Supplementary Materials:

Quartz Crystal Microbalance Platform for SARS-CoV-2 Immuno-diagnostics

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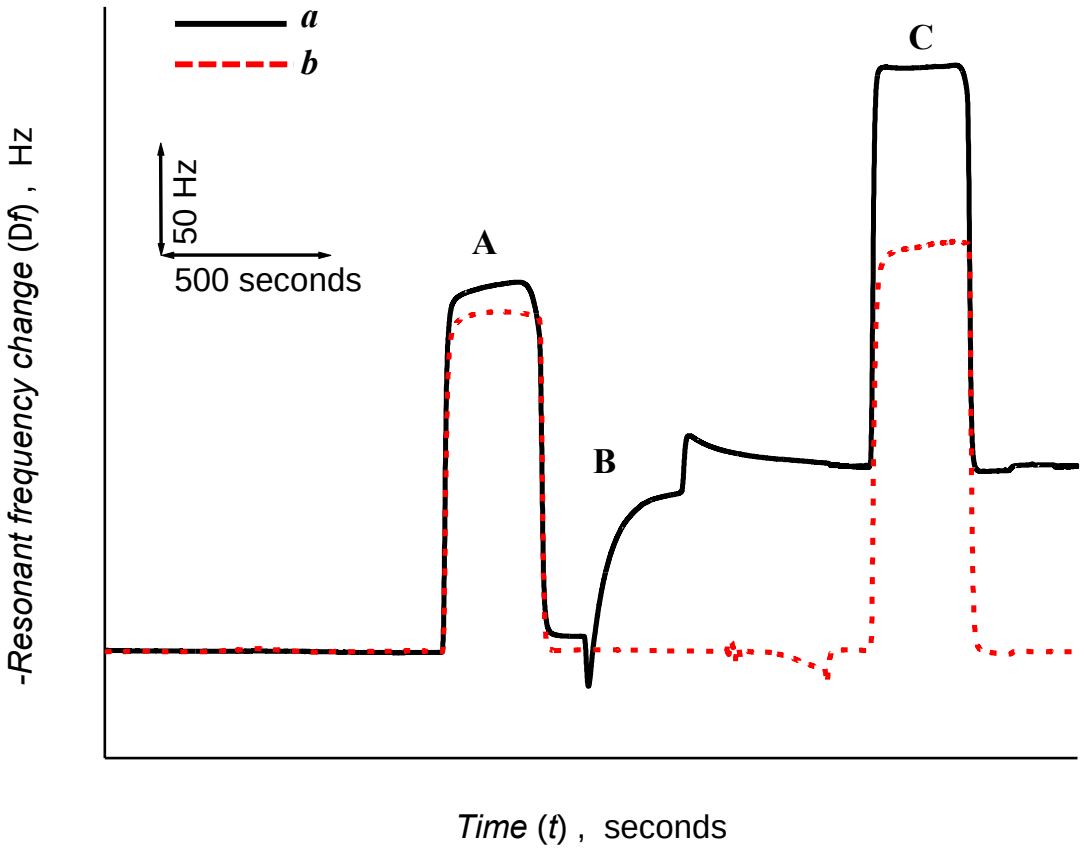

Fig. S-1. QCM trace (curve *a*) showing the immobilization of RBD on the LNB chip. (A) activation of LNB-chip by EDC/Sulfo-NHS, (B) RBD immobilization and (C) deactivation with ethanolamine. Curve *b* is the corresponding reference LNB chip without RBD.

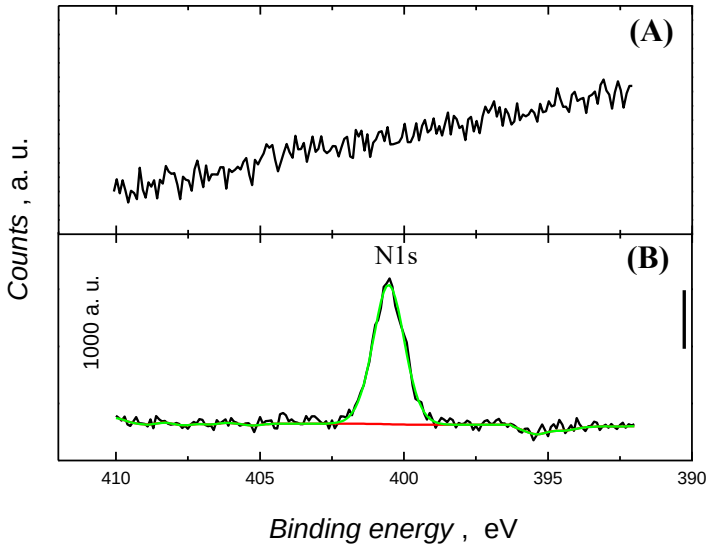

Fig. S-2. Binding energy profile recorded with XPS for the LNB chip measured (A) before and (B) after the immobilization of RBD. The presence of nitrogen after immobilization (together with antibody-based QCM response) provides evidence for the presence of the protein on the sensor chip surface.

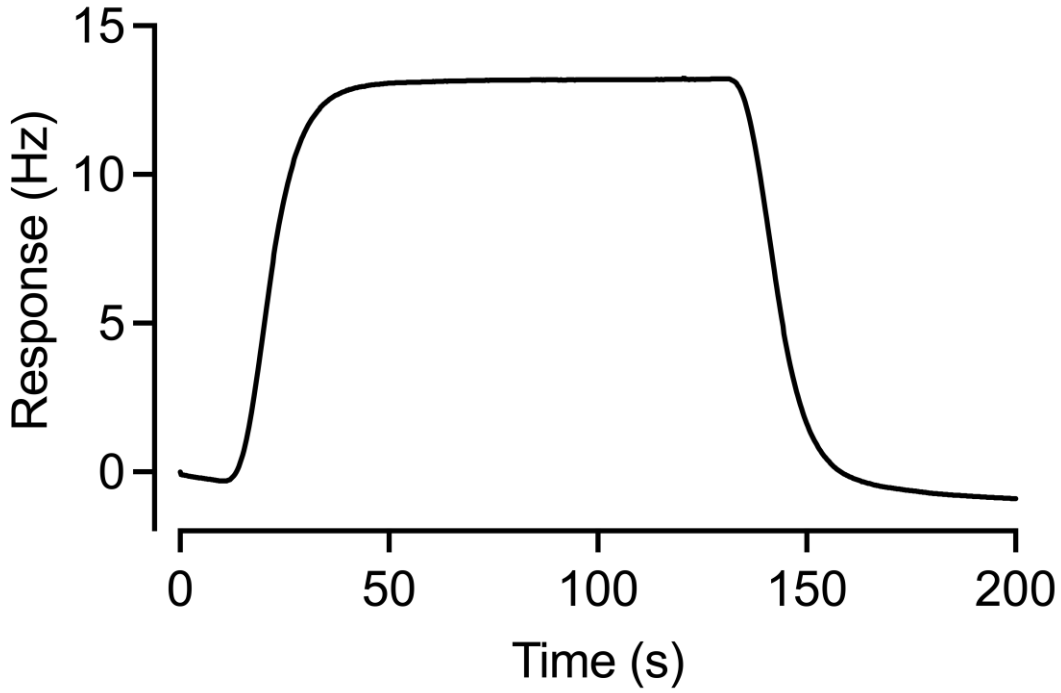

Fig. S-3. Injection of serum sample on reference chip (without immobilized RBD).

Table SI-1. Raw data for the detection of SARS-CoV-2 antibodies in 119 serum samples analyzed by the QCM, YHLO, and Roche assays. A response ≥2.5 in the QCM assay, ≥10.00 in the YHLO, and ≥1.00 in the Roche assay was regarded as a positive response (marked in green), and a response below was regarded as negative (marked in red). The samples are sorted according to the response in the QCM assay.

	QCM		YHLO		Roche	
Sample	**Response (Hz)**	**≥2.50**	**Response (U/mL)**	**≥10.00**	**Response (U/mL)**	**≥1.00**
1	14.09	Pos	46.27	Pos	71.1	Pos
2	14.08	Pos	36.53	Pos	32.0	Pos
3	13.98	Pos	23.78	Pos	17.70	Pos
4	13.56	Pos	105.03	Pos	78.90	Pos
5	13.45	Pos	96.33	Pos	86.20	Pos
6	11.88	Pos	86.80	Pos	151	Pos
7	9.85	Pos	52.65	Pos	89.6	Pos
8	9.72	Pos	105.65	Pos	110	Pos
9	8.74	Pos	103.65	Pos	142	Pos
10	8.72	Pos	27.68	Pos	50.3	Pos
11	8.44	Pos	7.99	Neg	6.93	Pos
12	8.38	Pos	111.45	Pos	137	Pos
13	7.87	Pos	12.24	Pos	25.7	Pos
14	7.72	Pos	62.62	Pos	110	Pos
15	7.44	Pos	129.18	Pos	116	Pos
16	7.33	Pos	65.07	Pos	38.8	Pos
17	7.17	Pos	52.89	Pos	127	Pos
18	6.53	Pos	29.99	Pos	52.9	Pos
19	6.31	Pos	103.04	Pos	58.9	Pos
20	6.31	Pos	81.19	Pos	168	Pos
21	5.99	Pos	87.07	Pos	108	Pos
22	5.96	Pos	13.19	Pos	31.6	Pos
23	5.79	Pos	129.48	Pos	90.7	Pos
24	5.73	Pos	67.62	Pos	92.0	Pos
25	5.68	Pos	21.54	Pos	47.6	Pos
26	5.18	Pos	100.25	Pos	111	Pos
27	4.94	Pos	83.87	Pos	146	Pos
28	4.81	Pos	15.96	Pos	13.6	Pos
29	4.69	Pos	85.28	Pos	158	Pos
30	4.67	Pos	44.01	Pos	87.4	Pos
31	4.63	Pos	24.04	Pos	30.0	Pos
32	4.60	Pos	24.62	Pos	45.4	Pos
33	4.43	Pos	20.57	Pos	37.0	Pos
34	4.20	Pos	26.94	Pos	55.6	Pos
35	4.14	Pos	64.08	Pos	141	Pos
36	4.11	Pos	63.34	Pos	152	Pos
37	4.08	Pos	60.36	Pos	125	Pos

38	4.03	Pos	25.77	Pos	20.1	Pos
39	4.03	Pos	49.39	Pos	79.9	Pos
40	3.97	Pos	45.48	Pos	117	Pos
41	3.36	Pos	39.15	Pos	98.3	Pos
42	3.21	Pos	18.18	Pos	22.1	Pos
43	3.17	Pos	132.27	Pos	106	Pos
44	2.78	Pos	60.23	Pos	146	Pos
45	2.60	Pos	64.37	Pos	149	Pos
46	2.54	Pos	20.48	Pos	44.0	Pos
47	2.54	Pos	0.08	Neg	0.08	Neg
48	2.52	Pos	3.27	Neg	2.24	Pos
49	2.46	Neg	0.50	Neg	0.08	Neg
50	2.41	Neg	28.45	Pos	54.2	Pos
51	2.17	Neg	0.12	Neg	0.08	Neg
52	2.14	Neg	5.80	Neg	1.98	Pos
53	2.05	Neg	12.31	Pos	28.6	Pos
54	1.96	Neg	0.53	Neg	0.09	Neg
55	1.94	Neg	4.24	Neg	6.45	Pos
56	1.89	Neg	0.10	Neg	0.08	Neg
57	1.84	Neg	123.72	Pos	123	Pos
58	1.74	Neg	6.54	Neg	6.41	Pos
59	1.71	Neg	3.04	Neg	4.19	Pos
60	1.68	Neg	0.09	Neg	0.09	Neg
61	1.44	Neg	0.09	Neg	0.08	Neg
62	1.43	Neg	70.79	Pos	149	Pos
63	1.42	Neg	0.17	Neg	0.09	Neg
64	1.40	Neg	0.55	Neg	0.08	Neg
65	1.36	Neg	0.10	Neg	0.08	Neg
66	1.28	Neg	13.45	Pos	9.33	Pos
67	1.20	Neg	0.14	Neg	0.08	Neg
68	1.20	Neg	0.14	Neg	0.09	Neg
69	1.19	Neg	0.14	Neg	0.09	Neg
70	1.18	Neg	5.02	Neg	0.30	Neg
71	1.17	Neg	0.11	Neg	0.08	Neg
72	1.14	Neg	24.75	Pos	51.7	Pos
73	1.10	Neg	0.17	Neg	0.09	Neg
74	1.08	Neg	0.10	Neg	0.08	Neg
75	1.00	Neg	0.23	Neg	0.09	Neg
76	0.98	Neg	0.12	Neg	0.09	Neg
77	0.97	Neg	0.59	Neg	0.10	Neg
78	0.96	Neg	0.78	Neg	0.09	Neg
79	0.88	Neg	13.89	Pos	18.0	Pos
80	0.87	Neg	0.17	Neg	0.10	Neg

81	0.85	Neg	0.20	Neg	1.29	Pos
82	0.81	Neg	0.12	Neg	0.08	Neg
83	0.79	Neg	0.12	Neg	0.08	Neg
84	0.74	Neg	0.28	Neg	0.09	Neg
85	0.70	Neg	0.17	Neg	0.08	Neg
86	0.70	Neg	2.94	Neg	0.93	Neg
87	0.66	Neg	0.37	Neg	0.08	Neg
88	0.65	Neg	0.33	Neg	0.09	Neg
89	0.62	Neg	0.52	Neg	0.08	Neg
90	0.59	Neg	0.30	Neg	0.08	Neg
91	0.55	Neg	0.15	Neg	0.08	Neg
92	0.52	Neg	0.52	Neg	0.09	Neg
93	0.50	Neg	0.26	Neg	0.09	Neg
94	0.50	Neg	0.17	Neg	0.09	Neg
95	0.46	Neg	0.44	Neg	0.09	Neg
96	0.42	Neg	0.65	Neg	0.08	Neg
97	0.40	Neg	0.35	Neg	0.09	Neg
98	0.39	Neg	0.88	Neg	0.09	Neg
99	0.39	Neg	0.34	Neg	0.09	Neg
100	0.35	Neg	0.57	Neg	0.08	Neg
101	0.31	Neg	1.60	Neg	0.09	Neg
102	0.29	Neg	0.29	Neg	0.09	Neg
103	0.29	Neg	1.02	Neg	0.09	Neg
104	0.27	Neg	0.72	Neg	0.08	Neg
105	0.25	Neg	0.72	Neg	0.08	Neg
106	0.15	Neg	0.23	Neg	0.08	Neg
107	0.15	Neg	0.23	Neg	0.09	Neg
108	0.15	Neg	6.04	Neg	0.09	Neg
109	0.13	Neg	0.66	Neg	0.09	Neg
110	0.11	Neg	0.30	Neg	0.08	Neg
111	0.04	Neg	0.39	Neg	0.08	Neg
112	-0.02	Neg	0.24	Neg	0.08	Neg
113	-0.05	Neg	1.13	Neg	0.08	Neg
114	-0.05	Neg	0.28	Neg	0.09	Neg
115	-0.07	Neg	0.21	Neg	0.08	Neg
116	-0.10	Neg	0.37	Neg	0.10	Neg
117	-0.11	Neg	0.20	Neg	0.09	Neg
118	-0.19	Neg	0.33	Neg	0.08	Neg
119	-0.24	Neg	0.26	Neg	0.09	Neg

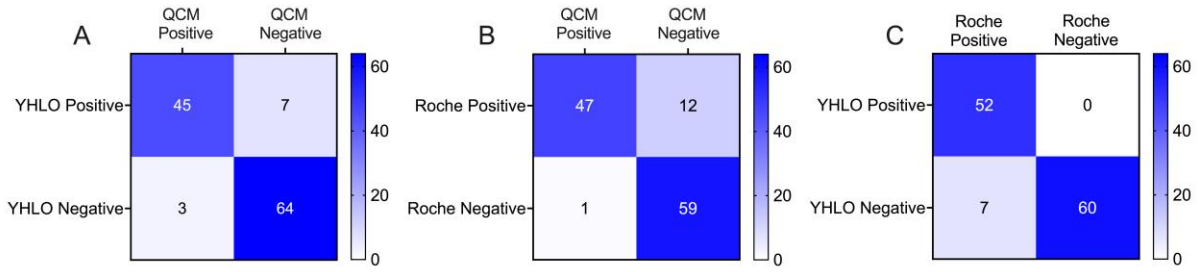

Figure S-4. Coherence between QCM, Roche, and YHLO SARS-CoV-2 antibody assays. Sera were analyzed for the presence of antibodies against SARS-CoV-2 RBD spike protein. Of the 119 analyzed samples, 48, 52, and 59 were positive in the QCM, Roche, and YHLO assays. The figure represents coherence between QCM and YHLO (A), QCM and Roche (B), Roche and YHLO (C).