January 21, 2021

Roche Molecular Systems, Inc.
Aradhana Karthikeyan
Sr Regulatory Affairs Specialist
4300 Hacienda Drive
Pleasanton, California 94588-2722

Re: K202408
Trade/Device Name: cobas CT/NG for use on cobas 6800/8800 systems
Regulation Number: 21 CFR 866.3393
Regulation Name: Nucleic acid detection system for non-viral microorganism(s) causing sexually transmitted infections
Regulatory Class: Class II
Product Code: QEP, MKZ, LSL, OOI
Dated: August 20, 2020
Received: August 21, 2020

Dear Aradhana Karthikeyan:

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 (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 located 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 803) for devices or postmarketing safety reporting (21 CFR 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 4, Subpart A) for combination products; and, if applicable, the electronic product radiation control provisions (Sections 531-542 of the Act); 21 CFR 1000-1050.

Also, please note the regulation entitled, "Misbranding by reference to premarket notification" (21 CFR Part 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,

Maria I. Garcia -S

Maria Ines Garcia, Ph.D.
Branch Chief
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: 06/30/2020
See PRA Statement below.

510(k) Number *(if known)*

K202408

Device Name

cobas® CT/NG for use on cobas 6800/8800 systems

Indications for Use *(Describe)*

The cobas® CT/NG for use on the cobas® 6800/8800 Systems is an automated, qualitative in vitro nucleic acid diagnostic test, that utilizes real-time polymerase chain reaction (PCR), for the direct detection of *Chlamydia trachomatis* (CT) and/or *Neisseria gonorrhoeae* (NG) DNA in male and female urine, clinician-instructed self-collected vaginal swab specimens (collected in a clinical setting), and clinician-collected vaginal swab specimens, endocervical swab specimens, oropharyngeal (throat) swab specimens and anorectal swab specimens all collected in cobas® PCR Media (Roche Molecular Systems, Inc.), and cervical specimens collected in PreservCyt® Solution. This test is intended as an aid in the diagnosis of chlamydial and gonococcal disease in both symptomatic and asymptomatic individuals.

Ancillary Collection Kits

The cobas® PCR Media Dual Swab Sample Kit is used to collect and transport human specimens. The cobas® PCR Media serves as a nucleic acid stabilizing transport and storage medium.
Note: This kit has been validated for use with the following tests:
• cobas® CT/NG v2.0 Test (for use on the cobas® 4800 Systems)
• cobas® CT/NG for use on cobas® 6800/8800 Systems
• cobas® TV/MG for use on the cobas® 6800/8800 Systems

The cobas® PCR Media Uni Swab Sample Kit is used to collect and transport human specimens. The cobas® PCR Media serves as a nucleic acid stabilizing transport and storage medium.
Note: This kit has been validated for use with the following tests:
• cobas® CT/NG v2.0 Test (for use on the cobas® 4800 Systems)
• cobas® CT/NG for use on cobas® 6800/8800 Systems
• cobas® TV/MG for use on the cobas® 6800/8800 Systems
• cobas® Cdiff Test for use on the cobas® 4800 System

The cobas® PCR Urine Sample Kit is used to collect and transport urine specimens. The cobas® PCR Media serves as a nucleic acid stabilizing transport and storage medium.
Note: This kit has been validated for use with the following tests:

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.

cobas® CT/NG
for use on the cobas® 6800/8800 Systems
510(k) Summary

This summary of 510(k) safety and effectiveness information is being submitted in accordance with the requirements of 21 CFR 807.92.

Submitter Name	Roche Molecular Systems, Inc.
Address	4300 Hacienda Drive Pleasanton, CA, 94588-2722
Contact	Aradhana Karthikeyan Phone: (925) 353-7713 FAX: (925) 730-8784 Email: Aradhana.karthikeyan@roche.com
Date Prepared	Jan 12, 2021
Proprietary Name	cobas® CT/NG for use on cobas® 6800/8800 systems
Common Name	Real-time PCR assay, in vitro nucleic acid amplification test for the quantitative detection of *Chlamydia trachomatis* (CT) and/or *Neisseria gonorrhoeae* (NG)
Classification Name	Nucleic acid detection system for non-viral microorganism(s) causing sexually transmitted infections Chlamydia serological reagents Neisseria spp. direct serological test reagents Real Time Nucleic Acid Amplification System
Product Codes	QEP: Sec. 866.3393 MKZ: Sec. 866.3120 LSL: Sec. 866.3390 OOI: Sec. 862.2570
Predicate Devices	cobas® CT/NG for use on the cobas® 6800/8800 systems (K173887)
Establishment Registration	Roche Molecular Systems, Inc. (2243471)

1. DEVICE CHANGE DESCRIPTION

The cobas® CT/NG for use on the cobas® 6800/8800 systems was originally cleared under K173887 as a qualitative test in vitro nucleic acid diagnostic test, that utilizes real-time polymerase chain reaction (PCR), for the direct detection of *Chlamydia trachomatis* (CT) and/or *Neisseria gonorrhoeae* (NG) DNA in male and female urine, clinician-instructed self-collected vaginal swab specimens (collected in a clinical setting), clinician-collected vaginal swab specimens, and endocervical swab specimens.

This device modification is for the claim extension to include oropharyngeal (throat) and anorectal swab specimens to cleared clinical specimen types. There have been no changes to the device design to accommodate this change.

1.1. Principles of the procedure

Principle of the assay procedure remains the same as K173887.

2. INTENDED USE

The cobas® CT/NG for use on the cobas® 6800/8800 system is an automated, qualitative *in vitro* nucleic acid diagnostic test, that utilizes real-time polymerase chain reaction (PCR), for the direct detection of *Chlamydia trachomatis* (CT) and/or *Neisseria gonorrhoeae* (NG) DNA in male and female urine, clinician-instructed self-collected vaginal swab specimens (collected in a clinical setting), and clinician-collected vaginal swab specimens, endocervical swab specimens, oropharyngeal (throat) swab specimens and anorectal swab specimens all collected in cobas® PCR Media (Roche Molecular Systems, Inc.), and cervical specimens collected in PreservCyt® solution. This test is intended as an aid in the diagnosis of chlamydial and gonococcal disease in both symptomatic and asymptomatic individuals.

2.1. Ancillary Collection Kits

The cobas® PCR Media Dual Swab Sample Kit is used to collect and transport human specimens. The cobas® PCR Media serves as a nucleic acid stabilizing transport and storage medium.

Note: *This kit has been validated for use with the following tests:*

- cobas® CT/NG v2.0 Test (for use on cobas® 4800 System)
- cobas® CT/NG for use on cobas® 6800/8800 Systems
- cobas® TV/MG for use on the cobas® 6800/8800 Systems

The cobas® PCR Media Uni Swab Sample Kit is used to collect and transport human specimens. The cobas® PCR Media serves as a nucleic acid stabilizing transport and storage medium.

Note: *This kit has been validated for use with the following tests:*

- cobas® CT/NG v2.0 Test (for use on cobas® 4800 System)
- cobas® CT/NG for use on cobas® 6800/8800 Systems
- cobas® TV/MG for use on the cobas® 6800/8800 Systems
- cobas® Cdiff Test for use on the cobas® 4800 System

The cobas® PCR Urine Sample Kit is used to collect and transport urine specimens. The cobas® PCR Media serves as a nucleic acid stabilizing transport and storage medium. Use this collection kit only with the following tests:

- cobas® CT/NG v2.0 Test (for use on cobas® 4800 System)
- cobas® CT/NG for use on cobas® 6800/8800 Systems
- cobas® TV/MG for use on the cobas® 6800/8800 Systems

3. TECHNOLOGICAL CHARACTERISTICS

The primary technological characteristics and intended use of the RMS cobas® CT/NG for use on the cobas® 6800/8800 systems are substantially equivalent to other legally marketed nucleic acid amplification tests intended for the qualitative detection of *Chlamydia trachomatis* (CT) and *Neisseria gonorrhoeae* (NG).

As indicated in Table 1, the cobas® CT/NG for use on the cobas® 6800/8800 systems is substantially equivalent to significant characteristics of the identified predicate device, the currently cleared cobas® CT/NG Test (K173887).

Table 1: Comparison of the cobas® CT/NG for use on the cobas® 6800/8800 systems with the Predicate Device

	Predicate Device **cobas® CT/NG for use on the cobas® 6800/8800 systems (K173887)**	**Subject Device** **cobas® CT/NG for use on the cobas® 6800/8800 systems (claim extension)**
Intended Use	The cobas® CT/NG on the cobas® 6800/8800 system is an automated, qualitative in vitro nucleic acid diagnostic test, that utilizes real-time polymerase chain reaction (PCR), for the direct detection of *Chlamydia trachomatis* (CT) and/or *Neisseria gonorrhoeae* (NG) DNA in male and female urine, clinician instructed self-collected vaginal swab specimens (collected in a clinical setting), clinician-collected vaginal swab specimens, and endocervical swab specimens, all collected in cobas® PCR Media (Roche Molecular Systems, Inc.), and cervical specimens collected in PreservCyt® solution. This test is intended as an aid in the diagnosis of chlamydial and gonococcal disease in both symptomatic and asymptomatic individuals.	The cobas® CT/NG on the cobas® 6800/8800 system is an automated, qualitative in vitro nucleic acid diagnostic test, that utilizes real-time polymerase chain reaction (PCR), for the direct detection of *Chlamydia trachomatis* (CT) and/or *Neisseria gonorrhoeae* (NG) DNA in male and female urine, clinician-instructed self-collected vaginal swab specimens (collected in a clinical setting), and clinician-collected vaginal swab specimens, endocervical swab specimens, oropharyngeal (throat) swab specimens and anorectal swab specimens all collected in cobas® PCR Media (Roche Molecular Systems, Inc.), and cervical specimens collected in PreservCyt® solution. This test is intended as an aid in the diagnosis of chlamydial and gonococcal disease in both symptomatic and asymptomatic individuals.
Intended Use, cont.	**<u>Ancillary Collection Kits:</u>** The cobas® PCR Media Dual Swab Sample Kit is used to collect and transport endocervical and vaginal swab specimens. The cobas® PCR Media serves as a nucleic acid stabilizing transport and storage medium for gynecological specimens. The cobas® PCR Media Uni Swab Sample Kit is used to collect and transport human specimens. The cobas® PCR Media serves as a nucleic acid stabilizing transport and storage medium for human specimens The cobas® PCR Urine Sample Kit is used to collect and transport urine specimens. The cobas® PCR Media serves as a nucleic acid stabilizing transport and storage medium for urine specimens	Same

	Predicate Device cobas® CT/NG for use on the cobas® 6800/8800 systems (K173887)	Subject Device cobas® CT/NG for use on the cobas® 6800/8800 systems (claim extension)
Sample Types	• Male and female urine, • Self-collected/clinician-collected vaginal swab specimens in cobas® PCR Media, • Endocervical swab specimens in cobas® PCR Media, • Cervical specimens in PreservCyt® solution	• Male and female urine, • Self-collected/clinician-collected vaginal swab specimens in cobas® PCR Media, • Endocervical swab specimens in cobas® PCR Media, • oropharyngeal (throat) swab specimens in cobas® PCR Media, • anorectal swab specimens in cobas® PCR Media, • Cervical specimens in PreservCyt® solution
Reagents	cobas® CT/NG Kit	Same
Positive Controls	cobas® CT/NG Positive Control Kit	Same
Negative Controls	cobas® 6800/8800 Buffer Negative Control Kit	Same
Subject Status	Asymptomatic and symptomatic	Same
Sample Collection Devices	cobas® PCR Media Dual Swab Sample Kit cobas® PCR Media Uni Swab Sample Kit cobas® PCR Urine Sample Kit	Same
CT Analyte targets	CT cryptic plasmid DNA CT ompA gene	Same
NG Analyte targets	NG genomic DNA	Same
Sample Preparation Procedure	Automated	Same
Amplification Technology	Real-time PCR	Same
Detection Chemistry	Paired reporter and quencher fluorescence labeled probes (TaqMan Technology) using fluorescence resonance energy transfer (FRET)	Same
Result Analysis	Based on PCR cycle threshold analysis	Same
Analyzer	cobas® 6800/8800 systems	Same

4. NON-CLINICAL PERFORMANCE EVALUATION

4.1. Limit of Detection (LoD)

Analytical sensitivity (Limit of Detection or LoD) was determined by analyzing a dilution series of quantified cultures of *Chlamydia trachomatis* (serovars D and I) and *Neisseria gonorrhoeae* strains 2948 (ATCC 19424) and 891. CT and NG cultures were diluted into a matrix of pooled negative specimens of each sample type. All levels were analyzed across 3 unique lots of reagents. LoD for each specimen type is shown in Table 2 as the target concentration, which can be detected in ≥ 95% of the replicates for all lots.

Table 2: Analytical sensitivity (Limit of Detection)

Specimen Types	CT serovar D LoD (EB/mL)	CT serovar D Mean Ct Value	CT serovar I LoD (EB/mL)	CT serovar I Mean Ct Value	NG Strain 2948 LoD (CFU/mL)	NG Strain 2948 Mean Ct Value	NG strain 891 LoD (CFU/mL)	NG strain 891 Mean Ct Value
Oropharyngeal Swab in cobas® PCR Media	2	37.3	40	36.5	0.2	38.0	0.08	37.3
Anorectal Swab in cobas® PCR Media	2	37.2	20	37.2	0.2	37.0	0.08	37.2

*EB = Elementary Bodies, CFU= Colony Forming Units

4.2. Inclusivity

Inclusivity and verification of the LoD were performed for 13 additional CT serovars, the Swedish new variant strain (nvCT) and an additional 43 independently isolated strains of NG using one lot of reagents. Testing was performed using CT and NG cultures diluted into pools of negative specimens. Results are shown in Table 3 and Table 4 for CT serovars and NG strains, respectively.

Table 3: Inclusivity and LoD verification for CT serovars

CT Serovar or Variant	Swab* Specimens EB/mL	Swab* Specimens % Pos
A	40	100%
B	40	100%
Ba	40	100%
C	40	100%
E	40	100%
F	40	100%
G	40	100%
H	40	100%
J	40	100%
K	40	100%
LGV Type 1	40	100%
LGV Type 2	40	100%
LGV Type 3	40	100%
nvCT	40	100%

*Includes all swab sample types.

Table 4: Inclusivity and LoD verification for NG strains

Numbers of NG Strains (43 strains)	Swab* Specimens CFU/mL (% Pos)
39	0.4 (≥ 95%)
4	1.0 (≥ 95%)

* Includes all swab sample types.

4.3. Analytical specificity/Cross reactivity

A panel of 178 bacteria, fungi and viruses was tested in all specimen types to assess analytical specificity (Table 5). Multiple strains were tested for several organisms, including 20 representatives of non-*gonorrhoeae Neisseria* strains. High titer stocks of the potentially cross-reacting microorganisms were spiked into pools of negative oropharyngeal or anorectal swab specimens to a concentration level of 1.0E+06 units/mL (EB or CFU/mL) for bacteria and yeast, and 1.0E+05 units/mL (as cells/mL for protozoa or as determined by $TCID_{50}$ Endpoint Dilution Assay for viruses). Testing was performed with each potentially interfering organism alone as well as with each organism mixed with 6 EB/mL of CT serovar D culture and

0.6 CFU/mL of NG strain 2948 (ATCC 19424) culture. Results indicated that none of these organisms interfered with the detection of CT and NG or produced false positive results in the CT/NG negative matrices.

Table 5: Microorganisms tested for analytical specificity/cross reactivity

Achromobacter xerosis	*Fusobacterium nucleatum*	Norovirus* ‡‡
Acinetobacter baumannii ‡‡	*Gardnerella vaginalis*	*Pantoea agglomerans*
Acinetobacter calcoaceticus	*Gemella haemolysans*	*Paracoccus denitrificans*
Acinetobacter lwoffi	*Giardia lamblia* ‡‡	*Parvinomas micra* ‡
Actinomyces israelii	*Haemophilus ducreyi*	*Peptostreptococcus anaerobius*
Adenovirus ‡	*Haemophilus influenzae*	*Peptostreptococcus asaccharolyticus*
Aerococcus viridans	*Helicobacter pylori*	*Peptostreptococcus magnus*
Aeromonas hydrophila	Herpes simplex virus I	*Plesiomonas shigelloides*
Aggregatibacter actinomycetemcomitans ‡‡	Herpes simplex virus II *	*Porphyromonas gingivalis* ‡
Alcaligenes faecalis	HPV16 ***	*Prevotella bivia* ‡‡‡
Anaerococcus prevotii ‡‡	Human influenza virus A ‡	*Prevotella oralis* ‡
Arcanobacterium haemolyticum ‡	Human influenza virus B ‡	*Propionibacterium acnes*
Atopobium vaginae	Human metapneumovirus ‡	*Proteus mirabilis*
Bacillus subtilis	*Kingella dentrificans*	*Proteus penneri*
Bacteriodes fragilis	*Kingella kingae*	*Proteus vulgaris*
Bacteroides caccae	*Klebsiella oxytoca*	*Providencia rettgeri*
Bacteroides ureolyticus	*Klebsiella pneumoniae*	*Providencia stuartii*
Bergeriella denitrificans	*Lactobacillus acidophillus*	*Pseudomonas aeruginosa*
Bifidobacterium adolescentis	*Lactobacillus brevis*	*Pseudomonas fluorescens*
Bifidobacterium breve	*Lactobacillus crispatus*	*Pseudomonas putida*
Bifidobacterium longum	*Lactobacillus jensenii*	*Rahnella aquatilis*
Blautia producta	*Lactobacillus lactis*	*Respiratory syncytial virus* ‡
Bordetella pertussis ‡	*Lactobacillus leichmannii*	*Rhinovirus** ‡
Branhamella catarrhalis	*Lactobacillus oris*	*Rhizobium radiobacter*
Brevibacterium linens	*Lactobacillus parabuchnerri*	*Rhodospirillum rubrum*
Campylobacter coli	*Lactobacillus reuteri*	*Saccharomyces cerevisiae*
Campylobacter jejuni	*Lactobacillus vaginalis*	*Salmonella choleraesuis*
Campylobacter rectus ‡	*Lactococcus lactis cremoris*	*Salmonella minnesota*
Candida albicans	*Legionella pneumophila*	*Salmonella typhimurium*
Candida glabrata	*Leuconostoc paramensenteroides*	*Serratia denitrificans*
Candida parapsilosis	*Listeria monocytogenes*	*Serratia marcescens*
Candida tropicalis	*Micrococcus luteus*	*Shigella dysenteriae*

Chlamydophila pneumoniae	*Moraxella catarrhalis* ‡	*Shigella flexneri* ‡‡
Chlamydophila psittaci	*Moraxella lacunata*	*Shigella sonnei* ‡‡
Chromobacter violaceum	*Moraxella osloensis*	*Staphylococcus aureus*
Citrobacter freundii	*Morganella morganii*	*Staphylococcus epidermidis*
Clostridioides difficile	*Mycobacterium smegmatis*	*Staphylococcus saprophyticus*
Clostridium perfringens	*Mycoplasma pneumoniae* ‡	*Streptococcus agalactiae*
Coronavirus ‡	*Mycoplasma genitalium***	*Streptococcus anginosus*
Corynebacterium diphtheriae ‡	*Mycoplasma hominis*	*Streptococcus bovis*
Corynebacterium genitalium	*Neisseria cinerea*	*Streptococcus dysgalactiae*
Corynebacterium xerosis	*Neisseria elongata subsp. elongata*	*Streptococcus equinis*
Cryptococcus neoformans	*Neisseria elongata subsp. nitroreducens*	*Streptococcus mitis*
Cytomegalovirus *	*Neisseria flava*	*Streptococcus mutans*
Deinococcus radiodurans	*Neisseria flavescens*	*Streptococcus pneumoniae*
Derxia gummosa	*Neisseria kochi*	*Streptococcus pyogenes*
Eikenella corrodens	*Neisseria lactamica*	*Streptococcus salivarius*
*Entamoeba histolytica** ‡‡	*Neisseria macacae*	*Streptococcus sanguis*
Enterobacter aerogenes	*Neisseria meningitides Serogroup W135*	*Streptomyces griseinus*
Enterobacter cloacae	*Neisseria meningitidis Serogroup A*	*Tannerella forsythia* ‡
Enterococcus avium	*Neisseria meningitidis Serogroup B*	*Treponema denticola* ‡
Enterococcus casseliflavus	*Neisseria meningitidis Serogroup C*	*Trichomonas vaginalis*
Enterococcus faecalis	*Neisseria meningitidis Serogroup D*	*Trueperella pyogenes*
Enterococcus faecium	*Neisseria meningitidis Serogroup Y*	*Ureaplasma urealyticum*
Enterovirus* ‡‡	*Neisseria mucosa*	*Veillonela parvula*
Erysipelothrix rhusiopathiae	*Neisseria perflava*	*Vibrio cholerae*
Escherichia coli	*Neisseria polysaccharea*	*Vibrio parahaemolyticus*
Escherichia fergusonii	*Neisseria sicca*	*Yersinia enterocolitica*
Flavobacterium meningosepticum	*Neisseria subflava*	-
Fusobacterium necrophorum ‡	*Neisseria weaverii*	-

* organism was tested at a concentration of 1 x E04 Units/mL

** organism was tested at a concentration of 1 x E05 CFU/mL

*** HPV16 was tested as CaSki cells

‡ Tested in oropharyngeal swabs only

‡‡ Tested in anorectal swabs only

‡‡‡ Tested in oropharyngeal and anorectal swabs only

4.4. Interference

The effects of over-the-counter (OTC) products that may be present in oropharyngeal and anorectal specimens (Table 6 and Table 7), were evaluated. Testing was done using pooled oropharyngeal and anorectal clinical specimens by spiking of potential interferents at levels

expected from a typical clinical patient sampling. Interferents were tested in CT/NG negative specimen pools as well as in specimen pools spiked with *Chlamydia trachomatis* culture at the levels ranging from 6 to 120 EB/mL and *Neisseria gonorrhoeae* culture at the levels ranging from 0.24 to 0.6 CFU/mL, depending on the specimen type tested. CT serovars D and I, and NG strains 2948 (ATCC 19424) and 891 were used in this study.

None of the OTC oral hygiene products tested in oropharyngeal swabs or OTC anorectal hygiene products tested in anorectal swabs caused interference to the test when examined at concentrations expected through typical product use.

Table 6: List of substances tested for interference in Oropharyngeal Samples

Product Name	Oropharyngeal Swabs (mg/mL)
Cepacol Maximum Strength Throat Drop Lozenges	7.5
Colgate Total Toothpaste	Residual *
Robitussin Cough / Chest Congestion Cough Syrup	4.4
Listerine Ultra Clean Antiseptic Mouthwash	15.8
Scope Mouthwash	20.1
Sucrets Complete Lozenges	5.8
Vicks - Chloraseptic Sore Throat Spray Menthol	18.1
Zicam Oral Mist	12.2

* Amount of toothpaste present on a swab collected immediately following a subject's brushing of their teeth

Table 7: List of substances tested for interference in Anorectal samples

Product Name	Anorectal Swabs (mg/mL)
ANUSOL® Plus Ointment	5.3
CB Fleet® Mineral Oil Enema	4.8
Doproct Suppositories/ Hemorrhoidal Treatment	4.9
K-Y Jelly	5.0
Lotrimin Antifungal Cream	4.2
Preparation H Hemorrhoidal Ointment	4.9
PREPARATION H Hemorrhoidal Suppositories	6.0
Driminate Generic for Dramamine Motion Sickness - Major Pharmaceuticals	0.6
Target – Triple Paste Diaper Rash Ointment	4.3
Tucks Medicated Cooling Hemorrhoidal Pads	35.6
Vaseline Original Petroleum Jelly	4.7

Endogenous substances that may be present in oropharyngeal and anorectal specimens were tested for interference. The summary of acceptable levels of endogenous substances tested for oropharyngeal and anorectal samples are listed in Table 8. No interference was noted when testing oropharyngeal swab specimens collected in cobas® PCR Media. Stool caused interference at 0.4% (w/v) in anorectal swab specimens collected in cobas® PCR Media, however no interference was noted when testing anorectal swab specimens containing 0.3% (w/v) of stool.

Table 8: List of endogenous substance tested for interference in Oropharyngeal Anorectal samples

Interferent	Oropharyngeal Swab	Anorectal Swab
Mucus (% w/v)	1.0%	1.0%
Peripheral Blood Mononuclear Cells (PBMCs as cells/mL)	1.00E+06	1.00E+06
Saliva (% w/v)	2.0%	NT
Stool (% w/v)	NT	0.3%
Whole Blood (% v/v)	10%	10%

NT = Not Tested

5. CLINICAL PERFORMANCE EVALUATION

5.1. Clinical Performance

5.1.1. Study Design

The clinical utility and performance of cobas® CT/NG was established in a multi-site, prospective collection study by comparing the results to an Infection Status (IS) that used a combination of commercially available CT/NG assays using anorectal or oropharyngeal swab samples. The subjects were enrolled from 8 geographically diverse clinic sites (STD, HIV, Family Planning, and STD Research).

Specimens were tested for CT and NG using cobas® CT/NG and commercially available NAATs. All tests were run according to the respective manufacturers' Instructions For Use.

The clinical performance of cobas® CT/NG was determined by comparing the results from collected specimen types to a IS (Infected Status). A positive IS interpretation was derived when

at least 2 of the 3 comparator reference assays were positive. The IS interpretations are further outlined in Table 9 below.

Table 9: Comparator Interpretation of Infection Status from "NAAT A" NAAT B" NAAT C" results for each specimen type

NAAT A	NAAT B	NAAT C	IS Interpretation
+	+	+	+
+	+	-	+
+	-	+	+
-	+	+	+
U	+	+	+
+	U	+	+
+	+	U	+
+	-	-	-
-	+	-	-
-	-	+	-
-	-	-	-
+	+	+	+
+	+	-	+
+	-	+	+
-	+	+	+
+	-	-	-
-	+	-	-
-	-	+	-
-	-	-	-
U	-	-	-
-	U	-	-
-	-	U	-
+	U	-	U
+ or -	U	U	U

IS = Infection status; + denotes Positive, - denotes Negative ; U = uninterpretable test result.

Note: Uninterpretable test results occurred when retesting of invalid or equivocal results failed to yield a positive or negative result.

5.1.2. Results

A total of 2,439 subjects were consented to participate in this study, however, a total of 49 subjects were excluded, based on exclusion/inclusion criteria, that led to a total subject enrollment of 2,390. Of the 2,390 subjects contributing specimens, 2,365 anorectal and 2,382 oropharyngeal specimens were tested. Out of the 4,747 samples (2,365 rectal swabs and 2,382 oropharyngeal swabs), there were four final invalid results due to processing errors.

Table 10 summarizes the results from evaluable subjects designated as CT positive or negative according to the IS algorithm for both Anorectal(AR) and Oropharyngeal(OP) specimens.

Table 10: *Chlamydia trachomatis*: Summary of Infection status Interpretation for Anorectal and Oropharyngeal Specimen Types

Specimen Type[a]	NAAT A	NAAT B	NAAT C	IS[b] Interpretation	cobas® CT/NG	SS[c] Sympd	SS[c] Asympd	SS[c] Missd	Total
AR	Inv	+	+	Positive	+	1	3	0	4
AR	-	+	+	Positive	-	0	3	0	3
AR	-	+	+	Positive	+	4	12	0	16
AR	+	-	+	Positive	-	0	1	0	1
AR	+	+	-	Positive	+	1	0	0	1
AR	+	+	+	Positive	-	2	1	0	3
AR	+	+	+	Positive	+	47	68	0	115
AR				**Total Positive**		**55**	**88**	**0**	**143**
AR	Inv	-	-	Negative	-	29	45	1	75
AR	-	NA	-	Negative	-	7	2	3	12
AR	-	NA	-	Negative	+	0	1	0	1
AR	-	Inv	-	Negative	-	3	3	0	6
AR	-	-	Inv	Negative	-	0	1	0	1
AR	-	-	Inv	Negative	+	1	0	0	1
AR	-	-	-	Negative	-	635	1,411	13	2,059
AR	-	-	-	Negative	+	5	2	0	7
AR	-	-	+	Negative	-	4	12	0	16
AR	-	-	+	Negative	+	0	6	0	6
AR	-	+	-	Negative	-	1	5	0	6
AR	-	+	-	Negative	+	1	1	0	2
AR				**Total Negative**		**686**	**1,489**	**17**	**2,192**

Specimen Type[a]	NAAT A	NAAT B	NAAT C	IS[b] Interpretation	cobas® CT/NG	SS[c] Sympd	SS[c] Asympd	SS[c] Missd	Total
OP	Inv	+	+	Positive	+	0	1	0	1
OP	-	+	+	Positive	+	1	2	0	3
OP	+	+	-	Positive	+	0	1	0	1
OP	+	+	+	Positive	+	8	15	0	23
OP				**Total Positive**		**9**	**19**	**0**	**28**
OP	Inv	-	-	Negative	-	32	46	1	79
OP	-	NA	-	Negative	-	5	7	2	14
OP	-	Inv	-	Negative	-	1	6	0	7
OP	-	-	Inv	Negative	-	1	0	0	1
OP	-	-	-	Negative	-	679	1,486	14	2,179
OP	-	-	-	Negative	+	2	0	0	2
OP	-	-	+	Negative	-	13	16	0	29
OP	-	+	-	Negative	-	1	1	0	2
OP	-	+	-	Negative	+	0	2	0	2
OP	+	-	-	Negative	-	1	1	0	2
OP				**Total Negative**		**735**	**1,565**	**17**	**2,317**

[a] AR = anorectal; OP=oropharyngeal

[b] IS = infection status.

[c] SS = symptom status;

Symp = symptomatic, Asymp = asymptomatic, Miss = missing symptom status.
Note: NA = Not available, Inv = Invalid.
Note: Infection Status (IS) is determined for each specimen type. The IS of a sample will be established by the concordance results from at least 2 out of 3 comparator assays (NAAT A, NAAT B, NAAT C). If one of the comparator assays is Uninterpretable/Invalid/Failed, the two remaining assays must be concordant to define the IS as Positive (+) or Negative (-). Any other combination of Uninterpretable/Invalid/Failed and valid results are excluded from the analyses.
Note: Of the 2,365 contributing subjects for Rectum, 18 subjects had CT uninterpretable IS. Similarly, of the 2,382 contributing subjects for Oropharyngeal, 23 subjects had CT uninterpretable IS.

The overall point estimate of cobas® CT/NG sensitivity for CT detection was 95.1% with a 95% CI of 90.2% to 97.6% for anorectal specimens and 100.0% with a 95% CI of 87.9% to 100% for oropharyngeal specimens. The sensitivity estimates were similar between asymptomatic and symptomatic subjects with overlapping two-sided 95% CIs (Table 11).

The overall point estimate of cobas® CT/NG specificity for CT was 99.2% with a 95% CI of 98.8% to 99.5% for anorectal specimens and 99.8% with a 95% CI of 99.6% to 99.9% for oropharyngeal specimens. The specificity estimates were similar between asymptomatic and symptomatic subjects with overlapping two-sided 95% CIs (Table 11).

Table 11: *Chlamydia trachomatis:* Overall Clinical Performance Compared with Infection Status by Sample Type and Symptom Status

Sample Type[a]	Symptom Status[b]	Total (N)	SENS	95% Score CI	SPEC	95% Score CI	PREV (%)	PPV	NPV
AR	Symp	741	96.4% (53/55)	(87.7%, 99.0%)	99.0% (679/686)	(97.9%, 99.5%)	7.4	88.3% (53/60)	99.7% (679/681)
AR	Asymp	1,577	94.3% (83/88)	(87.4%, 97.5%)	99.3% (1479/1489)	(98.8%, 99.6%)	5.6	89.2% (83/93)	99.7% (1479/1484)
AR	Unknown	17	NE	NE	100.0% (17/17)	(81.6%, 100.0%)	0.0	NE	100.0% (17/17)
AR	Overall	2,335	95.1% (136/143)	(90.2%, 97.6%)	99.2% (2175/2192)	(98.8%, 99.5%)	6.1	88.9% (136/153)	99.7% (2175/2182)
OP	Symp	744	100.0% (9/9)	(70.1%, 100.0%)	99.7% (733/735)	(99.0%, 99.9%)	1.2	81.8% (9/11)	100.0% (733/733)
OP	Asymp	1,584	100.0% (19/19)	(83.2%, 100.0%)	99.9% (1563/1565)	(99.5%, 100.0%)	1.2	90.5% (19/21)	100.0% (1563/1563)
OP	Unknown	17	NE	NE	100.0% (17/17)	(81.6%, 100.0%)	0.0	NE	100.0% (17/17)
OP	Overall	2,345	100.0% (28/28)	(87.9%, 100.0%)	99.8% (2313/2317)	(99.6%, 99.9%)	1.2	87.5% (28/32)	100.0% (2313/2313)

[a]AR = anorectal, OP = oropharyngeal.

[b]Symp = symptomatic, Asymp = asymptomatic.

Note: CI = confidence interval, PREV = prevalence; SENS = sensitivity; SPEC = specificity; PPV = positive predictive value; NPV = negative predictive value; NE =non-estimable.

Note: The predictive values shown above reflect performance specific to the clinical study population and may not be applicable to all individuals in the intended use population.

Table 12 summarizes the results from evaluable subjects designated as NG positive or negative according to the IS algorithm for both anorectal and Oropharyngeal specimens.

Table 12: *Neisseria gonorrhoeae*: Summary of Infection status Interpretation for Anorectal and Oropharyngeal Specimen Types

Specimen Type[a]	NAAT A	NAAT B	NAAT C	IS[b] Interpretation	cobas® CT/NG	SS[d] Symp[c]	SS[d] Asymp[c]	SS[d] Miss[c]	Total
AR	Inv	+	+	Positive	+	2	0	0	2
AR	-	+	+	Positive	-	1	0	0	1
AR	-	+	+	Positive	+	3	4	0	7
AR	+	NA	+	Positive	+	0	1	0	1
AR	+	Inv	+	Positive	+	0	1	0	1
AR	+	-	+	Positive	+	0	1	0	1
AR	+	+	+	Positive	+	37	50	1	88
AR				**Total Positive**		**43**	**57**	**1**	**101**
AR	Inv	-	-	Negative	-	27	50	1	78
AR	Inv	-	-	Negative	+	1	0	0	1
AR	-	NA	-	Negative	-	7	2	3	12
AR	-	Inv	-	Negative	-	3	2	0	5
AR	-	-	-	Negative	-	646	1,461	12	2,119
AR	-	-	-	Negative	+	3	3	0	6
AR	-	-	+	Negative	-	5	0	0	5
AR	-	-	+	Negative	+	6	1	0	7
AR	-	+	-	Negative	-	0	2	0	2
AR	+	-	-	Negative	-	0	1	0	1
AR	+	-	-	Negative	+	1	0	0	1
AR				**Total Negative**		**699**	**1,522**	**16**	**2,237**
OP	Inv	+	+	Positive	+	1	1	0	2
OP	-	+	+	Positive	+	9	8	0	17
OP	+	NA	+	Positive	+	0	1	0	1
OP	+	Inv	+	Positive	+	0	1	0	1
OP	+	-	+	Positive	+	1	2	0	3
OP	+	+	-	Positive	+	0	1	0	1
OP	+	+	+	Positive	+	41	30	0	71
OP				**Total Positive**		**52**	**44**	**0**	**96**
OP	Inv	-	-	Negative	-	30	53	1	84
OP	-	NA	-	Negative	-	5	6	2	13
OP	-	Inv	-	Negative	-	0	5	0	5
OP	-	-	Inv	Negative	-	2	0	0	2
OP	-	-	Inv	Negative	+	1	0	0	1

Specimen Type[a]	NAAT A	NAAT B	NAAT C	IS[b] Interpretation	cobas® CT/NG	SS[d] Symp[c]	SS[d] Asymp[c]	SS[d] Miss[c]	Total
OP	-	-	-	Negative	-	631	1,452	13	2,096
OP	-	-	-	Negative	+	6	7	1	14
OP	-	-	+	Negative	-	4	3	0	7
OP	-	-	+	Negative	+	4	4	0	8
OP	-	+	-	Negative	-	5	15	0	20
OP	-	+	-	Negative	+	0	1	0	1
OP	+	-	-	Negative	-	1	0	0	1
OP	+	-	-	Negative	+	0	1	0	1
OP				**Total Negative**		**689**	**1,547**	**17**	**2,253**

[a] AR = anorectal; OP = oropharyngeal.

[b] IS= infection status

[c] Symp = symptomatic, Asymp = asymptomatic, Miss = missing symptom status.

[d] SS=symptom status

Note: NA = Not available, Inv = Invalid.

Note: Infection status (IS) is determined for each specimen type. The IS of a sample will be established by the concordance results from at least 2 out of 3 comparator assays (NAAT A, NAAT B, NAAT C). If one of the comparator assays is Uninterpretable/Invalid/Failed, the two remaining assays must be concordant to define the IS as Positive (+) or Negative.Any othercombination of Uninterpretable/Invalid/Failed and valid results ar e excluded from analyses.

Note: Of the 2,365 contributing subjects for Rectum, 15 subjects had NG uninterpretable IS. Similarly, of the 2,382 contributing subjects for Oropharyngeal, 19 subjects had NG uninterpretable IS.

The overall point estimate of cobas® CT/NG sensitivity for NG detection was 99.0%, with a 95% CI of 94.6% to 99.8% for anorectal specimens and 100.0% with a 95% CI of 96.2% to 100% for Oropharyngeal specimens. The sensitivity estimates was 97.7% (42/43) and 100% (57/57) in anorectal specimens for symptomatic and asymptomatic subjects respectively (Table 13).

The overall point estimate of cobas® CT/NG specificity for NG was 99.3% with a 95% CI of 98.9% to 99.6% for anorectal specimens and 98.9% with a 95% CI of 98.4% to 99.2% for Oropharyngeal specimens. The specificity estimates were similar between asymptomatic and symptomatic subjects (Table 13).

Table 13: *Neisseria gonorrhoeae*: Overall Clinical Performance Compared with Infection status by Sample Type and Symptom Status

Sample Type[a]	Symptom Status[b]	Total (N)	SENS	95% Score CI	SPEC	95% Score CI	PREV (%)	PPV	NPV
AR	Symp	742	97.7% (42/43)	(87.9%, 99.6%)	98.4% (688/699)	(97.2%, 99.1%)	5.8	79.2% (42/53)	99.9% (688/689)
AR	Asymp	1,579	100.0% (57/57)	(93.7%, 100.0%)	99.7% (1518/1522)	(99.3%, 99.9%)	3.6	93.4% (57/61)	100.0% (1518/1518)
AR	Unknown	17	100.0% (1/1)	(20.7%, 100.0%)	100.0% (16/16)	(80.6%, 100.0%)	5.9	100.0% (1/1)	100.0% (16/16)
AR	Overall	2,338	99.0% (100/101)	(94.6%, 99.8%)	99.3% (2222/2237)	(98.9%, 99.6%)	4.3	87.0% (100/115)	100.0% (2222/2223)
OP	Symp	741	100.0% (52/52)	(93.1%, 100.0%)	98.4% (678/689)	(97.2%, 99.1%)	7.0	82.5% (52/63)	100.0% (678/678)
OP	Asymp	1,591	100.0% (44/44)	(92.0%, 100.0%)	99.2% (1534/1547)	(98.6%, 99.5%)	2.8	77.2% (44/57)	100.0% (1534/1534)
OP	Unknown	17	NE	NE	94.1% (16/17)	(73.0%, 99.0%)	0.0	0.0% (0/1)	100.0% (16/16)
OP	Overall	2,349	100.0% (96/96)	(96.2%, 100.0%)	98.9% (2228/2253)	(98.4%, 99.2%)	4.1	79.3% (96/121)	100.0% (2228/2228)

[a] AR = anorectal; OP = oropharyngeal.

[b] Symp = symptomatic, Asymp = asymptomatic

Note: CI = confidence interval, PREV = prevalence, SENS = sensitivity, SPEC = specificity, PPV = positive predictive value, NPV = negative predictive value, NE = non-estimable.

Note: The predictive values shown above reflect performance specific to the clinical study population and may not be applicable to all individuals in the intended use population.

6. CONCLUSIONS

The cobas® CT/NG for use on the cobas® 6800/8800 systems is the same as the device cleared in K173887. There have been no changes to the device to accommodate this claim expansion to include oropharyngeal and anorectal swab specimens.

A comparison of the technological characteristics and conclusions drawn from the nonclinical studies and clinical study demonstrate that the device is **substantially equivalent** and performs as well as the legally marketed predicate device identified above.