November 16, 2023

Hologic, Inc.
Jon Kukowski
Regulatory Affairs Specialist
10210 Genetic Center Drive
San Diego, California 92121

Re: K230451
Trade/Device Name: Aptima Chlamydia trachomatis Assay
Regulation Number: 21 CFR 866.3120
Regulation Name: Chlamydia Serological Reagents
Regulatory Class: Class I, reserved
Product Code: MKZ
Dated: February 16, 2023
Received: February 21, 2023

Dear Jon Kukowski:

We have reviewed your section 510(k) premarket notification of intent to market the device referenced above and have determined the device is substantially equivalent (for the indications for use stated in the enclosure) to legally marketed predicate devices marketed in interstate commerce prior to May 28, 1976, the enactment date of the Medical Device Amendments, or to devices that have been reclassified in accordance with the provisions of the Federal Food, Drug, and Cosmetic Act (the Act) that do not require approval of a premarket approval application (PMA). You may, therefore, market the device, subject to the general controls provisions of the Act. Although this letter refers to your product as a device, please be aware that some cleared products may instead be combination products. The 510(k) Premarket Notification Database available at https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfpmn/pmn.cfm identifies combination product submissions. The general controls provisions of the Act include requirements for annual registration, listing of devices, good manufacturing practice, labeling, and prohibitions against misbranding and adulteration. Please note: CDRH does not evaluate information related to contract liability warranties. We remind you, however, that device labeling must be truthful and not misleading.

If your device is classified (see above) into either class II (Special Controls) or class III (PMA), it may be subject to additional controls. Existing major regulations affecting your device can be found in the Code of Federal Regulations, Title 21, Parts 800 to 898. In addition, FDA may publish further announcements concerning your device in the Federal Register.

Please be advised that FDA's issuance of a substantial equivalence determination does not mean that FDA has made a determination that your device complies with other requirements of the Act or any Federal statutes and regulations administered by other Federal agencies. You must comply with all the Act's requirements, including, but not limited to: registration and listing (21 CFR Part 807); labeling (21 CFR Part 801 and Part 809); medical device reporting (reporting of medical device-related adverse events) (21 CFR

Part 803) for devices or postmarketing safety reporting (21 CFR Part 4, Subpart B) for combination products (see https://www.fda.gov/combination-products/guidance-regulatory-information/postmarketing-safety-reporting-combination-products); good manufacturing practice requirements as set forth in the quality systems (QS) regulation (21 CFR Part 820) for devices or current good manufacturing practices (21 CFR Part 4, Subpart A) for combination products; and, if applicable, the electronic product radiation control provisions (Sections 531-542 of the Act); 21 CFR Parts 1000-1050.

Also, please note the regulation entitled, "Misbranding by reference to premarket notification" (21 CFR 807.97). For questions regarding the reporting of adverse events under the MDR regulation (21 CFR Part 803), please go to https://www.fda.gov/medical-devices/medical-device-safety/medical-device-reporting-mdr-how-report-medical-device-problems.

For comprehensive regulatory information about medical devices and radiation-emitting products, including information about labeling regulations, please see Device Advice (https://www.fda.gov/medical-devices/device-advice-comprehensive-regulatory-assistance) and CDRH Learn (https://www.fda.gov/training-and-continuing-education/cdrh-learn). Additionally, you may contact the Division of Industry and Consumer Education (DICE) to ask a question about a specific regulatory topic. See the DICE website (https://www.fda.gov/medical-devices/device-advice-comprehensive-regulatory-assistance/contact-us-division-industry-and-consumer-education-dice) for more information or contact DICE by email (DICE@fda.hhs.gov) or phone (1-800-638-2041 or 301-796-7100).

Sincerely,

Himani Bisht -S

Himani Bisht, Ph.D.
Assistant Director
Viral Respiratory and HPV Branch
Division of Microbiology Devices
OHT7: Office of In Vitro Diagnostics
and Radiological Health
Office of Product Evaluation and Quality
Center for Devices and Radiological Health

Enclosure

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Food and Drug Administration

Indications for Use

Form Approved: OMB No. 0910-0120
Expiration Date: 07/31/2026
See PRA Statement below.

510(k) Number *(if known)*
K230451

Device Name
Aptima Chlamydia trachomatis Assay

Indications for Use *(Describe)*
The Aptima Chlamydia trachomatis (CT) assay is an in vitro qualitative nucleic acid amplification test (NAAT) for the detection of ribosomal RNA (rRNA) from Chlamydia trachomatis to aid in the diagnosis of chlamydia urogenital disease using the Panther System.

The assay may be used to test the following specimens from symptomatic or asymptomatic individuals: patient-collected vaginal swab specimens1 (in a clinical setting); and female and male urine specimens.

1Patient-collected vaginal swab specimens are an option for screening women when a pelvic exam is not otherwise indicated. The Aptima Multitest Swab Specimen Collection Kit has not been evaluated for home use.

Type of Use *(Select one or both, as applicable)*

☒ Prescription Use (Part 21 CFR 801 Subpart D) ☐ Over-The-Counter Use (21 CFR 801 Subpart C)

CONTINUE ON A SEPARATE PAGE IF NEEDED.

This section applies only to requirements of the Paperwork Reduction Act of 1995.

DO NOT SEND YOUR COMPLETED FORM TO THE PRA STAFF EMAIL ADDRESS BELOW.

The burden time for this collection of information is estimated to average 79 hours per response, including the time to review instructions, search existing data sources, gather and maintain the data needed and complete and review the collection of information. Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden, to:

Department of Health and Human Services
Food and Drug Administration
Office of Chief Information Officer
Paperwork Reduction Act (PRA) Staff
PRAStaff@fda.hhs.gov

"An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB number."

510(k) Summary

Contact Details

Applicant Name: Hologic, Inc.

Applicant Address: 10210 Genetic Center Drive San Diego CA 92121 United States

Applicant Contact Telephone: 858-410-8245

Applicant Contact: Jon Kukowski

Applicant Contact Email: jonathan.kukowski@hologic.com

Device Name

Device Trade Name: Aptima Chlamydia trachomatis Assay

Common Name: Aptima CT Assay

Classification Name: DNA Probe, Nucleic Acid Amplification, Chlamydia

Regulation Number: 866.3120

Regulatory Class: Class I

Product Code: MKZ

Legally Marketed Predicate Devices

Predicate #: K063451

Predicate Trade Name: Aptima Assay for Chlamydia trachomatis

Product Code: MKZ

Device Description Summary

Clearance of this pre-market application will allow the Aptima® Chlamydia trachomatis (CT) assay to be performed on the Panther® system using patient-collected vaginal swab specimens and female and male urine specimens.

The Aptima Chlamydia trachomatis assay (Aptima CT assay) is a target amplification nucleic acid probe test for in vitro qualitative detection of ribosomal RNA (rRNA) from *Chlamydia trachomatis* (CT). The Aptima CT assay combines the technologies of target capture, transcription-mediated amplification (TMA), and hybridization protection assay (HPA).

Specimens are collected and transferred into their respective specimen transport tubes. The transport solution in these tubes releases the rRNA target and protects it from degradation during

storage. When the Aptima CT assay is performed in the laboratory, the target rRNA molecule is isolated from the specimens by use of a capture oligomer via target capture that utilizes magnetic microparticles. The capture oligomer contains a sequence complementary to a specific region of the target molecule as well as a string of deoxyadenosine residues. During the hybridization step, the sequence specific region of the capture oligomer binds to a specific region of the target molecule. The capture oligomer:target complex is then captured out of solution by decreasing the temperature of the reaction to room temperature. This temperature reduction allows hybridization to occur between the deoxyadenosine region on the capture oligomer and the poly-deoxythymidine molecules that are covalently attached to the magnetic particles. The micro particles, including the captured target molecule bound to them, are pulled to the side of the reaction vessel using magnets and the supernatant is aspirated. The particles are washed to remove residual specimen matrix that may contain amplification reaction inhibitors. After the target capture steps are completed, the specimens are ready for amplification.

Target amplification assays are based on the ability of complementary oligonucleotide primers to specifically anneal and allow enzymatic amplification of the target nucleic acid strands. The Hologic TMA reaction replicates a specific region of the 16S rRNA from CT via DNA intermediates. A unique set of primers is used for the target molecule. Detection of the rRNA amplification product sequences (amplicon) is achieved using nucleic acid hybridization. A single-stranded chemiluminescent DNA probe, which is complementary to a region of the target amplicon, is labeled with an acridinium ester molecule. The labeled DNA probe combines with amplicon to form stable RNA:DNA hybrids. The Selection Reagent differentiates hybridized from unhybridized probe, eliminating the generation of signal from unhybridized probe. During the detection step, light emitted from the labeled RNA:DNA hybrids is measured as photon signals in a luminometer and are reported as Relative Light Units (RLU).

The device reagents are identical to the Aptima CT assay reagents for use on the Tigris DTS® system but are intended for use on the Panther system with different specimen type indications. The Panther and Tigris DTS systems use the same principles of operation.

Intended Use

The Aptima® Chlamydia trachomatis (CT) assay is an *in vitro* qualitative nucleic acid amplification test (NAAT) for the detection of ribosomal RNA (rRNA) from *Chlamydia trachomatis* to aid in the diagnosis of chlamydial urogenital disease using the Panther system.

The assay may be used to test the following specimens from symptomatic or asymptomatic individuals: patient-collected vaginal swab specimens[1] (in a clinical setting); and female and male urine specimens.

[1]Patient-collected vaginal swab specimens are an option for screening women when a pelvic exam is not otherwise indicated. The Aptima Multitest Swab Specimen Collection Kit has not been evaluated for home use.

Indications for Use Comparison

This pre-market application is to clear the Aptima CT assay on an additional platform, the Panther system, for use with selected cleared and new specimen type indications. The analytical and clinical study results demonstrate that the Aptima CT assay on the Panther system performs comparably to the predicate device in detecting rRNA of CT from the designated specimen types and support a substantial equivalence decision.

Technological Comparison

The Aptima CT assay incorporates the technologies of target capture, Transcription-Mediated Amplification (TMA), and Hybridization Protection Assay (HPA), which have been previously described in 510(k) submission K043072 for the Aptima CT assay, cleared in January 2005. The Aptima CT assay and system technologies remain unchanged with this submission, including all biochemical (e.g., *in vitro* nucleic acid probe test) and physical detection (e.g., chemiluminescence) technologies.

Non-Clinical and/or Clinical Tests Summary & Conclusions

The following studies were conducted to support analytical performance of the Aptima CT assay on the Panther system using patient-collected vaginal swab, and female and male urine specimens.

Analytical Studies

Within-lab Precision Study

Precision was determined using panels made by spiking CT organisms or equivalent RNA into Swab Transport Media (STM) at concentrations below, at, or above the analytical sensitivity claim in the package insert. Testing was performed on three Panther instruments. The negative panel member consisted of specimen transport medium (STM) only. The CT positive panel members were created by spiking STM with CT positive cells diluted in STM to achieve the appropriate targeted concentrations ranging from 0.25 IFU/mL to 2,500 IFU/mL. The percent agreement to expected results for all panels was 100%.

Limit of Detection Study

The limit of detection (LoD) was tested and confirmed with sensitivity panels prepared using CT serovars E and G spiked into pooled negative vaginal swab matrix. Sensitivity panels were tested on two Panther instruments with two reagent lots. At least 25 replicates were run for each concentration for each reagent lot for each serovar. LoD, defined as the target concentration that can be detected in 95% of the replicates tested for vaginal swab specimens, is 0.00267 IFU/mL for serovar E and 0.00441 IFU/mL for serovar G.

Analytical Sensitivity and Specificity Study

Analytical sensitivity and specificity was determined using panels made by spiking CT organisms or equivalent RNA into matrix pools. Analytical sensitivity using a variety of CT serovars have been previously established and shown to be equivalent for all types tested. Analytical specificity in the presence of closely related organisms was also previously established. For the purposes of this sensitivity study a single CT serovar was tested; specificity was confirmed using negative clinical pools. Pooled urine was used to determine analytical sensitivity and specificity. Analytical sensitivity was confirmed using separate pools of vaginal swabs and Specimen Transport Media (STM). All acceptance criteria for this study were met. Samples tested by the Aptima CT assay yielded a positive result when CT RNA was present at concentrations equivalent to 2.5 IFU/mL (1 IFU/assay; 5 fg of CT rRNA/assay). The percent agreement to expected results for all panels was 100%. The lower bound of the one-sided 95% score confidence interval for percent agreement for each panel were greater than or equal to 95%.

Carryover Study

A multi-run analytical study was conducted using spiked panels on six Panther systems. Carryover was assessed using approximately 20% high titer CT samples dispersed between negative samples. The runs included clusters of high positive samples with clusters of negative samples as well as single high positives dispersed within the run. High titer samples were made using CT rRNA spiked into STM to give a final concentration of 5×10^5 fg rRNA/reaction (rRNA equivalent of 2.5×10^5 IFU/mL). Testing was carried out using 5 runs on each of six Panther systems with a total of 5878 negative samples. The overall carryover rate was 0.19% with a 95% confidence interval of 0.10–0.33%.

Run-Size Validity

This study was to confirm that there are no front-to-back positional effects within a run for the Aptima CT assay on the Panther system. Panels and controls with known concentrations were tested and results were examined for front-to-back effects when compared to expected results. Negative and Positive panel member results produced 100% agreement with the expected results, with no difference in performance between the front and back of the runs.

Control Validity

This study was to demonstrate that Aptima CT assay run controls meet performance criteria and properly control for run validity over the timeframe allowed by the Panther software. The acceptance criteria for this study were met. Results at time-point 0 hour and time-point 30 hour (24 hours + 25%) yielded the expected results for the study and the control RLUs were within the expected range. Run controls met performance criteria and properly control for run validity over the 24-hours control validity timeframe allowed by the Panther software.

Control Effectiveness

This study was to demonstrate that the Aptima CT assay run controls are properly invalidated under fault conditions that are not detected by instrument process controls and that may exist during assay processing. The performance of the CT Controls correctly predicted the sample results in 8 out of 8 of the conditions tested for the assay when run on the Panther system. Results met the acceptance criteria of the study and demonstrated that performance of the Aptima CT assay controls properly determine run and test validity under fault conditions that are not detected by Panther system process controls.

Environmental Conditions

This study was to demonstrate that the Aptima CT assay on the Panther system meets performance requirements at the limits of Panther system environmental conditions for external ambient temperature (15-30ºC) and relative humidity (20-85%) specifications. Target panels at or below the sensitivity claims for the assays were tested. Negative and Positive panel member results produced 100% agreement with the expected results. The Aptima CT assay on the Panther system meets performance requirements at the limits of Panther system environmental conditions for external ambient temperature (15-30ºC) and relative humidity (20-85%) specifications.

Reproducibility Study

Aptima CT assay reproducibility was evaluated on the Panther system at two external US laboratories and at Hologic. Testing was performed using two lots of assay reagents and a total of six operators (two at each site). At each site, testing was performed over at least six days.

The negative panel member consisted of specimen transport medium (STM) only. The CT positive panel members were created by spiking STM with CT positive cells diluted in STM to achieve the appropriate targeted concentrations (very low positive, low positive, or high positive). Final CT concentrations ranged from 0.25 IFU/mL to 25 IFU/mL. The agreement with expected results was 100% for all panel members.

Table 1 shows the signal variability of assay RLU results for each panel member between sites, between operators, between lots, between runs, within runs, and overall (Total). Only samples with valid results were included in the analyses.

Table 1: Reproducibility Study Data: Signal Variability by Panel Member

Concentration	Target Conc. (IFU/mL)	N	Mean RLU (x1000)	Between Sites		Between Operators		Between Lots		Between Runs		Within Runs		Totals	
				SD	CV (%)	SD	CV (%)	SD	CV (%)	SD	CV (%)	SD	CV (%)	SD	CV (%)
Negative	0	107	1.5	0.8	49.7	0.0	0.0	0.0	0.0	0.1	4.9	1.5	101.1	1.7	112.8
Very Low Positive	0.25	108	7339.0	272.0	3.7	0.0	0.0	80.0	1.1	98.2	1.3	142.0	1.9	331.9	4.5
Low Positive	2.5	108	7387.6	307.8	4.2	0.0	0.0	97.9	1.3	139.9	1.9	114.0	1.5	370.0	5.0
High Positive	25	107[1]	7424.4	285.6	3.8	39.6	0.5	136.9	1.8	91.3	1.2	138.7	1.9	359.8	4.8

CV = coefficient of variation, RLU = relative light unit, SD = standard deviation.

Notes: The RLU value reported by the software is the total measured RLU divided by 1000 with the digits after the decimal point truncated. Variability from some factors may be numerically negative. In these cases, SD and CV are shown as 0.0.

[1]One invalid result was excluded from the analysis.

Clinical Studies

Clinical Performance Study

A prospective, multicenter clinical study was conducted to establish the clinical performance characteristics of the Aptima CT assay on the Panther system. Specimens were collected from 4413 symptomatic and asymptomatic women and men enrolled at 11 geographically and ethnically diverse US clinical sites, including obstetrics and gynecology, family planning, and STI clinics. Subjects were classified as symptomatic if symptoms were reported by the subject. Subjects were classified as asymptomatic if the subject did not report symptoms. One hundred sixty-six (166) enrolled subjects were not evaluable (28 were withdrawn and 138 did not have at least one specimen with a valid non-excluded Aptima result and a conclusive infected status). Of the 4247 evaluable subjects, 2283 were women and 1964 were men. The average age among evaluable study subjects was 34.5 years (range = 14 to 84 years). Symptoms were reported in 45.7% (1939/4247) of the evaluable subjects.

Up to 5 specimens were collected from each female subject (4 patient-collected vaginal swab, 1 first-catch urine), and 1 first-catch urine specimens was collected from each male subject. All specimens were collected by the subject at the clinical sites.

Specimens were tested with the Aptima CT assay on the Panther system. Specimens with initial equivocal or invalid Aptima CT assay results or instrument processing errors were retested, volume permitting; valid retest results were included in the performance analyses. Patient-collected vaginal swabs and male and female urine specimens were tested with up to 3 FDA-cleared NAATs to establish the specimen specific patient infected status (PIS) as follows:

- Male urine PIS was derived from male urine specimens
- Female urine CCA was derived from female urine specimens
- Vaginal swab PIS was derived from vaginal swab and female urine specimens

Performance of the Aptima CT assay was estimated relative to the specimen-specific PIS for each of the specimen types. Of the specimens collected, 6592 were processed in valid Aptima CT assay runs, including 213 (3.2%) that had to be retested due to invalid results. Overall, 6561 (99.5%) had final valid results and 31 (0.5%) had final invalid results and were excluded from the analyses. A total of 6415 specimens from 4247 evaluable subjects were included in the

analyses comparing Aptima CT assay results to the PIS: 2265 patient-collected vaginal swabs, 2186 female urine, and 1964 male urine specimens.

Analytical and clinical studies performed with the Aptima CT assay on the Panther system to ensure the device meets the safety and effectiveness requirements and to confirm that the automated Panther system produced equivalent results to the previously cleared automated Tigris system. All study results demonstrated that the performance of the Aptima CT assay on the Panther system is consistent with current expectations for CT testing, and that the assay is safe and effective for its intended use.

Conclusion

Analytical and clinical studies performed with the Aptima CT assay on the Panther system to ensure the device meets the safety and effectiveness requirements and to confirm that the automated Panther system produced equivalent results to the previously cleared automated Tigris system. All study results demonstrated that the performance of the Aptima CT assay on the Panther system is consistent with current expectations for CT testing, and that the assay is safe and effective for its intended use.