	100.00%	100.00%	100.00%	0.00%	97	98	1
69	Right	1.65	1.81	100.00%	100.00%	100.00%	0.00%	96	97	1
70	Left	1.03	1.35	100.00%	100.00%	100.00%	0.35%	97	97	0
71	Right	1.87	2.25	89.61%	100.00%	100.00%	2.36%	95	98	3
72	Left	1.42	1.62	100.00%	100.00%	100.00%	0.00%	96	96	0
73	Right	4.02	4.1	27.14%	100.00%	100.00%	0.00%	94	98	4
74	Left	2.4	2.53	93.24%	100.00%	100.00%	0.00%	96	98	2
75	Right	2.9	3.16	78.65%	100.00%	100.00%	0.00%	92	97	5
76	Right	0.9	0.95	100.00%	100.00%	100.00%	0.00%	95	96	1
77	Left	2.1	0	100.00%	100.00%	100.00%	0.00%	98	95	3
78	Right	0.66	0.94	100.00%	100.00%	100.00%	0.33%	96	96	0

友宏医疗 YOUHONG MEDICAL

J-STYLE Joint Chinese Ltd

SpO2 Test (normoxia test)

J-Style Smart Ring （Model#2301）
VS
Masimo Oxygen Generator

Test environment: based on Normal rest/working status

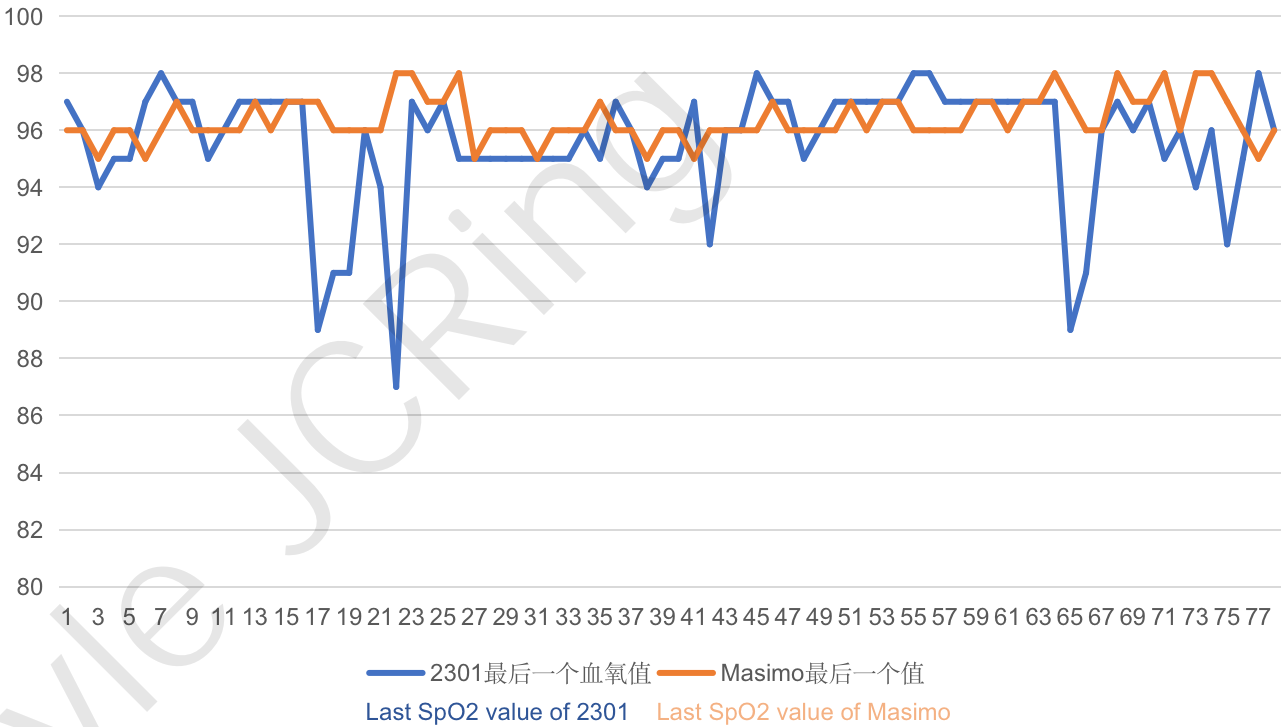**Comparison equipment:** Masimo

Reference standard:

Refer to "YY 0784-2010 Medical Electrical Equipment Medical Pulse Oximeter Equipment Basic Safety and Main Performance Requirements" in 50.101 on the accuracy of oxygen saturation, the accuracy of oxygen saturation is the root mean square of a difference, and in the range of 70% ~ 100% is less than or equal to 4.0% SpO2 value.

Test Result:

Total number of tests	MAE<=4	RMSE<=4	RMSE<=6	RMSE<=9
78	89.74%	89.74%	97.44%	97.44%

Normoxia Test

Legend: — 2301最后一个血氧值 — Masimo最后一个值
Last SpO2 value of 2301   Last SpO2 value of Masimo

Note: Several of the low values appearing in the curve are associated with rotation occurring while wearing.

SpO2 Test (hypoxia test)

J-Style Smart Ring （Model#2301)
VS
Masimo Oxygen Generator

Test environment: Based on simulated plateau hypoxia generator

Comparison equipment:

Masimo

Reference standard:

Refer to "YY 0784-2010 Medical Electric Equipment Medical Pulse Oximeter Equipment Basic Safety and Main Performance Requirements" in 50.101 on the accuracy of oxygen saturation, the accuracy of oxygen saturation is the root mean square of a difference, and in the range of 70% ~ 100% is less than or equal to 4.0% SpO2 value.

Test Result:

Total number of tests	MAE<=4	RMSE<=4	RMSE<=6	RMSE<=9
121	90.91%	85.12%	98.35%	100.00%

No.	Hand Wearing Position	MAE	RMSE	Percentage Within 3	Within 6	Within 9	Bluetooth Packet Loss Rate	Last SpO2 value of 2301 Ring	Last SpO2 value of Masimo Machine	Difference
1	Left	2.72	2.9	70.72%	100.00%	100.00%	0.25%	90	94	4
2	Right	3.6	4.05	34.13%	100.00%	100.00%	0.34%	90	95	5
3	Right	3.56	4.02	50.55%	96.72%	100.00%	0.00%	88	95	7
4	Left	3.05	3.33	63.97%	100.00%	100.00%	4.89%	89	91	2
5	Right	2.35	2.94	69.93%	100.00%	100.00%	0.00%	76	81	5
6	Left	2.3	3.08	70.55%	93.80%	100.00%	0.37%	81	81	0
7	Right	2.69	2.88	79.97%	100.00%	100.00%	0.35%	83	79	4
8	Left	4.15	4.55	37.36%	85.76%	100.00%	0.00%	86	79	7
9	Right	3.68	4.37	53.73%	81.95%	100.00%	0.00%	86	84	2
10	Left	1.25	1.47	100.00%	100.00%	100.00%	0.00%	88	91	3
11	Right	1.15	1.45	100.00%	100.00%	100.00%	0.33%	87	88	1
12	Left	2.25	2.81	77.43%	100.00%	100.00%	0.37%	82	86	4
13	Right	1.33	1.53	100.00%	100.00%	100.00%	0.00%	82	84	2
14	Left	2.37	2.85	73.61%	100.00%	100.00%	0.00%	85	83	2
15	Right	2.69	2.77	88.82%	100.00%	100.00%	0.33%	97	94	3
16	Left	3.35	3.41	58.19%	100.00%	100.00%	0.00%	97	93	4
17	Right	2.47	2.53	98.76%	100.00%	100.00%	0.33%	95	93	2
18	Right	0.47	0.69	100.00%	100.00%	100.00%	0.00%	92	93	1
19	Left	2	2.09	100.00%	100.00%	100.00%	0.00%	92	94	2
20	Left	2.48	2.99	76.21%	98.41%	100.00%	0.00%	83	84	1
21	Right	5.39	5.83	16.80%	65.55%	100.00%	0.37%	75	83	8
22	Left	2.41	2.7	76.69%	100.00%	100.00%	0.37%	78	82	4
23	Right	2.59	3.29	78.04%	91.89%	100.00%	0.34%	80	80	0
24	Left	2.27	2.45	87.87%	100.00%	100.00%	0.35%	77	79	2
25	Left	0.53	0.74	100.00%	100.00%	100.00%	0.67%	85	85	0
26	Right	0.71	0.99	100.00%	100.00%	100.00%	1.03%	82	84	2
27	Left	0.73	0.88	100.00%	100.00%	100.00%	0.00%	82	82	0
28	Right	1.04	1.32	100.00%	100.00%	100.00%	0.00%	81	81	0
29	Left	0.76	1.04	100.00%	100.00%	100.00%	0.00%	80	80	0
30	Right	1.98	2	100.00%	100.00%	100.00%	0.35%	92	90	2
31	Left	1.43	1.66	100.00%	100.00%	100.00%	0.00%	91	88	3
32	Right	1.43	1.53	100.00%	100.00%	100.00%	0.74%	90	88	2
33	Left	1.17	1.31	100.00%	100.00%	100.00%	0.00%	89	87	2
34	Right	1.35	1.71	94.03%	100.00%	100.00%	0.36%	88	85	3
35	Left	1.67	1.78	100.00%	100.00%	100.00%	0.00%	94	92	2
36	Right	1.79	1.97	100.00%	100.00%	100.00%	0.10%	93	92	1
37	Left	1.07	1.11	100.00%	100.00%	100.00%	0.00%	94	93	1
38	Right	1.03	1.21	100.00%	100.00%	100.00%	0.00%	94	92	2
39	Left	1.88	1.91	100.00%	100.00%	100.00%	0.38%	94	92	2
40	Left	1.86	2.36	84.51%	100.00%	100.00%	0.00%	84	83	1

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SpO2 Test (hypoxia test)

J-Style Smart Ring （Model#2301)
VS
Masimo Oxygen Generator

Test environment: Based on simulated plateau hypoxia generator

Comparison equipment:

Masimo

Reference standard:

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Test Result:

Total number of tests	MAE<=4	RMSE<=4	RMSE<=6	RMSE<=9
121	90.91%	85.12%	98.35%	100.00%

No.	Hand Wearing Position	MAE	RMSE	Percentage Within 3	Within 6	Within 9	Bluetooth Packet Loss Rate	Last SpO2 value of 2301 Ring	Last SpO2 value of Masimo Machine	Difference
41	Right	3.19	3.55	53.13%	98.59%	100.00%	0.00%	84	81	3
42	Left	4.65	5.21	37.82%	80.21%	100.00%	0.00%	85	79	6
43	Right	6.74	7.65	22.19%	45.83%	77.75%	0.00%	80	77	3
44	Left	2.38	2.91	70.30%	99.01%	100.00%	1.17%	85	80	5
45	Right	2.11	2.57	82.26%	100.00%	100.00%	0.62%	90	86	4
46	Left	1.93	2.35	89.19%	100.00%	100.00%	0.00%	88	88	0
47	Right	2.18	2.38	94.48%	100.00%	100.00%	0.00%	89	90	1
48	Left	2.42	2.64	80.96%	100.00%	100.00%	0.00%	86	90	4
49	Right	1.62	1.92	97.07%	100.00%	100.00%	0.35%	91	90	1
50	Left	2.35	2.99	77.00%	100.00%	100.00%	0.00%	90	90	0
51	Right	2.98	3.29	63.92%	100.00%	100.00%	0.00%	85	91	6
52	Left	2.22	2.51	83.76%	100.00%	100.00%	0.00%	89	92	3
53	Right	4.2	4.55	34.78%	91.59%	100.00%	0.00%	92	93	1
54	Left	2.72	2.9	70.72%	100.00%	100.00%	0.25%	90	94	4
55	Right	3.6	4.05	34.13%	100.00%	100.00%	0.34%	90	95	5
56	Left	3.56	4.02	50.55%	96.72%	100.00%	0.00%	88	95	7
57	Right	3.05	3.33	63.97%	100.00%	100.00%	4.89%	89	91	2
58	Left	1.26	1.56	100.00%	100.00%	100.00%	0.00%	93	94	1
59	Right	2.54	2.93	71.81%	100.00%	100.00%	0.00%	90	95	5
60	Left	3.87	4.35	32.68%	100.00%	100.00%	0.00%	89	95	6
61	Right	1.38	1.93	93.19%	100.00%	100.00%	0.00%	91	91	0
62	Left	2.35	2.94	69.93%	100.00%	100.00%	0.00%	76	81	5
63	Right	2.3	3.08	70.55%	93.80%	100.00%	0.37%	81	81	0
64	Left	2.69	2.88	79.97%	100.00%	100.00%	0.35%	83	79	4
65	Right	4.15	4.55	37.36%	85.76%	100.00%	0.00%	86	79	7
66	Left	3.68	4.37	53.73%	81.95%	100.00%	0.00%	86	84	2
67	Right	1.15	1.42	100.00%	100.00%	100.00%	0.00%	81	82	1
68	Left	1.05	1.32	100.00%	100.00%	100.00%	0.00%	81	79	2
69	Right	0.39	0.63	100.00%	100.00%	100.00%	0.00%	80	79	1
70	Left	0.39	0.64	100.00%	100.00%	100.00%	0.00%	79	79	0
71	Left	1.25	1.47	100.00%	100.00%	100.00%	0.00%	88	91	3
72	Right	1.15	1.45	100.00%	100.00%	100.00%	0.33%	87	88	1
73	Left	2.25	2.81	77.43%	100.00%	100.00%	0.37%	82	86	4
74	Right	1.33	1.53	100.00%	100.00%	100.00%	0.00%	82	84	2
75	Left	2.37	2.85	73.61%	100.00%	100.00%	0.00%	85	83	2
76	Right	1.16	1.32	100.00%	100.00%	100.00%	0.00%	91	91	0
77	Left	1.11	1.21	100.00%	100.00%	100.00%	0.00%	89	88	1
78	Right	1.52	1.64	100.00%	100.00%	100.00%	0.34%	87	86	1
79	Left	2.69	2.77	88.82%	100.00%	100.00%	0.33%	97	94	3
80	Right	1.45	1.9	96.21%	100.00%	100.00%	0.00%	83	83	0

SpO2 Test (hypoxia test)

J-Style Smart Ring （Model#2301)
VS
Masimo Oxygen Generator

Test environment: Based on simulated plateau hypoxia generator

**Comparison equipment:**

Masimo

Reference standard:

Refer to "YY 0784-2010 Medical Electrical Equipment Medical Pulse Oximeter Equipment Basic Safety and Main Performance Requirements" in 50.101 on the accuracy of oxygen saturation, the accuracy of oxygen saturation is the root mean square of a difference, and in the range of 70% ~ 100% is less than or equal to 4.0% SpO2 value.

Test Result:

Total number of tests	MAE<=4	RMSE<=4	RMSE<=6	RMSE<=9
121	90.91%	85.12%	98.35%	100.00%

No.	Hand Wearing Position	MAE	RMSE	Percentage Within 3	Within 6	Within 9	Bluetooth Packet Loss Rate	Last SpO2 value of 2301 Ring	Last SpO2 value of Masimo Machine	Difference
81	Left	3.35	3.41	58.19%	100.00%	100.00%	0.00%	97	93	4
82	Right	2.47	2.53	98.76%	100.00%	100.00%	0.33%	95	93	2
83	Left	0.47	0.69	100.00%	100.00%	100.00%	0.00%	92	93	1
84	Right	2	2.09	100.00%	100.00%	100.00%	0.00%	92	94	2
85	Left	2.49	2.54	100.00%	100.00%	100.00%	0.31%	96	94	2
86	Right	2.53	2.65	87.42%	100.00%	100.00%	0.00%	97	94	3
87	Left	2.63	2.67	100.00%	100.00%	100.00%	0.00%	96	93	3
88	Right	2.43	2.48	100.00%	100.00%	100.00%	0.32%	95	93	2
89	Left	1.32	1.4	100.00%	100.00%	100.00%	0.00%	95	94	1
90	Left	2.48	2.99	76.21%	98.41%	100.00%	0.00%	83	84	1
91	Right	5.39	5.83	16.80%	65.55%	100.00%	0.37%	75	83	8
92	Left	2.41	2.7	76.69%	100.00%	100.00%	0.37%	78	82	4
93	Right	2.59	3.29	78.04%	91.89%	100.00%	0.34%	80	80	0
94	Left	2.27	2.45	87.87%	100.00%	100.00%	0.35%	77	79	2
95	Right	0.75	0.88	100.00%	100.00%	100.00%	0.00%	85	84	1
96	Left	2.54	2.68	88.81%	100.00%	100.00%	0.00%	85	83	2
97	Right	1.01	1.35	100.00%	100.00%	100.00%	0.00%	86	86	0
98	Left	1.87	2.49	73.73%	100.00%	100.00%	0.00%	86	89	3
99	Right	2.59	2.84	81.11%	100.00%	100.00%	0.00%	86	85	1
100	Left	4.34	4.56	25.35%	91.10%	100.00%	0.00%	86	90	4
101	Right	0.71	0.99	100.00%	100.00%	100.00%	1.03%	82	84	2
102	Left	0.76	1.04	100.00%	100.00%	100.00%	0.00%	80	80	0
103	Right	1.78	2	100.00%	100.00%	100.00%	0.00%	83	84	1
104	Left	1.04	1.26	100.00%	100.00%	100.00%	0.00%	80	81	1
105	Right	1.09	1.33	100.00%	100.00%	100.00%	0.38%	81	80	1
106	Left	1.17	1.31	100.00%	100.00%	100.00%	0.00%	89	87	2
107	Right	1.35	1.71	94.03%	100.00%	100.00%	0.36%	88	85	3
108	Left	0.64	0.85	100.00%	100.00%	100.00%	0.00%	90	88	2
109	Right	1.67	1.78	100.00%	100.00%	100.00%	0.00%	94	92	2
110	Left	1.79	1.97	100.00%	100.00%	100.00%	0.10%	93	92	1
111	Right	1.03	1.21	100.00%	100.00%	100.00%	0.00%	94	92	2
112	Left	0.65	0.89	100.00%	100.00%	100.00%	0.00%	93	92	1
113	Right	1.56	1.67	100.00%	100.00%	100.00%	0.00%	93	92	1
114	Left	1.48	1.63	100.00%	100.00%	100.00%	0.00%	92	92	0
115	Right	1.86	2.36	84.51%	100.00%	100.00%	0.00%	84	83	1
116	Left	3.19	3.55	53.13%	98.59%	100.00%	0.00%	84	81	3
117	Right	4.65	5.21	37.82%	80.21%	100.00%	0.00%	85	79	6
118	Left	6.74	7.65	22.19%	45.83%	77.75%	0.00%	80	77	3
119	Right	2.69	3.04	70.78%	100.00%	100.00%	0.00%	85	86	1
120	Left	4.44	4.78	26.83%	89.02%	97.56%	0.25%	87	91	4
121	Left	2.1	0	100.00%	100.00%	100.00%	0.00%	98	95	3

SpO2 Test (hypoxia test)

J-Style Smart Ring （Model#2301)
VS
Masimo Oxygen Generator

Test environment: Based on simulated plateau hypoxia generator

Comparison equipment:

Masimo

Reference standard:

Refer to "YY 0784-2010 Medical Electrical Equipment Medical Pulse Oximeter Equipment Basic Safety and Main Performance Requirements" in 50.101 on the accuracy of oxygen saturation, the accuracy of oxygen saturation is the root mean square of a difference, and in the range of 70% ~ 100% is less than or equal to 4.0% SpO2 value.

Test Result:

Total number of tests	MAE<=4	RMSE<=4	RMSE<=6	RMSE<=9
121	90.91%	85.12%	98.35%	100.00%

Hypoxia Test

2301最后一个血氧值 ——— Masimo最后一个值
Last SpO2 value of 2301 Last SpO2 value of Masimo
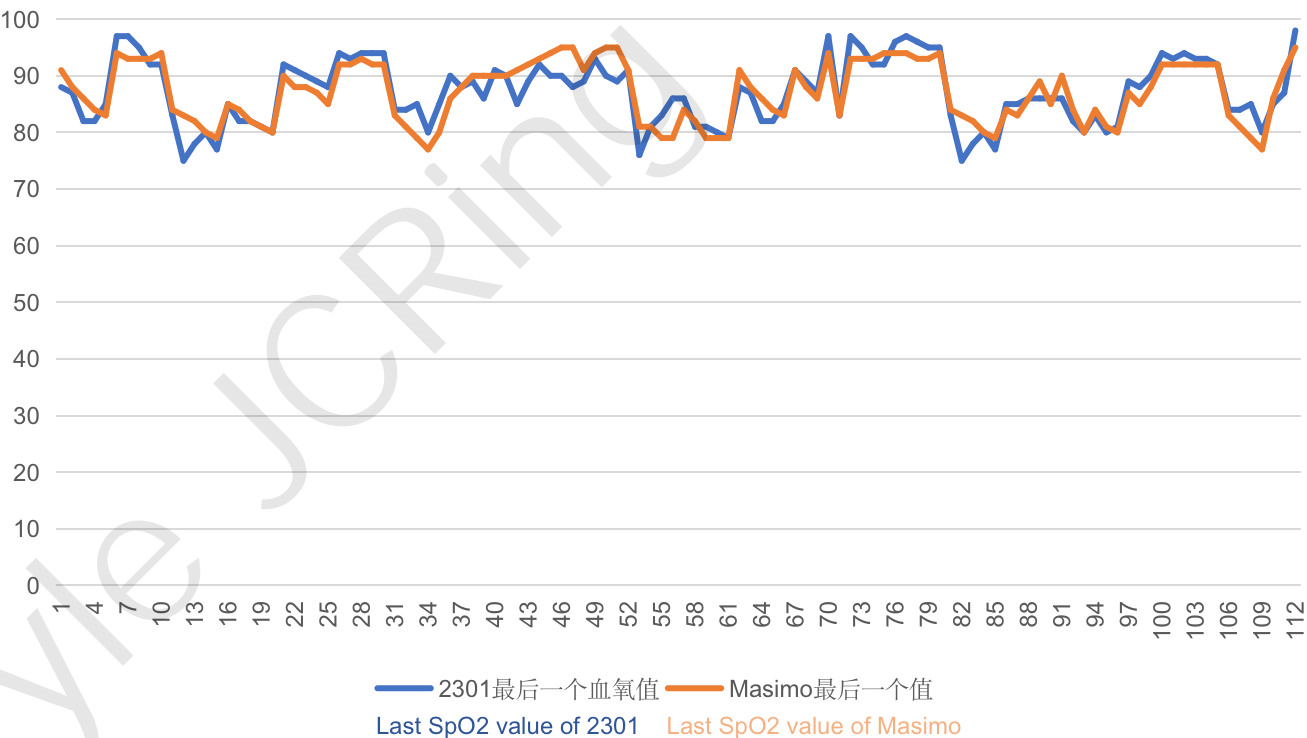
Part-3 Sleep Comparison Test

Comparison Devices: J-Style Smart Ring VS Oura Ring, Huawei GT3, Apple Watch

Sleep Test

Test time: 8/26~9/2

Test environment: based on daily night sleep

Comparison device:
J-Style Smart Rings (Model 2301A & 2301F)
 VS
Oura Ring, Huawei GT3, Apple Watch

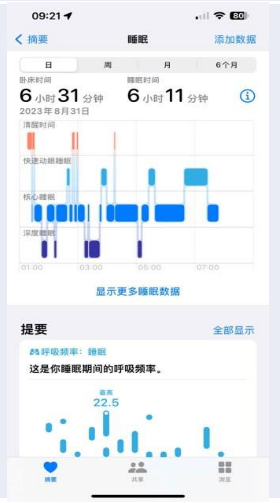| Date	Aug. 26th	Aug. 27th	Aug. 28th	Aug. 30th	Aug. 31st	Sep. 1st	Sep. 2nd
Tester	Tester-1	Tester-1	Tester-1	Tester-1	Tester-2	Tester-2	Tester-2
Actual sleep start time	1:50	1:00	22:30	1:30	1:30	2:00	1:10
Oura	1:56	0:54	22:47	1:31	1:17	1:56	1:08
2301A (J-Style sleep algo)	1:57	0:58	23:03	1:45	2:50	1:55	1:08
2301F (Philips sleep algo)	1:49	0:54	22:29	1:27	0:21	1:48	23:47
Huawei GT3	1:53	0:57	23:05	1:44	1:26	2:16	1:06
Apple Watch	1:56	0:54	23:03	1:41	1:27	1:47	1:04
Actual sleep end time	10:30	9:53	7:30	7:40	7:40	7:45	8:30
Oura	10:40	9:47	7:30	7:45	7:47	7:50	8:40
2301A (J-Style sleep algo)	10:32	10:14	7:29	7:44	7:46	7:50	8:27
2301F (Philips sleep algo)	10:31	9:36	7:38	7:52	7:57	7:45	8:38
Huawei GT3	10:34	10:17	7:29	7:44	7:45	7:34	8:25
Apple Watch	10:41	9:48	7:25	7:46	7:48	7:51	8:40

Sleep Test

Data on Sep. 2nd

J-Style Smart Rings
(Model 2301A & 2301F)
 VS
Oura Ring, Huawei GT3,
Apple Watch

Actual sleep time: Sep. 2nd 01:10 ~ Sep. 2nd 08:30   Note: Lights out for bed from 01:10

Model	Oura ring	JCRing 2301A (J-Style algo)	JCRing 2301F (Philips algo)	HUAWEI GT3	Apple Watch
Worn Hand	Left Thumb	Right Ring Finger	Left Ring Finger	Right Wrist	Left Wrist
Sleep Start	1:08	1:08	23:47	1:06	1:04
Sleep End	8:40	8:27	8:38	8:25	8:40
Total Time Asleep	7:17	6:01	7:13	7:19	7:34
Total Sleep Duration	7:32	7:19	8:51	/	7:36
Sleep Latency	15	4	40	/	/
Sleep Effeciency	97	82	82	/	100
Sleep Score	78	76	76	82	/
Awake	0:15	0:43	1:38	0:00	0:02
REM	1:39	1:01	0:09	1:53	1:31
Light Sleep	4:10	3:25	5:01	3:27	3:54
Deep Sleep	1:29	1:35	2:03	1:59	1:00
Avg Spo2	97%	95%	95%	/	/
Avg HRV	30ms	78ms	57ms	/	/
Avg HR	63	56	70	/	/
Temperature change	/	/	/	/	-0.12
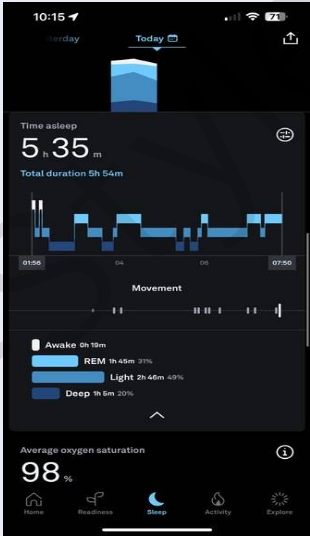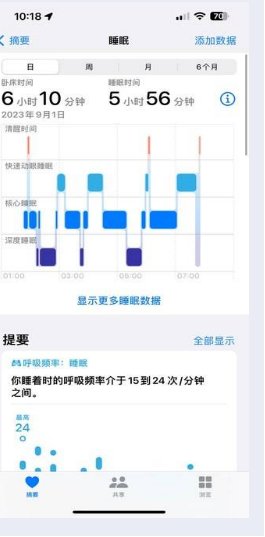
APP screenshots
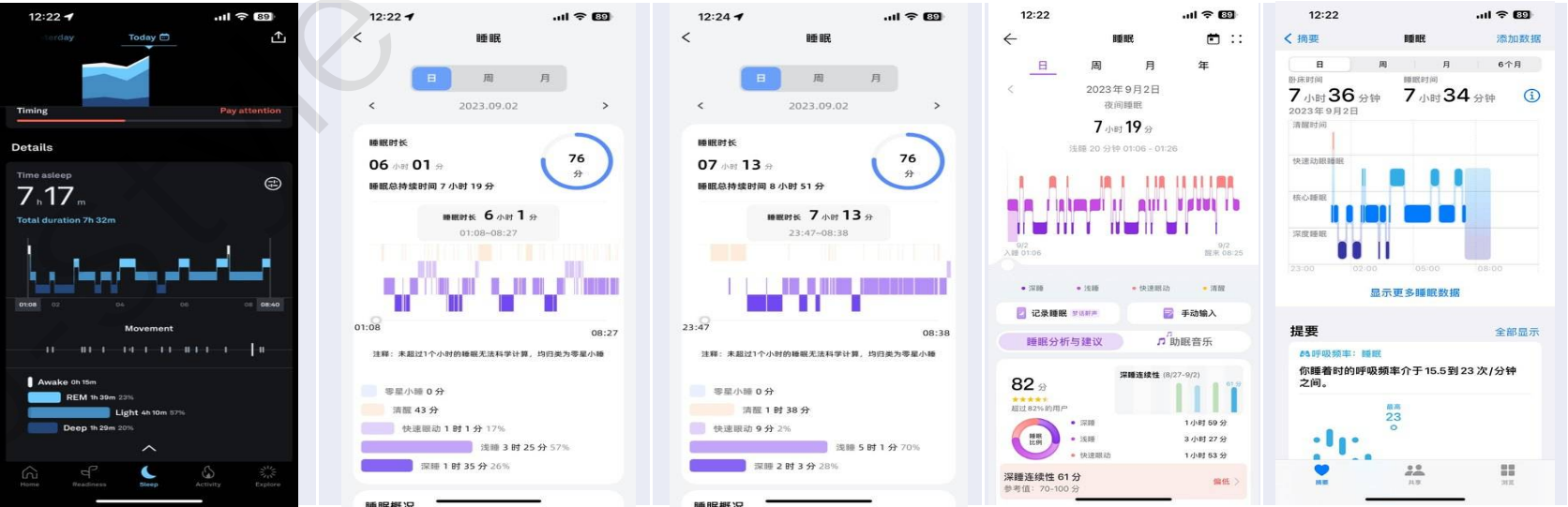
Sleep Test

Data on Sep. 1st

J-Style Smart Rings (Model 2301A & 2301F)
 VS
Oura Ring, Huawei GT3, Apple Watch

	Actual sleep time: Sep. 1st 02:00 ~ Sep. 1st 07:45			Note: Lights out for bed from 02:00	
Model	**Oura ring**	**JCRing 2301A (J-Style algo)**	**JCRing 2301F (Philips algo)**	**HUAWEI GT3**	**Apple Watch**
Worn Hand	Left Thumb	Right Ring Finger	Left Ring Finger	Right Wrist	Left Wrist
Sleep Start	1:56	1:55	1:48	2:16	1:47
Sleep End	7:50	7:50	7:45	7:34	7:51
Total Time Asleep	5:35	4:49	5:36	5:17	5:56
Total Sleep Duration	5:54	5:55	5:57	/	6:10
Sleep Latency	4	5	0	/	/
Sleep Effeciency	95	81	94	/	96
Sleep Score	69	67	72	77	/
Awake	0:19	0:51	21	0:16	0:08
REM	1:45	1:24	1:32	1:04	1:33
Light Sleep	2:46	2:15	1:58	2:28	3:02
Deep Sleep	1:05	1:10	2:06	1:45	1:15
Avg Spo2	98%	95%	95%	/	/
Avg HRV	33ms	78ms	92ms	/	/
Avg HR	61	76	68	/	/
Temperature change	/	/	/	/	-0.13
APP screenshots					

Sleep Test

Data on Aug. 31st

J-Style Smart Rings
(Model 2301A & 2301F)
 VS
Oura Ring, Huawei GT3, Apple Watch

Model	Oura ring	JCRing 2301A (J-Style algo)	JCRing 2301F (Philips algo)	HUAWEI GT3	Apple Watch
Worn Hand	Left Thumb	Right Ring Finger	Left Ring Finger	Right Wrist	Left Wrist
Sleep Start	1:17	2:50	0:21	1:26	1:27
Sleep End	7:47	7:46	7:57	7:45	7:48
Total Time Asleep	5:54	4:21	7:08	6:03	6:12
Total Sleep Duration	6:30	4:56	7:36	/	6:23
Sleep Latency	3	3	5	/	/
Sleep Effeciency	91	88	94	/	97
Sleep Score	70	65	81	77	/
Awake	0:36	0:35	0:28	0:16	0:11
REM	1:00	0:53	0:01	1:07	1:17
Light Sleep	3:25	2:36	4:12	3:20	4:03
Deep Sleep	1:29	0:52	2:55	1:36	0:52
Avg Spo2	97%	97%	96%	/	/
Avg HRV	25ms	74ms	42ms	/	/
Avg HR	56	65	70	/	/
Temperature change	/	/	/	/	-0.14

APP screenshots

Sleep Test

Data on Aug. 30th

J-Style Smart Rings
(Model 2301A & 2301F)
 VS
Oura Ring, Huawei GT3,
Apple Watch

Actual sleep time: Aug. 30th 01:30 ~ Aug. 30th 07:40
Note: Lights out for bed from 01:30, took about half an hour to fall asleep

Model	Oura ring	JCRing 2301A (J-Style algo)	JCRing 2301F (Philips algo)	HUAWEI GT3	Apple Watch
Worn Hand	Left Thumb	Right Ring Finger	Left Ring Finger	Right Wrist	Left Wrist
Sleep Start	1:31	1:45	1:27	1:44	1:41
Sleep End	7:45	7:44	7:52	7:44	7:46
Total Time Asleep	5:48	5:17	6:01	5:57	5:51
Total Sleep Duration	6:15	5:59	6:25	/	6:30
Sleep Latency	3	5	12	/	/
Sleep Effeciency	93	88	94	/	90
Sleep Score	70	72	73	78	/
Awake	0:27	0:32	0:24	0:02	0:24
REM	1:29	0:41	0:11	1:08	1:13
Light Sleep	4:25	2:54	3:40	3:13	3:31
Deep Sleep	1:28	1:42	2:10	1:36	0:55
Avg Spo2	93%	96%	96%	/	/
Avg HRV	28ms	79ms	87	/	/
Avg HR	62	67	68	/	/
Temperature change	/	/	/	/	-0.13

Sleep Test

Data on Aug. 28th

J-Style Smart Rings
(Model 2301A & 2301F)
VS
Oura Ring, Huawei GT3,
Apple Watch

Actual sleep time: Aug. 27th 22:30 ~ Aug. 28th 07:30
Note: Lights out for bed from 22:30, took about half an hour to fall asleep

Model	Oura ring	JCRing 2301A (J-Style algo)	JCRing 2301F (Philips algo)	HUAWEI GT3	Apple Watch
Worn Hand	Left Thumb	Right Ring Finger	Left Ring Finger	Right Wrist	Left Wrist
Sleep Start	22:47	23:03	22:29	23:05	23:03
Sleep End	7:30	7:29	7:38	7:29	7:25
Total Time Asleep	7:45	8:09	9:09	8:22	7:58
Total Sleep Duration	8:43	8:26	9:09	/	8:55
Sleep Latency	17	3	0:00	/	/
Sleep Effeciency	89	97	100	/	89
Sleep Score	85	90	83	82	/
Awake	0:58	0:41	0:45	0:02	0:24
REM	1:53	1:58	1:12	2:19	1:43
Light Sleep	4:25	3:38	5:14	4:03	5:14
Deep Sleep	1:28	1:52	1:58	2:00	1:01
Avg Spo2	99%	97%	98%	/	/
Avg HRV	49ms	74ms	62ms	/	/
Avg HR	52	60	61	/	/
Temperature change	/	/	/	/	-0.12

Sleep Test

Data on Aug. 27th

J-Style Smart Rings
(Model 2301A & 2301F)
VS
Oura Ring, Huawei GT3,
Apple Watch

	Actual sleep time: Aug. 27th 01:00 ~ Aug. 27th 09:53				
Model	Oura ring	JCRing 2301A (J-Style algo)	JCRing 2301F (Philips algo)	HUAWEI GT3	Apple Watch
Worn Hand	Left Thumb	Right Ring Finger	Left Ring Finger	Right Wrist	Left Wrist
Sleep Start	0:54	0:58	0:54	0:57	0:54
Sleep End	9:47	10:14	9:36	10:17	9:48
Total Time Asleep	7:50	9:12	8:42	8:59	8:17
Total Sleep Duration	8:52	9:16	8:42	/	8:54
Sleep Latency	8	5	6	/	/
Sleep Effeciency	88	99	100	/	93
Sleep Score	75	73	77	77	/
Awake	1:03	0:52	0:22	0:21	0:37
REM	1:01	2:18	2:23	1:11	1:55
Light Sleep	4:40	4:32	3:51	5:02	5:14
Deep Sleep	2:09	1:30	2:06	2:46	0:59
Avg Spo2	98%	96%	97%	/	/
Avg HRV	41ms	72ms	75ms	/	/
Avg HR	52	59	59	/	/
Temperature change	/	/	/	/	-0.26

Sleep Test

Data on Aug. 26th

J-Style Smart Rings
(Model 2301A & 2301F)
VS
Oura Ring, Huawei GT3,
Apple Watch

		Actual sleep time: Aug. 26th 01:50 ~ Aug. 26th 10:30			
Model	**Oura ring**	**JCRing 2301A (J-Style algo)**	**JCRing 2301F (Philips algo)**	**HUAWEI GT3**	**Apple Watch**
Worn Hand	Left Thumb	Right Ring Finger	Left Ring Finger	Right Wrist	Left Wrist
Sleep Start	1:56	1:57	1:49	1:53	1:56
Sleep End	10:40	10:32	10:31	10:34	10:41
Total Time Asleep	7:40	8:35	8:42	8:41	7:55
Total Sleep Duration	8:44	8:35	8:42	/	8:45
Sleep Latency	5	5	10	/	/
Sleep Effeciency	88	100	100	/	90
Sleep Score	74	71	73	80	/
Awake	1:05	0:52	0:33	0:00	0:50
REM	1:42	2:12	0:00	2:38	1:49
Light Sleep	4:08	4:20	4:07	4:43	5:04
Deep Sleep	1:50	1:11	2:02	1:20	1:01
Avg Spo2	98%	97%	97%	/	/
Avg HRV	48ms	90ms	77ms	/	/
Avg HR	53	60	59	/	/
Temperature change	/	/	/	/	0.02

Part-4 Step Counting Test

Comparison Devices: J-Style Smart Ring VS Huawei GT3, Pedometer

Step Counting Test

Test environment: based on daily walking, brisk walking

Comparison device:
Huawei GT3, pedometer

J-Style Smart Rings
(Model 2301A)
 VS
Huawei GT3, J-Style
Pedometers

Step Data	JCRing 2301A	JCRing 2301A	HUAWEI GT3	J-Style Pedometer
Worn Hand	Right Ring Finger	Right Index Finger	Right Hand	Waist
Tester-1	2030	1848	2078	2100
Tester-2	1684	1549	1769	1776
Tester-3	3180	3062	2942	3267
Tester-4	2180	2122	2090	2248

Step Counting Test

Test environment: based on a laboratory analog vibration step simulator

Comparison device: vibration step simulator

Test standard: error of not less than 3%

    J-Style Smart Rings
(Model 2301A)
    VS
Vibration Step Simulator

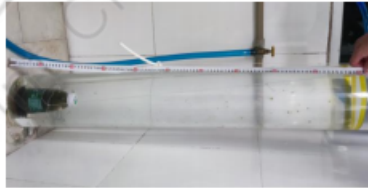| Stride Frequency (steps/minute	Exercise Time	Vibration Steps	JCRing 2301A	JCRing 2301A	#1 Error	#2 Error
90	2'13''	200	201	200	0.50%	0.00%
90	5'33''	500	501	500	0.20%	0.00%
90	11'06''	1000	1010	1009	1.00%	0.90%
120	1'40''	200	200	201	0.00%	0.50%
120	4'10''	500	501	501	0.20%	0.20%
120	8'20''	1000	1000	1000	0.00%	0.00%
150	1'20''	200	200	200	0.00%	0.00%
150	3'20''	500	501	505	0.20%	1.00%
150	6'40''	1000	1010	1009	1.00%	0.90%
180	1'06''	200	202	201	1.00%	0.50%
180	2'46''	500	503	501	0.60%	0.20%
180	5'33''	1000	1003	1005	0.30%	0.50%
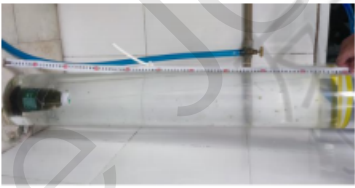
Part-5 Waterproof Test

IPX7 Waterproof

Test Criteria: GB/T 4208-2017

Test instruments: Air Tightness Tester, Water Tank

Test Results: pass

2. Test Condition:

Reference standard: GB/T4208-2017
Test equipment and test conditions: immersion tank. The size of the sample should be so that after the sample is put into the immersion tank, the distance from the bottom of the sample to the water surface is at least 1 m. The distance from the top of the sample to the water surface is at least 0.15m.
Test time: 30min

3. Judgment Criteria:

There shall be no water droplets inside the sample after the test, and the function is normal.

4. Test Instrument:

Instrument Name	Item	Calibration Date	Calibration Validity	Remark
Waterproof tester	/	/	/	/
Air Tightness Tester	DWJ-1021	2023/6/12	2024/6/11	/

5. Pictures:

1m water depth height measured by tape	prepare for alarm clock countdown	the countdown is over, test complete

before testing	after testing, connect app to test the function	

6. Test Result:

After testing, there was no significant change in appearance and normal function;
Upon visual inspection, no water ingress was found inside the sample.

7. Judgment:

The test is passed.

5ATM Waterproof

Test Criteria: ISO22810-2010

Test Results: pass (the test report is issued by a third-party laboratory)

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Test Result

No.	Test Item	Request of the Standard	Range of Test Result	Sample Quantity	Unqualified Quantity	Verdict
1	Water resistance test	1. Water resistance to overpressure Immerse the sample completely in a suitable container filled with water. Raise the pressure in the container in 1 min to a minimum overpressure of 5 bar. Hold it at this pressure for 10 min. Then, in 1 min, reduce the pressure back down to ambient pressure. 2. Water resistance at shallow depth Immerse the sample in water to a depth of 10 cm ±2 cm and keep it there for a minimum of 1 h. 3. Water resistance on exposure to thermal shocks Immerse the sample in water to a depth of 10 cm ±2 cm, successively: —in water at 40 °C for 5 min; —in water at 20 °C for 5 min; —in water at 40 °C for 5 min. The time taken to transfer from one immersion to another shall not exceed 1 min. *The function of test sample should be normal before and after the test.	Accord	1	0	Meet the Requirement

Part-6 Battery Life Test

Battery Life Test

Number of test samples: 6

Test Results: the test results show that the average daily power drop of the No. 12 ring (Li-ion battery capacity 20.5mAh) is about 10%.
Under normal use, its actual battery life is expected to reach more than 8 days.

2301A (size 12-20.5mAh) Power Observation Record Sheet

Date	2023/7/19（17:45）	2023/7/20（13:30）	2023/7/21（10:00）	2023/7/22（10:00）	2023/7/23（10:00）	2023/7/24（09:00）	2023/7/25（09:30）
Sample-1	100%	92%	81%	70%	60%	51%	39%
Sample-2	100%	93%	82%	72%	61%	52%	39%
Sample-3	100%	92%	80%	71%	60%	50%	38%
Sample-4	100%	92%	81%	71%	59%	49%	37%
Sample-5	100%	92%	81%	70%	59%	50%	37%
Sample-6	100%	92%	81%	71%	60%	51%	39%

Thanks

友宏医疗
YOUHONG MEDICAL

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