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Premarket Registration Full Evaluation Route
Summary Assessment Report for
Roche Molecular Systems cobas® liat SARS-CoV-2, Influenza A/B & RSV

Listing number	MDPR250919I0001
Date of approval	19/09/2025
Product owner	Roche Molecular System, Inc
Registrant	ROCHE DIAGNOSTICS ASIA PACIFIC PTE LTD
Risk Class	Class D
Intended use / Indications of use	The cobas® liat SARS-CoV-2, Influenza A/B & RSV nucleic acid test is an automated rapid multiplex real-time reverse transcription polymerase chain reaction (RT-PCR) test intended for the simultaneous qualitative detection and differentiation of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), influenza A virus, influenza B virus and respiratory syncytial virus (RSV) nucleic acids in self-collected anterior nasal (nasal) swab specimens (directly observed by a healthcare-provider) and healthcare provider-collected nasal swab and nasopharyngeal swab specimens from individuals with signs or symptoms of respiratory tract infection. Clinical signs and symptoms of respiratory tract infection due to SARS-CoV-2, influenza and RSV can be similar. The test is meant to be used in conjunction with other clinical and epidemiological information and laboratory findings. SARS-CoV-2, influenza A, influenza B and RSV nucleic acids are generally detectable in nasal swab and nasopharyngeal swab specimens during the acute phase of infection. Negative results do not preclude SARS-CoV-2, influenza and/or RSV infection and should not be used as the sole basis for diagnosis, treatment or other patient management decisions. Conversely, positive results do not rule out co-infection with other organisms. The agent(s) detected may not be the definite cause of disease. The cobas® liat SARS-CoV-2, Influenza A/B & RSV nucleic acid test is intended for professional use in a point of care location, near-patient setting or clinical laboratory.

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1. Device description

The cobas® liat SARS-CoV-2, Influenza A/B & RSV is an automated rapid multiplex real-time reverse transcription polymerase chain reaction (RT-PCR) test comprising 20 nucleic acid tests and 3 sets of control kit. Each control kit includes a positive control and a negative control buffer.

The test is performed on the cobas® liat analyzer, which automates and integrates specimen purification, nucleic acid amplification, and detection of the target sequence in biological samples using real-time RT-PCR assays. The assay targets both the ORF1 a/b non-structural region and membrane protein gene that are unique to SARS-CoV-2, a well-conserved region of the matrix gene of influenza A (Flu A target), the nonstructural protein 1 (NS1) gene of influenza B (Flu B target), and the matrix gene of RSV (RSV target). An Internal Control (IC) is included to ensure adequate processing of the target virus through all steps of the assay process and to monitor the presence of inhibitors in the RT-PCR processes.

The sample to result time is approximately 20 minutes.

The cobas® liat SARS-CoV-2, Influenza A/B & RSV control kit is intended for assay tube Lot Validation with the cobas® liat SARS-CoV-2, Influenza A/B & RSV nucleic acid test.

Results are displayed on the cobas® liat analyzer, and may be interpreted as follows:

SARS-CoV-2 Not Detected	Negative test for SARS-CoV-2 (no SARS-CoV-2 RNA detected).
SARS-CoV-2 Detected	Positive test for SARS-CoV-2 (SARS-CoV-2 RNA present).
SARS-CoV-2 Invalid	Presence or absence of SARS-CoV-2 could not be determined. If clinically indicated, repeat assay with same sample or, if possible, collect new sample for testing.
Influenza A Not Detected	Negative test for influenza A (no influenza A RNA detected).
Influenza A Detected	Positive test for influenza A (influenza A RNA present).
Influenza A Invalid	Presence or absence of influenza A could not be determined. If clinically indicated, repeat assay with same sample or, if possible, collect new sample for testing.
Influenza B Not Detected	Negative test for influenza B (no influenza B RNA detected).
Influenza B Detected	Positive test for influenza B (influenza B RNA present).
Influenza B Invalid	Presence or absence of influenza B could not be determined. If clinically indicated, repeat assay with same sample or, if possible, collect new sample for testing.
RSV Not Detected	Negative test for RSV (no RSV RNA detected).
RSV Detected	Positive test for RSV (RSV RNA present).
RSV Invalid	Presence or absence of RSV could not be determined. If clinically indicated, repeat assay with same sample or, if possible, collect new sample for testing.
Assay Invalid	Presence or absence of SARS-CoV-2, influenza A, influenza B, and RSV could not be determined. Repeat assay with same sample or, if possible, collect new sample for testing.
Assay Aborted by System	Run failed or aborted by system. Repeat assay with same sample or, if possible, collect new sample for testing.
Assay Aborted by script: Script aborted	Run failed or aborted by script. Repeat assay with same sample or, if possible, collect new sample for testing.
Assay Aborted by User	Run aborted by user.

Negative results do not preclude SARS-CoV-2, Influenza A, Influenza B, or RSV infection and should not be used as the sole basis for treatment or other patient management decisions. Invalid results may be obtained if there is insufficient specimen volume or if the specimen contains inhibitory substances that prevent nucleic acid target extraction and/or amplification and detection. Recent administration of nasal vaccines within 6 weeks prior to collection were not evaluated; cobas® liat SARS-CoV-2, Influenza A/B & RSV may detect the agents in those vaccines which may not represent infection by those viruses. Additional contraindications, warnings and precautions can be found in the labelling.

2. List of Standards applied

Standards	Title
EN ISO 14971	Medical devices – Application of risk management to medical devices
EN ISO 23640	In vitro diagnostic medical devices – Evaluation of stability of in vitro diagnostic reagents
IEC 62366-1	Medical devices – Part 1: Application of usability engineering to medical devices
EN 13612	Performance evaluation of in vitro diagnostic medical devices
EN 13641	Elimination or reduction of risk of infection related to in vitro diagnostic reagents
EN IEC 61010-2-101	Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 2-101: Safety requirements for in vitro diagnostic (IVD) medical equipment
IEC 61326-2-6	Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 2-6: Particular requirements - In vitro diagnostic (IVD) medical electrical equipment

3. Pre-clinical assessment

(i) Stability:
Studies provided support for a shelf life of 18 months at 2-8°C for both the assay and control kit. Studies were completed on three lots up to 19 months under real-time conditions and of 25°C to support shelf life. A transport stability study was conducted on one lot of the assay at various transportation conditions at -20°C for up to 7 days, 37°C for up to 14 days, and 45°C for up to 6 hours. One lot of control kit was tested at 2-8°C for up to 14 days and 37°C for up to 14 days. The results demonstrated the assay and control kit maintained stability when exposed to temperatures beyond storage conditions during transportation.

(ii) IVD specific studies:

- Analytical sensitivity

  Studies provided supported the following limit of detection (LoD) values for the different pathogens:

Virus Strains	LoD
SARS-CoV-2 (USA-WA1/2020)	0.0350 $TCID_{50}$/ml
SARS-CoV-2 (WHO International Standard 20/146, v3, 11/2021)	65.1 IU/ml
Influenza A (Darwin/6/2021)	0.295 $TCID_{50}$/ml
Influenza A (Brisbane/02/2018)	0.00325 $TCID_{50}$/ml
Influenza B (B/Austria/1359417/2021)	0.979 $TCID_{50}$/ml
Influenza B (Phuket/3073/2013)	0.183 $TCID_{50}$/ml
RSV (9320, subtype B)	0.269 $TCID_{50}$/ml
RSV (Long, subtype A)	0.0240 $TCID_{50}$/ml

- Inclusivity

  In-silico analysis was done using from databases (GISAID and NCBI), with 99.9% detection for SARS-CoV-2, 99.9% detection for influenza A H5 lineage and 100% detection for influenza A H7 lineage viruses.

  Studies demonstrated detection of COVID-19 variants (including Alpha, Beta, Delta, Epsilon, Gamma, Iota, Kappa, Omicron and Zeta), Influenza A subtypes (H1N1, H3N2, H5N1, H5N2, H7N9), Influenza B subtypes (Victoria, Yamagata) and RSV Types A & B.

- Analytical specificity

  The analytical specificity of the test was evaluated by testing various related microorganisms, those potentially encountered in nasal swab specimens, and diseases with similar clinical

manifestations. Viruses were tested at concentrations of ≥10^5 units/mL (except for SARS Coronavirus, Urbani, Human Rhinovirus Type 1A, and Human Parainfluenza Virus Type 4A tested at a concentration less than 10^5, but higher than 10^4 units/mL due to their low stock concentration) while bacteria and fungi were tested at concentrations of 10^6 units/mL. None of the organisms tested showed cross-reactivity or interference.

Adenovirus Type 1	*Human Rhinovirus B*	*Mycobacterium tuberculosis*
Adenovirus Type 7	*MERS-Coronavirus*	*Mycoplasma genitalium*
Cytomegalovirus	*Measles*	*Mycoplasma pneumoniae*
Epstein-Barr virus	*Mumps*	*Neisseria elongata*
Human Coronavirus OC43	*SARS Coronavirus, Urbani**	*Neisseria flava*
Human Coronavirus 229E	*Bordetella parapertussis*	*Neisseria meningitidis*
*Human Coronavirus HKU***	*Bordetella pertussis*	*Pneumocystis jirovecii***
Human Coronavirus NL63	*Chlamydophila pneumoniae*	*Pseudomonas aeruginosa*
Human Enterovirus 68	*Corynebacterium flavescens*	*Staphylococcus aureus*
Human Metapneumovirus 27	*Escherichia coli*	*Staphylococcus epidermidis*
Human Parainfluenza Virus Type 1	*Fusobacterium necrophorum subsp. necrophorum*	*Streptococcus pneumoniae*
Human Parainfluenza Virus Type 2	*Haemophilus influenzae*	*Streptococcus pyogenes*
Human Parainfluenza Virus Type 3	*Lactobacillus crispatus*	*Streptococcus salivarius*
*Human Parainfluenza Virus Type 4A**	*Legionella pneumophila*	*Aspergillus flavus var. flavus*
*Human Rhinovirus Type 1A**	*Moraxella catarrhalis*	*Candida albicans*

** Tested at highest concentration available*
*** Tested at unknown concentrations*

Interference studies demonstrated no impact from endogenous and exogenous substances including mucin, whole blood and pharmaceutical substances, in the absence and presence of the subject analytes.

Potential Interferent	Concentration Tested
Peripheral blood mononuclear cell (PBMC)	1.00E+06 cell/mL
Mucin: bovine submaxillary gland, type I-S	5 mg/mL
Human Whole Blood	5% (v/v)
Nasal spray - Afrin / Anefrin	15% (v/v)
Nasal corticosteroids - Flonase	5% (v/v)
Nasal gel - Zicam	5% (v/v)
Throat lozenges, oral anesthetic and analgesic - Cepacol	5 mg/ml
Antibiotic, nasal ointment - Bactroban mupirocin ointment	5 mg/ml
Antiviral drug – Relenza	5 mg/ml
Antiviral drug - Tamiflu	7.5 mg/ml
Antimicrobial, systemic - Tobramycin	4 µg/mL
Intranasal Vaccine – FluMist	6.25% (v/v)

Competitive inhibition studies confirmed the detection capability of pathogens at low concentrations (approximately three times LoD) in the presence of other pathogens at higher concentrations (≥10^5 $TCID_{50}$/mL).

- Precision
  Studies done on negative, low positive (1-2x LoD) and moderate positive (3-5x LoD) specimens showed acceptable repeatability and reproducibility (within-run, between-lot, between-day, between-operator and between-site) with no significant variance reported. The agreement of

obtained results with expected results was 99.6% for Influenza A/B and 100% for SARS-CoV-2 and RSV, across all runs, lots, days, operators, and sites.

- Specimen stability
  Studies validated claims for stability of both nasal and nasopharyngeal swabs at 30°C for up to 4 hours after collection, or at 2-8 °C for up to 72 hours. If needed, specimens collected in viral transport media (VTM) may be stored frozen (-70 °C or colder) if testing within 72 hours is not possible.

4. Clinical assessment

(i) Evaluation of Clinical Investigations

IVD Specific Requirements

Clinical performance

The clinical performance of the cobas® liat SARS-CoV-2, Influenza A/B & RSV nucleic acid test was established based on the evaluation of clinical specimens collected from two sources: prospectively collected specimens from 14 point-of-care testing sites between 2023 and 2024, and frozen archived clinical specimens obtained between 2019 and 2023. A total of 452 frozen archived clinical specimens were tested among the prospectively collected specimens to supplement the prospective data that may be excluded due to shipping/handling issues and inconclusive results on the method comparator.

A clinical evaluation was conducted comparing the test results to PCR tests performed by healthcare professionals. Symptomatic patients with signs or symptoms of respiratory tract infection were recruited for the study. Nasal swab (NS) specimens were either collected by the patient (self-collected) or healthcare provider, while nasopharyngeal swab (NPS) specimens were collected by the healthcare provider.

Clinical studies demonstrated the following performance when compared against the method comparator, for both prospective specimens and archived specimens per specimen type. For breakdown of performance of prospective specimens and archived specimens, refer to the instructions-for-use.

Specimen type NPS

Pathogens	Specimen size	Positive Percent Agreement (PPA)	Negative Percent Agreement (NPA)
SARS-CoV-2	1,927	95.0% (95%CI: 91.6%, 97.1%)	97.5% (95%CI: 96.6%, 98.1%)
Influenza A	1,924	100% (95%CI: 96.5%, 100%)	99.2% (95%CI: 98.7%, 99.5%)
Influenza B	1,926	100% (95%CI: 93.6%, 100%)	99.1% (95%CI: 98.6%, 99.5%)
RSV	1,927	100% (95%CI: 96.4%, 100%)	98.8% (95%CI: 98.2%, 99.2%)

Specimen type NS

Pathogens	Specimen size	PPA	NPA
SARS-CoV-2	1,911	97.1% (95%CI: 94.2%, 98.6%)	97.4% (95%CI: 96.5%, 98.0%)
Influenza A	1,908	100% (95%CI: 96.5%, 100%)	99.2% (95%CI: 98.7%, 99.5%)
Influenza B	1,911	100% (95%CI: 93.8%, 100%)	99.4% (95%CI: 98.9%, 99.6%)
RSV	1,912	98.3% (95%CI: 93.9%, 99.5%)	98.7% (95%CI: 98.1%, 99.1%)

5. Assessment of device quality

The assay and analyzer are manufactured in Switzerland and United States respectively at Roche Diagnostics International Ltd and Roche Molecular Systems, Inc. Both manufacturing sites conform to ISO 13485:2016 quality management system.

6. Conclusion

The cobas® liat SARS-CoV-2, Influenza A/B & RSV nucleic acid test demonstrates acceptable safety and performance for its intended use for qualitative detection and differentiation of four respiratory pathogens. The

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benefits of this device outweigh risks as it provides users with the ability to simultaneously test for respiratory pathogens when experiencing upper respiratory tract infection symptoms, under point-of-care or near-patient settings. All foreseeable risks have been identified and reasonably mitigated through appropriate design controls, labelling, and user instructions. The comprehensive pre-clinical and clinical validation data supports the device's safety and effectiveness for the intended population and use environment.