

Guidelines for Laboratory Verification of Performance of the BioFire® COVID-19 Test

TECHNICAL ::: NOTE

Purpose

The Clinical Laboratory Improvement Amendments (CLIA) and the Clinical Laboratory Improvement Program (CLIP) establish quality standards for all laboratory testing to ensure the accuracy and reliability of patient test results, regardless of where the test is performed. The CLIA and CLIP regulations include a requirement for verifying the performance specifications of unmodified tests authorized for use under an Emergency Use Authorization (EUA) by the FDA. The BioFire® COVID-19 Test is for use only under EUA in U.S. laboratories certified under CLIA to perform moderate or high complexity tests.

This document provides examples of verification procedures to assist your laboratory in developing a protocol for the verification of BioFire® COVID-19 Test performance on FilmArray® 2.0 and FilmArray® Torch Systems. Each verification scheme has been designed to provide positive and negative tests for SARS-CoV-2 which is detected by the BioFire® COVID-19 Test and may be easily modified or expanded to meet specific criteria. Day-to-day variation is evaluated by testing each sample on two separate days. To evaluate operator-to-operator variability, multiple laboratory technicians may test the same sample.

The Laboratory Director is ultimately responsible for ensuring that verification procedures meet the appropriate standards for CLIA, CLIP and any other applicable laboratory accrediting agencies.

BioFire Intended Use

The BioFire® COVID-19 Test is a qualitative, multiplexed, nucleic acid-based in vitro diagnostic test intended for use with FilmArray® 2.0 and FilmArray® Torch Systems. The BioFire® COVID-19 Test is intended for detection of SARS-CoV-2 in nasopharyngeal swabs (NPS) in transport media from individuals with signs or symptoms of COVID-19.

The complete intended use statement and additional information about the use of the FilmArray system can be found in the *BioFire® COVID-19 Test Instructions for Use*

Performance Verification: Overview

The procedures described below will generate Detected and Not Detected results for the BioFire® COVID-19 Test assays, and are example procedures to assist your laboratory in developing a protocol for the verification of BioFire® COVID-19 Test performance on FilmArray® 2.0 and FilmArray® Torch Systems.

A FilmArray® System is defined as one or more FilmArray® instruments or modules that are connected to and controlled by a single computer system. If the laboratory director chooses not to perform the verification protocol on each individual instrument, it is advised that test replicates be evenly distributed among the instruments.

Two example performance verification procedures are described. The Simple Protocol was developed using the BioFire® COVID-19 Test External Control Kit. The Alternate Protocol describes the use of alternative materials as controls.

In addition to, or in place of, the verification scheme described here; a laboratory may choose to test clinical/patient samples to assess clinical sensitivity and sample matrix effects in its performance verification of the FilmArray® system. Pooled clinical/patient samples may be tested and used in place of control material.

Table 1. Overview of Verification Protocols

Verification Protocol	Required Control Material	Sample Replicates	Expected Detected Results	Expected Not Detected Results	Days of Testing
Simple Protocol	BioFire® COVID-19 Test External Control Kit	8	4	4	2
Alternative Protocol	Alternative SARS-CoV-2 Source ^a	8	4	4	2

^a Acceptable material may include live virus, inactivated virus, or genomic RNA at a concentration of 1.0×10^5 GE/mL.

Performance Verification: Materials

The following materials may be needed to perform verification procedures:

Material	Part Number
BioFire® COVID-19 Test Kit (6 tests)	423745
BioFire® COVID-19 Test Kit (30 tests)	423744
BioFire® COVID-19 Test External Control Kit v1.0 (6 positive controls) ^a	423748
Genomic RNA, live virus, or inactivated virus from a SARS-CoV-2 isolate	BEI Resources NR-52285 (genomic RNA) or other source

Performance Verification Protocols

Both protocols can be followed to test a total of 8 samples, providing 4 positive results and 4 negative results on a single instrument. The estimated total time for completion of either verification example is 2 days for a FilmArray[®] 2.0 or FilmArray[®] Torch System configured with a single module. The testing schemes may be modified to run more samples per day based on the number of instruments in the FilmArray[®] System, and should be determined by the individual laboratory. Results of the verification may be recorded in the verification records provided below.

Simple Protocol

The Simple Protocol utilizes the BioFire[®] COVID-19 Test External Control Kit which contains freeze-dried synthetic RNA transcripts designed to be amplified by the BioFire[®] COVID-19 Test.

Day 1

1. Obtain two BioFire[®] COVID-19 Test External Control vials and four BioFire[®] COVID-19 Tests.

NOTE: The tests should be run in a single day by the same operator to evaluate run-to-run variation or different operators to evaluate operator-to-operator variation.

NOTE: To minimize the risk of cross-contamination set up only one test at a time.

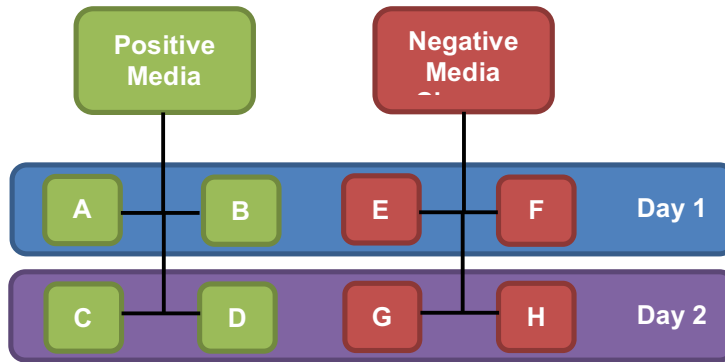
2. Follow the instructions in the *BioFire[®] COVID-19 Test External Control Quick Guide Use* to prepare and run 2 negative media samples on the BioFire[®] COVID-19 Test (e.g. samples E and F).
3. Follow the instructions in the *BioFire[®] COVID-19 Test External Control Quick Guide* to prepare and run 2 positive media samples on the BioFire[®] COVID-19 Test using the External Control material (e.g. samples A and B).

Day 2

4. To evaluate day-to-day variation, test the remaining positive media samples (e.g. samples C and D) and negative media samples (e.g. samples G and H) by repeating Steps 1-3 as in Day 1.

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Figure 1. Simple Protocol Workflow



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Alternative Protocol

The Alternative Protocol allows for the use of an alternative SARS-CoV-2 source material as a positive control. The material may be either live virus, inactivated virus, or genomic RNA. Known negative and positive clinical specimens may also be used, however the procedure may need to be modified. In order to obtain consistent results it is important that the material be accurately quantified.

Day 1

1. Using either transport media or saline solution, dilute the SARS-CoV-2 material in a new tube to obtain 0.75mL of sample material at a final concentration of 1.0×10^5 genomic equivalent copies/mL.

NOTE: Transport media is not recommended if using genomic RNA as a SARS-CoV-2 source material.

2. Obtain four BioFire[®] COVID-19 Tests.

NOTE: The tests should be run in a single day by the same operator to evaluate run-to-run variation or different operators to evaluate operator-to-operator variation.

NOTE: To minimize the risk of cross-contamination set up only one test at a time.

3. Follow the instructions in the *BioFire[®] COVID-19 Test Instructions for Use* or *Quick Guide* to prepare and run 2 negative media samples on the BioFire[®] COVID-19 Test (e.g. samples E and F) using either transport media or saline solution as the sample material.

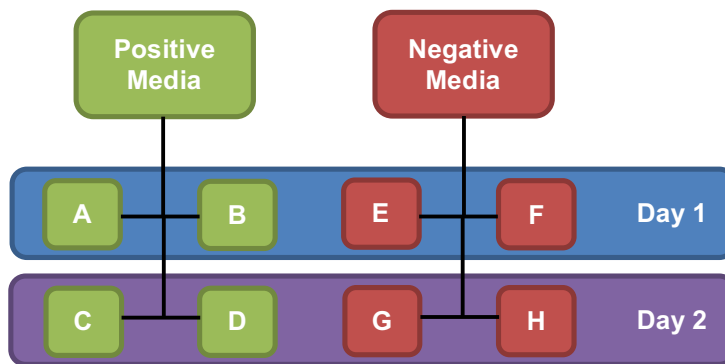
NOTE: The media, (transport media or saline solution), in the negative samples should be the same sample media used to dilute the SARS-CoV-2 material.

- Follow the instructions in the *BioFire® COVID-19 Test Instructions for Use* or *Quick Guide* to prepare and run 2 positive media samples on the BioFire® COVID-19 Test using the SARS-CoV-2 positive material prepared in Step 1 (e.g. samples A and B).

Day 2

- To evaluate day-to-day variation, test the remaining positive media samples (e.g. samples C and D) and negative media samples (e.g. samples G and H) by repeating Steps 1-4 as in Day 1.

Figure 2. Alternative Protocol Workflow



Expanding the Protocol

The protocol described above can be expanded to include more replicates per day, more replicates per operator, and/or more instruments per BioFire® System.

Verification of Replaced and Repaired or New Instruments

If it becomes necessary to verify the performance of a loaner or repaired instrument, the above protocol may serve as a guideline but should be verified by the Laboratory Director. The Laboratory Director should determine the appropriate number of samples to test. Four samples following the Day 1 testing plan may be sufficient (see Day 1 Testing above).

TECHNICAL NOTE

Technical Support Contact Information

BioFire Defense is dedicated to providing the best customer support available. If you have any questions or concerns about this process, please contact the FilmArray Technical Support team for assistance.

General Information

Email: support@biofiredefense.com

Phone: 1-801-262-3592

Fax: 1-801-447-6907



TECHNICAL NOTE

BioFire® COVID-19 Test Positive Verification Record

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Computer System Serial #: _____

BioFire® COVID-19 Test Kit Part #: _____

Lot #: _____

Sample/Control Material Source and Lot #: _____

Date: _____

Organism	Instrument Serial #	Was the Organism Detected?	Date/Operator
SARS-CoV-2		<input type="checkbox"/> Yes <input type="checkbox"/> No	/

Reviewed by:

Signature Date

BioFire® COVID-19 Test Negative Verification Record

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Computer System Serial #: _____

BioFire® COVID-19 Test Kit Part #: _____

Lot #: _____

Date: _____

Organism	Instrument Serial #	Was the Organism Detected?	Date/Operator
SARS-CoV-2		<input type="checkbox"/> Yes <input type="checkbox"/> No	/

Reviewed by:

Signature

Date