



**510(k) SUBSTANTIAL EQUIVALENCE DETERMINATION
DECISION SUMMARY
ASSAY AND INSTRUMENT**

I Background Information:

A 510(k) Number

K254264

B Applicant

Ortho-Clinical Diagnostics, Inc. (QuidelOrtho)

C Proprietary and Established Names

Sofia 2 SARS Antigen+ FIA

Sofia 2 Lyme FIA

D Regulatory Information

Product Code(s)	Classification	Regulation Section	Panel
QVF	Class II	21 CFR 866.3982 - Simple Point-Of-Care Device to Directly Detect Sars-CoV-2 Viral Target from Clinical Specimens In Near-Patient Settings	Microbiology
LSR	Class II	21 CFR 866.3830 - <i>Treponema pallidum</i> treponemal test reagents.	Microbiology
KHO	Class I, exempt	21 CFR 862.2560 - Fluorometer, For Clinical Use	Clinical Chemistry

II Submission/Device Overview:

A Purpose for Submission:

To obtain a substantial equivalence determination for Sofia 2 SARS Antigen+ FIA and the Sofia 2 Lyme FIA assays as performed on the Sofia 2 analyzer using an updated software version (v.2.0.14)

B Measurand:

Sofia 2 SARS Antigen+ FIA:

SARS CoV-2 nucleocapsid protein

Sofia 2 Lyme FIA:

IgM antibodies to *Borrelia burgdorferi* proteins

IgG antibodies to *Borrelia burgdorferi* proteins

C Type of Test:

Sofia 2 SARS Antigen+ FIA:

Lateral flow fluorescent immunoassay (FIA)

Sofia 2 Lyme FIA

Lateral flow fluorescent immunoassay (FIA)

III Intended Use/Indications for Use:

A Intended Use(s):

See Indications for Use below.

B Indication(s) for Use:

Sofia 2 SARS Antigen+ FIA

The Sofia 2 SARS Antigen+ FIA is a lateral flow immunofluorescent sandwich assay that is used with the Sofia 2 instrument for the rapid, qualitative detection of SARS-CoV-2 nucleocapsid protein antigens directly in anterior nasal swab specimens from individuals with signs and symptoms of upper respiratory infection. The test is intended for use as an aid in the diagnosis of SARS-CoV-2 infections (COVID-19) in symptomatic individuals when either: tested at least twice over three days with at least 48 hours between tests; or when tested once, and negative by the Sofia 2 SARS Antigen+ FIA and followed up with a molecular test.

The test does not differentiate between SARS-CoV and SARS-CoV-2.

A negative test result is presumptive, and does not preclude SARS-CoV-2 infection; it is recommended these results be confirmed by a molecular SARS-CoV-2 assay.

Positive results do not rule out co-infection with other respiratory pathogens and should not be used as the sole basis for diagnosis, treatment, or other patient management decisions.

Performance characteristics were established from August 2021 to November 2022 when SARS-CoV-2 Delta and Omicron were the predominant SARS-CoV-2 variants in circulation. When other variants are emerging, performance characteristics may vary.

Sofia 2 Lyme FIA

The Sofia 2 Lyme FIA employs immunofluorescence for the rapid differential detection of human IgM and IgG antibodies to *Borrelia burgdorferi* from finger-stick whole blood specimens from patients suspected of *B. burgdorferi* infection of at least 2 weeks' duration. The Sofia 2 Lyme FIA is intended for use as an aid in diagnosis of Lyme disease. A negative result does not preclude infection with *B. burgdorferi*. Positive results must be confirmed by testing with a corresponding second-tier *B. burgdorferi* Western blot assay. Test results are to be used in conjunction with information obtained from the patient's clinical evaluation and other diagnostic procedures.

The assay is to be performed on the Sofia 2 instrument. Professional guidelines should be consulted regarding testing and treatment for Lyme disease when acute *B. burgdorferi* infection is suspected.

C Special Conditions for Use Statement(s):

For Prescription Use Only

D Special Instrument Requirements:

Sofia 2 v2.0.14

IV Device/System Characteristics:

A Device Description:

Sofia 2 SARS Antigen+ FIA

The Sofia 2 SARS Antigen+ FIA is a rapid lateral flow immunoassay for the qualitative detection of SARS CoV-2 nucleoprotein in anterior nasal swab (ANS) specimens, collected from patients with signs and symptoms of upper respiratory infection. The Sofia 2 SARS Antigen+ FIA components have not been modified; detailed description of the lateral flow device is available in the DEN220039 Decision Summary.

The Sofia 2 analyzer may be set to one of two operating modes: Walk Away or Read Now. Time to results for the Sofia 2 analyzer are described below.

- **Walk Away Mode:** The Sofia 2 analyzer displays a positive or negative test result at 10 minutes.

- Read Now Mode: the user incubates the test cassette on the benchtop for 10 minutes before inserting the cassette into the Sofia 2 analyzer. Positive and negative test results are displayed within 1 minute.

Once testing is complete, Sofia 2 will display the test results (Positive Negative or Invalid) on the screen. If an invalid test result is reported, the assay should be repeated with a new patient sample and a new test cassette. The fluorescence signal obtained with this assay is invisible to the unaided eye. The test results can only be obtained with the proper use of Sofia 2. Each Sofia 2 SARS Antigen+ FIA will contain one SARS CoV-2 positive and one negative control swab.

Sofia 2 Lyme FIA

The Sofia 2 Lyme FIA is a rapid lateral flow immunoassay for the rapid differential detection of human IgM and IgG antibodies to *Borrelia burgdorferi* from finger-stick whole blood specimens from patients suspected of *B. burgdorferi* infection of at least 2 weeks' duration. The Sofia RSV FIA components have not been modified; detailed description of the lateral flow device is available in the K173496 Decision Summary.

The Sofia 2 analyzer may be set to one of two operating modes: Walk Away or Read Now. Time to results for the Sofia 2 analyzer are described below.

- Walk away mode: Sofia 2 analyzer images the test cassette periodically during the test development time. Positive test results will be displayed between 3 and 15 minutes. Negative test results will be displayed at 15 minutes.
- Read now mode: The user incubates the test cassette on the benchtop for 15 minutes before inserting the cassette into the Sofia 2 analyzer. Positive and negative test results are displayed within 1 minute.

Once testing is complete, Sofia 2 will display the test results (IgG/IgM Positive, IgG/IgM Negative, or Invalid) on the screen. If an invalid test result is reported, the Sofia 2 Lyme FIA assay should be repeated with a new patient sample and a new test cassette. The fluorescence signal obtained with this assay is invisible to the unaided eye. The test results can only be obtained with the proper use of Sofia 2. Each Sofia 2 Lyme FIA will contain 1 bottle each of positive control solution (*B. burgdorferi* IgM and IgG positive plasma diluted in PBS) and negative control solution (*B. burgdorferi* negative serum diluted in PBS).

B Principle of Operation:

Sofia 2 family assays employ immunofluorescence-based lateral flow technology to perform qualitative detection of analytes in human clinical samples.

C Instrument Description Information:

1. Instrument Name:

Sofia 2

2. Specimen Identification:

The Sofia 2 analyzer supports specimen identification through two methods: barcode entry and manual entry.

3. Specimen Sampling and Handling:

The Sofia 2 analyzer supports multiple specimen types depending on the assay. Specimen collection is performed using the sterile swab or collection device provided or recommended in the test kit following the procedures specified in the assay-specific labeling.

4. Calibration:

The Sofia 2 analyzer uses an automated calibration system to ensure stable optical performance and minimize signal drift. A calibration check must be performed at least every 30 days, or as otherwise specified in the applicable assay labeling.

5. Quality Control:

The Sofia 2 analyzer uses positive and negative External Controls provided in each assay kit. External QC demonstrates that assay reagents, test cassettes, and procedures are functioning properly.

V Substantial Equivalence Information:

A Predicate Device Name(s):

Sofia 2 SARS Antigen+ FIA

B Predicate 510(k) Number(s):

DEN220039

C Comparison with Predicate(s):

Device & Predicate Device(s):	<u>Proposed Device</u> <u>K254264</u>		<u>Predicate Device</u> <u>DEN220039</u>
Device Trade Name	Sofia 2 SARS Antigen + FIA	Sofia 2 Lyme FIA	Sofia 2 SARS Antigen + FIA
General Device Characteristic Similarities			
Intended Use/Indications For Use	The Sofia 2 SARS Antigen+ FIA is a lateral flow immunofluorescent sandwich assay that is used with the Sofia 2 instrument for the rapid, qualitative detection of SARS-CoV-2 nucleocapsid protein	The Sofia 2 Lyme FIA employs immunofluorescence for the rapid differential detection of human IgM and IgG antibodies to <i>Borrelia burgdorferi</i> from	The Sofia 2 SARS Antigen+ FIA is a lateral flow immunofluorescent sandwich assay that is used with the Sofia 2 instrument for the rapid, qualitative detection of SARS-CoV-2 nucleocapsid

Device & Predicate Device(s):	Proposed Device <u>K254264</u>	Predicate Device <u>DEN220039</u>
	antigens directly in anterior nasal swab specimens from individuals with signs and symptoms of upper respiratory infection. The test is intended for use as an aid in the diagnosis of SARS-CoV-2 infections (COVID-19) in symptomatic individuals when either: tested at least twice over three days with at least 48 hours between tests; or when tested once, and negative by the Sofia 2 SARS Antigen+ FIA and followed up with a molecular test. The test does not differentiate between SARS-CoV and SARS-CoV-2. A negative test result is presumptive, and does not preclude SARS-CoV-2 infection; it is recommended these results be confirmed by a molecular SARS-CoV-2 assay. Positive results do not rule out co-infection with other respiratory pathogens and should not be used as the sole basis for diagnosis, treatment, or other patient management decisions. Performance characteristics were established from August 2021 to November 2022 when SARS-CoV-2 Delta and Omicron were the predominant SARS-CoV-2 variants in circulation. When other variants are emerging,	protein antigens directly in anterior nasal swab specimens from individuals with signs and symptoms of upper respiratory infection (i.e., symptomatic) when testing is started within 6 days of symptom onset. The test is intended for use as an aid in the diagnosis of SARS-Co V-2 infections (COVID-19) in symptomatic individuals when tested at least twice over three days with at least 48 hours between tests. The test does not differentiate between SARS-CoV and SARS-CoV-2. A negative test result is presumptive, and it is recommended these results be confirmed by a molecular SARS-CoV-2 assay. Negative results do not preclude SARS-CoV-2 infections and should not be used as the sole basis for treatment or other patient management decisions. Positive results do not rule out co-infection with other respiratory pathogens. Performance characteristics for SARS-CoV-2 were established during the 2021-2022 SARS CoV-2 pandemic when SARS-CoV-2 Omicron was the predominant SARS-CoV-2 variant in circulation. When other SARS-CoV-2 virus variant are emerging, performance characteristics may vary. This test is intended for prescription use only and can

Device & Predicate Device(s):	Proposed Device <u>K254264</u>	Predicate Device <u>DEN220039</u>
	performance characteristics may vary.	be used in Point-of-Care settings.
Development Modes	Walk-Away and Read Now modes	Same
Development Time	Walk away mode: 3-15 minutes Read now mode: 1 minute	Same
Barcode Scanner (cassette)	Integrated barcode scanner	Same
Assay/instrument interface	Drawer (manual)	Same
User Interface	4-inch color LCD touchscreen display	Same
User Types	Operator user, Supervisor, Service level	Same
General Device Characteristic Differences		
Software Version	v2.0.14	V1.11.19
Software	The software has been reengineered to enhance usability and to modernize the device drivers, without requiring any hardware modifications.	The firmware provides a Graphical User Inter-face and manages the workflow, algorithms, hardware integration (camera, sensors, screen, touch, power), and all interoperability functions.
Assay Framework	Existing assays were refactored to have algorithms, graphical user interface screens, and AMF components migrated into an assay-specific plugin that can be deployed independently of the firmware. Assay-related workflows (e.g., operator workflows and assay calculations) will no longer reside within the firmware. This architecture provides greater flexibility for allowing algorithms and user interface screens to be tailored to each individual assay.	Algorithms and screens reside in the firmware and are configured with an Assay Method File (AMF). Assay related workflows (such as operator workflows and assay calculations) reside inside of the firmware.
Assay Data Files	Assay plugin format	Assay Method File (AMF)
Operating System	Linux operating system Kernel version 5.4	Linux operating system Kernel version 4.1
Programming Language	C++	Python
Security - Data Encryption	Encryption was added for database and clinical data	Database and clinical data not encrypted
Security - User Authentication	Enhanced support for unique and complex user identification and password	Combination user identification and password available

Device & Predicate Device(s):	<u>Proposed Device</u> <u>K254264</u>	<u>Predicate Device</u> <u>DEN220039</u>
Security - Export Files	Encryption of export setting files to USB i.e., instrument settings	Export setting files to USB were not encrypted

VI Standards/Guidance Documents Referenced:

- Content of Premarket Submissions for Device Software Functions (June 14, 2023)
- Cybersecurity in Medical Devices: Quality System Considerations and Content of Premarket Submissions (February 2026)
- Bundling Multiple Devices or Multiple Indications in a Single Submission (June 22, 2007)

VII Performance Characteristics (if/when applicable):

A Analytical Performance:

For the purposes of the analytical and comparison studies, previous software versions of the Sofia 2 analyzer (v1.11.19) are collectively referred to as “software version 1” and the updated software version (v2.0.14) is referred to as “software version 2”.

1. Precision/Reproducibility:

The precision and reproducibility studies for the Sofia 2 SARS Antigen+ FIA were previously assessed in DEN220039. Refer to DEN220039 Decision Summary for additional details.

The precision and reproducibility studies of the Sofia 2 Sofia Lyme FIA were previously assessed in K173496. Refer to K173496 Decision Summary for additional details.

2. Linearity:

Not applicable

3. Analytical Specificity/Interference:

The analytical specificity/interference studies for the Sofia 2 SARS Antigen+ FIA were previously assessed in DEN220039. Refer to DEN220039 Decision Summary for additional details.

The analytical specificity/interference studies of the Sofia 2 Sofia Lyme FIA were previously assessed in K173496. Refer to K173496 Decision Summary for additional details.

4. Detection Limit and Assay Reportable Range:

a) **Sofia 2 SARS Antigen+ FIA:**

The purpose of this study was to demonstrate that the Limit of Detection (LoD) is equivalent for the two software versions of the Sofia 2 analyzer with the Sofia 2 SARS Antigen+ FIA in nasal samples with heat inactivated SARS-CoV-2 virus. The limit of detection was established in two (2) phases using dilutions in negative nasal matrix (NNM) At least five (5) analyzers with each version of the software were used in which all test replicates in both phases were alternatively read in each Sofia 2 analyzer in the READ NOW mode.

LoD was determined in a 2-phase process. In the first phase (range-finding), a 1:5 dilution series was prepared by mixing heat inactivated SARS-CoV-2 stock solution directly into NNM and each dilution was tested using one (1) Sofia 2 SARS Antigen+ FIA lot on both software versions of the Sofia 2 analyzer. The preliminary LoD was determined by the lowest viral concentration that was positive in 5 out of 5 replicates (i.e., 100% detection) on the Sofia 2 analyzer.

In phase 2 (confirmation), the preliminary LoD concentration and 2-fold dilutions above and below this value were tested in replicates of twenty (20) using both versions of the Sofia software on one (1) lot of cassettes to confirm the LoD concentration. If the preliminary LoD was not confirmed, additional levels were tested until the lowest viral concentration that was positive in at least 19 of the 20 replicates ($\geq 95\%$ positivity) was determined.

The overall results are shown in **Table 1**. Identical LoD results were observed with both versions of the software.

Table 1: Limit of Detection Study Results: Sofia 2 SARS Antigen+ FIA

Testing Phase	Analyte Virus Concentration (TCID ₅₀ /mL)	Sofia 2 SW Version 1		Sofia 2 SW Version 2	
		#Pos/Total	% Pos	#Pos/Total	% Pos
Range Finding	2.42E+05	5/5	100.0	5/5	100.0
	4.84E+04	5/5	100.0	5/5	100.0
	9.68E+03	2/5	40.0	2/5	40.0
	1.94E+03	0/5	0.0	0/5	0.0
	3.87E+02	0/5	0.0	0/5	0.0
Confirmation	4.84E+04	20/20	100.0	20/20	100.0
	2.42E+04	20/20	100.0	20/20	100.0
	1.21E+04	16/20	80.0	16/20	80.0

b) **Sofia 2 Lyme FIA:**

To assess the equivalency of the two software versions of the Sofia 2 analyzer, the performance of the Sofia 2 Lyme FIA was evaluated with different dilutions of recombinant IgG and IgM antibodies to *B. burgdorferi* in negative whole blood matrix. The negative matrix consisted of individual whole blood samples collected from donors confirmed negative using the Sofia 2 Lyme FIA. Initially, five (5) replicates were tested for each of the serial dilutions on one lot of Sofia Lyme FIA.

Additional confirmatory testing was performed using 20 replicates with concentrations near the assay cut-off. Testing was performed on ten Sofia 2 analyzers (five per software version).

Results demonstrated equivalent performance of Sofia 2 Lyme FIA for IgG and IgM analytes using the Sofia 2 analyzer with both software versions. The data is summarized in **Tables 2-3**.

Table 2: Sofia 2 Lyme FIA Whole Blood: IgG Equivalency Study Results

Testing Phase	Analyte Concentration (ng/μL)	n	Sofia 2 SW Version 1						Sofia 2 SW Version 2					
			IgG			IgM			IgG			IgM		
			Invalid	Neg	Pos (%)	Invalid	Neg	Pos (%)	Invalid	Neg	Pos (%)	Invalid	Neg	Pos (%)
Blank Negative	N/A	10	0	10	0 (0.0)	0	10	0 (0.0)	0	10	0 (0.0)	0	10	0 (0.0)
Range Finding	6.60E+00	5	0	0	5 (100.0)	0	5	0 (0.0)	0	0	5 (100.0)	0	5	0 (0.0)
	1.32E+00	5	0	0	5 (100.0)	0	5	0 (0.0)	0	0	5 (100.0)	0	5	0 (0.0)
	2.64E-01	5	0	5	0 (0.0)	0	5	0 (0.0)	0	5	0 (0.0)	0	5	0 (0.0)
	5.28E-02	5	0	5	0 (0.0)	0	5	0 (0.0)	0	5	0 (0.0)	0	5	0 (0.0)
	1.06E-02	5	0	5	0 (0.0)	0	5	0 (0.0)	0	5	0 (0.0)	0	5	0 (0.0)
Confirmation	2.64E+00	20	0	0	20 (100.0)	0	20	0 (0.0)	0	0	20 (100.0)	0	20	0 (0.0)
	1.32E+00	20	0	1	19 (95.0)	0	20	0 (0.0)	0	0	20 (100.0)	0	20	0 (0.0)
	6.60E-01	20	0	12	8 (40.0)	0	20	0 (0.0)	0	11	9 (45.0)	0	20	0 (0.0)

Table 3: Sofia 2 Lyme FIA Whole Blood: IgM Equivalency Study Results

Testing Phase	Analyte Concentration (ng/μL)	n	Sofia 2 SW Version 1						Sofia 2 SW Version 2					
			IgG			IgM			IgG			IgM		
			Invalid	Neg	Pos (%)	Invalid	Neg	Pos (%)	Invalid	Neg	Pos (%)	Invalid	Neg	Pos (%)
Blank Negative	N/A	10	0	10	0 (0.0)	0	10	0 (0.0)	0	10	0 (0.0)	0	10	0 (0.0)
Range Finding	9.60E+00	5	0	5	0 (0.0)	0	0	5 (100.0)	0	5	0 (0.0)	0	0	5 (100.0)
	1.92E+00	5	0	5	0 (0.0)	0	2	3 (60.0)	0	5	0 (0.0)	0	2	3 (60.0)
	3.84E-01	5	0	5	0 (0.0)	0	5	0 (0.0)	0	5	0 (0.0)	0	5	0 (0.0)
	7.68E-02	5	0	5	0 (0.0)	0	5	0 (0.0)	0	5	0 (0.0)	0	5	0 (0.0)
	1.54E-02	5	0	5	0 (0.0)	0	5	0 (0.0)	0	5	0 (0.0)	0	5	0 (0.0)
Confirmation	9.60E+00	20	0	20	0 (0.0)	0	0	20 (100.0)	0	0	20 (100.0)	0	0	20 (100.0)
	4.80E+00	20	0	20	0 (0.0)	0	0	20 (100.0)	0	0	20 (100.0)	0	0	20 (100.0)
	2.40E+00	20	0	20	0 (0.0)	0	3	17 (85.0)	0	11	9 (45.0)	0	3	17 (85.0)

5. Traceability, Stability, Expected Values (Controls, Calibrators, or Methods):

Stability studies for the Sofia 2 SARS Antigen+ FIA were previously assessed in DEN220039. Refer to DEN220039 Decision Summary for additional details.

Stability studies for the Sofia 2 Lyme FIA were previously assessed in K173496. Refer to K173496 Decision Summary for additional details.

6. Assay Cut-Off:

Not applicable

B Comparison Studies:

1. Method Comparison with Predicate Device:

a) Sofia 2 SARS Antigen+ FIA

The purpose of this study was to demonstrate comparable performance for both versions of the Sofia 2 software with the Sofia 2 SARS Antigen+ FIA in anterior nasal samples with heat inactivated SARS-CoV-2 virus.

Using a panel of contrived samples, a side-by-side comparison was performed in which a cohort of fifty (50) known positive and thirty (30) negative samples were incorporated into a test panel (previously confirmed as negative or positive on Sofia 2 v1), coded, randomized, and distributed to be tested following the IFU. The contrived sample panel consisted of:

- 30 Negative Samples
- 18 Low Positive Samples (1-3x LoD)
- 17 Moderate Positive Samples (3-5x LoD)
- 15 Moderate to High Positive Samples (5-10x LoD)

For all samples tested in this study, there was 100% concurrence observed between both versions of the Sofia software.

b) Sofia 2 Lyme FIA

The purpose of this study was to demonstrate comparable performance for both versions of the Sofia 2 software with the Sofia 2 Lyme FIA in whole blood samples with Lyme IgG and IgM.

Negative matrix collected from 53 individual negative donors (confirmed negative on Sofia 2 v1) was incorporated into a panel consisting of 50 positive samples that were spiked with either Lyme IgG or IgM (single analyte samples) at ranges from 1 to 10x LoD of the panel analyte and 30 negative samples (whole blood with no analyte). Samples were tested side by side to demonstrate comparable performance between the Sofia 2 software version 1 and Sofia 2 software version 2 analyzers.

All IgG positive samples yielded 100% agreement to the expected result with the Sofia 2 analyzer and software version 2. One (1) invalid result (3-5x LoD IgM) was observed during the study on both software version 1 and version 2. Further analysis of the cassette image showed no sample migration along the test strip, likely due to aggregation. The retest was valid and yielded the expected result. Twenty-four (24) unexpected IgG positive results were observed among the IgM positive samples. Of these, twenty-three (23) were observed on both software version 1 and version 2, while one (1) was observed only on software version 2. The presence of unexpected IgG positive results does not impact patient treatment, as an initial positive result triggers a confirmatory serology test at a reference laboratory.

2. Matrix Comparison:

Not Applicable

C Clinical Studies:

1. Clinical Sensitivity:

Not applicable

2. Clinical Specificity:

Not applicable

3. Clinical Cut-Off:

Not applicable

4. Other Clinical Supportive Data (When 1. and 2. Are Not Applicable):

Performance Near the Assay Cutoff

i. Sofia 2 SARS Antigen+ FIA

The purpose of this study was to demonstrate that the performance near the cut-off is equivalent for both versions of the Sofia 2 software with the Sofia 2 SARS Antigen+ FIA in nasal samples with heat inactivated SARS-CoV-2 virus.

A coded panel of individual contrived samples was tested to demonstrate that multiple operators can consistently and correctly perform the assay as intended on both software versions of the Sofia 2 analyzers using a single (1) assay lot. Testing of this panel considered multiple analyzers, operators, days, and sample types to obtain variability

assessment as well as collect comparison data between the two systems. The contrived panel consisted of:

- Negative Sample (no analyte, C₀)
- Low Positive (1-2x LoD)
- Moderate Positive (4x LoD)

Each sample level was tested in triplicate (n=3) across ten (10) different testing events (2 events per day over 5 days) at the manufacturer's internal site with at least two (2) operators and ten (10) analyzers for use during the study. Each sample was tested for a total of thirty (30) times over the course of the study. One (1) kit lot was run and tested per event. A calibration check of the Sofia 2 analyzers was performed prior to the beginning of the study. One (1) set of Positive and Negative Control Swabs were tested for each day of the study on each analyzer.

The overall study results are shown in **Table 4** below. Equivalent performance (negative and positive percent agreement) was observed between both versions of the Sofia 2 analyzer software.

Table 4: Near Cutoff Study Results: Sofia 2 SARS Antigen+ FIA

Sample Name	SARS-CoV-2			
	Sofia 2 SW Version 1		Sofia 2 SW Version 2	
	Agreement n/N (%)	95% CI	Agreement n/N (%)	95% CI
Negative	30/30* (100.0)	(88.6% - 100.0%)	30/30* (100.0)	(88.6% -100.0%)
1.5x LoD SARS	30/30 (100.0)	(88.6% - 100.0%)	30/30 (100.0)	(88.6% -100.0%)
4x LoD SARS	30/30 (100.0)	(88.6% - 100.0%)	30/30 (100.0)	(88.6% -100.0%)

*Negative Agreement

ii. Sofia 2 Lyme FIA

The purpose of this study was to demonstrate that the performance near the cut-off is equivalent for both versions of the Sofia 2 software with the Sofia 2 Lyme FIA in whole blood samples with Lyme IgG and IgM.

A coded panel of individual contrived samples was tested to demonstrate that multiple operators can consistently and correctly perform the assay as intended on both software versions of the Sofia 2 analyzers using a single (1) assay lot. Testing of this same panel

considered multiple analyzers, operators, days, and sample types to obtain variability assessment as well as collect comparison data between the two systems.

The contrived panel consisted of:

- Negative Sample (no analyte, C₀)
- Low Positive IgG (1-2x IgG LoD)
- Low Positive IgM (1-2x IgM LoD)
- Moderate Positive IgG (4x IgG LoD)
- Moderate Positive IgM (4x IgM LoD)

Each sample level was tested in triplicate (n=3) across ten (10) different testing events (2 events per day over 5 days) at the manufacturer's internal site with two (2) operators and ten (10) analyzers for use during the study. Each sample was tested for a total of thirty (30) times over the course of the study. One (1) kit lot was run and tested per event.

The overall study results are shown in **Table 5** below. Except for the 4x LoD IgM sample, equivalent performance (negative and positive percent agreement) was observed between versions 1 and 2 of the Sofia 2 analyzer software.

Table 5: Near-Cutoff Study Results: Sofia 2 Lyme FIA

Sample Name	Lyme IgM				Lyme IgG			
	SW Version 1		SW Version 2		SW Version 1		SW Version 2	
	Agreement n/N (%)	95% CI	Agreement n/N (%)	95% CI	Agreement n/N (%)	95% CI	Agreement n/N (%)	95% CI
Negative	30/30* (100.0)	(88.6% - 100.0%)	30/30 * (100.0)	(88.6% - 100.0%)	30/30* (100.0)	(88.6% - 100.0%)	30/30* (100.0)	(88.6% - 100.0%)
1.5x LoD IgM	30/30 (100.0)	(88.6% - 100.0%)	30/30 (100.0)	(88.6% - 100.0%)	30/30* (100.0)	(88.6% - 100.0%)	30/30* (100.0)	(88.6% - 100.0%)
4x LoD IgM	30/30 (100.0)	(88.6% - 100.0%)	30/30 (100.0)	(88.6% - 100.0%)	22/30* (73.3)	(55.6% - 85.8%)	22/30* (73.3)	(55.6% - 85.8%)
1.5x LoD IgG	30/30 * (100.0)	(88.6% - 100.0%)	30/30 * (100.0)	(88.6% - 100.0%)	30/30 (100.0)	88.6% - 100.0%	30/30 (100.0)	(88.6% - 100.0%)
4x LoD IgG	30/30 * (100.0)	(88.6% - 100.0%)	30/30 * (100.0)	(88.6% - 100.0%)	30/30 (100.0)	(88.6% - 100.0%)	30/30 (100.0)	(88.6% - 100.0%)

*Negative Agreement

D Expected Values/Reference Range:

A patient sample is expected to be negative for SARS CoV-2.

A patient sample is expected to be negative for *B. burgdorferi* IgG and IgM.

E Other Supportive Instrument Performance Characteristics Data:

1) Electromagnetic compatibility

Electrical safety and electromagnetic compatibility (EMC) testing were performed, and the new test system was found to be acceptable

2) Software and cybersecurity

Software and cybersecurity documentation was reviewed and found to be acceptable.

VIII Proposed Labeling:

The labeling supports the finding of substantial equivalence for this device.

IX Conclusion:

The submitted information in this premarket notification is complete and supports a substantial equivalence decision