DiaSorin Inc.
1951 Northwestern Ave – Stillwater, MN 55082 – USA
Tel 1.651.439.9710 – Fax 1.651.351.5669

Changes: §
Deletions: §

LIAISON® SARS-CoV-2 TrimericS IgG ([___REF___] 311510D)
For Emergency Use Authorization Only
For In Vitro Diagnostic Use Only
For Prescription Use Only

The results of this semiquantitative test should not be interpreted as an indication or degree of immunity or protection from infection.

1. INTENDED USE

The LIAISON® SARS-CoV-2 TrimericS IgG is a chemiluminescent immunoassay (CLIA) intended for the qualitative and semi-quantitative detection of IgG antibodies to SARS-CoV-2 in human serum, and plasma (lithium heparin and dipotassium EDTA). The LIAISON® SARS-CoV-2 TrimericS IgG is intended for use as an aid in identifying individuals with an adaptive immune response to SARS-CoV-2, indicating recent or prior infection. At this time, it is unknown for how long antibodies persist following infection and if the presence of antibodies confers protective immunity. The LIAISON® SARS-CoV-2 TrimericS IgG should not be used to diagnose or exclude acute SARS-CoV-2 infection. Testing is limited to laboratories certified under the Clinical Laboratory Improvement Amendments of 1988 (CLIA), 42 U.S.C 263a, that meet requirements to perform moderate or high complexity tests.

The LIAISON® SARS-CoV-2 TrimericS IgG assay is to be used on the LIAISON® XL Analyzer.

Results are for the detection of SARS CoV-2 IgG antibodies. IgG antibodies to SARS-CoV-2 are generally detectable in blood several days after initial infection, although the duration of time antibodies are present post-infection is not well characterized. Individuals may have detectable virus present for several weeks following seroconversion.

Laboratories within the United States and its territories are required to report all results to the appropriate public health authorities.

Negative results do not preclude acute SARS-CoV-2 infection. If acute infection is suspected, direct testing for SARS-CoV-2 is necessary.

False positive results for LIAISON® SARS-CoV-2 TrimericS IgG may occur due to cross-reactivity from pre-existing antibodies or other possible causes.

Samples should only be tested from individuals that are 15 days or more post symptom onset.

The LIAISON® SARS-CoV-2 TrimericS IgG is only for use under the Food and Drug Administration's Emergency Use Authorization.

Caution: **U.S. Federal Law restricts this device to sale by or on the order of a licensed practitioner – for US only**

2. SUMMARY AND EXPLANATION OF THE TEST

Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus. At the end of December 2019, Chinese public health authorities reported several cases of acute respiratory syndrome in Wuhan City, Hubei province, China. The initial outbreak in Wuhan spread rapidly, affecting other parts of China. Cases were then detected in several other countries. Since late February, the majority of cases reported are from outside China, with an increasing majority of these reported from EU/EEA countries and the US. The Director General of the World Health Organization declared COVID-19 a global pandemic on 11 March 2020.[1, 2].

The causative virus of the COVID -19 is Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). It is a new strain of coronavirus that has not been previously identified in humans. It spreads primarily through contact with an infected person through respiratory droplets generated when a person coughs or sneezes, or through droplets of saliva or discharge from the nose.

Infection with SARS-CoV-2 can cause mild symptoms including a runny nose, sore throat, cough and fever. However, it can be more severe for some people and can lead to pneumonia or breathing difficulties. The elderly and people with pre-existing medical conditions (such as, diabetes and heart disease) appear to be more vulnerable to becoming severely ill with the virus. Based on previous studies on SARS, an incubation period from three to fourteen days after onset of symptoms may be expected. (3)

The presence of IgG antibodies to SARS-CoV-2 is indicative of an immune response to infection; however, it is unknown whether the presence of IgG antibodies to SARS-CoV-2 confers protective immunity or for how long after infection IgG antibodies will remain detected. Patients can remain infectious in the presence of IgG if specimens are obtained during acute infection (4).

Currently, molecular testing is available using reverse transcription-polymerase chain reaction (RT-PCR) for detecting viral RNA for early identification of SARS-CoV-2.

The coronavirus spike (S) glycoprotein is a class I viral fusion protein on the outer envelope of the virion that plays a critical role in viral infection by recognizing host cell receptors and mediating fusion of the viral and cellular membranes.

3. PRINCIPLE OF THE PROCEDURE

The LIAISON® SARS-CoV-2 TrimericS IgG is an indirect chemiluminescence immunoassay (CLIA) for the detection of IgG antibodies to SARS-CoV-2 in human serum and plasma samples. The principal components of the test are magnetic particles (solid phase) coated with recombinant trimeric SARS-CoV-2 spike protein and a conjugate reagent containing an anti-human IgG mouse monoclonal antibody linked to an isoluminol derivative (isoluminol-antibody conjugate). During the first incubation, SARS-CoV-2 IgG antibodies present in calibrators, samples or controls bind to the solid phase. Unbound material is then removed with a wash cycle. During the second incubation, the antibody conjugate reacts with antibodies to SARS-CoV-2 already bound to the solid phase. Excess antibody conjugate is then removed with a wash cycle. Subsequently, the starter reagents are added and a flash chemiluminescence reaction is thus induced. The light signal, and hence the amount of isoluminol-antibody conjugate, is measured by a photomultiplier as relative light units (RLU) and is indicative of antibodies to SARS-CoV-2 present in calibrators, samples or controls.

4. MATERIALS PROVIDED

Reagent Integral

Magnetic Particles (2.6 mL)	[SORB]	Magnetic particles coated with recombinant trimeric SARS-CoV-2 spike protein (Chinese Hamster Ovary) in phosphate buffer containing BSA and < 0.1% sodium azide.
Calibrator 1 (1.2 mL)	[CAL|1]	Human defibrinated plasma containing low SARS-CoV-2 IgG antibody levels, stabilized in TRIS buffer, 0.2% Proclin® 300, preservatives.
Calibrator 2 (1.2 mL)	[CAL|2]	Human defibrinated plasma containing high SARS-CoV-2 IgG antibody levels, stabilized in TRIS buffer, 0.2% Proclin® 300, preservatives.
Specimen Diluent (2 x 29 mL)	[DIL|SPE]	Phosphate buffer containing BSA, non-specific recombinant protein (produced in *E. coli*), detergent, EDTA, 0.2% ProClin® 300, preservatives.
Conjugate (25 mL)	[CONJ]	Mouse monoclonal antibody to human IgG conjugated to an isoluminol derivative in a phosphate buffer containing BSA, surfactant, 0.2% ProClin® 300, and preservatives.
Number of Tests		110

ProClin is a trademark of the Dow Chemical Company (Dow) or an affiliated company of Dow.

All reagents are supplied ready to use. The order of reagents reflects the layout of containers in the Reagent Integral.

The calibrator concentrations are referenced to an in-house standard preparation. Currently no reference standard is available for this assay.

Materials required but not provided (system related)

LIAISON® XL Analyzer (Software Version 4.2.2.3 or higher)
LIAISON® Wash/System Liquid ([___REF___] 319100)
LIAISON® XL Waste Bags ([___REF___] X0025)
LIAISON® XL Cuvettes ([___REF___] X0016)
LIAISON® XL Starter Kit ([___REF___] 319200) or
LIAISON® EASY Starter Kit ([___REF___] 319300)
LIAISON® XL Disposable Tips ([___REF___] X0015) or
LIAISON® Disposable Tips ([___REF___] X0055)

Additional required materials:

LIAISON® SARS-CoV-2 TrimericS IgG Control Set ([___REF___] 311511D)

5. WARNINGS AND PRECAUTIONS

For prescription use only

For *in vitro* diagnostic use only

FOR EMERGENCY USE AUTHORIZATION ONLY

This product has not been FDA cleared or approved, but has been authorized for emergency use by FDA under an EUA for use by authorized laboratories.

This product has been authorized only for detecting the presence of IgG antibodies to 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 Cosmetic Act, 21 U.S.C. § 360bbb-3(b)(1), unless the declaration is terminated or authorization is revoked sooner.

– Not for internal or external use in humans or animals.

General Safety:

- All specimens, biological reagents and materials used in the assay must be considered potentially able to transmit infectious agents. Avoid contact with skin, eyes or mucous membranes. Follow good industrial hygiene practices during testing.
- Do not eat, drink, smoke or apply cosmetics in the assay laboratory.
- Do not pipette solutions by mouth.
- Avoid direct contact with all potentially infectious materials by wearing lab coat, protective eye/face wear and disposable gloves.
- Wash hands thoroughly at the end of each assay.
- Avoid splashing or forming aerosols when handling, diluting or transferring specimens or reagents. Any reagent spill should be decontaminated with 10% bleach solution (containing 0.5% sodium hypochlorite) and disposed of as though potentially infectious.
- Waste materials should be disposed of in accordance with the prevailing regulations and guidelines of the agencies holding jurisdiction over the laboratory, and the regulations of each country.
- Do not use kits or components beyond the expiration date given on the label.

Chemical Hazard and Safety Information: Reagents in this kit are classified in accordance with US OSHA Hazard Communication Standard; individual US State Right-to-Know laws; Canadian Centre for Occupational Health and Safety Controlled Products Regulations; and applicable European Union directives (see Material Safety Data Sheet for additional information).

Reagents Containing Human Source Material:

Warning – Treat as potentially infectious. Each serum/plasma donor unit used in the preparation of this product has been tested by an U.S. FDA approved method and found non-reactive for the presence of the antibody to Human Immunodeficiency Virus 1 and 2 (HIV 1/2), the Hepatitis B surface antigen (HBsAg), and the antibody to Hepatitis C (HCV). While these methods are highly accurate, they do not guarantee that all infected units will be detected. This product may also contain other human source diseases for which there is no approved test. Because no known test method can offer complete assurance that HIV, Hepatitis B Virus (HBV) and HCV or other infectious agents are absent, all products containing human source material should be handled following universal precautions; and as applicable in accordance with good laboratory practices as described in the Centers for Disease Control and the National Institutes of Health current manual, Biosafety in Microbiological and Biomedical Laboratories (BMBL); or the World Health Organization current edition, Laboratory Biosafety Manual.

GHS/CLP:

	Sodium Azide	ProClin®
CAS No.:	26628-22-8	55965-84-9
Reagents:	[SORB]	[CAL|1] [CAL|2] [DIL|SPE] [CONJ]
Classification:	None required	Skin sensitization, Category 1
Signal Word:	None required	Warning
Pictogram:	None required	 GHS07 – Exclamation mark
Hazard Statements:	None required	H317 – May cause an allergic skin reaction.

Precautionary Statements:	None required	P261 – Avoid breathing dust, fumes, gas, mist, vapors or spray. P272 – Contaminated work clothing should not be allowed out of the workplace. P280 – Wear protective gloves, protective clothing, eye protection, and face protection.

REAGENTS CONTAINING SODIUM AZIDE: Sodium azide may react with lead or copper plumbing to form highly explosive metal azides. On disposal, flush with a large volume of water to prevent azide build-up. For further information, refer to "Decontamination of Laboratory Sink Drains to Remove Azide Salts," in the Manual Guide-Safety Management No. CDC-22 issued by the Centers for Disease Control and Prevention, Atlanta, GA, 1976.

6. PREPARATION OF THE REAGENT INTEGRAL

Please note the following important reagent handling precautions:

6.1 Resuspension of magnetic particles

Magnetic particles must be completely resuspended before the integral is placed on the instrument. Follow the steps below to ensure complete suspension:

- Before the seal is removed, rotate the small wheel at the magnetic particle compartment until the colour of the suspension has changed to brown. Gentle and careful side-to-side mixing may assist in the suspension of the magnetic particles (avoid foam formation). Visually check the bottom of the magnetic particle vial to confirm that all settled magnetic particles have resuspended.
- Repeat as necessary until the magnetic particles are completely resuspended.
- After removal of the seal carefully wipe the surface of each septum to remove residual liquid if necessary.

6.2 Foaming of reagents

In order to ensure optimal performance of the integral, foaming of reagents should be avoided. Adhere to the recommendation below to prevent this occurrence:

- Visually inspect the reagents to ensure there is no foaming present before using the integral. If foam is present after re-suspension of the magnetic particles, place the integral on the instrument and allow the foam to dissipate. The integral is ready to use once the foam has dissipated and the integral has remained onboard and mixing.

6.3 Loading of integral into the reagent area

LIAISON® XL Analyzer

- LIAISON® XL Analyzer is equipped with a built-in solid-state magnetic device which aids in the dispersal of microparticles prior to placement of a Reagent Integral into the reagent area of the analyzer. Refer to the analyzer operator's manual for details.
    a. Insert the reagent integral into the dedicated slot.
    b. Allow the reagent integral to remain in the solid-state magnetic device for at least 30 seconds (up to several minutes). Repeat as necessary.
- Place the integral into the reagent area of the analyzer with the label facing left and let it stand for 15 minutes before using. The analyzer automatically stirs and completely resuspends the magnetic particles.
- Follow the analyzer operator's manual to load the specimens and start the run.

7. STORAGE AND STABILITY OF THE REAGENT INTEGRAL

Upon receipt, the Reagent Integral must be stored in an upright position to facilitate re-suspension of magnetic particles. When the Reagent Integral is stored unopened the reagents are stable at 2-8°C up to the expiration date. Do not freeze. The Reagent Integral should not be used past the expiration date indicated on the kit and Reagent Integral labels. After opening and each use, the Reagent Integral must be returned to the kit box and stored upright at 2-8°C. Open use is 4 weeks when properly stored at 2-8°C. Undue exposure to light should be avoided.

8. SPECIMEN COLLECTION AND PREPARATION

Human serum, and plasma (lithium heparin, and dipotassium EDTA) or serum separator tubes may be used. (Fasting samples are recommended, but not required). Blood should be collected aseptically by venipuncture. Serum samples should be allowed to clot. Centrifuge samples and separate serum from the clot or plasma from the cells as soon as possible. No additives or preservatives are required to maintain integrity of the sample. Samples having particulate matter, turbidity, lipemia, or erythrocyte debris may require clarification by filtration or centrifugation before testing. Grossly hemolyzed or lipemic samples as well as samples containing particulate matter or exhibiting obvious microbial contamination should not be tested. Check for and remove air bubbles before assaying. Samples are stable at room temperature for up to 48 hours. If the assay is performed within 21 days of sample collection, the samples should be kept at 2-8°C; otherwise they should be stored frozen (-20°C or below). If samples are stored frozen, mix thawed samples well before testing. Samples may be frozen-thawed 3 times. Self-defrosting freezers are not recommended for sample storage. It is the responsibility of the individual laboratory to use all available references and/or its own studies to determine specific stability criteria for its laboratory.

The minimum specimen volume required for a single determination is 160 µL. [10 µL specimen for testing + 150 µL dead volume (volume left at the bottom of the aliquot tube which the instrument cannot aspirate)].

9. CALIBRATION

Individual LIAISON® SARS-CoV-2 TrimericS IgG Reagent Integrals contain specific information for calibration of the particular Reagent Integral lot. Test of assay specific calibrators allows the detected relative light units (RLU) values to adjust the assigned master curve. Each calibration solution allows 5 calibrations to be performed.
Recalibration in triplicate is mandatory whenever at least one of the following conditions occurs:

- With each new lot of reagents (Reagent Integral or Starter Reagents).
- The previous calibration was performed more than 4 weeks prior.
- Quality Control results are out of the acceptable range.
- The Analyzer has been serviced.

Refer to the analyzer operator's manual for calibration instructions.

Measuring range: The LIAISON® SARS-CoV-2 TrimericS IgG assay measures between 1.85 and 800 AU/mL.

10. ASSAY PROCEDURE

To ensure proper test performance, strictly adhere to the operating instructions of the Analyzer.

LIAISON® XL Analyzer: Each test parameter is identified via information encoded in the Reagent Integral Radio Frequency Identification transponder (RFID Tag). In the event that the RFID Tag cannot be read by the analyzer, the integral cannot be used. Do not discard the reagent integral: contact your local DiaSorin technical support for instruction.
For details, refer to the analyzer operator's manual

The analyzer operations are as follows:

LIAISON® XL:

1. Dispense specimen, calibrator or control, magnetic particles and specimen diluent into reaction cuvette.
2. Incubate
3. Wash with Wash/System liquid
4. Dispense conjugate into reaction cuvette.
5. Incubate
6. Wash with Wash/System liquid
7. Add the Starter Reagents and measure the light emitted.

11. QUALITY CONTROL

Quality control is required to be performed once per day of use, or according to the guidelines or requirements of local regulations or accredited organizations. It is recommended that the user refer to CLSI C24-A3 and 42 CFR 493.1256 (c) for guidance on appropriate quality control practices.

LIAISON® SARS-CoV-2 TrimericS IgG controls are intended to monitor for substantial reagent failure. LIAISON® controls should be run in singlicate to monitor the assay performance. If control values lie within the expected ranges provided on the certificate of analysis, the test is valid. If control values lie outside the expected ranges, the test is invalid and patient results cannot be reported. Assay calibration should be performed if a control failure is observed and controls and patient specimens must be repeated.

The range of concentrations of each control is reported on the certificate of analysis and indicates the limits established by DiaSorin for control values that can be obtained in reliable assay runs.

12. INTERPRETATION OF RESULTS

The Analyzer automatically calculates the SARS-CoV-2 IgG antibody levels expressed as Arbitrary Units (AU/mL) and grades the results. For details, refer to the analyzer operator's manual.

Patient results should be interpreted as follows:

AU/mL	Interpretation	Description
< 13.0 AU/mL	NEG	Antibodies for SARS-CoV-2 are not detected.
≥ 13.0 AU/mL	POS; Numerical value is reported to the end user	Antibodies for SARS-Cov-2 are detected.
> 800*	POS; Value above ULMI** is not reported	

*ULMI: upper limit of measuring interval.

Test results are reported as positive or negative along with a numeric value for semi-quantitative measurement for values between 13 AU/mL and 800 AU/mL. Numeric results below 13 AU/mL should not be reported outside of the laboratory. Results above 800 CU are reported as >800.

13. LIMITATIONS OF THE PROCEDURE

1. For Use under Emergency Use Authorization Only
2. For in vitro diagnostic use
3. For professional use Only
4. A skillful technique and strict adherence to the instructions are necessary to obtain reliable results.
5. Bacterial contamination of samples may affect the test results.
6. Specimens from patients receiving therapeutic doses of Biotin (Vitamin H, B7 or B8) may interfere in immunoassays based on biotinylated reagents. Interference was not observed testing Biotin serum concentration up to 3500 ng/mL with LIAISON® SARS-CoV-2 TrimericS IgG assay (for details, refer to §14).
7. The clinical applicability of a quantitative or semi-quantitative result is currently unknown and results cannot be interpreted as an indication or degree of immunity or protection from reinfection, nor be compared to the results from other SARS-CoV-2 antibody assays.
8. Results obtained with this assay may not be used interchangeably with results obtained with different manufacturers' test methods.
9. Use of LIAISON SARS-CoV-2 TrimericS IgG is limited to laboratory personnel who have been trained. Not for home use.
10. Performance has only been established with the specimen types listed in the Intended Use. Other specimen types have not been evaluated and should not be used with this assay
11. Detection of IgG antibodies against SARS-CoV-2 at present is not yet established to determine immunity to the virus or to protect the patient against re-infection by the virus.
12. Results from antibody testing should not be used to diagnose or exclude acute COVID-19 infection or to inform infection status.
13. False positive results may occur due to cross-reactivity from pre-existing antibodies or other possible causes.
14. A positive result may not indicate previous SARS-CoV-2 infection. Consider other information including clinical history and local disease prevalence, in assessing the need for a second but different serology test to confirm an immune response.
15. The results obtained with this test should only be interpreted in conjunction with clinical findings, and the results from other laboratory tests and evaluations. This is especially important if the patient has had recent exposure to COVID-19, or clinical presentation indicates that COVID-19 is likely and diagnostic tests for other causes of illness (e.g., other respiratory illness) are negative. In this case, direct testing for the SARS-CoV-2 virus (e.g. PCR testing) should be considered.
16. This test should not be used for screening of donated blood.
17. Positive results may be due to past or present infection with non-SARS-CoV-2 coronavirus strains, such as coronavirus HKU1, NL63, OC43, or 229E.
18. A negative result for an individual subject indicates absence of detectable anti-SARS-CoV-2 antibodies. Negative results do not preclude SARS-CoV-2 infection and should not be used as the sole basis for patient management decisions. The sensitivity of this assay early after infection is unknown.
19. A negative result can occur if the quantity of the anti-SARS-CoV-2 antibodies present in the specimen is below the detection limits of the assay, or the antibodies that are detected are not present during the stage of disease in which a sample is collected.
20. This assay has not been evaluated with fingerstick specimens. This test is not authorized for use with fingerstick whole blood.
21. The performance of this device has not been established in samples collected from individuals less than 15 days following the onset of symptoms. Samples should be collected from individuals greater than 14 days following the onset of symptoms. Samples should not be tested if collected from individuals less than 15 days post symptom onset.
22. Do not test lipemic samples
23. The performance of this test has not been established in individuals that have received a COVID-19 vaccine. The clinical significance of a positive or negative antibody result following COVID-19 vaccination has not been established, and the result from this test should not be interpreted as an indication or degree of protection from infection after vaccination.
24. The performance of this test was established based on the evaluation of a limited number of clinical specimens. Samples for the testing were purchased from a reference laboratory in Florida, U.S. and collected prior to December 2019 or between April, 2020 and August, 2020.The clinical performance has not been established in 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.

Conditions of Authorization for the Laboratory

The LIAISON® SARS-CoV-2 TrimericS IgG Letter of Authorization, along with the authorized Fact Sheet for Healthcare Providers, the authorized Fact Sheet for Recipients, and authorized labeling are available on the FDA website:
https://www.fda.gov/medical-devices/coronavirus-disease-2019-covid-19-emergency-use-authorizations-medical-devices/vitro-diagnostics-euas or at www.diasorin.com

Authorized laboratories using the LIAISON® SARS-CoV-2 TrimericS IgG ("your product" in the conditions below), must adhere to the Conditions of Authorization indicated in the Letter of Authorization as listed below:

A. Authorized laboratories[1] using your product must include with test result reports of your product, all authorized Fact Sheets. Under exigent circumstances, other appropriate methods for disseminating these Fact Sheets may be used, which may include mass media.
B. Authorized laboratories using your product must use your product as outlined in the authorized labeling. Deviations from the authorized procedures, including the authorized instrument, authorized clinical specimen types, authorized control materials, authorized other ancillary reagents and authorized materials required to use your product are not permitted.
C. Authorized laboratories that receive your product must notify the relevant public health authorities of their intent to run your product prior to initiating testing.
D. Authorized laboratories using your product must have a process in place for reporting test results to healthcare providers and relevant public health authorities, as appropriate.
E. Authorized laboratories must collect information on the performance of your product and report to DMD/OHT7-OIR/OPEQ/ CDRH (via email: CDRH-EUA-Reporting@fda.hhs.gov) and to you (at www.diasorin.com) any suspected occurrence of false positive or false negative results and significant deviations from the established performance characteristics of your product of which they become aware.
F. All laboratory personnel using your product must be appropriately trained in automated immunoassay techniques and use appropriate laboratory and personal protective equipment when handling this kit, and use your product in accordance with the authorized labeling. All laboratory personnel using the assay must also be trained in and be familiar with the interpretation of results of the product.
G. DiaSorin Inc., authorized distributors, and authorized laboratories using your product must ensure that any records associated with this EUA are maintained until otherwise notified by FDA. Such records will be made available to FDA for inspection upon request.

14. SPECIFIC PERFORMANCE CHARACTERISTICS

14.1 Analytical specificity

Analytical specificity may be defined as the ability of the assay to accurately detect specific analyte in the presence of potentially interfering factors in the sample matrix (e.g., anticoagulants, hemolysis, effects of sample treatment), or cross-reactive antibodies.

Interference.

Controlled studies of potentially interfering substances showed no interference to each substance listed below in the LIAISON® SARS-CoV-2 TrimericS IgG assay, at the indicated concentration.

Substances	Tested concentrations
Triglycerides	3000 mg/dL
Hemoglobin	1000 mg/dL
Unconjugated bilirubin	40 mg/dL
Conjugated bilirubin	40 mg/dL
Cholesterol total	400 mg/dL
Human Serum Albumin	6 g/dL
Biotin	3500 ng/mL
Acetaminophen	500 µg/mL
Ibuprofen	500 µg/mL

[1] "The letter of authorization refers to authorized laboratories as the following: Laboratories certified under the Clinical Laboratory Improvement Amendments of 1988 (CLIA), 42 U.S.C. §263a that meet requirements to perform moderate or high complexity tests.

The cross-reactivity study for the LIAISON® SARS-CoV-2 TrimericS IgG assay was designed to evaluate potential cross-reactivity to antibodies to other viruses that may cause symptoms similar to SARS-CoV-2 infection, to other organisms that may cause infectious diseases, as well as to other conditions that may result in atypical immune system activity. Two (2) specimens out of 387 assessed specimens resulted Positive with the LIAISON® SARS-CoV-2 TrimericS IgG assay. The results are summarized in the following tables.

Non-SARS Human Coronavirus Condition	Number of tested samples	LIAISON® XL Positive results
Anti-Human CoV 229E^	6	0
Anti-Human CoV OC43^	7	0
Anti-Human CoV HKU1^	7	0
Anti-Human CoV NL63^	11	0
Condition	**Number of tested samples**	**LIAISON® XL Positive results**
Anti-EBV IgG	10	0
Anti-CMV IgG	14	0
Anti-Rubella IgG	10	0
Anti-Parvovirus B19 IgG	13	0
Anti-Borrelia burgdorferi	10	0
Anti-HSV-1/2 IgG	20	0
Anti-VZV IgG	10	0
Anti-HCV	10	0
Anti-HBV	60	1
Anti-HIV	60	0
Anti-West Nile Virus	15	0
Rheumatoid factor	16	0
HAMA	27	0
Anti-nuclear autoantibodies (ANA)	29	0
Anti-Mycoplasma pneumoniae IgG	4	0
Anti-Influenza A	10	0
Anti-Influenza B	9	0
Anti-Influenza A/B	9	0
Condition	**Number of tested samples**	**LIAISON® XL Positive results**
Anti-respiratory syncytial virus A^	5	0
Anti-respiratory syncytial virus B^	1	0
Anti-rhinovirus/Enterovirus^	5	0
Anti-human metapneumovirus^	5	0
Anti-human parainfluenza virus^	4	1
Total Samples Tested	387	2

^ Samples were collected from subjects between 9- and 135-days following PCR positive result for the indicated disease state. The presence of antibodies was assumed but not confirmed.

14.2 Precision

A 5 day precision study was performed by using a coded panel of 6 serum samples prepared by blending samples as necessary to obtain negative, low positive and moderate positive samples. Kit Controls were also included in the study. The panel samples and kit controls were tested with 2 lots of LIAISON® SARS-CoV-2 TrimericS IgG assay in 3 replicates per run, 2 runs per day for 5 operating days at 2 testing sites on 2 LIAISON® XL Analyzers. The CLSI document EP15-A3 was consulted in the preparation of the testing protocol.

LIAISON® SARS-CoV-2 TrimericS IgG Precision – Two Lots Combined, Multi-Site

Sample Number	n	Mean	Within run		Between run		Between day		Between site		Overall	
			SD	CV	SD	CV	SD	CV	SD	CV	SD	CV
Neg Kit Control*	60	665	34	5.1%	40	6.0%	28	4.2%	8	1.2%	60	9.0%
Pos Kit Control	60	34.8	0.622	1.8%	0.229	0.7%	1.169	3.4%	0.000	0.0%	1.344	3.9%
Sample 1	60	5.00	0.097	1.9%	0.062	1.2%	0.146	2.9%	0.067	1.3%	0.198	4.0%

Sample 2	60	12.7	0.200	1.6%	0.210	1.7%	0.353	2.8%	0.000	0.0%	0.457	3.6%
Sample 3	60	14.3	0.245	1.7%	0.000	0.0%	0.718	5.0%	0.316	2.2%	0.822	5.7%
Sample 4	60	245	7.904	3.2%	2.063	0.8%	10.233	4.2%	5.472	2.2%	14.191	5.8%
Sample 5	60	503	22.329	4.4%	0.000	0.0%	10.667	2.1%	11.182	2.2%	27.155	5.4%
Sample 6	60	591	21.510	3.6%	13.317	2.3%	0.000	0.0%	9.547	1.6%	27.040	4.6%

*AU/mL values for the Negative Control falls below the assay range and were evaluated based on RLUs instead of AU/mL.

The results refer to the groups of samples investigated and are not guaranteed specifications, as differences may exist between laboratories and locations.

14.3 Limit of Blank (LoB)*
Following the method from CLSI EP17-A2, the limit of blank for the LIAISON® SARS-CoV-2 TrimericS IgG assay for serum is 0.600 AU/mL.

*Limit of Blank, or the highest value likely to be observed with a sample containing no analyte, replaces the term "analytical sensitivity".

14.4 Limit of Detection (LoD)
Following the method from CLSI EP17-A2, the limit of detection for the LIAISON® SARS-CoV-2 TrimericS IgG assay for serum is 0.717 AU/mL.

14.5 Limit of Quantitation (LoQ)
Following the method from CLSI EP17-A2, the limit of quantitation for LIAISON® SARS-CoV-2 TrimericS IgG assay for serum is 1.63 AU/mL.

14.6 Linearity Study
Three serum specimens containing high levels of SARS-CoV-2 IgG above the measuring range of the assay at 800 AU/mL were diluted with a negative serum to prepare a dilution series comprised of 8 levels spanning approximately 10-20% wider than the assay measuring range. Each level was tested by the LIAISON® SARS-CoV-2 TrimericS IgG assay following CLSI EP6-A. Linearity was demonstrated for the analytical measuring range interval of the assay with deviations from linearity within 10%. The assay claimed linear range is 1.85–800 AU/mL

14.7 Specimen Equivalency
Matched sample sets from the same donors were used for the matrix comparison studies. Samples contained SARS-CoV-2 IgG levels distributed across the measuring range of the assay. Specimen equivalency was determined by testing the samples with the LIAISON® SARS-CoV-2 TrimericS IgG assay. Results from plasma samples were compared to serum results using a Weighted Deming regression. The resulting equations for each sample type are:

Sample Type	Slope 95% CI	Intercept 95% CI	R
Serum SST	0.998 -099. to 1.04	-0.5 -0.076 to 0.42	0.998
K_2 EDTA Plasma	1.07 1.04 to 1.10	-0.37 -1.18 to 0.52	0.994
Lithium Heparin Plasma	1.04 1.03 to 1.06	-0.12 -0.34 to 0.14	0.996

Agreement of the specimen types may vary depending on the study design and sample population used. Assay results obtained at individual laboratories may vary from the data presented.

15. SUMMARY OF CLINICAL PERFORMANCE

15.1 Clinical Agreement
Positive percent agreement and negative percent agreement were determined in accordance with CSLI Document EP12-A2.

Positive Percent Agreement
Positive percent agreement was determined by testing 70 serum samples collected over the course of time from subjects with a clinical diagnosis of COVID-19 based on a positive SARS-CoV-2 polymerase chain reaction (PCR) method. The following table describes positive percent agreement by time from symptom onset.

Days from Symptom Onset	n	Positive	Negative	PPA (95% CI)
0–7	14	3	11	21.4% (7.6–47.6%)
8–14	24	17	7	70.8% (50.8–85.1%)
≥15	32	31	1	96.9% (84.3-99.4%)
Total	70	N/A	N/A	N/A

15.2 Negative Percent Agreement (NPA)

One thousand eight hundred ninety nine (n=1899) presumed SARS-CoV-2 negative serum samples from US blood donors collected prior to COVID-19 outbreak were tested with the LIAISON® SARS-CoV-2 TrimericS IgG. From the samples tested, 1889 out of 1899 were negative resulting in a NPA of 99.5% (95% CI: 99.0% – 99.7%).

Population	n	Positive	Negative	NPA	95% CI (Wilson Score)
Apparently Healthy	1899	10	1889	99.5%	99.0% - 99.7%

16.0 References

1. 1 European Centre for Disease Prevention and Control (ECDC). Novel Coronavirus. Available from: https://www.ecdc.europa.eu/en/novel-coronavirus-china (last page update March 24 2020)
2. European Centre for Disease Prevention and Control (ECDC). Geographical distribution 2019.
3. Wang G, Jin X. The progress of 2019 Novel Coronavirus (2019-nCoV) event in China. J MedVirol. doi: 10.1002/jmv.25705
4. Kelvin Kai-Wang To, Owen Tak-Yin Tsang et al.: Temporal profiles of viral load in posterior oropharyngeal saliva samples and serum antibody responses during infection by SARS-CoV-2: an observational cohort study. March 23, 2020 Lancet Infectious Diseases
5. Structure, Function, and Antigenicity of the SARS-CoV-2 Spike Glycoprotein. Walls, Park, Tortorici, Wall, McGuire, Veesler. Cell 180, 1–12, March 19, 2020 ª 2020 Elsevier Inc.

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Technical Service at productsupport@diasorin.com
DiaSorin's website at www.diasorin.com

DiaSorin Inc.
1951 Northwestern Avenue
Stillwater, MN 55082-0285

EC REP DiaSorin S.p.A.,
13040 Saluggia (VC) Italy

DiaSorin Inc.
1951 Northwestern Ave – Stillwater, MN 55082 – USA
Tel. 1.651.439.9710 – Fax 1.651.351.5669

Changes: §
Deletions: §

LIAISON® SARS-CoV-2 TrimericS IgG Control Set ([___REF___] 311511D)
For Emergency Use Authorization Only
For In Vitro Diagnostic Use Only
For Prescription Use Only

1. INTENDED USE

The DiaSorin LIAISON® SARS-CoV-2 TrimericS IgG Control Set is intended for use as assayed quality control samples to monitor the performance of the LIAISON® SARS-CoV-2 TrimericS IgG assay. The performance characteristics of the LIAISON® SARS-CoV-2 TrimericS IgG controls have not been established for any other assay or instrument platforms different from the LIAISON® XL.

Caution: **U.S. Federal Law restricts this device to sale by or on the order of a licensed practitioner**

LIAISON® XL Analyzer. The certificate of analysis bar codes give specific information on the lot of controls and should be read by the hand-held bar code scanner of the LIAISON® XL Analyzer prior to loading the control vials on board. For details, refer to the analyzer operator's manual.

2. MATERIALS PROVIDED

Negative control (2 x 0.9mL)	[___CONTROL___|___-___]	Human serum non-reactive for SARS-CoV-2 IgG antibodies, 0.2% ProClin® 300, preservatives.
Positive control (2 x 0.9 mL)	[___CONTROL___|___+___]	Human serum/defibrinated plasma reactive for SARS-CoV-2 IgG antibodies, 0.2% ProClin® 300, preservatives.

ProClin is a trademark of the Dow Chemical Company (Dow) or an affiliated company of Dow.

All reagents are supplied ready to use.

Controls are not kit lot specific and may be safely interchanged between different LIAISON® SARS-CoV-2 TrimericS IgG Reagent Integral lots.

3. WARNINGS AND PRECAUTIONS

For Emergency Use Authorization Only
FOR *IN VITRO* DIAGNOSTIC USE – Not for internal or external use in humans or animals.
General Safety:

- All specimens, biological reagents and materials used in the assay must be considered potentially able to transmit infectious agents. Avoid contact with skin, eyes or mucous membranes. Follow good industrial hygiene practices during testing.
- Do not eat, drink, smoke or apply cosmetics in the assay laboratory.
- Do not pipet solutions by mouth.
- Avoid direct contact with all potentially infectious materials by wearing lab coat, protective eye/face wear and disposable gloves.
- Wash hands thoroughly at the end of each assay.
- Avoid splashing or forming aerosols when handling, diluting or transferring specimens or reagents. Any reagent spill should be decontaminated with 10% bleach solution (containing 0.5% sodium hypochlorite) and disposed of as though potentially infectious.
- Waste materials should be disposed of in accordance with the prevailing regulations and guidelines of the agencies holding jurisdiction over the laboratory, and the regulations of each country.
- Do not use kits or components beyond the expiration date given on the label.
- This product has not been FDA cleared or approved but has been authorized for emergency use by FDA under an EUA for use by authorized laboratories.
- This product is for use with a test authorized only for detecting the presence of IgG antibodies to 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 Cosmetic Act, 21 U.S.C. § 360bbb-3(b)(1), unless the declaration is terminated or authorization is revoked sooner.

Chemical Hazard and Safety Information: Reagents in this kit are classified in accordance with US OSHA Hazard Communication Standard; individual US State Right-to-Know laws; Canadian Centre for Occupational Health and Safety Controlled Products Regulations; and applicable European Union directives (see Material Safety Data Sheet for additional information).

Reagents Containing Human Source Material:
Warning – Treat as potentially infectious. Each serum/plasma donor unit used in the preparation of this product has been tested by an U.S. FDA approved method and found non-reactive for the presence of the antibody to Human Immunodeficiency Virus 1 and 2 (HIV 1/2), the Hepatitis B surface antigen (HBsAg), and the antibody to Hepatitis C (HCV). While these methods are highly accurate, they do not guarantee that all infected units will be detected. This product may also contain other human source diseases for which there is no approved test. Because no known test method can offer complete assurance that HIV, Hepatitis B Virus (HBV) and HCV or other infectious agents are absent, all products containing human source material should be handled following universal precautions; and as applicable in accordance with good laboratory practices as described in the Centers for Disease Control and the National Institutes of Health current manual, Biosafety in Microbiological and Biomedical Laboratories (BMBL); or the World Health Organization current edition, Laboratory Biosafety Manual.

GHS/CLP:

	ProClin®
CAS No.:	55965-84-9
Reagents:	[CONTROL|-] [CONTROL|+]
Classification:	Skin sensitization, Category 1
Signal Word:	Warning
Pictogram:	 GHS07 – Exclamation mark
Hazard Statements:	H317 – May cause an allergic skin reaction.
Precautionary Statements:	P261 – Avoid breathing dust, fumes, gas, mist, vapours or spray. P272 – Contaminated work clothing should not be allowed out of the workplace. P280 – Wear protective gloves, protective clothing, eye protection, and face protection.

4. STORAGE AND STABILITY
Store the controls at 2-8°C upon receipt. Controls are stable until the expiration date on the vial labels when stored at 2-8°C. Controls should not be used past their expiration date. Once opened, controls are stable for 4 weeks when properly stored at 2-8°C between uses.
Indications of possible deterioration include the presence of particulate matter in the liquid or significant deviation from previous results.

5. QUALITY CONTROL
Quality control is required to be performed once per day of use, or according to the guidelines or requirements of local regulations or accredited organizations. It is recommended that the user refer to CLSI C24-A3 and 42 CFR 493.1256 (c) for guidance on appropriate quality control practices.

LIAISON® SARS-CoV-2 TrimericS IgG controls are intended to monitor for substantial reagent failure. If controls lie outside the expected ranges, calibration should be repeated, and controls and samples retested.

Do not report patient results until control results are within expected ranges. Strict adherence to the instructions of the LIAISON® SARS-CoV-2 TrimericS IgG assay is necessary to obtain reliable results.

6. PREPARATION AND USE
The LIAISON® SARS-CoV-2 TrimericS IgG Control Set is provided ready to use. Allow controls to reach room temperature prior to use and mix thoroughly by gentle inversion. Remove caps from the controls and place controls into the appropriate sample rack type with the barcode showing outward and slide rack into the patient sample area. Control identification is detected by the bar code label or may be manually programmed into the instrument. Follow the analyzer operator's manual to start the run. Return controls to the refrigerator immediately after each use.

7. LIMITATIONS
Control values for assays other than the LIAISON® SARS-CoV-2 TrimericS IgG assay have not been established. If users wish to use this control material with other assays, it is their responsibility to establish appropriate ranges.

The performance of other controls should be evaluated for compatibility with this assay before they are used. Appropriate reference ranges should be established for all quality control materials used.

If control values obtained after successful calibration lie repeatedly outside the expect ranges, the test should be repeated using an unopened control vial.

8. ASSIGNED VALUES

The range of concentrations of each control is reported on the certificate of analysis and indicates the limits established by DiaSorin for control values that can be obtained in reliable assay runs.

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EC REP

DiaSorin S.p.A.,
13040 Saluggia (VC) Italy

ALERT

LIAISON®SARS-CoV-2 TrimericS IgG Assay, catalog number 311510D

LIAISON® SARS-CoV-2 TrimericS Control Set catalog number 311511D

Important Information: Please read carefully

For Emergency Use Authorization Only
For *In Vitro* Diagnostic Use
Rx Only
Dear Valued Customer:

DiaSorin is proud to provide you the next generation in COVID-19 serology testing.
The LIAISON® SARS-CoV-2 TrimericS IgG assay (catalog numbers **#311510D, #311511D)** is a new semi-quantitative assay designed to aid in identifying individuals with an adaptive immune response to SARS-CoV-2.

- This product has not been FDA cleared or approved but has been authorized for emergency use by the FDA under an EUA for use by authorized laboratories.
- This product has been authorized only for detecting the presence of IgG antibodies to 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 Cosmetic Act, 21 U.S.C.§ 360bbb-3(b)(1), unless the declaration is terminated or authorization is revoked sooner.

For the Instructions for Use (IFU) please visit: https://molecular.diasorin.com/us/covid19/. This card is not the full IFU. A printed copy of the IFU can be obtained free of charge by contacting DiaSorin Technical Service at productsupport@diasorin.com or 1-800-328-1482.

May 18, 2021