



**CERTIFICATE OF ANALYSIS**

**Product Description:** Serology Control Pack 1

**Catalog Number:** C4381-1

**Storage Temperature:** ≤-70°C

Components	Lot Number	Expiration Date
Serology Control 1.1	A00C0771	28 Feb 2026
Serology Control 1.2	A00C0772	28 Feb 2026
Serology Control 1.3	A00C0773	28 Feb 2026

Values are provided in two units - MSD Arbitrary Units/mL (AU/mL) and WHO Biological Arbitrary Units/mL (BAU/mL) (NIBSC 20/136).

**Control Assignments based on WHO Standard (vial):**

Assay	Isotype	Control 1.1	Control 1.2	Control 1.3	UOM
SARS-CoV-2 Nucleocapsid	IgG	0.054	0.0179	0.0107	BAU/mL
SARS-CoV-2 S1 RBD		0.2595	0.093	0.0231	BAU/mL
SARS-CoV-2 Spike		0.2045	0.0878	0.0197	BAU/mL
SARS-CoV-2 Nucleocapsid	IgM	0.1769	0.0425	0.0623	BAU/mL
SARS-CoV-2 S1 RBD		0.0729	0.0161	0.0106	BAU/mL
SARS-CoV-2 Spike		0.0803	0.0263	0.0133	BAU/mL
SARS-CoV-2 Nucleocapsid	IgA	0.3818	0.0205	0.0971	BAU/mL
SARS-CoV-2 S1 RBD		0.1447	0.0223	0.0762	BAU/mL
SARS-CoV-2 Spike		0.1659	0.0377	0.0543	BAU/mL

**Control Assignments based on WHO Standard (1:5000 dilution adjusted):**

Assay	Isotype	Control 1.1	Control 1.2	Control 1.3	UOM
SARS-CoV-2 Nucleocapsid	IgG	270	89.5	53.5	BAU/mL
SARS-CoV-2 S1 RBD		1298	465	116	BAU/mL
SARS-CoV-2 Spike		1023	439	98.5	BAU/mL
SARS-CoV-2 Nucleocapsid	IgM	885	213	312	BAU/mL
SARS-CoV-2 S1 RBD		365	80.5	53.0	BAU/mL
SARS-CoV-2 Spike		402	132	66.5	BAU/mL
SARS-CoV-2 Nucleocapsid	IgA	1909	103	486	BAU/mL
SARS-CoV-2 S1 RBD		724	112	381	BAU/mL
SARS-CoV-2 Spike		830	189	272	BAU/mL

**Note:** Controls 1.1, 1.2, and 1.3 are provided pre-diluted. Their assigned concentrations reflect the antibody concentrations in the as-provided vial material. Dilution-adjusted concentrations that are comparable to the concentration of antibodies in undiluted samples are provided below.

**Note:** Alternative S-GENE mutations for Spike of AY.1, AY.2, and B.1.617.2 are listed as **Alt Seq #**.



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**Concentration Assignment of IgG Antibodies (vialed):**

Assay	Alternate Name	Control 1.1	Control 1.2	Control 1.3	UOM
<b>SARS-CoV-2</b>					
SARS-CoV-2 Nucleocapsid		22.9	7.59	4.54	AU/mL
SARS-CoV-2 S1 NTD		0.271	0.144	0.030	AU/mL
SARS-CoV-2 S1 RBD		9.54	3.42	0.850	AU/mL
SARS-CoV-2 Spike		22.7	9.74	2.19	AU/mL
SARS-CoV-2 S1 RBD (A.23.1)	V367F	9.77	3.73	0.921	AU/mL
SARS-CoV-2 S1 RBD (A.VOI.V2)	R346K, T478R, E484K	1.35	0.757	0.201	AU/mL
SARS-CoV-2 S1 RBD (AY.1)	K417N, L452R, T478K	3.67	1.85	0.475	AU/mL
SARS-CoV-2 S1 RBD (AY.2)	K417N, L452R, T478K	3.67	1.85	0.475	AU/mL
SARS-CoV-2 S1 RBD (AY.3)	L452R, T478K; RBD (Delta)	3.97	1.74	0.508	AU/mL
SARS-CoV-2 S1 RBD (AY.4)	L452R, T478K; RBD (Delta)	3.97	1.74	0.508	AU/mL
SARS-CoV-2 S1 RBD (AY.4.2)	L452R, T478K; RBD (Delta)	3.97	1.74	0.508	AU/mL
SARS-CoV-2 S1 RBD (AY.5)	L452R, T478K; RBD (Delta)	3.97	1.74	0.508	AU/mL
SARS-CoV-2 S1 RBD (AY.6)	L452R, T478K; RBD (Delta)	3.97	1.74	0.508	AU/mL
SARS-CoV-2 S1 RBD (AY.7)	L452R, T478K; RBD (Delta)	3.97	1.74	0.508	AU/mL
SARS-CoV-2 S1 RBD (AY.12)	L452R, T478K; RBD (Delta)	3.97	1.74	0.508	AU/mL
SARS-CoV-2 S1 RBD (AY.14)	L452R, T478K; RBD (Delta)	3.97	1.74	0.508	AU/mL
SARS-CoV-2 S1 RBD (B.1.1.519)	T478K	7.10	2.66	0.624	AU/mL
SARS-CoV-2 S1 RBD (B.1.1.529; BA.1)	G339D, S371L, S373P, S375F, K417N, N440K, G446S, S477N, T478K, E484A, Q493R, G496S, Q498R, N501Y, Y505H; RBD (Omicron; BA.1)	0.436	0.176	0.0638	AU/mL
SARS-CoV-2 S1 RBD (B.1.1.7)	N501Y; RBD (Alpha)	6.08	2.12	0.755	AU/mL
SARS-CoV-2 S1 RBD (B.1.1.7+E484K)	E484K, N501Y	1.30	0.51	0.204	AU/mL
SARS-CoV-2 S1 RBD (B.1.214.2)	Q414K, N450K	4.71	2.11	0.505	AU/mL
SARS-CoV-2 S1 RBD (B.1.258.17)	N439K	2.67	1.06	0.34	AU/mL
SARS-CoV-2 S1 RBD (B.1.351)	K417N, E484K, N501Y; RBD (Beta)	1.35	0.552	0.173	AU/mL
SARS-CoV-2 S1 RBD (B.1.351.1)	K417N, E484K, N501Y; RBD (Beta)	1.35	0.552	0.173	AU/mL
SARS-CoV-2 S1 RBD (B.1.427)	L452R	4.77	2.27	0.668	AU/mL
SARS-CoV-2 S1 RBD (B.1.429)	L452R	4.77	2.27	0.668	AU/mL
SARS-CoV-2 S1 RBD (B.1.466.2)	N439K	2.67	1.06	0.34	AU/mL
SARS-CoV-2 S1 RBD (B.1.525)	E484K	2.09	0.925	0.298	AU/mL
SARS-CoV-2 S1 RBD (B.1.526)	E484K	2.09	0.925	0.298	AU/mL
SARS-CoV-2 S1 RBD (B.1.526.1)	L452R	4.77	2.27	0.668	AU/mL
SARS-CoV-2 S1 RBD (B.1.526.2)	S477N	9.04	3.48	0.850	AU/mL
SARS-CoV-2 S1 RBD (B.1.617)	L452R, E484Q	3.24	1.69	0.58	AU/mL
SARS-CoV-2 S1 RBD (B.1.617.1)	L452R, E484Q	3.24	1.69	0.58	AU/mL
SARS-CoV-2 S1 RBD (B.1.617.2)	L452R, T478K; RBD (Delta)	3.97	1.74	0.508	AU/mL
SARS-CoV-2 S1 RBD (B.1.617.2+ΔY144)	L452R, T478K; RBD (Delta)	3.97	1.74	0.508	AU/mL
SARS-CoV-2 S1 RBD (B.1.617.3)	L452R, E484Q	3.24	1.69	0.58	AU/mL

**Note:** Alternative S-GENE mutations for Spike of AY.1, AY.2, and B.1.617.2 are listed as **Alt Seq #**.



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SARS-CoV-2 S1 RBD (B.1.618)	E484K	2.09	0.925	0.298	AU/mL
SARS-CoV-2 S1 RBD (B.1.620)	S477N, E484K	1.37	0.571	0.205	AU/mL
SARS-CoV-2 S1 RBD (BA.1.1)	G339D, R346K, S371L, S373P, S375F, K417N, N440K, G446S, S477N, T478K, E484A, Q493R, G496S, Q498R, N501Y, Y505H; RBD (Omicron; BA.1.1)	0.289	0.138	0.0493	AU/mL
SARS-CoV-2 S1 RBD (BA.2)	G339D, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, S477N, T478K, E484A, Q493R, Q498R, N501Y, Y505H; RBD (Omicron; BA.2)	0.749	0.325	0.112	AU/mL
SARS-CoV-2 S1 RBD (BV-1)	Q493R, N501Y	3.76	1.48	0.521	AU/mL
SARS-CoV-2 S1 RBD (C.37)	L452Q, F490S	2.81	1.17	0.419	AU/mL
SARS-CoV-2 S1 RBD (P.1)	K417T, E484K, N501Y; RBD (Gamma)	2.27	0.9	0.315	AU/mL
SARS-CoV-2 S1 RBD (P.2)	E484K	2.09	0.925	0.298	AU/mL
SARS-CoV-2 S1 RBD (P.3)	E484K, N501Y	1.30	0.51	0.204	AU/mL
SARS-CoV-2 S1 RBD (R.1)	E484K	2.09	0.925	0.298	AU/mL
SARS-CoV-2 Spike (A.23.1)		24.8	12.4	2.33	AU/mL
SARS-CoV-2 Spike (A.VOI.V2)		6.51	3.07	0.796	AU/mL
SARS-CoV-2 Spike (AY.1)		9.55	4.12	1.06	AU/mL
SARS-CoV-2 Spike (AY.1) <b>Alt Seq 1</b>		8.54	3.62	0.995	AU/mL
SARS-CoV-2 Spike (AY.2)		11.1	4.1	1.11	AU/mL
SARS-CoV-2 Spike (AY.2) <b>Alt Seq 1</b>		8.9	3.62	0.945	AU/mL
SARS-CoV-2 Spike (AY.12)		9.44	3.97	0.997	AU/mL
SARS-CoV-2 Spike (AY.4.2)		9.85	3.48	0.940	AU/mL
SARS-CoV-2 Spike (B.1.1.519)		17.4	6.56	1.59	AU/mL
SARS-CoV-2 Spike (B.1.1.529; BA.1)		1.70	0.791	0.214	AU/mL
SARS-CoV-2 Spike (B.1.1.7)		13.9	5.50	1.62	AU/mL
SARS-CoV-2 Spike (B.1.1.7+E484K)		8.93	4.01	1.13	AU/mL
SARS-CoV-2 Spike (B.1.258.17)		23.5	10.2	2.32	AU/mL
SARS-CoV-2 Spike (B.1.351)		7.12	3.31	0.798	AU/mL
SARS-CoV-2 Spike (B.1.351.1)		13.4	7.97	1.37	AU/mL
SARS-CoV-2 Spike (B.1.429)		9.31	3.93	1.14	AU/mL
SARS-CoV-2 Spike (B.1.466.2)		18.3	7.89	1.79	AU/mL
SARS-CoV-2 Spike (B.1.525)		8.04	3.66	1.01	AU/mL
SARS-CoV-2 Spike (B.1.526)		13.7	5.84	1.34	AU/mL
SARS-CoV-2 Spike (B.1.526.1)		9.31	4.71	1.12	AU/mL
SARS-CoV-2 Spike (B.1.617)		14.4	6.17	1.54	AU/mL
SARS-CoV-2 Spike (B.1.617.1)		8.96	4.12	0.975	AU/mL
SARS-CoV-2 Spike (B.1.617.2)		8.02	2.83	0.815	AU/mL
SARS-CoV-2 Spike (B.1.617.2 +1)		6.87	2.96	0.778	AU/mL
SARS-CoV-2 Spike (B.1.617.2 +2)		5.73	2.52	0.621	AU/mL

**Note:** Alternative S-GENE mutations for Spike of AY.1, AY.2, and B.1.617.2 are listed as **Alt Seq #**.



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SARS-CoV-2 Spike (B.1.617.2 +3)		6.67	3.01	0.731	AU/mL
SARS-CoV-2 Spike (B.1.617.2 +4)		6.01	2.45	0.598	AU/mL
SARS-CoV-2 Spike (B.1.617.2; AY.3; AY.5; AY.6; AY.7; AY.14) <b>Alt Seq 1</b>		9.93	3.69	1.01	AU/mL
SARS-CoV-2 Spike (B.1.617.2; AY.4) <b>Alt Seq 2</b>		11.0	3.96	1.15	AU/mL
SARS-CoV-2 Spike (B.1.617.2+ ΔY144)		8.8	3.41	0.983	AU/mL
SARS-CoV-2 Spike (B.1.617.3)		10.4	4.44	0.99	AU/mL
SARS-CoV-2 Spike (B.1.618)		10.8	4.23	1.11	AU/mL
SARS-CoV-2 Spike (B.1.620)		5.03	2.14	0.649	AU/mL
SARS-CoV-2 Spike (B.1.621)		7.02	3.59	0.764	AU/mL
SARS-CoV-2 Spike (B.1.640.2)		6.07	2.93	0.923	AU/mL
SARS-CoV-2 Spike (BA.1+L452R)		1.95	1.02	0.26	AU/mL
SARS-CoV-2 Spike (BA.1+R346K)		1.07	0.504	0.155	AU/mL
SARS-CoV-2 Spike (BA.2)		3.43	1.11	0.367	AU/mL
SARS-CoV-2 Spike (BA.3)		1.21	0.547	0.162	AU/mL
SARS-CoV-2 Spike (BV-1)		9.23	3.78	1.08	AU/mL
SARS-CoV-2 Spike (C.37)		7.68	3.78	0.982	AU/mL
SARS-CoV-2 Spike (D614G)		24.4	9.51	2.45	AU/mL
SARS-CoV-2 Spike (P.1)		8.49	5.10	0.947	AU/mL
SARS-CoV-2 Spike (P.2)		12.1	5.29	1.36	AU/mL
SARS-CoV-2 Spike (P.3)		3.57	1.54	0.424	AU/mL
SARS-CoV-2 Spike (R.1)		9.15	3.96	0.977	AU/mL
<b>Other Coronaviruses</b>					
SARS-CoV-1 Spike		3.20	0.628	0.285	AU/mL
MERS-CoV Spike		>ULOQ	0.207	0.260	AU/mL
HCoV-229E Spike		21.7	4.86	1.16	AU/mL
HCoV-HKU1 Spike		11.3	3.01	0.963	AU/mL
HCoV-NL63 Spike		2.60	0.641	0.185	AU/mL
HCoV-OC43 Spike		>ULOQ	6.98	3.82	AU/mL
<b>Other Respiratory Viruses</b>					
Flu A/HongKong H3		59.8	14.3	3.06	AU/mL
Flu A/Michigan H1		43.9	6.06	2.80	AU/mL
Flu A/Shanghai H7		3.88	1.00	0.398	AU/mL
Flu B/Brisbane HA		53.0	9.47	2.27	AU/mL
Flu B/Phuket HA		71.9	10.6	3.03	AU/mL
RSV Pre-Fusion F		91.2	15.7	6.76	AU/mL

**Concentration Assignment of IgG Antibodies (1:5000 dilution-adjusted):**

Assay	Alternate Name	Control 1.1	Control 1.2	Control 1.3	UOM
<b>SARS-CoV-2</b>					
SARS-CoV-2 Nucleocapsid		114500	37950	22700	AU/mL
SARS-CoV-2 S1 NTD		1355	720	150	AU/mL
SARS-CoV-2 S1 RBD		47700	17100	4250	AU/mL
SARS-CoV-2 Spike		113500	48700	10950	AU/mL
SARS-CoV-2 S1 RBD (A.23.1)	V367F	48850	18650	4605	AU/mL

**Note:** Alternative S-GENE mutations for Spike of AY.1, AY.2, and B.1.617.2 are listed as **Alt Seq #**.



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SARS-CoV-2 S1 RBD (A.VOI.V2)	R346K, T478R, E484K	6750	3785	1005	AU/mL
SARS-CoV-2 S1 RBD (AY.1)	K417N, L452R, T478K	18350	9250	2375	AU/mL
SARS-CoV-2 S1 RBD (AY.2)	K417N, L452R, T478K	18350	9250	2375	AU/mL
SARS-CoV-2 S1 RBD (AY.3)	L452R, T478K; RBD (Delta)	19850	8700	2540	AU/mL
SARS-CoV-2 S1 RBD (AY.4)	L452R, T478K; RBD (Delta)	19850	8700	2540	AU/mL
SARS-CoV-2 S1 RBD (AY.4.2)	L452R, T478K; RBD (Delta)	19850	8700	2540	AU/mL
SARS-CoV-2 S1 RBD (AY.5)	L452R, T478K; RBD (Delta)	19850	8700	2540	AU/mL
SARS-CoV-2 S1 RBD (AY.6)	L452R, T478K; RBD (Delta)	19850	8700	2540	AU/mL
SARS-CoV-2 S1 RBD (AY.7)	L452R, T478K; RBD (Delta)	19850	8700	2540	AU/mL
SARS-CoV-2 S1 RBD (AY.12)	L452R, T478K; RBD (Delta)	19850	8700	2540	AU/mL
SARS-CoV-2 S1 RBD (AY.14)	L452R, T478K; RBD (Delta)	19850	8700	2540	AU/mL
SARS-CoV-2 S1 RBD (B.1.1.519)	T478K	35500	13300	3120	AU/mL
SARS-CoV-2 S1 RBD (B.1.1.529; BA.1)	G339D, S371L, S373P, S375F, K417N, N440K, G446S, S477N, T478K, E484A, Q493R, G496S, Q498R, N501Y, Y505H; RBD (Omicron; BA.1)	2180	880	319	AU/mL
SARS-CoV-2 S1 RBD (B.1.1.7)	N501Y; RBD (Alpha)	30400	10600	3775	AU/mL
SARS-CoV-2 S1 RBD (B.1.1.7+E484K)	E484K, N501Y	6500	2550	1020	AU/mL
SARS-CoV-2 S1 RBD (B.1.214.2)	Q414K, N450K	23550	10550	2525	AU/mL
SARS-CoV-2 S1 RBD (B.1.258.17)	N439K	13350	5300	1700	AU/mL
SARS-CoV-2 S1 RBD (B.1.351)	K417N, E484K, N501Y; RBD (Beta)	6750	2760	865	AU/mL
SARS-CoV-2 S1 RBD (B.1.351.1)	K417N, E484K, N501Y; RBD (Beta)	6750	2760	865	AU/mL
SARS-CoV-2 S1 RBD (B.1.427)	L452R	23850	11350	3340	AU/mL
SARS-CoV-2 S1 RBD (B.1.429)	L452R	23850	11350	3340	AU/mL
SARS-CoV-2 S1 RBD (B.1.466.2)	N439K	13350	5300	1700	AU/mL
SARS-CoV-2 S1 RBD (B.1.525)	E484K	10450	4625	1490	AU/mL
SARS-CoV-2 S1 RBD (B.1.526)	E484K	10450	4625	1490	AU/mL
SARS-CoV-2 S1 RBD (B.1.526.1)	L452R	23850	11350	3340	AU/mL
SARS-CoV-2 S1 RBD (B.1.526.2)	S477N	45200	17400	4250	AU/mL
SARS-CoV-2 S1 RBD (B.1.617)	L452R, E484Q	16200	8450	2900	AU/mL
SARS-CoV-2 S1 RBD (B.1.617.1)	L452R, E484Q	16200	8450	2900	AU/mL
SARS-CoV-2 S1 RBD (B.1.617.2)	L452R, T478K; RBD (Delta)	19850	8700	2540	AU/mL
SARS-CoV-2 S1 RBD (B.1.617.2+ΔY144)	L452R, T478K; RBD (Delta)	19850	8700	2540	AU/mL
SARS-CoV-2 S1 RBD (B.1.617.3)	L452R, E484Q	16200	8450	2900	AU/mL
SARS-CoV-2 S1 RBD (B.1.618)	E484K	10450	4625	1490	AU/mL
SARS-CoV-2 S1 RBD (B.1.620)	S477N, E484K	6850	2855	1025	AU/mL
SARS-CoV-2 S1 RBD (BA.1.1)	G339D, R346K, S371L, S373P, S375F, K417N, N440K, G446S, S477N, T478K, E484A, Q493R, G496S, Q498R, N501Y, Y505H; RBD (Omicron; BA.1.1)	1445	690	246.5	AU/mL

**Note:** Alternative S-GENE mutations for Spike of AY.1, AY.2, and B.1.617.2 are listed as **Alt Seq #**.



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SARS-CoV-2 S1 RBD (BA.2)	G339D, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, S477N, T478K, E484A, Q493R, Q498R, N501Y, Y505H; RBD (Omicron; BA.2)	3745	1625	560	AU/mL
SARS-CoV-2 S1 RBD (BV-1)	Q493R, N501Y	18800	7400	2605	AU/mL
SARS-CoV-2 S1 RBD (C.37)	L452Q, F490S	14050	5850	2095	AU/mL
SARS-CoV-2 S1 RBD (P.1)	K417T, E484K, N501Y; RBD (Gamma)	11350	4500	1575	AU/mL
SARS-CoV-2 S1 RBD (P.2)	E484K	10450	4625	1490	AU/mL
SARS-CoV-2 S1 RBD (P.3)	E484K, N501Y	6500	2550	1020	AU/mL
SARS-CoV-2 S1 RBD (R.1)	E484K	10450	4625	1490	AU/mL
SARS-CoV-2 Spike (A.23.1)		124000	62000	11650	AU/mL
SARS-CoV-2 Spike (A.VOLV2)		32550	15350	3980	AU/mL
SARS-CoV-2 Spike (AY.1)		47750	20600	5300	AU/mL
SARS-CoV-2 Spike (AY.1) <b>Alt Seq 1</b>		42700	18100	4975	AU/mL
SARS-CoV-2 Spike (AY.2)		55500	20500	5550	AU/mL
SARS-CoV-2 Spike (AY.2) <b>Alt Seq 1</b>		44500	18100	4725	AU/mL
SARS-CoV-2 Spike (AY.12)		47200	19850	4985	AU/mL
SARS-CoV-2 Spike (AY.4.2)		49250	17400	4700	AU/mL
SARS-CoV-2 Spike (B.1.1.519)		87000	32800	7950	AU/mL
SARS-CoV-2 Spike (B.1.1.529; BA.1)		8500	3955	1070	AU/mL
SARS-CoV-2 Spike (B.1.1.7)		69500	27500	8100	AU/mL
SARS-CoV-2 Spike (B.1.1.7+E484K)		44650	20050	5650	AU/mL
SARS-CoV-2 Spike (B.1.258.17)		117500	51000	11600	AU/mL
SARS-CoV-2 Spike (B.1.351)		35600	16550	3990	AU/mL
SARS-CoV-2 Spike (B.1.351.1)		67000	39850	6850	AU/mL
SARS-CoV-2 Spike (B.1.429)		46550	19650	5700	AU/mL
SARS-CoV-2 Spike (B.1.466.2)		91500	39450	8950	AU/mL
SARS-CoV-2 Spike (B.1.525)		40200	18300	5050	AU/mL
SARS-CoV-2 Spike (B.1.526)		68500	29200	6700	AU/mL
SARS-CoV-2 Spike (B.1.526.1)		46550	23550	5600	AU/mL
SARS-CoV-2 Spike (B.1.617)		72000	30850	7700	AU/mL
SARS-CoV-2 Spike (B.1.617.1)		44800	20600	4875	AU/mL
SARS-CoV-2 Spike (B.1.617.2)		40100	14150	4075	AU/mL
SARS-CoV-2 Spike (B.1.617.2 +1)		34350	14800	3890	AU/mL
SARS-CoV-2 Spike (B.1.617.2 +2)		28650	12600	3105	AU/mL
SARS-CoV-2 Spike (B.1.617.2 +3)		33350	15050	3655	AU/mL
SARS-CoV-2 Spike (B.1.617.2 +4)		30050	12250	2990	AU/mL
SARS-CoV-2 Spike (B.1.617.2; AY.3; AY.5; AY.6; AY.7; AY.14) <b>Alt Seq 1</b>		49650	18450	5050	AU/mL
SARS-CoV-2 Spike (B.1.617.2; AY.4) <b>Alt Seq 2</b>		55000	19800	5750	AU/mL
SARS-CoV-2 Spike (B.1.617.2+ ΔY144)		44000	17050	4915	AU/mL
SARS-CoV-2 Spike (B.1.617.3)		52000	22200	4950	AU/mL
SARS-CoV-2 Spike (B.1.618)		54000	21150	5550	AU/mL

**Note:** Alternative S-GENE mutations for Spike of AY.1, AY.2, and B.1.617.2 are listed as **Alt Seq #**.





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SARS-CoV-2 Spike (B.1.620)		25150	10700	3245	AU/mL
SARS-CoV-2 Spike (B.1.621)		35100	17950	3820	AU/mL
SARS-CoV-2 Spike (B.1.640.2)		30350	14650	4615	AU/mL
SARS-CoV-2 Spike (BA.1+L452R)		9750	5100	1300	AU/mL
SARS-CoV-2 Spike (BA.1+R346K)		5350	2520	775	AU/mL
SARS-CoV-2 Spike (BA.2)		17150	5550	1835	AU/mL
SARS-CoV-2 Spike (BA.3)		6050	2735	810	AU/mL
SARS-CoV-2 Spike (BV-1)		46150	18900	5400	AU/mL
SARS-CoV-2 Spike (C.37)		38400	18900	4910	AU/mL
SARS-CoV-2 Spike (D614G)		122000	47550	12250	AU/mL
SARS-CoV-2 Spike (P.1)		42450	25500	4735	AU/mL
SARS-CoV-2 Spike (P.2)		60500	26450	6800	AU/mL
SARS-CoV-2 Spike (P.3)		17850	7700	2120	AU/mL
SARS-CoV-2 Spike (R.1)		45750	19800	4885	AU/mL
<b>Other Coronaviruses</b>					
SARS-CoV-1 Spike		16000	3140	1425	AU/mL
MERS-CoV Spike		>ULOQ	1035	1300	AU/mL
HCoV-229E Spike		108500	24300	5800	AU/mL
HCoV-HKU1 Spike		56500	15050	4815	AU/mL
HCoV-NL63 Spike		13000	3205	925	AU/mL
HCoV-OC43 Spike		>ULOQ	34900	19100	AU/mL
<b>Other Respiratory Viruses</b>					
Flu A/HongKong H3		299000	71500	15300	AU/mL
Flu A/Michigan H1		219500	30300	14000	AU/mL
Flu A/Shanghai H7		19400	5000	1990	AU/mL
Flu B/Brisbane HA		265000	47350	11350	AU/mL
Flu B/Phuket HA		359500	53000	15150	AU/mL
RSV Pre-Fusion F		456000	78500	33800	AU/mL

**Concentration Assignment of IgM Antibodies (viald):**

Assay	Alternate Name	Control 1.1	Control 1.2	Control 1.3	UOM
<b>SARS-CoV-2</b>					
SARS-CoV-2 Nucleocapsid		1.34	0.322	0.472	AU/mL
SARS-CoV-2 S1 NTD		0.152	0.077	0.026	AU/mL
SARS-CoV-2 S1 RBD		3.13	0.691	0.457	AU/mL
SARS-CoV-2 Spike		3.70	1.21	0.614	AU/mL
SARS-CoV-2 S1 RBD (A.23.1)	V367F	3.18	0.755	0.542	AU/mL
SARS-CoV-2 S1 RBD (A.VOI.V2)	R346K, T478R, E484K	1.52	0.057	0.674	AU/mL
SARS-CoV-2 S1 RBD (AY.1)	K417N, L452R, T478K	2.8	0.723	0.208	AU/mL
SARS-CoV-2 S1 RBD (AY.2)	K417N, L452R, T478K	2.8	0.723	0.208	AU/mL
SARS-CoV-2 S1 RBD (AY.3)	L452R, T478K; RBD (Delta)	2.79	0.634	0.215	AU/mL
SARS-CoV-2 S1 RBD (AY.4)	L452R, T478K; RBD (Delta)	2.79	0.634	0.215	AU/mL
SARS-CoV-2 S1 RBD (AY.4.2)	L452R, T478K; RBD (Delta)	2.79	0.634	0.215	AU/mL
SARS-CoV-2 S1 RBD (AY.5)	L452R, T478K; RBD (Delta)	2.79	0.634	0.215	AU/mL
SARS-CoV-2 S1 RBD (AY.6)	L452R, T478K; RBD (Delta)	2.79	0.634	0.215	AU/mL
SARS-CoV-2 S1 RBD (AY.7)	L452R, T478K; RBD (Delta)	2.79	0.634	0.215	AU/mL

**Note:** Alternative S-GENE mutations for Spike of AY.1, AY.2, and B.1.617.2 are listed as **Alt Seq #**.



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SARS-CoV-2 S1 RBD (AY.12)	L452R, T478K; RBD (Delta)	2.79	0.634	0.215	AU/mL
SARS-CoV-2 S1 RBD (AY.14)	L452R, T478K; RBD (Delta)	2.79	0.634	0.215	AU/mL
SARS-CoV-2 S1 RBD (B.1.1.519)	T478K	1.99	0.462	0.347	AU/mL
SARS-CoV-2 S1 RBD (B.1.1.529; BA.1)	G339D, S371L, S373P, S375F, K417N, N440K, G446S, S477N, T478K, E484A, Q493R, G496S, Q498R, N501Y, Y505H; RBD (Omicron; BA.1)	0.109	0.0233	0.0238	AU/mL
SARS-CoV-2 S1 RBD (B.1.1.7)	N501Y; RBD (Alpha)	1.49	0.378	0.252	AU/mL
SARS-CoV-2 S1 RBD (B.1.1.7+E484K)	E484K, N501Y	0.957	0.127	0.256	AU/mL
SARS-CoV-2 S1 RBD (B.1.214.2)	Q414K, N450K	1.92	0.497	0.236	AU/mL
SARS-CoV-2 S1 RBD (B.1.258.17)	N439K	1.56	0.387	0.291	AU/mL
SARS-CoV-2 S1 RBD (B.1.351)	K417N, E484K, N501Y; RBD (Beta)	<LLOQ	<LLOQ	<LLOQ	AU/mL
SARS-CoV-2 S1 RBD (B.1.351.1)	K417N, E484K, N501Y; RBD (Beta)	<LLOQ	<LLOQ	<LLOQ	AU/mL
SARS-CoV-2 S1 RBD (B.1.427)	L452R	1.80	0.441	0.172	AU/mL
SARS-CoV-2 S1 RBD (B.1.429)	L452R	1.80	0.441	0.172	AU/mL
SARS-CoV-2 S1 RBD (B.1.466.2)	N439K	1.56	0.387	0.291	AU/mL
SARS-CoV-2 S1 RBD (B.1.525)	E484K	0.526	0.105	0.0947	AU/mL
SARS-CoV-2 S1 RBD (B.1.526)	E484K	0.526	0.105	0.0947	AU/mL
SARS-CoV-2 S1 RBD (B.1.526.1)	L452R	1.80	0.441	0.172	AU/mL
SARS-CoV-2 S1 RBD (B.1.526.2)	S477N	1.56	0.397	0.273	AU/mL
SARS-CoV-2 S1 RBD (B.1.617)	L452R, E484Q	1.1	0.211	0.578	AU/mL
SARS-CoV-2 S1 RBD (B.1.617.1)	L452R, E484Q	1.1	0.211	0.578	AU/mL
SARS-CoV-2 S1 RBD (B.1.617.2)	L452R, T478K; RBD (Delta)	2.79	0.634	0.215	AU/mL
SARS-CoV-2 S1 RBD (B.1.617.2+ΔY144)	L452R, T478K; RBD (Delta)	2.79	0.634	0.215	AU/mL
SARS-CoV-2 S1 RBD (B.1.617.3)	L452R, E484Q	1.1	0.211	0.578	AU/mL
SARS-CoV-2 S1 RBD (B.1.618)	E484K	0.526	0.105	0.0947	AU/mL
SARS-CoV-2 S1 RBD (B.1.620)	S477N, E484K	1.37	0.559	0.438	AU/mL
SARS-CoV-2 S1 RBD (BA.1.1)	G339D, R346K, S371L, S373P, S375F, K417N, N440K, G446S, S477N, T478K, E484A, Q493R, G496S, Q498R, N501Y, Y505H; RBD (Omicron; BA.1.1)	0.0888	0.0218	0.0154	AU/mL
SARS-CoV-2 S1 RBD (BA.2)	G339D, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, S477N, T478K, E484A, Q493R, Q498R, N501Y, Y505H; RBD (Omicron; BA.2)	0.195	0.0327	0.0382	AU/mL
SARS-CoV-2 S1 RBD (BV-1)	Q493R, N501Y	2.49	0.552	0.335	AU/mL
SARS-CoV-2 S1 RBD (C.37)	L452Q, F490S	1.86	0.323	0.187	AU/mL

**Note:** Alternative S-GENE mutations for Spike of AY.1, AY.2, and B.1.617.2 are listed as **Alt Seq #**.





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SARS-CoV-2 S1 RBD (P.1)	K417T, E484K, N501Y; RBD (Gamma)	<LLOQ	<LLOQ	<LLOQ	AU/mL
SARS-CoV-2 S1 RBD (P.2)	E484K	0.526	0.105	0.0947	AU/mL
SARS-CoV-2 S1 RBD (P.3)	E484K, N501Y	0.957	0.127	0.256	AU/mL
SARS-CoV-2 S1 RBD (R.1)	E484K	0.526	0.105	0.0947	AU/mL
SARS-CoV-2 Spike (A.23.1)		4.32	1.99	0.764	AU/mL
SARS-CoV-2 Spike (A.VOI.V2)		1.22	0.249	0.261	AU/mL
SARS-CoV-2 Spike (AY.1)		2.5	0.679	0.222	AU/mL
SARS-CoV-2 Spike (AY.1) <b>Alt Seq 1</b>		2.38	0.813	0.225	AU/mL
SARS-CoV-2 Spike (AY.2)		3.22	0.843	0.27	AU/mL
SARS-CoV-2 Spike (AY.2) <b>Alt Seq 1</b>		2.28	0.683	0.198	AU/mL
SARS-CoV-2 Spike (AY.12)		2.18	0.696	0.189	AU/mL
SARS-CoV-2 Spike (AY.4.2)		3.52	0.907	0.281	AU/mL
SARS-CoV-2 Spike (B.1.1.519)		3.07	1.00	0.454	AU/mL
SARS-CoV-2 Spike (B.1.1.529; BA.1)		0.209	0.0404	0.0209	AU/mL
SARS-CoV-2 Spike (B.1.1.7)		2.64	0.780	0.387	AU/mL
SARS-CoV-2 Spike (B.1.1.7+E484K)		1.63	0.572	0.318	AU/mL
SARS-CoV-2 Spike (B.1.258.17)		4.48	1.91	0.684	AU/mL
SARS-CoV-2 Spike (B.1.351)		0.880	0.437	0.093	AU/mL
SARS-CoV-2 Spike (B.1.351.1)		2.77	1.51	0.452	AU/mL
SARS-CoV-2 Spike (B.1.429)		3.19	0.641	0.246	AU/mL
SARS-CoV-2 Spike (B.1.466.2)		3.66	1.37	0.5	AU/mL
SARS-CoV-2 Spike (B.1.525)		1.52	0.54	0.262	AU/mL
SARS-CoV-2 Spike (B.1.526)		2.01	1.01	0.341	AU/mL
SARS-CoV-2 Spike (B.1.526.1)		3.28	0.796	0.384	AU/mL
SARS-CoV-2 Spike (B.1.617)		1.92	0.955	0.314	AU/mL
SARS-CoV-2 Spike (B.1.617.1)		1.25	0.548	0.159	AU/mL
SARS-CoV-2 Spike (B.1.617.2)		2.74	0.518	0.165	AU/mL
SARS-CoV-2 Spike (B.1.617.2 +1)		0.912	0.443	0.0881	AU/mL
SARS-CoV-2 Spike (B.1.617.2 +2)		0.763	0.414	0.0724	AU/mL
SARS-CoV-2 Spike (B.1.617.2 +3)		0.95	0.494	0.0916	AU/mL
SARS-CoV-2 Spike (B.1.617.2 +4)		0.786	0.409	0.085	AU/mL
SARS-CoV-2 Spike (B.1.617.2; AY.3; AY.5; AY.6; AY.7; AY.14) <b>Alt Seq 1</b>		3.23	0.819	0.239	AU/mL
SARS-CoV-2 Spike (B.1.617.2; AY.4) <b>Alt Seq 2</b>		3.73	1.02	0.276	AU/mL
SARS-CoV-2 Spike (B.1.617.2+ ΔY144)		2.77	0.644	0.243	AU/mL
SARS-CoV-2 Spike (B.1.617.3)		1.48	0.634	0.140	AU/mL
SARS-CoV-2 Spike (B.1.618)		1.56	0.596	0.187	AU/mL
SARS-CoV-2 Spike (B.1.620)		0.878	0.157	0.101	AU/mL
SARS-CoV-2 Spike (B.1.621)		1.13	0.569	0.254	AU/mL
SARS-CoV-2 Spike (B.1.640.2)		1.72	0.228	0.185	AU/mL
SARS-CoV-2 Spike (BA.1+L452R)		0.442	0.0962	<LLOQ	AU/mL
SARS-CoV-2 Spike (BA.1+R346K)		0.271	<LLOQ	<LLOQ	AU/mL
SARS-CoV-2 Spike (BA.2)		0.819	0.114	0.0712	AU/mL
SARS-CoV-2 Spike (BA.3)		0.266	0.0518	<LLOQ	AU/mL
SARS-CoV-2 Spike (BV-1)		1.68	0.57	0.239	AU/mL
SARS-CoV-2 Spike (C.37)		1.59	0.482	0.155	AU/mL

**Note:** Alternative S-GENE mutations for Spike of AY.1, AY.2, and B.1.617.2 are listed as **Alt Seq #**.



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SARS-CoV-2 Spike (D614G)		4.12	1.41	0.642	AU/mL
SARS-CoV-2 Spike (P.1)		1.56	0.799	0.214	AU/mL
SARS-CoV-2 Spike (P.2)		1.98	0.819	0.273	AU/mL
SARS-CoV-2 Spike (P.3)		0.553	0.144	0.0442	AU/mL
SARS-CoV-2 Spike (R.1)		1.16	0.603	0.236	AU/mL
<b>Other Coronaviruses</b>					
SARS-CoV-1 Spike		0.138	<LLOQ	<LLOQ	AU/mL
MERS-CoV Spike		0.100	<LLOQ	<LLOQ	AU/mL
HCoV-229E Spike		<LLOQ	<LLOQ	<LLOQ	AU/mL
HCoV-HKU1 Spike		0.210	<LLOQ	<LLOQ	AU/mL
HCoV-NL63 Spike		<LLOQ	<LLOQ	<LLOQ	AU/mL
HCoV-OC43 Spike		0.108	0.0410	<LLOQ	AU/mL
<b>Other Respiratory Viruses</b>					
Flu A/HongKong H3		<LLOQ	<LLOQ	<LLOQ	AU/mL
Flu A/Michigan H1		0.292	0.080	<LLOQ	AU/mL
Flu A/Shanghai H7		<LLOQ	<LLOQ	<LLOQ	AU/mL
Flu B/Brisbane HA		1.07	0.520	0.0870	AU/mL
Flu B/Phuket HA		1.50	0.685	0.132	AU/mL
RSV Pre-Fusion F		0.308	<LLOQ	<LLOQ	AU/mL

**Concentration Assignment of IgM Antibodies (1:5000 dilution-adjusted):**

Assay	Alternate Name	Control 1.1	Control 1.2	Control 1.3	UOM
<b>SARS-CoV-2</b>					
SARS-CoV-2 Nucleocapsid		6700	1610	2360	AU/mL
SARS-CoV-2 S1 NTD		760	385	130	AU/mL
SARS-CoV-2 S1 RBD		15650	3455	2285	AU/mL
SARS-CoV-2 Spike		18500	6050	3070	AU/mL
SARS-CoV-2 S1 RBD (A.23.1)	V367F	15900	3775	2710	AU/mL
SARS-CoV-2 S1 RBD (A.VOI.V2)	R346K, T478R, E484K	7600	285	3370	AU/mL
SARS-CoV-2 S1 RBD (AY.1)	K417N, L452R, T478K	14000	3615	1040	AU/mL
SARS-CoV-2 S1 RBD (AY.2)	K417N, L452R, T478K	14000	3615	1040	AU/mL
SARS-CoV-2 S1 RBD (AY.3)	L452R, T478K; RBD (Delta)	13950	3170	1075	AU/mL
SARS-CoV-2 S1 RBD (AY.4)	L452R, T478K; RBD (Delta)	13950	3170	1075	AU/mL
SARS-CoV-2 S1 RBD (AY.4.2)	L452R, T478K; RBD (Delta)	13950	3170	1075	AU/mL
SARS-CoV-2 S1 RBD (AY.5)	L452R, T478K; RBD (Delta)	13950	3170	1075	AU/mL
SARS-CoV-2 S1 RBD (AY.6)	L452R, T478K; RBD (Delta)	13950	3170	1075	AU/mL
SARS-CoV-2 S1 RBD (AY.7)	L452R, T478K; RBD (Delta)	13950	3170	1075	AU/mL
SARS-CoV-2 S1 RBD (AY.12)	L452R, T478K; RBD (Delta)	13950	3170	1075	AU/mL
SARS-CoV-2 S1 RBD (AY.14)	L452R, T478K; RBD (Delta)	13950	3170	1075	AU/mL
SARS-CoV-2 S1 RBD (B.1.1.519)	T478K	9950	2310	1735	AU/mL
SARS-CoV-2 S1 RBD (B.1.1.529; BA.1)	G339D, S371L, S373P, S375F, K417N, N440K, G446S, S477N, T478K, E484A, Q493R, G496S, Q498R, N501Y, Y505H; RBD (Omicron; BA.1)	545	116.5	119	AU/mL
SARS-CoV-2 S1 RBD (B.1.1.7)	N501Y; RBD (Alpha)	7450	1890	1260	AU/mL

**Note:** Alternative S-GENE mutations for Spike of AY.1, AY.2, and B.1.617.2 are listed as **Alt Seq #**.



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SARS-CoV-2 S1 RBD (B.1.1.7+E484K)	E484K, N501Y	4785	635	1280	AU/mL
SARS-CoV-2 S1 RBD (B.1.214.2)	Q414K, N450K	9600	2485	1180	AU/mL
SARS-CoV-2 S1 RBD (B.1.258.17)	N439K	7800	1935	1455	AU/mL
SARS-CoV-2 S1 RBD (B.1.351)	K417N, E484K, N501Y; RBD (Beta)	<LLOQ	<LLOQ	<LLOQ	AU/mL
SARS-CoV-2 S1 RBD (B.1.351.1)	K417N, E484K, N501Y; RBD (Beta)	<LLOQ	<LLOQ	<LLOQ	AU/mL
SARS-CoV-2 S1 RBD (B.1.427)	L452R	9000	2205	860	AU/mL
SARS-CoV-2 S1 RBD (B.1.429)	L452R	9000	2205	860	AU/mL
SARS-CoV-2 S1 RBD (B.1.466.2)	N439K	7800	1935	1455	AU/mL
SARS-CoV-2 S1 RBD (B.1.525)	E484K	2630	525	473.5	AU/mL
SARS-CoV-2 S1 RBD (B.1.526)	E484K	2630	525	473.5	AU/mL
SARS-CoV-2 S1 RBD (B.1.526.1)	L452R	9000	2205	860	AU/mL
SARS-CoV-2 S1 RBD (B.1.526.2)	S477N	7800	1985	1365	AU/mL
SARS-CoV-2 S1 RBD (B.1.617)	L452R, E484Q	5500	1055	2890	AU/mL
SARS-CoV-2 S1 RBD (B.1.617.1)	L452R, E484Q	5500	1055	2890	AU/mL
SARS-CoV-2 S1 RBD (B.1.617.2)	L452R, T478K; RBD (Delta)	13950	3170	1075	AU/mL
SARS-CoV-2 S1 RBD (B.1.617.2+ΔY144)	L452R, T478K; RBD (Delta)	13950	3170	1075	AU/mL
SARS-CoV-2 S1 RBD (B.1.617.3)	L452R, E484Q	5500	1055	2890	AU/mL
SARS-CoV-2 S1 RBD (B.1.618)	E484K	2630	525	473.5	AU/mL
SARS-CoV-2 S1 RBD (B.1.620)	S477N, E484K	6850	2795	2190	AU/mL
SARS-CoV-2 S1 RBD (BA.1.1)	G339D, R346K, S371L, S373P, S375F, K417N, N440K, G446S, S477N, T478K, E484A, Q493R, G496S, Q498R, N501Y, Y505H; RBD (Omicron; BA.1.1)	444	109	77	AU/mL
SARS-CoV-2 S1 RBD (BA.2)	G339D, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, S477N, T478K, E484A, Q493R, Q498R, N501Y, Y505H; RBD (Omicron; BA.2)	975	163.5	191	AU/mL
SARS-CoV-2 S1 RBD (BV-1)	Q493R, N501Y	12450	2760	1675	AU/mL
SARS-CoV-2 S1 RBD (C.37)	L452Q, F490S	9300	1615	935	AU/mL
SARS-CoV-2 S1 RBD (P.1)	K417T, E484K, N501Y; RBD (Gamma)	<LLOQ	<LLOQ	<LLOQ	AU/mL
SARS-CoV-2 S1 RBD (P.2)	E484K	2630	525	473.5	AU/mL
SARS-CoV-2 S1 RBD (P.3)	E484K, N501Y	4785	635	1280	AU/mL
SARS-CoV-2 S1 RBD (R.1)	E484K	2630	525	473.5	AU/mL
SARS-CoV-2 Spike (A.23.1)		21600	9950	3820	AU/mL
SARS-CoV-2 Spike (A.VOL.V2)		6100	1245	1305	AU/mL
SARS-CoV-2 Spike (AY.1)		12500	3395	1110	AU/mL
SARS-CoV-2 Spike (AY.1) <b>Alt Seq 1</b>		11900	4065	1125	AU/mL
SARS-CoV-2 Spike (AY.2)		16100	4215	1350	AU/mL
SARS-CoV-2 Spike (AY.2) <b>Alt Seq 1</b>		11400	3415	990	AU/mL

**Note:** Alternative S-GENE mutations for Spike of AY.1, AY.2, and B.1.617.2 are listed as **Alt Seq #**.



**CERTIFICATE OF ANALYSIS**

SARS-CoV-2 Spike (AY.12)		10900	3480	945	AU/mL
SARS-CoV-2 Spike (AY.4.2)		17600	4535	1405	AU/mL
SARS-CoV-2 Spike (B.1.1.519)		15350	5000	2270	AU/mL
SARS-CoV-2 Spike (B.1.1.529; BA.1)		1045	202	104.5	AU/mL
SARS-CoV-2 Spike (B.1.1.7)		13200	3900	1935	AU/mL
SARS-CoV-2 Spike (B.1.1.7+E484K)		8150	2860	1590	AU/mL
SARS-CoV-2 Spike (B.1.258.17)		22400	9550	3420	AU/mL
SARS-CoV-2 Spike (B.1.351)		4400	2185	465	AU/mL
SARS-CoV-2 Spike (B.1.351.1)		13850	7550	2260	AU/mL
SARS-CoV-2 Spike (B.1.429)		15950	3205	1230	AU/mL
SARS-CoV-2 Spike (B.1.466.2)		18300	6850	2500	AU/mL
SARS-CoV-2 Spike (B.1.525)		7600	2700	1310	AU/mL
SARS-CoV-2 Spike (B.1.526)		10050	5050	1705	AU/mL
SARS-CoV-2 Spike (B.1.526.1)		16400	3980	1920	AU/mL
SARS-CoV-2 Spike (B.1.617)		9600	4775	1570	AU/mL
SARS-CoV-2 Spike (B.1.617.1)		6250	2740	795	AU/mL
SARS-CoV-2 Spike (B.1.617.2)		13700	2590	825	AU/mL
SARS-CoV-2 Spike (B.1.617.2 +1)		4560	2215	440.5	AU/mL
SARS-CoV-2 Spike (B.1.617.2 +2)		3815	2070	362	AU/mL
SARS-CoV-2 Spike (B.1.617.2 +3)		4750	2470	458	AU/mL
SARS-CoV-2 Spike (B.1.617.2 +4)		3930	2045	425	AU/mL
SARS-CoV-2 Spike (B.1.617.2; AY.3; AY.5; AY.6; AY.7; AY.14) <b>Alt Seq 1</b>		16150	4095	1195	AU/mL
SARS-CoV-2 Spike (B.1.617.2; AY.4) <b>Alt Seq 2</b>		18650	5100	1380	AU/mL
SARS-CoV-2 Spike (B.1.617.2+ ΔY144)		13850	3220	1215	AU/mL
SARS-CoV-2 Spike (B.1.617.3)		7400	3170	700	AU/mL
SARS-CoV-2 Spike (B.1.618)		7800	2980	935	AU/mL
SARS-CoV-2 Spike (B.1.620)		4390	785	505	AU/mL
SARS-CoV-2 Spike (B.1.621)		5650	2845	1270	AU/mL
SARS-CoV-2 Spike (B.1.640.2)		8600	1140	925	AU/mL
SARS-CoV-2 Spike (BA.1+L452R)		2210	481	<LLOQ	AU/mL
SARS-CoV-2 Spike (BA.1+R346K)		1355	<LLOQ	<LLOQ	AU/mL
SARS-CoV-2 Spike (BA.2)		4095	570	356	AU/mL
SARS-CoV-2 Spike (BA.3)		1330	259	<LLOQ	AU/mL
SARS-CoV-2 Spike (BV-1)		8400	2850	1195	AU/mL
SARS-CoV-2 Spike (C.37)		7950	2410	775	AU/mL
SARS-CoV-2 Spike (D614G)		20600	7050	3210	AU/mL
SARS-CoV-2 Spike (P.1)		7800	3995	1070	AU/mL
SARS-CoV-2 Spike (P.2)		9900	4095	1365	AU/mL
SARS-CoV-2 Spike (P.3)		2765	720	221	AU/mL
SARS-CoV-2 Spike (R.1)		5800	3015	1180	AU/mL
<b>Other Coronaviruses</b>					
SARS-CoV-1 Spike		690	<LLOQ	<LLOQ	AU/mL
MERS-CoV Spike		500	<LLOQ	<LLOQ	AU/mL
HCoV-229E Spike		<LLOQ	<LLOQ	<LLOQ	AU/mL
HCoV-HKU1 Spike		1050	<LLOQ	<LLOQ	AU/mL
HCoV-NL63 Spike		<LLOQ	<LLOQ	<LLOQ	AU/mL

**Note:** Alternative S-GENE mutations for Spike of AY.1, AY.2, and B.1.617.2 are listed as **Alt Seq #**.



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HCoV-OC43 Spike		540	205	<LLOQ	AU/mL
<b>Other Respiratory Viruses</b>					
Flu A/HongKong H3		<LLOQ	<LLOQ	<LLOQ	AU/mL
Flu A/Michigan H1		1460	400	<LLOQ	AU/mL
Flu A/Shanghai H7		<LLOQ	<LLOQ	<LLOQ	AU/mL
Flu B/Brisbane HA		5350	2600	435	AU/mL
Flu B/Phuket HA		7500	3425	660	AU/mL
RSV Pre-Fusion F		1540	<LLOQ	<LLOQ	AU/mL

**Concentration Assignment of IgA Antibodies (vial):**

Assay	Alternate Name	Control 1.1	Control 1.2	Control 1.3	UOM
<b>SARS-CoV-2</b>					
SARS-CoV-2 Nucleocapsid		3.44	0.185	0.875	AU/mL
SARS-CoV-2 S1 NTD		0.52	0.186	0.072	AU/mL
SARS-CoV-2 S1 RBD		1.85	0.285	0.975	AU/mL
SARS-CoV-2 Spike		2.68	0.609	0.877	AU/mL
SARS-CoV-2 S1 RBD (A.23.1)	V367F	2.08	0.283	0.783	AU/mL
SARS-CoV-2 S1 RBD (A.VOI.V2)	R346K, T478R, E484K	0.336	0.0811	0.0633	AU/mL
SARS-CoV-2 S1 RBD (AY.1)	K417N, L452R, T478K	1.14	0.254	0.220	AU/mL
SARS-CoV-2 S1 RBD (AY.2)	K417N, L452R, T478K	1.14	0.254	0.220	AU/mL
SARS-CoV-2 S1 RBD (AY.3)	L452R, T478K; RBD (Delta)	1.07	0.215	0.223	AU/mL
SARS-CoV-2 S1 RBD (AY.4)	L452R, T478K; RBD (Delta)	1.07	0.215	0.223	AU/mL
SARS-CoV-2 S1 RBD (AY.4.2)	L452R, T478K; RBD (Delta)	1.07	0.215	0.223	AU/mL
SARS-CoV-2 S1 RBD (AY.5)	L452R, T478K; RBD (Delta)	1.07	0.215	0.223	AU/mL
SARS-CoV-2 S1 RBD (AY.6)	L452R, T478K; RBD (Delta)	1.07	0.215	0.223	AU/mL
SARS-CoV-2 S1 RBD (AY.7)	L452R, T478K; RBD (Delta)	1.07	0.215	0.223	AU/mL
SARS-CoV-2 S1 RBD (AY.12)	L452R, T478K; RBD (Delta)	1.07	0.215	0.223	AU/mL
SARS-CoV-2 S1 RBD (AY.14)	L452R, T478K; RBD (Delta)	1.07	0.215	0.223	AU/mL
SARS-CoV-2 S1 RBD (B.1.1.519)	T478K	1.36	0.222	0.572	AU/mL
SARS-CoV-2 S1 RBD (B.1.1.529; BA.1)	G339D, S371L, S373P, S375F, K417N, N440K, G446S, S477N, T478K, E484A, Q493R, G496S, Q498R, N501Y, Y505H; RBD (Omicron; BA.1)	0.0966	0.0261	0.0969	AU/mL
SARS-CoV-2 S1 RBD (B.1.1.7)	N501Y; RBD (Alpha)	1.44	0.228	0.635	AU/mL
SARS-CoV-2 S1 RBD (B.1.1.7+E484K)	E484K, N501Y	0.492	0.0662	0.106	AU/mL
SARS-CoV-2 S1 RBD (B.1.214.2)	Q414K, N450K	1.24	0.176	0.551	AU/mL
SARS-CoV-2 S1 RBD (B.1.258.17)	N439K	0.741	0.133	0.507	AU/mL
SARS-CoV-2 S1 RBD (B.1.351)	K417N, E484K, N501Y; RBD (Beta)	0.201	0.04	0.043	AU/mL
SARS-CoV-2 S1 RBD (B.1.351.1)	K417N, E484K, N501Y; RBD (Beta)	0.201	0.04	0.043	AU/mL
SARS-CoV-2 S1 RBD (B.1.427)	L452R	1.03	0.216	0.194	AU/mL
SARS-CoV-2 S1 RBD (B.1.429)	L452R	1.03	0.216	0.194	AU/mL

**Note:** Alternative S-GENE mutations for Spike of AY.1, AY.2, and B.1.617.2 are listed as **Alt Seq #**.





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SARS-CoV-2 S1 RBD (B.1.466.2)	N439K	0.741	0.133	0.507	AU/mL
SARS-CoV-2 S1 RBD (B.1.525)	E484K	0.316	0.0591	0.0733	AU/mL
SARS-CoV-2 S1 RBD (B.1.526)	E484K	0.316	0.0591	0.0733	AU/mL
SARS-CoV-2 S1 RBD (B.1.526.1)	L452R	1.03	0.216	0.194	AU/mL
SARS-CoV-2 S1 RBD (B.1.526.2)	S477N	1.68	0.259	0.653	AU/mL
SARS-CoV-2 S1 RBD (B.1.617)	L452R, E484Q	1.03	0.185	0.189	AU/mL
SARS-CoV-2 S1 RBD (B.1.617.1)	L452R, E484Q	1.03	0.185	0.189	AU/mL
SARS-CoV-2 S1 RBD (B.1.617.2)	L452R, T478K; RBD (Delta)	1.07	0.215	0.223	AU/mL
SARS-CoV-2 S1 RBD (B.1.617.2+ΔY144)	L452R, T478K; RBD (Delta)	1.07	0.215	0.223	AU/mL
SARS-CoV-2 S1 RBD (B.1.617.3)	L452R, E484Q	1.03	0.185	0.189	AU/mL
SARS-CoV-2 S1 RBD (B.1.618)	E484K	0.316	0.059	0.073	AU/mL
SARS-CoV-2 S1 RBD (B.1.620)	S477N, E484K	0.388	0.0624	0.0891	AU/mL
SARS-CoV-2 S1 RBD (BA.1.1)	G339D, R346K, S371L, S373P, S375F, K417N, N440K, G446S, S477N, T478K, E484A, Q493R, G496S, Q498R, N501Y, Y505H; RBD (Omicron; BA.1.1)	0.0896	0.025	0.0506	AU/mL
SARS-CoV-2 S1 RBD (BA.2)	G339D, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, S477N, T478K, E484A, Q493R, Q498R, N501Y, Y505H; RBD (Omicron; BA.2)	0.165	0.0455	0.0976	AU/mL
SARS-CoV-2 S1 RBD (BV-1)	Q493R, N501Y	1.16	0.167	0.650	AU/mL
SARS-CoV-2 S1 RBD (C.37)	L452Q, F490S	0.784	0.148	0.0942	AU/mL
SARS-CoV-2 S1 RBD (P.1)	K417T, E484K, N501Y; RBD (Gamma)	0.386	0.08	0.086	AU/mL
SARS-CoV-2 S1 RBD (P.2)	E484K	0.316	0.0591	0.0733	AU/mL
SARS-CoV-2 S1 RBD (P.3)	E484K, N501Y	0.492	0.0662	0.106	AU/mL
SARS-CoV-2 S1 RBD (R.1)	E484K	0.316	0.0591	0.0733	AU/mL
SARS-CoV-2 Spike (A.23.1)		2.93	0.94	0.889	AU/mL
SARS-CoV-2 Spike (A.VOI.V2)		1.31	0.50	0.22	AU/mL
SARS-CoV-2 Spike (AY.1)		1.69	0.61	0.29	AU/mL
SARS-CoV-2 Spike (AY.1) <b>Alt Seq 1</b>		1.46	0.609	0.285	AU/mL
SARS-CoV-2 Spike (AY.2)		2.00	0.86	0.37	AU/mL
SARS-CoV-2 Spike (AY.2) <b>Alt Seq 1</b>		1.46	0.62	0.265	AU/mL
SARS-CoV-2 Spike (AY.12)		1.45	0.649	0.272	AU/mL
SARS-CoV-2 Spike (AY.4.2)		1.72	0.726	0.311	AU/mL
SARS-CoV-2 Spike (B.1.1.519)		2.13	0.714	0.706	AU/mL
SARS-CoV-2 Spike (B.1.1.529; BA.1)		0.435	0.0676	0.0524	AU/mL
SARS-CoV-2 Spike (B.1.1.7)		2.00	0.550	0.640	AU/mL
SARS-CoV-2 Spike (B.1.1.7+E484K)		1.74	0.608	0.292	AU/mL
SARS-CoV-2 Spike (B.1.258.17)		3.02	1.29	0.929	AU/mL
SARS-CoV-2 Spike (B.1.351)		1.12	0.391	0.161	AU/mL
SARS-CoV-2 Spike (B.1.351.1)		1.89	0.792	0.306	AU/mL

**Note:** Alternative S-GENE mutations for Spike of AY.1, AY.2, and B.1.617.2 are listed as **Alt Seq #**.





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SARS-CoV-2 Spike (B.1.429)		2.04	0.730	0.322	AU/mL
SARS-CoV-2 Spike (B.1.466.2)		2.67	0.839	0.927	AU/mL
SARS-CoV-2 Spike (B.1.525)		1.43	0.496	0.224	AU/mL
SARS-CoV-2 Spike (B.1.526)		1.57	0.916	0.312	AU/mL
SARS-CoV-2 Spike (B.1.526.1)		1.76	0.594	0.284	AU/mL
SARS-CoV-2 Spike (B.1.617)		2.05	1.04	0.375	AU/mL
SARS-CoV-2 Spike (B.1.617.1)		1.29	0.503	0.184	AU/mL
SARS-CoV-2 Spike (B.1.617.2)		1.37	0.663	0.265	AU/mL
SARS-CoV-2 Spike (B.1.617.2 +1)		1.02	0.493	0.139	AU/mL
SARS-CoV-2 Spike (B.1.617.2 +2)		0.862	0.464	0.116	AU/mL
SARS-CoV-2 Spike (B.1.617.2 +3)		1.08	0.548	0.150	AU/mL
SARS-CoV-2 Spike (B.1.617.2 +4)		0.895	0.519	0.129	AU/mL
SARS-CoV-2 Spike (B.1.617.2; AY.3; AY.5; AY.6; AY.7; AY.14) <b>Alt Seq 1</b>		1.79	0.740	0.344	AU/mL
SARS-CoV-2 Spike (B.1.617.2; AY.4) <b>Alt Seq 2</b>		1.87	0.846	0.371	AU/mL
SARS-CoV-2 Spike (B.1.617.2+ ΔY144)		1.60	0.628	0.251	AU/mL
SARS-CoV-2 Spike (B.1.617.3)		1.42	0.925	0.277	AU/mL
SARS-CoV-2 Spike (B.1.618)		1.83	0.792	0.307	AU/mL
SARS-CoV-2 Spike (B.1.620)		0.947	0.281	0.150	AU/mL
SARS-CoV-2 Spike (B.1.621)		1.12	0.588	0.204	AU/mL
SARS-CoV-2 Spike (B.1.640.2)		0.782	0.0981	0.0797	AU/mL
SARS-CoV-2 Spike (BA.1+L452R)		0.224	0.0319	<LLOQ	AU/mL
SARS-CoV-2 Spike (BA.1+R346K)		0.129	<LLOQ	<LLOQ	AU/mL
SARS-CoV-2 Spike (BA.2)		0.557	0.157	0.103	AU/mL
SARS-CoV-2 Spike (BA.3)		0.141	<LLOQ	<LLOQ	AU/mL
SARS-CoV-2 Spike (BV-1)		1.54	0.498	0.611	AU/mL
SARS-CoV-2 Spike (C.37)		1.15	0.483	0.159	AU/mL
SARS-CoV-2 Spike (D614G)		2.99	1.04	0.815	AU/mL
SARS-CoV-2 Spike (P.1)		1.41	0.398	0.183	AU/mL
SARS-CoV-2 Spike (P.2)		1.97	0.79	0.323	AU/mL
SARS-CoV-2 Spike (P.3)		0.613	0.229	0.0893	AU/mL
SARS-CoV-2 Spike (R.1)		1.31	0.60	0.218	AU/mL
<b>Other Coronaviruses</b>					
SARS-CoV-1 Spike		0.633	0.086	0.074	AU/mL
MERS-CoV Spike		1.49	1.40	0.134	AU/mL
HCoV-229E Spike		2.28	0.618	0.218	AU/mL
HCoV-HKU1 Spike		3.36	1.04	0.292	AU/mL
HCoV-NL63 Spike		1.22	0.343	<LLOQ	AU/mL
HCoV-OC43 Spike		8.72	3.16	1.04	AU/mL
<b>Other Respiratory Viruses</b>					
Flu A/HongKong H3		3.68	0.328	0.209	AU/mL
Flu A/Michigan H1		5.43	0.392	0.1	AU/mL
Flu A/Shanghai H7		>ULOQ	0.145	<LLOQ	AU/mL
Flu B/Brisbane HA		10.4	1.90	0.512	AU/mL
Flu B/Phuket HA		12.9	1.83	0.745	AU/mL
RSV Pre-Fusion F		14.5	3.62	0.871	AU/mL

**Note:** Alternative S-GENE mutations for Spike of AY.1, AY.2, and B.1.617.2 are listed as **Alt Seq #**.



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**Concentration Assignment of IgA Antibodies (1:5000 dilution-adjusted):**

Assay	Alternate Name	Control 1.1	Control 1.2	Control 1.3	UOM
<b>SARS-CoV-2</b>					
SARS-CoV-2 Nucleocapsid		17200	925	4375	AU/mL
SARS-CoV-2 S1 NTD		2600	930	360	AU/mL
SARS-CoV-2 S1 RBD		9250	1425	4875	AU/mL
SARS-CoV-2 Spike		13400	3045	4385	AU/mL
SARS-CoV-2 S1 RBD (A.23.1)	V367F	10400	1415	3915	AU/mL
SARS-CoV-2 S1 RBD (A.VOI.V2)	R346K, T478R, E484K	1680	405.5	316.5	AU/mL
SARS-CoV-2 S1 RBD (AY.1)	K417N, L452R, T478K	5700	1270	1100	AU/mL
SARS-CoV-2 S1 RBD (AY.2)	K417N, L452R, T478K	5700	1270	1100	AU/mL
SARS-CoV-2 S1 RBD (AY.3)	L452R, T478K; RBD (Delta)	5350	1075	1115	AU/mL
SARS-CoV-2 S1 RBD (AY.4)	L452R, T478K; RBD (Delta)	5350	1075	1115	AU/mL
SARS-CoV-2 S1 RBD (AY.4.2)	L452R, T478K; RBD (Delta)	5350	1075	1115	AU/mL
SARS-CoV-2 S1 RBD (AY.5)	L452R, T478K; RBD (Delta)	5350	1075	1115	AU/mL
SARS-CoV-2 S1 RBD (AY.6)	L452R, T478K; RBD (Delta)	5350	1075	1115	AU/mL
SARS-CoV-2 S1 RBD (AY.7)	L452R, T478K; RBD (Delta)	5350	1075	1115	AU/mL
SARS-CoV-2 S1 RBD (AY.12)	L452R, T478K; RBD (Delta)	5350	1075	1115	AU/mL
SARS-CoV-2 S1 RBD (AY.14)	L452R, T478K; RBD (Delta)	5350	1075	1115	AU/mL
SARS-CoV-2 S1 RBD (B.1.1.519)	T478K	6800	1110	2860	AU/mL
SARS-CoV-2 S1 RBD (B.1.1.529; BA.1)	G339D, S371L, S373P, S375F, K417N, N440K, G446S, S477N, T478K, E484A, Q493R, G496S, Q498R, N501Y, Y505H; RBD (Omicron; BA.1)	483	130.5	484.5	AU/mL
SARS-CoV-2 S1 RBD (B.1.1.7)	N501Y; RBD (Alpha)	7200	1140	3175	AU/mL
SARS-CoV-2 S1 RBD (B.1.1.7+E484K)	E484K, N501Y	2460	331	530	AU/mL
SARS-CoV-2 S1 RBD (B.1.214.2)	Q414K, N450K	6200	880	2755	AU/mL
SARS-CoV-2 S1 RBD (B.1.258.17)	N439K	3705	665	2535	AU/mL
SARS-CoV-2 S1 RBD (B.1.351)	K417N, E484K, N501Y; RBD (Beta)	1005	200	215	AU/mL
SARS-CoV-2 S1 RBD (B.1.351.1)	K417N, E484K, N501Y; RBD (Beta)	1005	200	215	AU/mL
SARS-CoV-2 S1 RBD (B.1.427)	L452R	5150	1080	970	AU/mL
SARS-CoV-2 S1 RBD (B.1.429)	L452R	5150	1080	970	AU/mL
SARS-CoV-2 S1 RBD (B.1.466.2)	N439K	3705	665	2535	AU/mL
SARS-CoV-2 S1 RBD (B.1.525)	E484K	1580	295.5	366.5	AU/mL
SARS-CoV-2 S1 RBD (B.1.526)	E484K	1580	295.5	366.5	AU/mL
SARS-CoV-2 S1 RBD (B.1.526.1)	L452R	5150	1080	970	AU/mL
SARS-CoV-2 S1 RBD (B.1.526.2)	S477N	8400	1295	3265	AU/mL
SARS-CoV-2 S1 RBD (B.1.617)	L452R, E484Q	5150	925	945	AU/mL
SARS-CoV-2 S1 RBD (B.1.617.1)	L452R, E484Q	5150	925	945	AU/mL
SARS-CoV-2 S1 RBD (B.1.617.2)	L452R, T478K; RBD (Delta)	5350	1075	1115	AU/mL
SARS-CoV-2 S1 RBD (B.1.617.2+ΔY144)	L452R, T478K; RBD (Delta)	5350	1075	1115	AU/mL
SARS-CoV-2 S1 RBD (B.1.617.3)	L452R, E484Q	5150	925	945	AU/mL

**Note:** Alternative S-GENE mutations for Spike of AY.1, AY.2, and B.1.617.2 are listed as **Alt Seq #**.



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SARS-CoV-2 S1 RBD (B.1.618)	E484K	1580	295.5	366.5	AU/mL
SARS-CoV-2 S1 RBD (B.1.620)	S477N, E484K	1940	312	445.5	AU/mL
SARS-CoV-2 S1 RBD (BA.1.1)	G339D, R346K, S371L, S373P, S375F, K417N, N440K, G446S, S477N, T478K, E484A, Q493R, G496S, Q498R, N501Y, Y505H; RBD (Omicron; BA.1.1)	448	125	253	AU/mL
SARS-CoV-2 S1 RBD (BA.2)	G339D, S371F, S373P, S375F, T376A, D405N, R408S, K417N, N440K, S477N, T478K, E484A, Q493R, Q498R, N501Y, Y505H; RBD (Omicron; BA.2)	825	227.5	488	AU/mL
SARS-CoV-2 S1 RBD (BV-1)	Q493R, N501Y	5800	835	3250	AU/mL
SARS-CoV-2 S1 RBD (C.37)	L452Q, F490S	3920	740	471	AU/mL
SARS-CoV-2 S1 RBD (P.1)	K417T, E484K, N501Y; RBD (Gamma)	1930	400	430	AU/mL
SARS-CoV-2 S1 RBD (P.2)	E484K	1580	295.5	366.5	AU/mL
SARS-CoV-2 S1 RBD (P.3)	E484K, N501Y	2460	331	530	AU/mL
SARS-CoV-2 S1 RBD (R.1)	E484K	1580	296	367	AU/mL
SARS-CoV-2 Spike (A.23.1)		14650	4700	4445	AU/mL
SARS-CoV-2 Spike (A.VOLV2)		6550	2480	1110	AU/mL
SARS-CoV-2 Spike (AY.1)		8450	3055	1450	AU/mL
SARS-CoV-2 Spike (AY.1) <b>Alt Seq 1</b>		7300	3045	1425	AU/mL
SARS-CoV-2 Spike (AY.2)		10000	4295	1835	AU/mL
SARS-CoV-2 Spike (AY.2) <b>Alt Seq 1</b>		7300	3100	1325	AU/mL
SARS-CoV-2 Spike (AY.12)		7250	3245	1360	AU/mL
SARS-CoV-2 Spike (AY.4.2)		8600	3630	1555	AU/mL
SARS-CoV-2 Spike (B.1.1.519)		10650	3570	3530	AU/mL
SARS-CoV-2 Spike (B.1.1.529; BA.1)		2175	338	262	AU/mL
SARS-CoV-2 Spike (B.1.1.7)		10000	2750	3200	AU/mL
SARS-CoV-2 Spike (B.1.1.7+E484K)		8700	3040	1460	AU/mL
SARS-CoV-2 Spike (B.1.258.17)		15100	6450	4645	AU/mL
SARS-CoV-2 Spike (B.1.351)		5600	1955	805	AU/mL
SARS-CoV-2 Spike (B.1.351.1)		9450	3960	1530	AU/mL
SARS-CoV-2 Spike (B.1.429)		10200	3650	1610	AU/mL
SARS-CoV-2 Spike (B.1.466.2)		13350	4195	4635	AU/mL
SARS-CoV-2 Spike (B.1.525)		7150	2480	1120	AU/mL
SARS-CoV-2 Spike (B.1.526)		7850	4580	1560	AU/mL
SARS-CoV-2 Spike (B.1.526.1)		8800	2970	1420	AU/mL
SARS-CoV-2 Spike (B.1.617)		10250	5200	1875	AU/mL
SARS-CoV-2 Spike (B.1.617.1)		6450	2515	920	AU/mL
SARS-CoV-2 Spike (B.1.617.2)		6850	3315	1325	AU/mL
SARS-CoV-2 Spike (B.1.617.2 +1)		5100	2465	695	AU/mL
SARS-CoV-2 Spike (B.1.617.2 +2)		4310	2320	580	AU/mL

**Note:** Alternative S-GENE mutations for Spike of AY.1, AY.2, and B.1.617.2 are listed as **Alt Seq #**.



**CERTIFICATE OF ANALYSIS**

SARS-CoV-2 Spike (B.1.617.2 +3)		5400	2740	750	AU/mL
SARS-CoV-2 Spike (B.1.617.2 +4)		4475	2595	645	AU/mL
SARS-CoV-2 Spike (B.1.617.2; AY.3; AY.5; AY.6; AY.7; AY.14) <b>Alt Seq 1</b>		8950	3700	1720	AU/mL
SARS-CoV-2 Spike (B.1.617.2; AY.4) <b>Alt Seq 2</b>		9350	4230	1855	AU/mL
SARS-CoV-2 Spike (B.1.617.2+ ΔY144)		8000	3140	1255	AU/mL
SARS-CoV-2 Spike (B.1.617.3)		7100	4625	1385	AU/mL
SARS-CoV-2 Spike (B.1.618)		9150	3960	1535	AU/mL
SARS-CoV-2 Spike (B.1.620)		4735	1405	750	AU/mL
SARS-CoV-2 Spike (B.1.621)		5600	2940	1020	AU/mL
SARS-CoV-2 Spike (B.1.640.2)		3910	490.5	398.5	AU/mL
SARS-CoV-2 Spike (BA.1+L452R)		1120	159.5	<LLOQ	AU/mL
SARS-CoV-2 Spike (BA.1+R346K)		645	<LLOQ	<LLOQ	AU/mL
SARS-CoV-2 Spike (BA.2)		2785	785	515	AU/mL
SARS-CoV-2 Spike (BA.3)		705	<LLOQ	<LLOQ	AU/mL
SARS-CoV-2 Spike (BV-1)		7700	2490	3055	AU/mL
SARS-CoV-2 Spike (C.37)		5750	2415	795	AU/mL
SARS-CoV-2 Spike (D614G)		14950	5200	4075	AU/mL
SARS-CoV-2 Spike (P.1)		7050	1990	915	AU/mL
SARS-CoV-2 Spike (P.2)		9850	3950	1615	AU/mL
SARS-CoV-2 Spike (P.3)		3065	1145	446.5	AU/mL
SARS-CoV-2 Spike (R.1)		6550	3000	1090	AU/mL
<b>Other Coronaviruses</b>					
SARS-CoV-1 Spike		3165	430	370	AU/mL
MERS-CoV Spike		7450	7000	670	AU/mL
HCoV-229E Spike		11400	3090	1090	AU/mL
HCoV-HKU1 Spike		16800	5200	1460	AU/mL
HCoV-NL63 Spike		6100	1715	<LLOQ	AU/mL
HCoV-OC43 Spike		43600	15800	5200	AU/mL
<b>Other Respiratory Viruses</b>					
Flu A/HongKong H3		18400	1640	1045	AU/mL
Flu A/Michigan H1		27150	1960	500	AU/mL
Flu A/Shanghai H7		>ULOQ	725	<LLOQ	AU/mL
Flu B/Brisbane HA		52000	9500	2560	AU/mL
Flu B/Phuket HA		64500	9150	3725	AU/mL
RSV Pre-Fusion F		72500	18100	4355	AU/mL

This product was manufactured and tested according to MSD documents. This lot meets MSD’s specifications. This product is intended for Research Use Only. Not for use in Diagnostic Procedures.

	Name	Function	Signature	Date
<b>Review/Approval</b>	Karen Hamilla	Quality		05 Jan 2023

**Note:** Alternative S-GENE mutations for Spike of AY.1, AY.2, and B.1.617.2 are listed as **Alt Seq #**.