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

I Background Information:

A 510(k) Number

K240217

B Applicant

Roche Molecular Systems, Inc.

C Proprietary and Established Names

cobas liat CT/NG nucleic acid test

D Regulatory Information

Product Code(s)	Classification	Regulation Section	Panel
QEP	Class II	21 CFR 866.3393 - Device To Detect Nucleic Acids From Non-Viral Microorganism(S) Causing Sexually Transmitted Infections And Associated Resistance Marker(S)	MI - Microbiology
MKZ	Class I, reserved	21 CFR 866.3120 - Chlamydia serological reagents	MI - Microbiology
LSL	Class II	21 CFR 866.3390 - Neisseria spp. direct serological test reagents	MI - Microbiology

II Submission/Device Overview:

A Purpose for Submission:

To obtain market clearance for a new device.

To support cobas liat CT/NG nucleic acid test performance, some study results were leveraged from data collected with the cobas liat CT/NG/MG nucleic acid test (K240197). The assays were developed using the same reagent formulation and design, packaged into two separate products. The product software Assay Specific Packages used for each device have the same sample processing workflow, PCR cycling, and calculations. The only difference is the masking of the

MG result in the cobas liat CT/NG nucleic acid test. Though the performance results are applicable to both tests, this summary will focus solely on CT and NG performance.

B Measurand:
Chlamydia trachomatis (CT) cryptic plasmid DNA and 23S ribosomal RNA
Neisseria gonorrhoeae (NG) pivNG and NGR9 DNA

C Type of Test:
Qualitative, real time nucleic acid amplification test (NAAT)

III Intended Use/Indications for Use:

A Intended Use(s):
See Indications for Use below.

B Indication(s) for Use:
The cobas liat CT/NG nucleic acid test 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 Neisseria gonorrhoeae (NG) nucleic acid in male urine and vaginal swabs, all in cobas PCR Media (Roche Molecular Systems, Inc.).

This test is intended as an aid in the diagnosis of urogenital infections in both symptomatic and asymptomatic individuals.

C Special Conditions for Use Statement(s):
Rx - For Prescription Use Only

IVD – For use In Vitro Diagnostic Use Only

D Special Instrument Requirements:
cobas liat System (Analyzer)

IV Device/System Characteristics:

A Device Description:
The cobas liat CT/NG nucleic acid test is a 2-target multiplex PCR assay performed on the cobas liat analyzer. The analyzer automates and integrates sample purification, nucleic acid amplification, and detection of the target sequences in clinical specimens using real-time PCR.

The sample to result time is approximately 20 minutes.

<u>The cobas liat CT/NG nucleic acid test requires the following</u>:

1. A cobas liat CT/NG assay tube. Contents are as listed:
    - Internal process control (IPC)
        - Controls for adequate processing of target bacteria through all steps of the assay and monitors for the presence of PCR inhibitors.
    - PCR mastermix (assay specific oligonucleotides and polymerase)
    - Co-factor, liat magnetic particles, lysis buffer, wash buffer, and elution buffer

2. Specimen sample stored in cobas PCR Media
3. cobas liat CT/NG/MG Control Kit
    - Contains positive and negative control tubes for use validating new cobas liat CT/NG assay tube lots.
4. cobas liat System
5. liat Assay Specific Package (LASP)

Results

A target result call is determined individually for the target (CT or NG) channel and the internal process control channel based an internal algorithm using signal response. A final result is determined for the targets based on the combination of the target result call, internal process control result call, curve validity (including Ct cutoffs), and the sample input volume.

B Principle of Operation:

The cobas CT/NG nucleic acid test targets the Cryptic plasmid and 23S rRNA of *Chlamydia trachomatis* and the pivNG and NGR9 of *Neisseria gonorrhoeae*. An Internal Control (IC) is included to control for adequate processing of the target bacteria through sample purification, nucleic acid amplification, and to monitor the presence of inhibitors in the PCR process. The assay uses a flexible tube as a sample processing vessel. The tube contains all requisite PCR reagents pre-packaged and segmented within the tube, separated by breakable seals. When the cobas liat assay tube containing a biological specimen is inserted into the cobas liat analyzer, multiple sample-processing actuators in the cobas liat analyzer compress the cobas liat assay tube to selectively release the assay reagents, moving the sample from one segment to the next and controlling reaction conditions. An embedded microprocessor controls and coordinates these actions to perform all required assay processes. All assay steps are performed within the closed, self-contained cobas liat assay tube.

Within the cobas liat analyzer, the detection module monitors the reaction in real-time, while an on-board computer analyzes the collected data and outputs an interpreted result. The latter is displayed in the assay report on the integrated LCD touch screen of the cobas liat analyzer and in an electronic file. The report can be printed directly through a USB or network-connected printer. The results can also be exported to an external server, middleware, or data management system (DMS), or to a Laboratory Information System (LIS).

C Instrument Description Information:

1. Instrument Name:

   cobas liat System (Analyzer)

2. Specimen Identification:
   The cobas liat system maintains positive identification of each sample and assay tube during processing and analysis by means of barcode labels.

   Before starting a run, the user is required to scan the assay tube barcode and then scan the sample barcode. The user then transfers the sample into the assay tube and is required to scan

the assay tube barcode again before inserting the assay tube into the analyzer and starting the run.

3. Specimen Sampling and Handling:
   Specimen sampling and handling during the assay is controlled automatically using multiple sample processing modules contained within the cobas liat System.

4. Calibration:

   Not applicable.

5. Quality Control:

External Quality Controls
Before using a new lot of cobas liat CT/NG nucleic acid test tubes, the "Lot Validation" procedure must be performed on the analyzer to validate cobas liat CT/NG nucleic acid test tube lot. The procedure includes running a negative control and a positive control in separate runs. After processing is completed for each control, the system will inform the user that the control result has been accepted. The user can now use that specific lot of assay tubes for processing samples.

Internal Quality Control
An armored RNA is included in the cobas liat CT/NG nucleic acid test tube. This control acts to monitor the successful execution of the entire assay, from nucleic acid extraction from the targeted microorganisms, amplification, and detection and reporting. The internal control also acts to identify any PCR inhibitors detected in the sample.

V Substantial Equivalence Information:

A Predicate Device Name(s):
cobas CT/NG for use on cobas 6800/8800 systems

B Predicate 510(k) Number(s):
K173887

C Comparison with Predicate(s):

Device & Predicate Device(s):	K240217	K173887
Device Trade Name	cobas liat CT/NG nucleic acid test	cobas CT/NG for use on cobas 6800/8800 systems
General Device Characteristic Similarities and Differences		
Intended Use/Indications For Use	The cobas liat CT/NG nucleic acid test is an automated, qualitative	The cobas CT/NG on the cobas 6800/8800 system is an automated,

	in vitro diagnostic test that utilizes real-time polymerase chain reaction (PCR) for the direct detection of *Chlamydia trachomatis* (CT) and *Neisseria gonorrhoeae* (NG) nucleic acid in male urine and vaginal swabs (clinician-collected and self-collected) in cobas PCR Media (Roche Molecular Systems, Inc.). This test is intended as an aid in the diagnosis of urogenital infections in both symptomatic and asymptomatic individuals.	qualitative *in vitro* 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.
Analyte Targets	*Chlamydia trachomatis* (CT) *Neisseria gonorrhoeae* (NG)	same
Sample Preparation	Automated	same
Controls Used	Sample processing control (IC), Positive and negative control	same
Results Analysis	PCR cycle threshold analysis	same
Sample Type	Male urine and self-collected/clinician-collected vaginal swabs in cobas PCR Media	Male and female urine, Self-collected/clinician-collected vaginal swabs in cobas PCR Media, Endocervical swab specimens in cobas

		PCR Media, Cervical specimens in PreservCyt solution
Ancillary Collection Kits	cobas PCR Urine Sample Kit cobas PCR Media Uni Swab Sample Kit	cobas PCR Urine Sample Kit cobas PCR Media Uni Swab Sample Kit cobas PCR Media Dual Swab Sample Kit
Detection Chemistry	Assay uses different reporter dyes for target and control	Paired reporter and quencher fluorescence labeled probes (TaqMan Technology) using fluorescence resonance energy transfer (FRET)

VI Standards/Guidance Documents Referenced:

Class II Special Controls as per 21 CFR 866.3393.

VII Performance Characteristics (if/when applicable):

A Analytical Performance:

1. Precision/Reproducibility:

   See FDA decision summary for K240197.

2. Linearity:

   Not applicable

3. Analytical Specificity/Interference:

   See FDA Decision Summary for K240197.

4. Assay Reportable Range:

   Not applicable

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

   Specimen Stability
   Two temperature conditions were evaluated for urine and vaginal swab specimen stability. Panel members were prepared by spiking analyte negative urine and vaginal swab matrix with one strain of each analyte, CT (Serovar D) and NG (Strain 2948). Analytes were spiked

into each matrix at a final concentration of 3x LoD. Two replicates of each panel member, unique analyte negative (5) and analyte positive samples (5) were evaluated for a total of 10 replicates. The conditions used for testing are indicated in Table 1 below:

Table 1: Specimen stability study conditions

Clinical Matrix	Storage Temp	Timepoint	No. of Replicates
Urine	N/A	Baseline/T0 (Immediate)	20 Total
	2-8°C	12 Hours	10 analyte positive 10 analyte negative
		36 Hours	
		60 Hours	
		84 Hours	
	30°C	1 Hour	
		3 Hours	
		5 Hours	
		12 Hours	
		24 Hours	
		36 Hours	
		48 Hours	
Vaginal Swab	N/A	Baseline/T0	20 Total
	2-8°C	24 Hours	10 analyte positive 10 analyte negative
		48 Hours	
		72 Hours	
		96 Hours	
	30°C	24 Hours	
		48 Hours	

The data supported specimen stability claims as reported below:

Urine specimens
Stable for up to two days when stored at 2-8°C.
Stable for 3 hours when stored at 2-30°C.

Vaginal swab specimens
Stable for up to three days when stored at 2-8°C.
Stable for up to one day when stored at 2-30°C.

6. Detection Limit:

The limit of detection (LoD) was determined by analyzing a dilution series of two representative strains/serovars of CT (Serovars D and I) and NG (Strains 2948 and 891). The CT and NG cultures were co-formulated and serially diluted in pooled negative urine or pooled negative vaginal swab clinical specimens to seven concentration levels. All levels were tested with at least 20 replicates per condition tested across three unique lots of reagents. The LoD for each specimen type is shown in Table 2.

Table 2: Limit of Detection reported based on a 95% hit rate.

Specimen	**Strain**	**Lot**	**CT (EB/mL)**	**NG (CFU/mL)**
Urine	1	1	0.09	0.25

		2	0.09	0.25
		3	0.043	0.25
	2	1	0.784	0.1
		2	0.784	0.1
		3	0.784	0.2
Vaginal Swab	1	1	0.17	0.25
		2	0.17	0.5
		3	0.17	0.25
	2	1	0.784	0.2
		2	0.784	0.2
		3	0.784	0.1

To demonstrate that multi-analyte spike-in (MS) panel members did not impact the detected LoD for each individual analyte, the LoD for single-analyte spike-in (SS) was also evaluated and compared to the LoD determined for multi-analyte spike-in. The LoD between SS and MS samples were assessed for representative subtypes of CT (Serovar I) and NG (Strain 2948). The CT and NG culture stocks were diluted (either individually or co-formulated) in pooled negative urine clinical specimen matrix. Three dilution levels were prepared for each SS and MS panel members, one above, below and at the hit rate of ≥ 95% as determined in the MS LoD analysis above. Twenty replicates of each concentration were tested using one lot of the cobas liat CT/NG nucleic acid test tubes, across 20 cobas liat analyzers. The results of this analysis demonstrated that the SS LoD is comparable to the MS LoD (i.e., within a 3-fold difference).

Inclusivity

See FDA Decision Summary for K240197 for study details.

Table 3: CT serovars tested for inclusivity

CT Serovar	Urine	Vaginal Swabs
	Concentration (EB/ml)	
A	0.1	0.2
B	0.4	0.2
Ba	0.4	1
C	0.7	0.7
E	2	36
F	0.4	0.04
G	0.4	0.4
H	0.4	3
J	0.1	0.2
K	0.1	0.04
LGV Type 1	0.1	0.04
LGV Type 2	1600	200
LGV Type 3	0.1	0.7
nvCT	0.1	0.7
Finnish-nvCT	1:100 of Patient Sample	1:100 of Patient Sample

Table 4: NG strains tested for inclusivity

NG Strain	Urine	Vaginal Swabs
	Concentration (CFU/ml)	
27633	0.2	0.5
ATCC 49226	1	0.006
ATCC 700825	0.01	0.001
Clinical Isolate SS169	0.06	0.02
NBL 1606	0.3	0.08

NBL 1952	0.2	0.1
NBL 2012	0.2	0.3
NRL 1977	0.02	0.02
NRL 8042 - Belgium	0.02	0.02
NRL 13477	0.09	0.1
NRL 13819	0.006	0.004
NRL 33155 - Atlanta	0.09	0.001
NRL 33641	0.01	0.07
NRL 35495	0.01	0.07
NRL DAN 09612	0.02	0.03
NRL DN 7896 - DENMARK	0.9	0.3
NRL DN 7901 - DENMARK	0.02	0.02
NRL DOM 362 - Dominican Republic	0.09	0.09
NRL DOM 1271 - Dominican Republic	0.4	0.1
NRL KPO 1148 - KENYA (KPO)	0.2	0.07
NRL KPO 1161 - KENYA (KPO)	0.02	0.02
NRL Peru 33	0.07	0.07
NRL Peru 83	0.02	0.02
NRL PITT 94-4833 - PITTSBURGH (PITT)	0.02	0.02
NRL PITT 94-8561 - PITTSBURGH (PITT)	0.09	0.1
NRL PP 132 - PHILLIPINES	0.09	0.1
NRL SEN 97 P-292 - SENEGAL (SEN)	0.006	0.02
NRL SEN 97 P-301 - SENEGAL (SEN)	0.006	0.07
Roche Diagnostics K.K.,Japan RDN001-00193	0.02	0.03
Roche Diagnostics, Australia 04D125: Darwin Northern Territory, Australia	0.09	0.1
Roche Diagnostics, Australia 04D127: Darwin Northern Territory, Australia	0.09	0.1
Roche Diagnostics, Australia 04D129: Darwin Northern Territory, Australia	0.09	0.1
Roche Diagnostics, Australia 04D130: Darwin Northern Territory, Australia	0.4	0.1
Roche Diagnostics, Australia 04D132: Darwin Northern Territory, Australia	0.09	0.09
Roche Diagnostics, Australia 05D003: Darwin Northern Territory, Australia	0.02	0.03
Roche Diagnostics, Australia 05D004: Darwin Northern Territory, Australia	0.006	0.004
Roche Diagnostics, Australia 4551 - Western Australia	0.02	0.02
Statens Serum Institut 223/06	0.006	0.006
Statens Serum Institut 1498/46	0.02	0.02
Statens Serum Institut 2170/46	0.02	0.02
Statens Serum Institut 2222/46	0.4	0.09
Statens Serum Institut 6973/45	0.09	0.09
UCSF58	0.06	0.07

7. Assay Cut-Off:

   The assay cutoffs for CT, NG, and internal control were initially evaluated using selected clinical study testing data or cultures spiked into clinical matrix (urine stabilized in or vaginal swabs collected in cobas PCR Media). This data (13,651 valid results) was used to confirm adequate separation between the latest Ct value observed in the analyte positive specimens for CT and NG target detection channels and the assay cut-off. The overall positive and negative agreements for the prospective samples were calculated across specimen types against the matched specimen result from the clinical study comparator assays.

8. Carry-Over:

   A carry-over study evaluating the cobas liat System was conducted with the first assay cleared for the Liat System (K153544) and demonstrated that there was no carry-over or

cross contamination observed. The cobas liat CT/NG nucleic acid test utilizes the same instrumentation and workflow as the cobas Influenza A/B & RSV for the Liat System (K153544), including elution of all samples prior to transfer into the liat tube. Therefore, additional carry-over studies were not required.

B Comparison Studies:

1. Method Comparison with Predicate Device:

   See Clinical Studies below.

2. Matrix Comparison:

   N/A

C Clinical Studies:

A clinical study was conducted to establish the utility and performance of cobas liat CT/NG nucleic acid test in a multi-site, prospective study by comparing the results to a Composite Comparator Algorithm (CCA) or Patient Infected Status (PIS) derived from a combination of FDA-cleared NAATs for the two analytes. Male urine and vaginal swabs were collected and tested at 13 geographically diverse intended use clinical sites across the US. A total of 48 operators performed cobas liat CT/NG testing, of which, 43 represented CLIA-waived operators. Five of the 48 operators represented experienced laboratorians in a moderate complexity laboratory.

Prospectively enrolled female subjects provided 4 vaginal swab specimens, three for comparator tests and one for the cobas liat CT/NG nucleic acid test. Vaginal swab specimen for the cobas liat CT/NG nucleic acid test was either collected by clinician or self-collected.

Prospectively enrolled male subjects provided a urine specimen that was aliquoted into the respective manufacturers' collection devices and cobas PCR Media.

Specimens were tested for CT and NG with the investigational and the comparator NAATs. All tests were run according to the respective IFU.

A total of 4852 (2512 females and 2340 males) provided specimens in the clinical study. A total of 72 patients were excluded from the final clinical analysis due to non-evaluable test results (24 had no valid cobas liat result and 21 did not have a final comparator result), protocol deviations (18 patients), or sample collection incidents (9 patients). A total of 4780 patients (2304 providing a male urine sample and 2476 patients provided a vaginal swab sample, either clinician-collected or self-collected) had a valid cobas liat CT/NG nucleic acid test result and known comparator (PIS or CCA) result. Upon initial testing, the cobas liat CT/NG nucleic acid test invalid rate was 0.6% and after retesting the final invalid rate was 0.1%. In addition, a total of 253 archived vaginal and male urine specimens prospectively collected were included and tested in this clinical study due to the low NG prevalence.

The clinical performance of cobas liat CT/NG nucleic acid test was evaluated by comparing the results from collected specimen types to a PIS or CCA result. Male urine samples were tested with three comparator tests for each analyte (CT and NG); a concordant result for two out of

three comparator tests determined the final PIS status. Vaginal swabs (clinician-collected and self-collected) were tested with three comparator tests for each analyte; a concordant result for two out of three reference tests determined the CCA result for CT and NG. Table 5 below illustrates the comparator algorithm for each analyte.

Table 5: Comparator algorithm for CT and NG

NAAT1	NAAT2	NAAT3	PIS Result	CCA Result
+	+	N/A	Infected	Positive
+	-	+	Infected	Positive
-	+	+	Infected	Positive
-	-	N/A	Not Infected	Negative
+	-	-	Not Infected	Negative
-	+	-	Not Infected	Negative
-	Invalid	+	Indeterminate	Indeterminate
-	Invalid	-	Not Infected	Negative
Invalid	-	+	Indeterminate	Indeterminate
Invalid	-	-	Not Infected	Negative
+	Invalid	-	Indeterminate	Indeterminate
Invalid	+	-	Indeterminate	Indeterminate
+	Invalid	+	Infected	Positive
Invalid	+	+	Infected	Positive
Invalid	Invalid	N/A	Indeterminate	Indeterminate

N/A = Not applicable; NAAT = nucleic acid amplification test

The clinical performance estimates of the cobas liat CT/NG nucleic acid test: positive percent agreement (PPA) and negative percent agreement (NPA) with the CCA results or sensitivity and specificity with the PIS results with vaginal swabs (clinician-collected and self-collected vaginal swabs) and male urine specimens are shown below for each target pathogen, shown by symptom status.

Table 6: CT Clinical Performance

Specimen Type	Symptom Status	N	TP	FP	TN	FN	Sensitivity		Specificity	
							Estimate (95% CI)	n/N	Estimate (95% CI)	n/N
Prospective Male Urine	Symp	808	55	1	751	1	98.2% (90.6%, 99.7%)	55/56	99.9% (99.3%, 100.0%)	751/752
	Asymp	1488	53	1	1432	2	96.4% (87.7%, 99.0%)	53/55	99.9% (99.6%, 100.0%)	14332/1433
	Total	2296	108	2	2183	3	97.3% (92.4, 99.1%)	108/111	99.9% (99.7%, 100.0%)	2182/2185
Specimen Type	Symptom Status	N	TP	FP	TN	FN	PPA		NPA	
							Estimate (95% CI)	n/N	Estimate (95% CI)	n/N
Prospective Vaginal Swabs	Symp	1116	60	3	1052	1	98.4% (91.3%, 99.7%)	60/61	99.7% (99.2%, 99.9%)	1052/1055
	Asymp	1357	47	2	1307	1	97.9% (89.1%, 99.6%)	47/48	99.8% (99.4%, 100.0)	1307/1309
	Total	2473	107	5	2359	2	98.2% (93.6%, 99.5%)	107/109	99.8% (99.5%, 99.9%)	2359/2364

Table 7: NG Clinical Performance

Specimen Type	Symptom Status	N	TP	FP	TN	FN	Sensitivity		Specificity	
							Estimate (95% CI)	n/N	Estimate (95% CI)	n/N

Prospective Male Urine	Symp	813	68	0	745	0	100.0% (94.7%, 100.0%)	68/68	100.0% (99.5%, 100.0%)	745/745
	Asymp	1488	11	3	1474	0	100.0% (74.1%, 100.0%)	11/11	99.8% (99.4%, 99.9%)	1474/1477
	Total	2301	79	3	2219	0	100.0% (95.4%, 100.0%)	79/79	99.9% (99.6%, 100.0%)	2219/2222
Archived Male Urine	Symp	125	77	0	48	0	100.0% (95.2%, 100.0%)	77/77	100.0% (92.6%, 100.0%)	48/48
	Asymp	38	5	0	33	0	100.0% (56.6%, 100.0%)	5/5	100.0% (89.6%, 100.0%)	33/33
	Total	163	82	0	81	0	100.0% (95.5%, 100.0%)	82/82	100.0% (95.5%, 100.0%)	81/81
Total Male Urine	Symp	938	145	0	793	0	100.0% (97.4%, 100.0%)	145/145	100.0% (99.5%, 100.0%)	793/793
	Asymp	1526	16	3	1507	0	100.0% (80.6%, 100.0%)	16/16	99.8% (99.4%, 99.9%)	1507/1510
	Total	2464	161	3	2300	0	100.0% (97.7, 100.0%)	161/161	99.9% (99.6%, 100.0%)	2300/2303

Specimen Type	Symptom Status	N	TP	FP	TN	FN	PPA		NPA	
							Estimate (95% CI)	n/N	Estimate (95% CI)	n/N
Prospective Vaginal Swabs	Symp	1115	22	2	1089	2	91.7% (74.2%, 97.7%)	22/24	99.8% (99.3%, 99.9%)	1089/1091
	Asymp	1357	18	2	1337	0	100.0% (82.4%, 100.0%)	18/18	99.9% (99.5%, 100.0%)	1337/1339
	Total	2472	40	4	2426	2	95.2% (84.2%, 98.7%)	40/42	99.8% (99.6%, 99.9%)	2426/2430
Archived Vaginal Swabs	Symp	42	20	0	22	0	100.0% (83.9%, 100.0%)	20/20	100.0% (83.9%, 100.0%)	22/22
	Asymp	48	25	0	23	0	100.0% (86.7%, 100.0%)	25/25	100.0% (86.7%, 100.0%)	23/23
	Total	90	45	0	45	0	100.0% (92.1%, 100.0)	45/45	100.0% (92.1%, 100.0%)	45/45
Total Vaginal Swabs	Symp	1157	42	2	1111	2	95.5% (84.9%, 98.7%)	42/44	99.8% (99.5%, 100.0%)	1111/1113
	Asymp	1405	43	2	1360	0	100% (91.8%, 100.0%)	43/43	99.9% (99.5%, 100.0%)	1360/1362
	Total	2562	85	4	2471	2	97.7% (92.0%, 99.4%)	85/87	99.8% (99.6%, 99.9%)	2471/2475

D Clinical Cut-Off:

N/A

E Expected Values/Reference Range:

The positivity rate of the cobas liat CT/NG nucleic acid test for CT and NG observed during the study is shown for each specimen type, by collection site in table below.

Table 8: Positivity of CT/NG as determined by the cobas liat CT/NG nucleic acid test by specimen type and clinical sites

	CT		NG	
Collection Site	**Male Urine**	**VS**	**Male Urine**	**VS**
1	8.7% (30/343)	9.2% (14/152)	11.0% (38/346)	3.3% (5/152)
2	2.6% (9/346)	6.2% (15/241)	1.7% (6/346)	3.7% (9/241)
3	11.9% (18/151)	8.2% (30/366)	6.6% (10/151)	0.55% (2/364)
4	11.2% (12/107)	0.63% (1/160)	9.3% (10/107)	1.25% (2/160)
5	0.0% (0/4)	NC	0.0% (0/4)	NC
6	0.9% (1/117)	1.2% (1/85)	0.0% (0/118)	1.2% (1/85)
7	5.3% (3/57)	5.7% (2/35)	1.8% (1/57)	2.9% (1/35)
8	0.0% (0/80)	0.0% (0/19)	2.5% (2/80)	0.0% (0/19)
9	1.3% (6/468)	1.9% (10/527)	0.4% (2/469)	2.3% (12/528)
10	0.5% (1/198)	1.4% (5/347)	1.0% (2/198)	0.86% (3/347)
11	17.1% (18/105)	5.6% (17/305)	4.8% (5/105)	2.0% (6/305)
12	3.5% (10/289)	8.8% (12/136)	1.7% (5/289)	1.5% (2/136)
13	6.5% (2/31)	5.0% (5/100)	3.2% (1/31)	1.0% (1/100)

VS: vaginal swabs (clinician-collected vaginal swabs and self-collected)
NC: Non calculable as no female subjects were enrolled at this site

Positive and Negative Predictive Values for Hypothetical Prevalence Rates

The Positive Predictive Value and Negative Predictive Value (PPV and NPV) of the cobas liat CT/NG nucleic acid test were calculated based on the demonstrated sensitivity and specificity (or PPA and NPA estimates for CT and NG in vaginal swabs) in prospectively collected samples tested during the clinical study, using hypothetical prevalence rates. Estimates of the PPV and NPV for the cobas liat CT/NG nucleic acid test are presented for each target organism by specimen type in tables below.

Table 9: CT – PPV and NPV for hypothetical CT prevalence

Specimen Type	Hypothetical Prevalence (%)	Sensitivity/ PPA (%)[a]	Specificity/ NPA (%)[a]	PPV (%)	NPV (%)
Male Urine	1	97.3	99.9	91.5	100.0
	3	97.3	99.9	97.0	99.9

	5	97.3	99.9	98.2	99.9
	10	97.3	99.9	99.2	99.7
	15	97.3	99.9	99.5	99.5
	20	97.3	99.9	99.6	99.3
	30	97.3	99.9	99.8	98.9
	50	97.3	99.9	99.9	97.4
Vaginal Swabs	1	98.2	99.8	82.4	100.0
	3	98.2	99.8	93.5	99.9
	5	98.2	99.8	96.1	99.9
	10	98.2	99.8	98.1	99.8
	15	98.2	99.8	98.8	99.7
	20	98.2	99.8	99.1	99.5
	30	98.2	99.8	99.5	99.2
	50	98.2	99.8	99.8	98.2

[a] The sensitivity and specificity (male urine) and PPA and NPA (vaginal swabs) shown were reported for the prospective samples

Table 10: NG – PPV and NPV for hypothetical NG prevalence

Specimen Type	Hypothetical Prevalence (%)	Sensitivity/ PPA (%)[a]	Specificity/ NPA (%)[a]	PPV (%)	NPV (%)
Male Urine	1	100.0	99.9	88.2	100.0
	3	100.0	99.9	95.8	100.0
	5	100.0	99.9	97.5	100.0
	10	100.0	99.9	98.8	100.0
	15	100.0	99.9	99.2	100.0
	20	100.0	99.9	99.5	100.0
	30	100.0	99.9	99.7	100.0
	50	100.0	99.9	99.9	100.0
Vaginal Swabs	1	95.2	99.8	85.4	100.0
	3	95.2	99.8	94.7	99.9
	5	95.2	99.8	96.8	99.7
	10	95.2	99.8	98.5	99.5
	15	95.2	99.8	99.0	99.2
	20	95.2	99.8	99.3	98.8
	30	95.2	99.8	99.6	98.0
	50	95.2	99.8	99.8	95.4

[a] The sensitivity and specificity (male urine) and PPA and NPA (vaginal swabs) shown were reported for the prospective samples

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.