December 19, 2018

DiaSorin Molecular LLC
Sharon Young
Principal Regulatory Affairs Specialist
11331 Valley View Street
Cypress, California 90630

Re: K183223
Trade/Device Name: Simplexa Bordetella Direct, Simplexa Bordetella Positive Control Pack
Regulation Number: 21 CFR 866.3980
Regulation Name: Respiratory viral panel multiplex nucleic acid assay
Regulatory Class: Class II
Product Code: OZZ, OOI
Dated: November 16, 2018
Received: November 20, 2018

Dear Sharon Young:

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/CombinationProducts/GuidanceRegulatoryInformation/ucm597488.htm); 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 http://www.fda.gov/MedicalDevices/Safety/ReportaProblem/default.htm.

For comprehensive regulatory information about medical devices and radiation-emitting products, including information about labeling regulations, please see Device Advice (https://www.fda.gov/MedicalDevices/DeviceRegulationandGuidance/) and CDRH Learn (http://www.fda.gov/Training/CDRHLearn). 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 (http://www.fda.gov/DICE) for more information or contact DICE by email (DICE@fda.hhs.gov) or phone (1-800-638-2041 or 301-796-7100).

Sincerely,

Steven R. Gitterman -S for

Uwe Scherf, M.Sc., Ph.D.
Director
Division of Microbiology Devices
Office of In Vitro Diagnostics
and Radiological Health
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: January 31, 2017
See PRA Statement below.

510(k) Number *(if known)*
K183223

Device Name
Simplexa™ Bordetella Direct MOL2750 and Simplexa™ Bordetella Positive Control Pack MOL2760

Indications for Use *(Describe)*

Simplexa™ Bordetella Direct

The DiaSorin Molecular Simplexa™ Bordetella Direct assay is an in vitro diagnostic test intended for use on the LIAISON® MDX instrument for the qualitative detection and differentiation of *Bordetella pertussis* and *Bordetella parapertussis* nucleic acids from nasopharyngeal swab (NPS) specimens from patients with signs and symptoms of Bordetella infection of the respiratory tract.

The Simplexa™ Bordetella Direct assay is performed on the LIAISON® MDX instrument and utilizes real-time PCR amplification to detect *B. pertussis* by targeting the IS481 insertional element of the *B. pertussis* genome and to detect *B. parapertussis* by targeting the IS1001 insertional element of the *B. parapertussis* genome. The IS481 insertional element can also be present in *B. holmesii* and *B. bronchiseptica*. Specimens collected from patients with respiratory infection caused by *B. pertussis*, *B. holmesii* or *B. bronchiseptica* may yield positive test results in IS481 assays. *B. holmesii* infection may cause clinical illness similar to *B. pertussis*, and mixed outbreaks involving both *B. pertussis* and *B. holmesii* infection have been reported. Additional testing should be performed if necessary to differentiate *B. holmesii* and *B. pertussis*. *B. bronchiseptica* is a rare cause of infection in humans. When clinical factors suggest that *B. pertussis* may not be the cause of respiratory infection, other clinically appropriate investigation(s) should be carried out in accordance with published guidelines.

Negative results for the Simplexa™ Bordetella Direct assay do not preclude Bordetella infection and positive results do not rule out co-infection with other respiratory pathogens. Results from the Simplexa™ Bordetella Direct assay should be used with other clinical findings and epidemiological information as an aid in diagnosis of Bordetella infection. Test results should not be used as the sole basis for treatment or other patient management decisions.

Simplexa™ Bordetella Positive Control Pack

The Simplexa™ Bordetella Positive Control Pack is intended to be used as a control with the Simplexa™ Bordetella Direct kit.

This control is not intended for use with other assays or systems.

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."

Applicant	DiaSorin Molecular LLC. 11331 Valley View Street Cypress, California 90630 USA
Establishment Registration No.	2023365
Contact Person	Sharon Young, Principal Regulatory Affaris Specialist tel 562.240.6680 fax 562.240.6529 Sharon.Young@DiaSorin.com
Summary Date	November 6, 2018
Proprietary Name	Simplexa™ Bordetella Direct and Simplexa™ Bordetella Positive Control Pack
Generic Name	Bordetella nucleic acid
Classification	Class II
Predicate Devices	Simplexa™ Bordetella Direct (K173498)

Intended Use

Simplexa™ Bordetella Direct

The DiaSorin Molecular Simplexa™ Bordetella Direct assay is an *in vitro* diagnostic test intended for use on the LIAISON® MDX instrument for the qualitative detection and differentiation of *Bordetella pertussis* and *Bordetella parapertussis* nucleic acids from nasopharyngeal swab (NPS) specimens from patients with signs and symptoms of Bordetella infection of the respiratory tract.

The Simplexa™ Bordetella Direct assay is performed on the LIAISON® MDX instrument and utilizes real-time PCR amplification to detect *B. pertussis* by targeting the IS481 insertional element of the *B. pertussis* genome and to detect *B. parapertussis* by targeting the IS1001 insertional element of the *B. parapertussis* genome. The IS481 insertional element can also be present in *B. holmesii* and *B. bronchiseptica*. Specimens collected from patients with respiratory infection caused by *B. pertussis*, *B. holmesii* or *B. bronchiseptica* may yield positive test results in IS481 assays. *B. holmesii* infection may cause clinical illness similar to *B. pertussis*, and mixed outbreaks involving both *B. pertussis* and *B. holmesii* infection have been reported. Additional testing should be performed if necessary to differentiate *B. holmesii* and *B. pertussis*. *B. bronchiseptica* is a rare cause of infection in humans. When clinical factors suggest that *B. pertussis* may not be the cause of respiratory infection, other clinically appropriate investigation(s) should be carried out in accordance with published guidelines.

Negative results for the Simplexa™ Bordetella Direct assay do not preclude Bordetella infection and positive results do not rule out co-infection with other respiratory pathogens. Results from the Simplexa™ Bordetella Direct assay should be used with other clinical findings and epidemiological information as an aid in diagnosis of Bordetella infection. Test results should not be used as the sole basis for treatment or other patient management decisions.

Simplexa™ Bordetella Positive Control Pack

The Simplexa™ Bordetella Positive Control Pack is intended to be used as a control with the Simplexa™ Bordetella Direct kit.

This control is not intended for use with other assays or systems.

Device Description

The Simplexa™ Bordetella Direct assay system is a real-time PCR assay that enables the direct amplification, detection and differentiation of *Bordetella pertussis* and *Bordetella parapertussis* DNA from unprocessed nasopharyngeal swabs (NPS) without nucleic acid extraction. The system consists of the Simplexa™ Bordetella Direct assay, the LIAISON® MDX (with LIAISON® MDX Studio Software), the Direct Amplification Disc and associated accessories.

In the Simplexa™ Bordetella Direct assay, primers and fluorescent probes are used together to amplify and detect *Bordetella pertussis*, *Bordetella parapertussis* and internal control targets. Insertion sequences IS481 and IS1001 are targeted to identify *Bordetella pertussis* and *Bordetella parapertussis* DNA respectively in the specimen. An internal control is used to detect PCR failure and/or inhibition.

Kit Description

Component Name	REF	EC SYMBOL ON LABEL		Abbreviated Name	Cap Color	Number of Vials	Reactions per Vial/Kit	Volume per Vial
Simplexa™ Bordetella Direct Reaction Mix	MOL2751	REAG	A	RM	Brown	24	1/24	50 µL

Component Description

Kit Component	Contents
Simplexa™ Bordetella Direct Reaction Mix (RM)	**DNA polymerase, buffer, dNTPs, Internal Control template DNA, dye-labeled fluorescent probes and primers specific for detection of *Bordetella pertussis*, *Bordetella parapertussis* and DNA Internal Control**

Target	Probe Fluorophore (Dye)	Excitation (nm)	Emission (nm)	Targeted Gene
Bordetella pertussis	FAM	495	520	IS481
Bordetella parapertussis	CFR610	590	610	IS1001
DNA Internal Control	Q670	644	670	DNA IC

Simplexa™ Bordetella Kit Barcode Card	Assay specific parameters

MATERIALS SUPPLIED SEPARATELY

1. Direct Amplification Disc Kit (REF MOL1455)
    a. Direct Amplification Discs for use on the LIAISON® MDX

Simplexa™ Bordetella Positive Control Pack REF MOL2760

Component Name	REF	Description	Cap Color	Number of Vials	Reactions per Vial/Kit	Volume per Vial
Simplexa™ Bordetella Direct Positive Control	MOL2761	Inactivated Bordetella bacteria	Red	10	1/10	100 µL

Direct Amplification Disc kit REF MOL1455

Component Name	REF	Description	Number of Discs	Reactions per Disc/Kit
Direct Amplification Disc	MOL1452	Direct Amplification Disc for the processing of up to 8 individual controls or specimens	3	8/24

Predicate Device Information

Table 1, Differences

Item	Device	
Name	**K173498** **Simplexa™ Bordetella Direct** **REF MOL2750** **And** **Simplexa™ Bordetella Positive Control Pack REF MOL2760**	**Candidate Device** **Simplexa™ Bordetella Direct** **REF MOL2750** **And** **Simplexa™ Bordetella Positive Control Pack** **REF MOL2760**
Intended Use	Simplexa™ Bordetella Direct The DiaSorin Molecular Simplexa™ Bordetella Direct assay is an in vitro diagnostic test intended for use on the LIAISON® MDX instrument for the qualitative detection and differentiation of *Bordetella pertussis* and *Bordetella parapertussis* nucleic acids from frozen nasopharyngeal (NPS) specimens from patients with signs and symptoms of Bordetella infection of the respiratory tract. The Simplexa™ Bordetella Direct assay is performed on the LIAISON® MDX instrument and utilizes real-time PCR amplification to detect *B. pertussis* by targeting the IS481 insertional element of the *B. pertussis* genome and to detect *B. parapertussis* by targeting the IS1001 insertional element of the *B. parapertussis* genome. The IS481 insertional element can also be present in *B. holmesii* and *B. bronchiseptica*. Specimens collected from patients with respiratory infection caused by *B. pertussis, B. holmesii* or *B. bronchiseptica* may yield positive test results in IS481 assays. *B. holmesii* infection may cause clinical illness similar to B. pertussis, and mixed outbreaks involving both B. pertussis and *B. holmesii* infection have been reported. Additional testing should be performed if necessary to differentiate *B. holmesii* and *B. pertussis. B. bronchiseptica* is a rare cause of infection in humans. When clinical factors suggest that *B. pertussis* may not be the cause of respiratory infection, other clinically appropriate investigation(s) should be carried out in	Simplexa™ Bordetella Direct The DiaSorin Molecular Simplexa™ Bordetella Direct assay is an in vitro diagnostic test intended for use on the LIAISON® MDX instrument for the qualitative detection and differentiation of *Bordetella pertussis* and *Bordetella parapertussis* nucleic acids from frozen nasopharyngeal (NPS) specimens from patients with signs and symptoms of Bordetella infection of the respiratory tract. The Simplexa™ Bordetella Direct assay is performed on the LIAISON® MDX instrument and utilizes real-time PCR amplification to detect *B. pertussis* by targeting the IS481 insertional element of the B. pertussis genome and to detect *B. parapertussis* by targeting the IS1001 insertional element of the *B. parapertussis* genome. The IS481 insertional element can also be present in *B. holmesii* and *B. bronchiseptica*. Specimens collected from patients with respiratory infection caused by *B. pertussis, B. holmesii* or *B. bronchiseptica* may yield positive test results in IS481 assays. *B. holmesii* infection may cause clinical illness similar to *B. pertussis*, and mixed outbreaks involving both *B. pertussis* and *B. holmesii* infection have been reported. Additional testing should be performed if necessary to differentiate *B. holmesii* and *B. pertussis*. *B. bronchiseptica* is a rare cause of infection in humans. When clinical factors suggest that *B. pertussis* may not be the cause of respiratory infection, other clinically appropriate investigation(s) should be carried out in accordance with published guidelines. Negative results for the Simplexa™ Bordetella

Item	**Device**	
Name	**K173498** **Simplexa™ Bordetella Direct** **REF MOL2750** **And** **Simplexa™ Bordetella Positive Control Pack REF MOL2760**	**Candidate Device** **Simplexa™ Bordetella Direct** **REF MOL2750** **And** **Simplexa™ Bordetella Positive Control Pack** **REF MOL2760**
	accordance with published guidelines. Negative results for the Simplexa™ Bordetella Direct assay do not preclude Bordetella infection and positive results do not rule out co-infection with other respiratory pathogens. Results from the Simplexa™ Bordetella Direct assay should be used with other clinical findings and epidemiological information as an aid in diagnosis of Bordetella infection. Test results should not be used as the sole basis for treatment or other patient management decisions.	Direct assay do not preclude Bordetella infection and positive results do not rule out co-infection with other respiratory pathogens. Results from the Simplexa™ Bordetella Direct assay should be used with other clinical findings and epidemiological information as an aid in diagnosis of Bordetella infection. Test results should not be used as the sole basis for treatment or other patient management decisions.
Physical state of the naso-pharyngeal swab sample	Frozen	Fresh and Frozen

Table 2. Similarities

Item	**Device**	
Name	**K173498** **Simplexa™ Bordetella Direct** **REF MOL2750** **And** **Simplexa™ Bordetella Positive Control Pack REF MOL2760**	**Candidate Device** **Simplexa™ Bordetella Direct** **REF MOL2750** **And** **Simplexa™ Bordetella Positive Control Pack** **REF MOL2760**
Assay Targets	The Simplexa™ Bordetella Direct assay detects the following multi-copy insertion sequence targets: *Bordetella pertussis* target IS481 and *Bordetella parapertussis* target IS1001.	Same

Item	**Device**	
Name	**K173498** **Simplexa™ Bordetella Direct** **REF MOL2750** **And** **Simplexa™ Bordetella Positive Control Pack REF MOL2760**	**Candidate Device** **Simplexa™ Bordetella Direct** **REF MOL2750** **And** **Simplexa™ Bordetella Positive Control Pack** **REF MOL2760**
Sample Types	Nasopharyngeal swabs in Remel M4, Remel M4RT, Remel M5, Remel M6, UTM, VTM and Liquid Aimes (ESwab).	Same
Instrument	LIAISON® MDX Instrument with LIAISON® MDX Studio Software	Same
Extraction Methods	None	Same
Assay Methodology	PCR-based system for detecting the presence / absence of Bordetella pertussis and Bordetella parapertussis DNA in clinical specimens.	Same
Detection Techniques	Multiplex assay using different reporter dyes for each target.	Same
Optical Detection	Fluorescence	Same
Time to result	Approximately 1 hour	Same
Test Interpretation	Automated test interpretation and report generation	Same
Simplexa™ Bordetella Positive Control Pack (MOL2760)	Simplexa™ Bordetella Positive Control Pack The Simplexa™ Bordetella Positive Control Pack is intended to be used as a control with the Simplexa™ Bordetella Direct kit. This control is not intended for use with other assays or systems.	Same

METHOD COMPARISON

Fresh *Bordetella pertussis* and *Bordetella parapertussis* Samples

Three hundred and sixty-nine (369) evaluable fresh *Bordetella pertussis* samples were prospectively collected from five (5) geographically diverse sites from May 2018 to October 2018, from patients with signs and symptoms of Bordetella infection. All three hundred and sixty-nice (369) samples were tested on the Simplexa™ Bordetella Direct at five (5) collection sites and an FDA Cleared reference method testing was performed at two (2) collection sites within seventy-two (72) hours of collection. The *Bordetella pertussis* prospectively collected fresh sample results are shown in Table 3.

Table 3. Simplexa™ Bordetella Direct *Bordetella pertussis* Results Versus FDA Cleared NAAT Prospectively Collected Fresh Samples

Simplexa™ Bordetella Direct *B. pertussis*	FDA Cleared NAAT		
	Detected	**Not Detected**	**Total**
Detected	36	7	43
Not Detected	0	326	326
Total	36	333	369
	%PPA 100.0 %(36/36) 95% CI: 90.4% to 100.0%	**%NPA** 97.9%(326/333) 95% CI: 95.7% to 99.0%	

One hundred and seventy-eight (178) samples were prospectively collected fresh samples from six (6) geographically diverse sites between July 2017 and August 2017, from patients with signs and symptoms of Bordetella infections. Of the one hundred and seventy-eight (178) samples, one hundred and seventy-six (176) samples were evaluable on Simplexa™ Bordetella Direct and a composite reference method. The composite reference method consisted of two well-characterized real-time PCR assays followed by confirmation of positive PCR amplification products with bi-directional sequencing, per target. Samples were characterized as positive if one or both composite reference methods were positive and confirmed by bi-directional sequencing. Samples were characterized as negative if both composite reference methods were negative. Samples were tested on Simplexa™ Bordetella Direct at the collection sites and the composite reference method was performed at DiaSorin Molecular. The *Bordetella parapertussis* prospectively collected fresh sample results are shown in Table 4.

Table 4 Simplexa™ Bordetella Direct *Bordetella parapertussis* results versus PCR/Bi-Directional Sequencing Method Prospectively Collected Fresh Samples

Simplexa™ Bordetella Direct *B. parapertussis*	PCR/Bi-directional Sequencing		
	Detected	**Not Detected**	**Total**
Detected	2	0	2
Not Detected	0	174	174
Total	2	174	176
	%PPA 100.0%(2/2) 95% CI: 34.2% to 100.0%	**%NPA** 100.0%(174/174) 95% CI: 97.8% to 100.0%	

REPRODUCIBILITY

There have been no changes since K173498.

ANALYTICAL SENSITIVITY/LIMIT OF DETECTION

There have been no changes since K173498.

ANALYTICAL REACTIVITY / CROSS REACTIVITY

Analytical Reactivity

There have been no changes since K173498.

Cross Reactivity (Analytical Specificity)

There have been no changes since K173498.

INTERFERENCE

There have been no changes since K173498.

COMPETITIVE INTERFERENCE

There have been no changes since K173498.

INHIBITION BY OTHER MICROORGANISMS

There have been no changes since K173498.

SUMMARY OF DESIGN CONTROL ACTIVITIES

Design controls in accordance with 21 CFR 820.30 were conducted to update the sample state [from frozen nasopharyngeal swabs (NPS) to fresh and frozen nasopharyngeal swabs NPS)] that can be used with the Simplexa™ Bordetella Direct. Validation included protocols with defined acceptance criteria (design inputs), conducting a clinical study and documenting the results of the clinical study to predetermined acceptance criteria (design outputs). The results of the validation show the data met the acceptance criteria and that performance of the Simplexa™ Bordetella using fresh samples was not affected.

The expanded sample type was assessed using risk management; risk management included Application FMEA, Process FMEA, and Design FMEA. For each FMEA the risk analysis included risk analysis of failure modes, potential hazards (harm) Severity, potential cause of the failure, occurrence, risk control measure, residual risk acceptability and clinical risk.

A declaration of conformity to design controls in accordance to 21 CFR 820.30 is included in the K18XXXX Simplexa™ Bordetella Direct MOL2750 and Simplexa™ Bordetella Positive Control Pack MOL2760 Special 510(k) submission. The declaration of conformity was signed by the individuals responsible for the activities.