EMERGENCY USE AUTHORIZATION (EUA) SUMMARY

UCSD EXCITE COVID-19 EL Test

For In vitro Diagnostic Use
For use under Emergency Use Authorization (EUA) only
For prescription use only
For use with anterior nasal swabs collected with adult assistance from individuals 2 years of age or older, or self-collected by any individuals 15 years of age or older

INTENDED USE

The UCSD EXCITE COVID-19 EL Test is an in vitro diagnostic real-time reverse transcription polymerase chain reaction (RT-PCR) test for the qualitative detection of nucleic acid from SARS-CoV-2 in anterior nasal swab specimens that are either Healthcare Provider collected from individuals of any age, or collected at home (which includes in a community-based setting), with adult assistance from individuals 2 years of age or older, or self-collected by any individuals 15 years of age or older including individuals without symptoms or other reasons to suspect COVID-19 when determine to be appropriate by a healthcare provider using the UCSD EXCITE COVID-19 EL Sampling Kit.

Anterior nasal swab specimens collected at home or at a testing site and dropped off at temperature-controlled collection sites are transported within 36 hours at ambient temperature to the laboratory for testing.

Testing is limited to UCSD BCG EXCITE Lab located at 9500 Gilman Drive, San Diego, CA 92161 that is certified under the Clinical Laboratory Improvement Amendments of 1988 (CLIA), 42 U.S.C. §263a, and meets requirements to perform high complexity tests.

Results are for the identification of SARS-CoV-2 RNA. The SARS-CoV-2 RNA is generally detectable in nasal swab specimens during the acute phase of infection. Positive results are indicative of the presence of SARS-CoV-2 RNA; clinical correlation with patient history and other diagnostic information is necessary to determine patient infection status. Positive results do not rule out bacterial infection or co-infection with other viruses. The agent detected may not be the definite cause of disease. Laboratories within the United States and its territories are required to report all test results to the appropriate public health authorities.

Negative results do not preclude SARS-CoV-2 infection and should not be used as the sole basis for patient management decisions. Negative results must be combined with clinical observations, patient history, and epidemiological information.

The UCSD EXCITE COVID-19 EL Test is intended for use by clinical laboratory personnel specifically instructed and trained in the techniques of real-time PCR and in vitro diagnostic procedures. The assay is only for use under the Food and Drug Administration’s Emergency Use Authorization.

DEVICE DESCRIPTION AND TEST PRINCIPLE

1. Test Principle

The UCSD EXCITE COVID-19 EL is a real-time reverse transcription polymerase chain reaction (RT-PCR) test based upon the TaqPath COVID-19 Combo Kit. The SARS-CoV-2 primer and probe set(s) is designed to detect RNA from SARS-CoV-2 in nasal swab specimens from patients recommended for testing by public health authority guidelines. The assay simultaneously detects four targets: three SARS-CoV-2 viral targets, the Nucleocapsid gene (N gene), the ORF1ab gene and the Spike protein gene (S gene), and one primer/probe set detecting endogenous RNase P RNA (and DNA) present in the sample as an lysis, RT-PCR, and process control.

This test does not employ an RNA extraction and purification step.

Anterior nares swab specimens are self-collected in MAWI iSwab-Microbiome-EL collection medium using the UCSD EXCITE COVID-19 EL Sampling Kit. Samples in MAWI iSwab-Microbiome-EL collection medium are heated to promote the release of RNA and the heated sample is then directly introduced into the RT-PCR reaction. The RT-PCR is performed with the QuantStudio 7 Pro PCR Real Time PCR Instrument using the QuantStudio RealTime PCR Software v2.5.

2. Collection Device Description

The UCSD EXCITE COVID-19 EL Sampling Kit collects viral RNA from anterior nares swab specimens using MAWI iSwab-Microbiome-EL collection medium. MAWI iSwab-Microbiome EL collection medium has been demonstrated to be non-hazardous. Swabs can be transported and stored at ambient temperature for up to 66 hours (please see sample stability testing study, below) and are to be tested with the molecular UCSD EXCITE COVID-19 EL Test that is authorized for use with the UCSD EXCITE COVID-19 EL Sampling Kit. The UCSD EXCITE COVID-19 Sampling Kit consists of either:

- **Kit A** (for distribution to individuals for home collection without supervision by a healthcare provider or trained staff member): A flocked anterior nares swab, a collection tube containing MAWI iSwab-Microbiome EL collection medium, and specimen collection instructions placed into a recyclable “clamshell” type of container.
- **Kit B** (For use by individuals at a designated testing site under supervision of a healthcare provider or trained staff member): A flocked anterior nares swab and collection tube containing MAWI iSwab-Microbiome EL collection medium. Specimen collection instructions will be displayed at the collection sites.

a) Ordering, Prescription, and Result Communication

Individuals who may be tested under this process are students and employees of UC San Diego or San Diego State University, and have orders placed for COVID-19-RT-PCR testing from the UCSD BCG EXCITE Lab using an Electronic Health Record (such as the UCSD EPIC EHR). Only persons who are registered in the EHR with valid orders are able to access test kits. All UCSD students/employees being tested are registered in the EHR, and the kits are distributed to them either by staff who verify that the person receiving the test is registered, or through using vending machines that are activated using student/employee ID card swipes.

i. Orders for an individual test for an individual patient will be placed using an Electronic Health Record (EHR) system and transmitted to the BCG EXCITE Lab's Laboratory Information System. For tests ordered in this manner, all tested persons will be registered patients of the EHR's health care system. Test results will be transmitted back to the EHRs of the tested individuals. All positive, inconclusive, and invalid results will be communicated to individuals by a health care provider for the health care system by telephone and appropriate follow-up care will be offered at the health care system.

ii. Orders for multiple tests for multiple patients will be placed using an Electronic Health Record (EHR) system and transmitted to the BCG EXCITE Lab's Laboratory Information System. For tests ordered in this manner, all tested persons will be registered patients of the EHR's health care system. Test results will be transmitted back to the EHRs of the tested individuals. All positive, inconclusive, and invalid results will be communicated to individuals by a health care provider for the health care system by telephone and appropriate follow-up care will be offered at the health care system. For tests ordered in this manner, individual sample collection tubes will be linked to individual patients using an application that is accessible using a patient's smartphone or tablet computer, or tablet computer provided by the testing institution. The patient will log into their account, and then use the application to scan the unique barcode on the collection tube. In institutions where this system is in place, Information Technology services will be available 24/7, and at least one testing site staffed by testing personnel will be open during normal business hours to assist patients who encounter barriers with this system.

iii. Orders for individual tests for multiple patients will be placed by direct upload of a spreadsheet into the BCG EXCITE Lab's Laboratory Information System including all demographics needed to link the sample to the patient, and to report results to state and county public health authorities. For tests ordered in this manner, test results will be transmitted back to the ordering physician by spreadsheet.

b) Collection Kit Dispensing

Individuals will have access to the UCSD EXCITE COVID-19 EL Sampling Kit device in the same manner as authorized under EUA210524 and as described here:

- **For Kit A:** Kits are picked up at designated locations on the UCSD and San Diego State University (SDSU) campuses. These locations may be monitored by staff designated by the institution or by security camera within secure badge-access indoor locations, or access to kits may be controlled by use of vending machines or other similar dispensing equipment that controls access to kits using ID badge-activated systems, and which are either located indoors or have a built-in temperature control system to maintain temperature between 15-30 ºC. Vending machines will be activated by patients' ID cards, preventing distribution of test kits to individuals without a test order.
- **For Kit B:** Kits are provided at a designated testing site staffed by a healthcare provider or trained staff member, where instructions are posted.

c) Sample Self-Collection & Transport

At the time of sample collection, the individual being tested will be asked to wash/sanitize their hands, and then utilize a smartphone- or electronic device-accessible student/employee application to link their individual-specific identification code to the unique specimen barcode that is affixed to each collection tube; the application will log the time of sample collection, and this information will be transmitted to the UCSD BCG EXCITE Lab information system. The individual will then collect the sample per the collection instructions. For kit A this is performed unobserved (e.g., at home), for kit B the collection will be under the supervision of the healthcare provider or trained staff member.

- **For Kit A,** the tube containing the sample will then be placed into a drop box that is lined with a large biohazard bag with absorbent pad that will be dropped-off at one of the designated drop boxes on the same day as collection. Drop boxes are in temperature-controlled locations and/or contain electronic monitors that record the minimum and maximum temperature. If the temperature monitor inside the drop box reports that the temperature has been > 40ºC or <4ºC since the last pickup, the samples in the drop box will be rejected and the patients will be asked to submit a new sample. Samples are collected from each collection box within 24 hours, and transported to the testing lab by ground transportation consistent with US Department of Transportation Category B.
- **For Kit B**: Kit distribution and sample collection will be monitored by institutional staff, and the tube containing the sample will then be dropped into a collection bag on site. Samples will be transported within 24 hours of collection. Transport conditions are consistent with US Department of Transportation Category B.

d) Specimen Accessioning:

To minimize the risk of cross-contamination between sample tubes, the outside of each sample tube will be wiped with a disinfectant wipe containing a disinfectant listed in the EPA "List N: Disinfectants for Coronavirus (COVID-19)." Specimens received at the clinical laboratory for testing with the UCSD EXCITE COVID-19 Test will then undergo accessioning prior to acceptance for testing through visual inspection of the specimen according to the following criteria:

- Prescription (Test Order) from testing partner received
- Sample received within 36 hours of collection
- Swab present
- Barcode is present and readable by an electronic scanner.
- Collection tube is undamaged.
- Tube cap is properly screwed onto tube
- Collection tube contains an adequate volume of collection medium (at least 200 µL)
- Specimen has not been frozen or exposed to temperatures < 4 °C or > 40 °C

For specimens that are rejected at the time of accessioning, the ordering physician or designee is notified within 12 hours.

To minimize the risk of cross-contamination between sample tubes, the outside of each sample tube will be wiped with a disinfectant wipe containing a disinfectant listed in the EPA "List N: Disinfectants for Coronavirus (COVID-19)."

e) Specimen Collection Control:

To ensure that an adequate human specimen has been collected, RT-PCR for RNase P is performed as part of the UCSD EXITE COVID-19 EL Test RT-PCR assay.

INSTRUMENT REQUIREMENTS

RT-PCR with the EXCITE COVID-19 EL Test is performed with the QuantStudio 7 Pro Real Time PCR Instrument using the QuantStudio RealTime PCR Software v2.5. In addition, the RT-PCR procedure uses the following liquid handling systems for all processing steps. Each instrument has distinct uses, and they are therefore not interchangeable, except where specifically noted. Instrument model numbers are provided where relevant (if a model number is not listed, the manufacturer has not named the instrument with a model number):

- Hamilton Microlab STAR liquid handler:
    - Sample prescan (PAN-007 9.1)
    - Mawi EL Heat Incubation (PAN-011 9.3)
    - Plating Samples into the EL RNA Working Plate (ELRWP)
- SPT Labtech Mosquito HV (for RT-PCR reaction setup).
    - PCR reagent plate stamping (ANA-064 9.8)
    - Transfer extracted RNA from RWP compressed plate to QRP reaction plate (ANA-064 9.12)
- SPT Labtech Mosquito X1 (for RT-PCR setup).
    - PCR add positive control (ANA-064 9.9)
    - PCR add RNase P control (ANA-064 9.10)

REAGENTS AND MATERIALS

1. Components of UCSD EXCITE COVID-19 EL Sampling Kit

The UCSD EXCITE COVID-19 EL Sampling Kit consists of the following:

- pre-packaged sterile anterior nares swab
- pre-filled collection tube containing 1.5 mL MAWI iSwab-Microbiome collection medium
- A Masterfile was submitted by the manufacturer of the MAWI iSwab-Microbiome collection medium and a Right-of-Reference Letter was provided to UCSD.
- specimen collection instructions " IFU_COVID_self-test_short swab"
- recyclable "clamshell" type of container

Samples are dropped off, not mailed. Therefore, there is no individual sample packaging or mailer.

2. Materials for the UCSD EXCITE COVID-19 EL Test

Table 1: Materials Required for the UCSD EXCITE COVID-19 EL Test

Material ID	Vendor	Catalog #
TaqPath COVID-19 Combo Kit	ThermoFisher	A47814
Reliance One-Step Multiplex Supermix	BioRad	12010220
RNase P (ATTO™ 647) Probe	IDT	10007062
Hs_RPP30 Control sequence	IDT	10006626

QUALITY CONTROLS

The UCSD EXITE COVID-19 EL Test incorporates the following controls:

- **Internal Positive Control (IPC)** – The endogenously expressed human RNase P gene. This endogenous control, which is naturally present in all human samples, ensures adequate sample collection, and adequate performance of the RNA extraction process, PCR assay reagents, and RNase P Probe.
- **External Positive Control** - TaqPath COVID-19 Control contains the SARS-CoV-2 RNA genomic regions targeted by the kit. This positive control is used to monitor for expected performance of the PCR assay reagents, and viral N/S/Orf1ab gene probes but does not contain the RNase P target. One positive control sample will be included with each plate of 94 samples.
- **No Viral Template Control** - molecular-grade, nuclease-free, non-DEPC-treated water to which RPP30 plasmid is added and is used to monitor non-specific amplification, performance of the RNase P probe, cross-contamination during experimental setup, and nucleic acid contamination of reagents. One negative control sample will be included on each plate.

INTERPRETATION OF RESULTS

1. Interpretation of Control Results:

All control wells must pass for the patient results to be considered valid and acceptable. A positive result for a target is defined as a Cq ≤ 38. Refer to the table below for a summary of controls and expected results. If the controls are not valid, the customer results cannot be interpreted.

Table 2: Cq Values for Controls that Must Be Observed to Obtain Valid Results

	N gene	S gene	Orf1ab	RNase P
External Positive Control	Cq≤38 and Cq Confidence ≥0.7	Cq≤38 and Cq Confidence ≥0.7	Cq≤38 and Cq Confidence ≥0.7	Cq>38 or Cq Confidence <0.7*
No Template Control	Cq>38 or Cq Confidence <0.7	Cq>38 or Cq Confidence <0.7	Cq>38 or Cq Confidence <0.7	Cq≤38 and Cq Confidence ≥0.7**

Undetermined/Negative corresponds to Cq>38 or No Detectable Cq for the viral N, S, and Orf1ab genes, and Cq>38 or No Detectable Cq for RNase P.

*RNase P Control sequence is not added to the External Positive Control, thus no signal for RNase P should be present.
**RNase P Control sequence is added to the No Template Control, and thus a signal for RNase P should be present.

2. Interpretation of Clinical Sample Results:

Assessment of clinical sample test results must be performed after the positive and negative controls have been examined and confirmed to be valid and acceptable. If the controls are not valid, the patient results cannot be interpreted, and a root cause investigation should be performed. Once the root case has been established and corrective measures implemented, sample testing should be repeated.

Assay Targets are interpreted as follows:

Table 3: Target Interpretation

Cq Cutoff	Cq Confidence*	Target Call
ORF1ab, N gene and S gene		
≤ 38	≥ 0.7	Detected
≤ 38	< 0.7	Not Detected
> 38	< 0.7	Not Detected
> 38	≥ 0.7	Not Detected
RNAse P gene		
≤ 38	≥ 0.7	Detected
≤ 38	< 0.7	Not Detected
> 38	< 0.7	Not Detected
> 38	≥ 0.7	Not Detected

* The Cq Confidence value is a metric that describes the quality of the amplification curve, looking at curve shape and baseline. It is programmed into the QS7 software.

Based on the target results the sample result interpretation and reporting is described in the table below. Note that a Cq value of any viral target of <10 triggers technician review of the signal trace to manually determine validity of the amplification curve:

Table 4: Result Interpretation Clinical Samples

N gene	S gene	Orf1ab	RNaseP	Status	Result	Action
NEG	NEG	NEG	NEG	Invalid	Invalid	Repeat test. If repeat test is also invalid, consider collecting a new sample.
NEG	NEG	NEG	POS	Valid	SARS-CoV-2 Not Detected	Report results to healthcare provider and appropriate public health authorities. Consider testing for other viruses
Only one SARS-CoV-2 target = POS			POS or NEG	Valid	SARS-CoV-2 Inconclusive	Repeat test. If repeat test is inconclusive, consider additional testing if clinically indicated.
Two or more SARS-CoV-2 targets = POS			POS or NEG	Valid	Positive for SARS-CoV-2	Report results to healthcare provider and appropriate public health authorities.

PERFORMANCE EVALUATION

1. Analytical Sensitivity (LoD)

The LoD study was performed by spiking gamma irradiated inactivated SARS-CoV-2 (SARS-Related Coronavirus 2, Isolate USA-WA1/2020, Gamma-Irradiated BEI NR-52287) in negative anterior nares clinical matrix in MAWI iSwab-Microbiome_EL using a two-fold dilution series. Specifically, anterior nares swabs were collected from healthy volunteers and placed into MAWI iSwab-Microbiome_EL collection medium (9 swabs) to create a negative matrix pool. Gamma irradiation inactivated SARS-CoV-2 was then added to each sample at the final concentrations indicated in the "Range Finding Study" sections of the Table below. The preliminary LoD was defined as the lowest concentration with 3 of 3 replicates that tested positive, which was 250 GCE/mL (=0.25 cp/µL) for samples collected in MAWI iSwab-Microbiome_EL.

To confirm the LoD, testing was performed by spiking the inactivated SARS-CoV-2 in negative pooled anterior nares clinical matrix collected in MAWI iSwab-Microbiome_EL (see Table 7 below) collection medium at 250, 500 and 1000 GCE/mL (=1 cp/µL). 20 individual replicates were tested.

Table 5: LoD Study Results –Anterior Nares Swab Samples Collected in MAWI iSwab-Microbiome-EL

Target Level* [cp/µL]	Valid Tested Replicates	SARS-CoV-2 Target 1 (N gene) Positive			SARS-CoV-2 Target 2 (Orf1ab) Positive			SARS-CoV-2 Target 3 (S-gene) Positive			Internal Control Positive (RNase P)			Final Detection Rate*
		n	Mean Ct	Detection Rate	n	Mean Ct	Detection Rate	n	Mean Ct	Detection Rate	n	Mean Ct	Detection Rate	
Range Finding Study														
1	3	3	35.1	3/3 100%	3	35.5	3/3 100%	3	35.6	3/3 100%	3	30.3	3/3 100%	3/3 (100%)
0.5	3	2	36.3	3/3 100%	3	35.3	3/3 100%	3	35.3	3/3 100%	3	31.7	3/3 100%	3/3 (100%)
0.25	**3**	**3**	**38.4**	**3/3 100%**	**3**	**37.6**	**1/3 33%**	**2**	**37.5**	**2/3 67%**	**3**	**32.5**	**3/3 100%**	**3/3 (100%)**
0.125	3	0	37.5	1/3 33%	3	38.2	3/3 100%	0	36.6	1/3 33%	3	32.5	3/3 100%	1/3 (33%)
0.063	3	0	38.1	1/3 33%	1	37.6	1/3 33%	0	37.5	1/3 33%	3	32.6	3/3 100%	1/3 (33%)
Confirmatory Study														
1	**32**	**31**	**35.0**	**31/32 97%**	**31**	**35.1**	**31/32 97%**	**29**	**35.8**	**29/32 91%**	**29**	**32.8**	**29/32 91%**	**31/32 97%**
0.5	20	18	35.7	18/20 90%	19	36.0	19/20 95%	17	35.7	17/20 85%	20	30.7	20/20 100%	18/20 (90%)
0.25	20	20	35.6	20/20 100%	18	36.2	18/20 90%	15	36.2	15/20 75%	20	30.5	20/20 100%	18/20 (90%)

The final LOD of the UCSD EXCITE COVID-19 EL Test per its result interpretation is 1 copy/µL (1000 copies/mL) for MAWI iSwab-Microbiome-EL.

2. Inclusivity

The UCSD EXCITE COVID-19 EL Test utilizes the identical oligonucleotide sequences for the spike (S), nucleocapsid (N) and ORF 1ab regions as those used in the TaqPath COVID-19 Combo Kit. Inclusivity was assessed by Thermo Fisher Scientific as part of the EUA granted to this manufacturer for the TaqPath COVID-19 Combo Kit. A Right of Reference (RoR) Letter was provided by ThermoFisher granting the sponsor the right to include the inclusivity information into their EUA by reference. While the Omicron variant is known for the drop-out of the S-target, independent analysis concluded that the detection of currently know and circulating variants is not impacted because individual target drop-outs are mitigated through the multi target design of the test and no variants have been identified with simultaneous impactful mutations in all three targets.

3. Cross-Reactivity

Cross Reactivity was assessed by Thermo Fisher Scientific as part of the EUA granted to this manufacturer for the TaqPath COVID-19 Combo Kit. A Right of Reference (RoR) Letter was provided by ThermoFisher granting the sponsor the right to include the Cross-Reactivity information into their EUA by reference.

4. Interfering Substances Study

An interfering substances study was performed where each potentially interfering substance was spiked into samples with or without SARS-CoV-2 at 2.5X LoD. With the exception of whole blood, no interference was observed.

Concentrations of whole blood above 1.5% whole blood result in false negative, inconclusive or invalid results.

Table 6:Interfering Substances Study

Potential Interfering Substance	Conc.	Positive Samples			Negative Samples
		Viral Strain Level	Expected Results	Mean Ct	Expected Results
Control	-	2.5X LoD	3/3	30.54	3/3
Nasal congestion spray (with Oxymetazoline)	15% v/v	2.5X LoD	3/3	35.24	3/3
Flonase	5% v/v	2.5X LoD	3/3	34.53	3/3
Saline nasal spray	10% v/v	2.5X LoD	3/3	36.05	3/3
Sore Throat Spray	5% v/v	2.5X LoD	3/3	34.75	3/3
NeilMed Nasal gel	1.25%	2.5X LoD	3/3	35.80	3/3
Mucin (bovine submaxillary gland, type I-S)	2.5 mg/mL	2.5X LoD	3/3	33.90	3/3
Human Genomic DNA	10 ng/uL	2.5X LoD	3/3	35.55	3/3
Vaseline	5%	2.5X LoD	3/3	34.45	3/3
Nicotine	0.03 mg/mL	2.5X LoD	3/3	34.62	3/3

Potential Interfering Substance	Conc.	Positive Samples			Negative Samples
		Viral Strain Level	Expected Results	Mean Ct	Expected Results
Whole Blood	0.25%	2.5X LoD	9/9	30.61	9/9
	0.5%	2.5X LoD	9/9	31.11	9/9
	1.0%	2.5X LoD	8/9 (1 inconclusive)	32.63	9/9
	1.5%	2.5X LoD	6/9 (2 inconclusive, 1 invalid)	32.95	9/9
	2.0%	2.5X LoD	1/9 (7 inconclusive, 1 invalid)	N/A	5/9 (4 invalid)
	2.5%	2.5X LoD	2/12 (7 inconclusive, 3 false negatives)	N/A	5/12 (7 invalid)

5. Sample Stability

a) Transport Stability

Sample stability under simulated winter and summer time and temperature profiles was assessed following recommendations in the EUA template for home collection devices with the following results:

Table 7: Detection Results for MAWI iSwab-Microbiome EL Media

	Immediate				Winter			Summer		
Gene	**Negative**	**2XLOD**	**3XLOD**	**10xLOD**	**Negative**	**2XLOD**	**10xLOD**	**Negative**	**2XLOD**	**10xLOD**
N-gene	0/10	30/30	20/20	10/10	0/10	2/30	3/10	0/10	29/30	10/10
Orf1ab	0/10	30/30	18/20	10/10	0/10	3/30	5/10	0/10	28/30	10/10
S-Gene	0/10	25/30	17/20	10/10	0/10	1/30	2/10	0/10	27/30	10/10
RNaseP	10/10	30/30	19/20	9/10	9/10	30/30	10/10	10/10	30/30	10/10
Detection	0/10	30/30	19/20	10/10	0/10	**2/30**	**3/10**	0/10	29/30	10/10
Rate	0%	100%	95%	100%	0%	**7%**	**30%**	0%	97%	100%

b) In-Laboratory Hold Sample Stability

Since freezing was not supported for samples in MAWI-EL collection media, additional data was generated validating sample stability at 4°C covering a 72 hour hold period for samples at 3x LoD of inactivated SARS-CoV-2.

Table 8:In-lab hold time stability of samples in MAWI iSWab-Microbiome EL medium at 4°C

	4°C 72 hrs hold			4°C 96 hrs hold			30°C 96 hrs hold		
Gene	**Negative**	**3X LOD**	**10x LOD**	**Negative**	**3X LOD**	**10x LOD**	**Negative**	**3X LOD**	**10x LOD**
N-gene	0/10	20/20	10/10	0/10	20/20	10/10	0/10	20/20	10/10
Orf1ab	0/10	18/20	10/10	0/10	19/20	10/10	0/10	20/20	10/10
S-Gene	0/10	17/20	10/10	0/10	20/20	10/10	0/10	19/20	10/10
RNaseP	10/10	19/20	10/10	10/10	19/20	9/10	10/10	20/20	10/10
Detection Rate	0/10	19/20	10/10	0/10	20/20	10/10	0/10	20/20	10/10
	0%	95%	100%	0%	100%	100%	0%	100%	100%

The significant failure of samples exposed to temperatures below 4°C was mitigated by the addition of electronic tracking thermometers in the sample collection bins and the sample transport containers. Samples are dropped off on the same day as sample collection and are transported locally (ground-transport only) to the testing lab at least once per day. The temperature monitors are read out at sample pick up; samples will be discarded if the readout falls outside the following temperature window: ≥ 4°C and ≤40°C. In addition, a warning was added to the collection IFU not to freeze samples.

The combined scientific evidence supports the following sample stability claims as long as samples are dropped off and ground shipped in temperature monitored containers:

Table 9: Final Sample Stability Claims

Temperature	Hold Period Hours	Final Claim [Shipping + In-Lab Hold]
4°C	96	96 hrs @ 4 - 30°C, or 66 hrs @ 4 - 30°C with temperature excursions up to 40°C not to exceed 20 hours
30°C	96	

c) Fresh vs. Frozen Study

In addition to the transport stability with contrived samples (above), a study was performed to evaluate the performance of the EXCITE COVID-19 EL Test with fresh and frozen anterior nasal swab samples collected in MAWI iSwab-Microbiome EL media. Clinical samples were initially run fresh using the UCSD EXCITE COVID-19 EL Test. The remnants of these clinical samples were then stored at -80ºC, and then re-run using the same assay to produce the "frozen result." The study does not support freezing of samples.

6. Clinical Performance

The UCSD EXCITE COVID-19 EL Test was validated in a real-life study, using anterior nares samples prospectively collected during the same visit in MAWI iSwab-Microbiome medium and MAWI iSwab-Microbiome EL medium. The study was designed to include all-comers. Samples were consecutively collected from the UCSD student and staff population between 9/27/21 and 1/11/22 and between 2/15/2022 to 3/3/2022.

The cohort of individuals suspected of COVID-19 was enriched with prospectively collected samples from individuals who had previously been suspected of COVID-19 and tested positive or negative for SARS-CoV-2, and who were called back to recollect paired anterior nasal swabs that were then processed with the comparator and the investigational devices.

The samples collected in MAWI iSwab-Microbiome medium were tested using a highly sensitive FDA-authorized comparator that is authorized for use with the MAWI iSwab Microbiome collection medium and contains a RNA extraction and purification step. Samples collected in MAWI iSwab-Microbiome EL medium were tested with the UCSD EXCITE COVID-19 EL Test and the results were compared to those obtained with the FDA-authorized comparator.

Samples with invalid results obtained from comparator or investigational device testing, and samples exceeding the sample stability window were excluded from the study.

The clinical performance of the UCSD EXCITE COVID-19 EL Test is presented below stratified by symptoms/suspicion.

a) Performance in Suspected Individuals

Performance of the EXCITE COVID-19 EL Test with samples from symptomatic patients is summarized below.

Table 10: Test Performance in UCSD's Population of Individuals Suspected of SARS-CoV-2.

		EUA Authorized Comparator Assay			**Total**
		Positive	**Incon[1, 2]**	**Negative**	
EXCITE COVID-19 EL Test	**Positive**	118	0	2	120
	Incon[1, 2]	5	0	4	9
	Negative	5	3	776	784
	Total	128	3	782	913
Positive Percent Agreement		**95.9 % (118/123)[2]**		95% CI[3]: 90.8% - 98.2%	
Negative Percent Agreement		**99.7% (776/778)[2]**		95% CI[3]: 99.1% - 99.9%	

[1] Incon = Inconclusive

[2] Samples with Inconclusive results with the candidate assay were not retested as per IFU. Since inconclusive results have one positive and two negative targets, they are neither concordant nor discordant and are therefore excluded from the performance calculation.

[3] CI = Confidence Interval

b) Performance in a Screening Population (Asymptomatic Individuals)

Performance of the EXCITE COVID-19 EL Test with samples from asymptomatic individuals, representative of an asymptomatic screening population, is summarized below.

Table 11: Test Performance in UCSD's Asymptomatic Screening Population.

		EUA Authorized Comparator Assay			Total
		Positive	Incon[1, 2]	Negative	
EXCITE COVID-19 EL Test	Positive	29	0	5	34
	Incon[1, 2]	3	0	1	4
	Negative	1	7	2,075	2,083
	Total	33	7	2,081	2,121
Positive Percent Agreement		96.7% (29/30)[2]		95% CI[3]: 83.3% - 99.4%	
Negative Percent Agreement		99.8% (2,075/2,080)[2]		95% CI[3]: 99.4% - 99.9%	

[1] Incon = Inconclusive

[2] Samples with Inconclusive results with the candidate assay were not retested as per IFU. Since inconclusive results have one positive and two negative targets, they are neither concordant nor discordant and are therefore excluded from the performance calculation.

[3] CI = Confidence Interval

7. Usability Studies

The sample collection process used for the UCSD EXCITE COVID-19 EL Test is the same as for the UCSD EXCITE COVID-19 Test. Please refer to the information and data provided in EUA210524 for the UCSD EXCITE COVID-19 Test for the Human Usability Study data applicable to the UCSD EXCITE COVID-19 EL Test.

WARNINGS:

- For Emergency Use Authorization (EUA) only.
- For in vitro diagnostic use.
- For prescription use only.
- This product (collection kit in combination with the authorized test) has not been FDA cleared or approved, but has been authorized for emergency use by FDA under an EUA for use by the authorized laboratory.
- This product has been authorized only for the detection of nucleic acid from SARS-CoV-2, not for any other viruses or pathogens.
- The emergency use of this product is only authorized for the duration of the declaration that circumstances exist justifying the authorization of emergency use of in vitro diagnostics for detection and/or diagnosis of COVID-19 under Section 564(b)(1) of the Federal Food, Drug and Cosmetics Act, 21 U.S.C. § 360bbb-3(b)(1), unless the declaration is terminated or authorization is revoked sooner.
- The solution in the collection tube contains hazardous ingredients. if the solution contacts the skin or eye, flush with plenty of water.

LIMITATIONS:

1. The use of this assay as an *in vitro* diagnostic under FDA Emergency Use Authorization (EUA) is limited to a single laboratory that is certified under the Clinical Laboratory Improvement Amendments of 1988 (CLIA), 42 U.S.C. § 263a, and meets requirements perform high complexity tests.
2. This kit is used for the qualitative detection of SARS-CoV-2 RNA from human anterior nasal swab samples. The results cannot directly reflect the viral load in the original sample.
3. The UCSD EXCITE COVID-19 Test performance has only been established with the sample types described in the Intended Use section. Testing other types of samples may cause inaccurate results.
4. Extraction and amplification of nucleic acid from clinical samples must be performed as specified in the methods listed in the Laboratory SOP. Other extraction approaches and processing systems have not been evaluated.
5. Samples should be stored at ambient temperature (22-40℃) and should not be frozen.
6. A false negative result may occur if a specimen is improperly collected, transported, stored or processed. False negative results may also occur if amplification inhibitors are present in the specimen or if inadequate numbers of organisms are present in the specimen.
7. Negative results do not preclude SARS-CoV-2 infections and should not be used as the sole basis for treatment or other management decisions.
8. Results from the UCSD EXCITE COVID-19 EL Test should be used as an adjunct to clinical observations and other information available to the physician. The result is only for clinical reference, and the clinical management of patients should be considered in combination with their symptoms/signs, history, other laboratory tests and treatment responses.
9. This test cannot rule out diseases caused by other bacterial or viral pathogens.
10. The impacts of vaccines, antiviral therapeutics, antibiotics, chemotherapeutics, or immunosuppressant drugs have not been evaluated.
11. Laboratories are required to report all negatives and positive results to the appropriate public health authorities.
12. The performance of this test was established based on the evaluation of a limited number of clinical specimens. Clinical performance has not been established with all circulating variants but is anticipated to be reflective of the prevalent variants in circulation at the time and location of the clinical evaluation. Performance at the time of testing may vary depending on the variants circulating, including newly emerging strains of SARS-CoV-2 and their prevalence, which change over time.