November 18, 2022

Sebia, Inc.
Karen Anderson
Director of Regulatory
1705 Corporate Drive, Suite 400
Norcross, Georgia 30093

Re: K210623
Trade/Device Name: FLC Kappa, FLC Lambda
Regulation Number: 21 CFR 866.5550
Regulation Name: Immunoglobulin (Light Chain Specific) Immunological Test System
Regulatory Class: Class II
Product Code: DFH, DEH
Dated: August 2, 2022
Received: August 4, 2022

Dear Karen Anderson:

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,

Ying Mao -S

Ying Mao, Ph.D.
Branch Chief
Division of Immunology and Hematology Devices
OHT7: Office of In Vitro Diagnostics
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: 06/30/2023
See PRA Statement below.

510(k) Number *(if known)*
K210623

Device Name
FLC Kappa
FLC Lambda

Indications for Use *(Describe)*
The FLC Kappa kit is intended for the quantification of Kappa free light chains in human serum from adults with an Enzyme-Linked Immunosorbent Assay (ELISA) procedure. Measurement of free light chains aids in the diagnosis of multiple myeloma and AL amyloidosis. It must be used in conjunction with other laboratory and clinical findings. For In Vitro Diagnostic Use.

The FLC Lambda kit is intended for the quantification of Lambda free light chains in human serum from adults with an Enzyme-Linked Immunosorbent Assay (ELISA) procedure. Measurement of free light chains aids in the diagnosis of multiple myeloma and AL amyloidosis. It must be used in conjunction with other laboratory and clinical findings. For In Vitro Diagnostic Use.

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

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

CONTINUE ON A SEPARATE PAGE IF NEEDED.

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510K SUMMARY (Summary of Safety and Effectiveness)

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

Submitter Name	Sebia, Inc.
Address	1705 Corporate Drive Suite 400 Norcross, Georgia 30093, USA
Contact	Karen Anderson, Dir of Regulatory, Sebia Inc. Phone: 1-800-835-6497 Fax: 770-446-8511 Email: karen.anderson@sebia-usa.com Matthew C Wagner, Scientific Affairs Specialist Phone 1-800-835-6497, 3752 Fax 770-446-8511 Email: Matthew.Wagner@sebia-usa.com
Date Prepared	October 20, 2022
Manufacturing	Sebia Parc Technologique Léonard de Vinci Rue Léonard de Vinci, CP 8010 LISSES, 91008 EVRY Cedex FRANCE Phone: (33) 1 69 89 80 80 Fax: (33) 1 69 89 78 78
Product Name	FLC Kappa FLC Lambda
Common Name	Light Chain immunological test system
Product Regulation No.	21CFR sec. 866.5550 - Immunoglobulin (light chain specific) immunological test system 21 CFR sec. 862.1660- Quality Control Material (assayed and unassayed)
Product Codes	DFH, Kappa antigen, antiserum, control DEH, Lambda, antigen, antiserum, control
Device classification and Panel Classification	Class II, Immunology (82)
Establishment Registration No.	8023024

1. DEVICE DESCRIPTIONS

The FLC Kappa and FLC Lambda test kits are intended for the quantification of free light chains in human serum from adults with an Enzyme-Linked Immunosorbent Assay (ELISA) procedure utilizing specific antibodies targeting anti-Kappa and anti-Lambda free light chains.

It is carried out in 8 successive steps:

- Incubation of the previously diluted samples and calibrators, in the wells of the microplate, where specific free light chain antibodies are fixed.
- Washing of the wells to remove elements that have not been fixed by the anti-free light chain antiserum.
- Incubation with an anti- light chain antiserum (Kit specific) conjugated to peroxidase.
- Washing of the wells to remove the excess of antiserum conjugated to peroxidase.
- Incubation with peroxidase substrate.
- Stopping of the enzymatic reaction with an acidic solution.
- Reading of the optical density by absorbance spectrophotometry at 450 nm of the colored product.
- Calculation of the free light chain concentration of the sample using a calibration curve obtained with calibrators that have been analyzed on the same microplate.

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2. REAGENTS

REAGENTS AND MATERIALS SUPPLIED IN THE FLC KAPPA AND FLC LAMBDA KITS

ITEMS	**PN 5102** **FLC Kappa Kit**	**PN 5103** **FLC Lambda Kit**
Microplate Kappa 1 plate with 12 segments, 8 wells each	Microplate Kappa 1 plate with 12 segments, 8 wells each	Microplate Lambda 1 plate with 12 segments, 8 wells each
Dilution buffer (ready to use)	1 vial, 100 mL	1 vial, 100 mL
Wash solution (stock solution)	1 vial, 100 mL	1 vial, 100 mL
Calibrators (ready to use)	5 vials, 0.6 mL each Kappa Calibrators	5 vials, 0.6 mL each Lambda Calibrators
PER antiserum (ready to use)	1 vial, 12 mL Anti-Kappa – PER antiserum (ready to use)	1 vial, 12 mL Anti-Lambda – PER antiserum (ready to use)
Substrate	1 vial, 12 mL Substrate Kappa (ready to use)	1 vial, 12 mL Substrate Lambda (ready to use)
Stop solution (ready to use)	1 vial, 12 mL	1 vial, 12 mL

REAGENTS/SUPPLIES REQUIRED BUT NOT SUPPLIED IN THE KITS

SUPPLIES	SEBIA PRODUCT NUMBER
Densitometer for microplate reading by absorbance spectrophotometry at 450 nm.	
NON COATED ELISA PLATES (10), SEBIA, microplates with scored wells in order to complete segments when the forecasted number of samples per segment is fewer than 8, and frame to store the segments that have not been used.	PN 5303
Absorbent paper for removal the excess of wash solution from the wells of the microplate.	
Multichannel pipette.	
FLC CONTROL LEVEL 1	PN 5112
FLC CONTROL LEVEL 2	PN 5113

3. INDICATIONS FOR USE

FLC Kappa and FLC Lambda kits

The FLC Kappa kit is intended for the quantification of Kappa free light chains in human serum from adults with an Enzyme-Linked Immunosorbent Assay (ELISA) procedure. Measurement of free light chains aids in the diagnosis of multiple myeloma and AL amyloidosis. It must be used in conjunction with other laboratory and clinical findings.
For *In Vitro* Diagnostic Use only.

The FLC Lambda kit is intended for the quantification of Lambda free light chains in human serum from adults with an Enzyme-Linked Immunosorbent Assay (ELISA) procedure. Measurement of free light chains aids in the diagnosis of multiple myeloma and AL amyloidosis. It must be used in conjunction with other laboratory and clinical findings.
For *In Vitro* Diagnostic Use only.

Special conditions for use statements: For prescription use only.

Warning: The result of the FLC Kappa and FLC Lambda in a given specimen determined with assays and/or instrument platforms from different manufacturers can vary due to differences in assay methods and reagent
specificity. The results reported by the laboratory to the physician must include the identity of the assay used. Values obtained with different assay methods cannot be used interchangeably.

SUBSTANTIAL EQUIVALENCE INFORMATION

Predicate Device Name	Predicate Device 510(k) number	Regulation No.
The Binding Site Freelite® Human Kappa Free Kit for use on the Siemens BN™ II	K031016	866.5550
The Binding Site Freelite® Human Lambda Free Kit for use on the Siemens BN™ II	K031016	866.5550

4. COMPARISON WITH PREDICATE DEVICE

Kit Similarities (Table A).

Similarities		
Table A	**Candidate Device** FLC Kappa FLC Lambda	**Predicate** The Binding Site Freelite® Human Kappa Free and Freelite® Human Lambda Free kits for use on the Siemens BN™ II (K031016)
Analyte	Kappa: Kappa FLC Lambda: Lambda FLC	Same
Measurement	Quantitative	Same

Kit Differences (Table B)

	Differences	
Table B	**Candidate Device**	**Predicate Device**
Indications for Use	The FLC Kappa kit is intended for the quantification of Kappa free light chains in human serum from adults with an Enzyme-Linked Immunosorbent Assay (ELISA) procedure. Measurement of free light chains aids in the diagnosis of multiple myeloma and AL amyloidosis. It must be used in conjunction with other laboratory and clinical findings. For *In Vitro* Diagnostic Use only.	Kappa: This kit is intended for the quantitation of kappa free light chains in serum and urine on the Siemens BN™ II. Measurement of free light chains aids in the diagnosis and monitoring of multiple myeloma, lymphocytic neoplasms, Waldenstrom's macroglobulinemia, AL amyloidosis, light chain deposition disease and connective tissue diseases such as systemic lupus erythematosus in conjunction with other laboratory and clinical findings.

	The FLC Lambda kit is intended for the quantification of Lambda free light chains in human serum from adults with an Enzyme-Linked Immunosorbent Assay (ELISA) procedure. Measurement of free light chains aids in the diagnosis of multiple myeloma and AL amyloidosis. It must be used in conjunction with other laboratory and clinical findings. For *In Vitro* Diagnostic Use only.	Lambda: This kit is intended for the quantitation of lambda free light chains in serum and urine on the Siemens BN™ II. Measurement of free light chains aids in the diagnosis and monitoring of multiple myeloma, lymphocytic neoplasms, Waldenstrom's macroglobulinemia, AL amyloidosis, light chain deposition disease and connective tissue diseases such as systemic lupus erythematosus in conjunction with other laboratory and clinical findings.
Specimen Type	Human Serum	Human Serum, Human Urine
Detection Method	Enzyme-Linked Immunosorbent Assay (ELISA)	Nephelometric
Detection Antibody	Kappa : Sandwich ELISA with polyclonal rabbit anti- human kappa free light chains coated on the well of the microplate (capture antibody) and polyclonal rabbit anti-human kappa light chain conjugated to horseradish peroxidase (HRP) (detection antibody) Lambda : Sandwich ELISA with polyclonal rabbit anti-human lambda free light chain coated on the well of the microplate (capture antibody) and polyclonal rabbit anti-human lambda light chain conjugated to horseradish peroxidase (HRP) (detection antibody)	Kappa: Polyclonal sheep anti-human kappa antibody coated with latex particles Lambda: Polyclonal sheep anti-human Lambda antibody coated with latex particles
Analytical Measuring ranges	Kappa Standard dilution (1/1000) 4.5 to 76.2 mg/L (dilution scheme 1/250 to 1/100 000) Lambda Standard dilution (1/1000) 3.8 to 66.8 mg/L (dilution scheme 1/250 to 1/100 000)	Kappa Standard dilution (1/100) 5.9 to 190 mg/L (dilution scheme 1/5 to 1/8000) Lambda Standard dilution (1/100) 5.0 to 160 mg/L (dilution scheme 1/5 to 1/8000)
Reference Interval	Kappa: 6.4 to 17.4 mg/L. Lambda: 8.4 to 21.8 mg/L. Ratio: 0.46 to 1.51	Kappa: 3.30 to 19.40 mg/L Lambda: 5.71 to 26.30 mg/L Ratio: 0.26-1.65

Calibrators:

Similarities		
Item	Candidate	Predicate
Reference Material	Internal Reference preparation	Same

Differences		
Item	Candidate	Predicate
Number of levels	5	One

5. PERFORMANCE DATA

a) Precision and Reproducibility

The precision and FLC Kappa and FLC Lambda assays were evaluated according to the CLSI EP05-A3 guideline.

Single-site reproducibility
Six different samples were tested using the FLC Kappa and FLC Lambda kits. The analyzed samples included 4 serum samples (samples S1 to S4) and 2 controls (samples C1 and C2). Each day, for 20 days, a unique operator analyzed the same samples (3 replicates / sample) on a microplate (2 runs with minimum 2 hours between the 2 runs) with 1 reagent lot (same microplate design each day), yielding a total of 120 results per sample.

The single-site reproducibility study is summarized in the following table including within-run, between runs, within-day, between-days and total reproducibility precision estimates (SD and %CV) for the free light chain concentrations (in mg/L).

FLC Kappa

Sample	Mean (mg/L)	Within-run		Between-runs		Within-day		Between-days		Total reproducibility (*) (Within-laboratory precision)	
		SD	CV	SD	CV	SD	CV	SD	CV	SD	CV
S1	39.2	1.47	3.8%	4.02	10.2%	4.28	10.9%	1.29	3.3%	4.47	11.4%
S2	6.3	0.41	6.6%	0.74	11.9%	0.85	13.6%	0.36	5.8%	0.92	14.8%
S3	14.4	0.54	3.7%	1.30	9.0%	1.40	9.7%	0.81	5.6%	1.62	11.2%
S4	62.0	2.89	4.7%	6.03	9.7%	6.69	10.8%	1.77	2.9%	6.92	11.2%
C1	11.5	0.67	5.8%	1.09	9.5%	1.28	11.2%	0.00	0.0%	1.28	11.2%
C2	42.2	1.64	3.9%	4.00	9.5%	4.32	10.2%	0.66	1.6%	4.37	10.4%

(*) Total reproducibility includes within-run, between-runs, within-day and between-days.

FLC Lambda

Sample	Mean (mg/L)	Within-run		Between-runs		Within-day		Between-days		Total reproducibility (*) (Within-laboratory precision)	
		SD	CV	SD	CV	SD	CV	SD	CV	SD	CV
S1	33.7	1.55	4.6%	2.67	7.9%	3.09	9.2%	1.61	4.8%	3.48	10.3%
S2	13.2	0.55	4.2%	0.96	7.3%	1.11	8.4%	0.63	4.8%	1.28	9.7%
S3	20.0	0.83	4.1%	1.25	6.2%	1.50	7.5%	0.74	3.7%	1.67	8.3%
S4	79.5	5.13	6.5%	5.15	6.5%	7.27	9.1%	6.91	8.7%	10.03	12.6%
C1	19.7	1.33	6.8%	1.40	7.1%	1.93	9.8%	0.00	0.0%	1.93	9.8%
C2	37.1	1.66	4.5%	2.76	7.5%	3.22	8.7%	1.55	4.2%	3.57	9.6%

(*) Total reproducibility includes within-run, between-runs, within-day and between-days.

Multi-operator reproducibility

Six different samples were tested using the FLC Kappa and FLC Lambda kits. The analyzed samples included 4 serum samples (samples S1 to S4) and 2 controls (samples C1 and C2). Each day, for 5 days, 3 operators analyzed the same samples (5 replicates / sample) on a microplate, with 1 reagent lot (same microplate design each day), yielding a total of 75 results per sample. The multi-operator reproducibility study is summarized in the following table including within-day, between-days, within-operator, between-operators and total reproducibility precision estimates (SD and %CV) for the free light chain concentrations (in mg/L).

FLC Kappa

Sample	Mean (mg/L)	Within-day		Between-days		Within-operator		Between-operators		Total reproducibility (*)	
		SD	CV	SD	CV	SD	CV	SD	CV	SD	CV
S1	44.1	2.49	5.7%	2.05	4.7%	3.23	7.3%	0.50	1.1%	3.27	7.4%
S2	6.8	0.46	6.8%	0.63	9.2%	0.78	11.4%	0.00	0.0%	0.78	11.4%
S3	15.7	0.72	4.6%	1.30	8.3%	1.49	9.5%	0.00	0.0%	1.49	9.5%
S4	67.9	3.52	5.2%	5.58	8.2%	6.60	9.7%	0.00	0.0%	6.60	9.7%
C1	12.7	1.25	9.9%	0.93	7.3%	1.56	12.3%	0.50	3.9%	1.64	12.9%
C2	44.8	1.95	4.3%	2.94	6.6%	3.53	7.9%	0.00	0.0%	3.53	7.9%

(*) Total reproducibility includes within-day, between-days, within-operator and between-operators.

FLC Lambda

Sample	Mean (mg/L)	Within-day		Between-days		Within-operator		Between-operators		Total reproducibility (*)	
		SD	CV	SD	CV	SD	CV	SD	CV	SD	CV
S1	35.4	2.70	7.6%	2.87	8.1%	3.94	11.1%	0.00	0.0%	3.94	11.1%
S2	13.4	0.87	6.5%	0.83	6.2%	1.20	9.0%	0.00	0.0%	1.20	9.0%
S3	21.1	0.98	4.6%	1.49	7.1%	1.79	8.5%	0.00	0.0%	1.79	8.5%
S4	81.5	5.88	7.2%	5.58	6.8%	8.11	10.0%	3.99	4.9%	9.03	11.1%
C1	20.7	1.59	7.7%	1.41	6.8%	2.13	10.3%	0.00	0.0%	2.13	10.3%
C2	37.1	2.09	5.6%	2.81	7.6%	3.51	9.4%	1.93	5.2%	4.00	10.8%

(*) Total reproducibility includes within-day, between-days, within-operator and between-operators.

Multi-lot reproducibility

Six different samples were tested using the FLC Kappa and FLC Lambda kits. The analyzed samples included 4 serum samples (samples S1 to S4), and 2 controls (samples C1 and C2). Each day, for 5 days, 1 operator analyzed the same samples (5 replicates / sample) on a microplate, with 3 reagent lots (1 microplate per reagent lot, same microplate design each day), yielding a total of 75 results per sample. The multi-lot reproducibility study is summarized in the following table including between-days, within day, between-lots, within-lot and total reproducibility precision estimates (SD and %CV) for the free light chain concentrations (in mg/L).

FLC Kappa

Sample	Mean (mg/L)	Between-days		Within-day		Between-lots		Within-lot		Total reproducibility (*)	
		SD	CV	SD	CV	SD	CV	SD	CV	SD	CV
S1	38.7	1.72	4.4%	2.00	5.2%	0.76	2.0%	2.64	6.8%	2.75	7.1%
S2	6.8	0.50	7.4%	0.36	5.3%	0.17	2.6%	0.62	9.1%	0.64	9.4%
S3	15.3	0.55	3.6%	0.50	3.3%	0.40	2.6%	0.74	4.9%	0.84	5.5%
S4	62.2	1.69	2.7%	3.59	5.8%	1.65	2.6%	3.96	6.4%	4.29	6.9%
C1	12.1	0.54	4.4%	0.86	7.1%	0.00	0.0%	1.01	8.3%	1.01	8.3%
C2	42.8	1.71	4.0%	1.96	4.6%	1.44	3.4%	2.60	6.1%	2.97	6.9%

(*) Total reproducibility includes between-days, within-day, between-lots and within-lot.

FLC Lambda

Sample	Mean (mg/L)	Between-days		Within-day		Between-lots		Within-lot		Total reproducibility (*)	
		SD	CV	SD	CV	SD	CV	SD	CV	SD	CV
S1	33.7	3.12	9.3%	2.91	8.6%	0.70	2.1%	4.27	12.7%	4.33	12.9%
S2	13.8	1.20	8.7%	1.14	8.3%	1.40	10.1%	1.66	12.0%	2.17	15.7%
S3	20.8	1.98	9.5%	0.99	4.8%	2.20	10.6%	2.21	10.7%	3.12	15.0%
S4	71.4	7.63	10.7%	5.71	8.0%	0.00	0.0%	9.53	13.4%	9.53	13.4%
C1	20.9	1.51	7.2%	1.70	8.2%	2.32	11.1%	2.27	10.9%	3.25	15.6%
C2	38.5	3.29	8.5%	1.84	4.8%	1.66	4.3%	3.77	9.8%	4.12	10.7%

(*) Total reproducibility includes between-days, within-day, between-lots and within-lot.

Multi-site reproducibility

Six different samples were tested using the FLC Kappa and the FLC Lambda kits. The analyzed samples included 4 serum samples (samples S1 to S4) and 2 controls (samples C1 and C2). Each day, for 5 days, 1 operator analyzed the same samples (1 dilution 1/1000, 5 replicates / sample) on a microplate with 1 reagent lot (same microplate design each day). The same protocol was followed by 2 other operators in 2 other laboratories with the same reagent lot.

The multi-sites reproducibility study is summarized in the following table including within-day, between-days, within-site, between-sites and total reproducibility precision estimates (SD and %CV) for the free light chain concentrations (in mg/L).

FLC Kappa

Sample	Mean (mg/L)	Between-days		Within-day		Between-sites		Within-site		Total reproducibility (*)	
		SD	CV	SD	CV	SD	CV	SD	CV	SD	CV
S1	6.2	0.39	6.3%	0.45	7.2%	0.00	0.0%	0.60	9.6%	0.60	9.6%
S2	15.0	1.48	9.9%	0.87	5.8%	0.00	0.0%	1.71	11.4%	1.71	11.4%
S3	32.5	2.76	8.5%	1.29	4.0%	1.48	4.5%	3.05	9.4%	3.38	10.4%
S4	71.9	5.78	8.0%	4.23	5.9%	2.86	4.0%	7.16	9.9%	7.71	10.7%
C1	13.8	0.70	5.0%	1.08	7.9%	1.69	12.2%	1.29	9.3%	2.12	15.4%
C2	57.2	2.68	4.7%	2.67	4.7%	3.79	6.6%	3.78	6.6%	5.36	9.4%

(*) Total reproducibility includes between-days, within-day, between-sites and within-site.

FLC Lambda

Sample	Mean (mg/L)	Between-days		Within-day		Between-sites		Within-site		Total reproducibility (*)	
		SD	CV	SD	CV	SD	CV	SD	CV	SD	CV
S1	11,4	0,91	8,0%	0,76	6,7%	0,51	4,5%	1,19	10,5%	1,30	11,4%
S2	20,7	1,62	7,8%	1,51	7,3%	1,12	5,4%	2,22	10,7%	2,48	12,0%
S3	31,3	3,39	10,8%	2,12	6,8%	1,87	6,0%	4,00	12,8%	4,42	14,1%
S4	68,8	6,13	8,9%	4,44	6,5%	4,81	7,0%	7,57	11,0%	8,97	13,0%
C1	24,2	2,27	9,4%	1,62	6,7%	2,40	9,9%	2,78	11,5%	3,68	15,2%
C2	50,1	5,81	11,6%	3,87	7,7%	2,83	5,7%	6,98	13,9%	7,53	15,1%

(*) Total reproducibility includes between-days, within-day, between-sites and within-site.

b) Linearity/assay

The linearity of the FLC Kappa and FLC Lambda kits was evaluated in a study based on the Clinical and Laboratory Standards Institute (CLSI – USA) EP06-ed2: 2020 guideline “Evaluation of the Linearity of Quantitative Measurement Procedures”.
The results for concentration (mg/L) of Kappa and Lambda free light chains were analyzed using statistical tools recommended by CLSI.

Three linearity panels at 1/1000 dilution were performed based on 3 different patient sample pools.

FLC Assay	Range Tested (mg/L)	Linear Regression	95% CI Slope	95% CI Y-Intercept	Claimed linear range
Kappa study N°1	[4.4; 81.7]	Y=1.009x -0.2967	[0.9534; 1.065]	[-0.88; 0.29]	[4.5mg/L; 76.2mg/L]
Kappa study N°2	[4.5; 79.9]	Y=1.016x -0.2014	[0.967; 1,065]	[-0.72; 0.32]	
Kappa study N°3	[3.5; 76.2]	Y=0.9332x + 0.4952	[0.8635; 1,003]	[-0.11; 1.10]	
Lambda study N°1	[3.8; 74.1]	Y=1.046x -1.537	[0.9389; 1.153]	[-2.52; -0.55]	[3.8mg/L; 66.8mg/L]
Lambda study N°2	[3.3; 77.7]	Y=0.9561x -0.62	[0.9299; 0.9823]	[-0.84; -0.40]	
Lambda study N°3	[3.5; 66.8]	Y=0.9611x -0.31	[0.8948; 1.027]	[-0.87; 0.25]	

The highest of the lower limit and the lowest of the higher limit found in the 3 linearity panels were taken.
The linearity of FLC Kappa kit at initial dilution 1/1000 is demonstrated between 4.5 mg/L and 76.2 mg/L.
The linearity of FLC Lambda kit at initial dilution 1/1000 is demonstrated between 3.8 mg/L and 66.8 mg/L.

c) Limit of Blank (LOB) / Limit of Detection (LOD) / Limit of Quantitation (LOQ)

The determination of the limit of detection (LOD) and of the limit of quantitation (LOQ) of the FLC Kappa kit was evaluated in a study based on the Clinical and Laboratory Standards Institute (CLSI - USA) EP17-A2 guideline "Evaluation of Detection Capability for Clinical Laboratory Measurement Procedures; Approved Guideline – Second Edition".

Due to the blank removal, the limit of blank (LOB) is considered as being 0 mg/L.

The LOD was determined by assaying 5 samples with low Kappa free light chains concentration: they were tested in two runs of four replicates over the course of seven days using two reagent lots (a total of 56 replicates per sample for each lot). The precision profile analysis was used to calculate the LOD. Since LOD values for the 2 lots are below the calibrator 1 values, the LOD value is considered as equal to the LOQ value.

The LOQ was determined by assaying 5 samples with low Kappa free light chains concentration: they were tested in two runs of four replicates over the course of seven days using two reagent lots (a total of 56 replicates per sample for each lot). The LoQ was defined to be the lowest concentration level that meets the within-laboratory imprecision of < 20% for each lot. Since LOQ values for the 2 lots are below the linearity study range, the LOQ value is considered to be equal to the concentration of the lower limit sample with the highest value among the 3 linearity panels.

The claimed LoB/LoD/LoQ for the FLC Kappa and FLC Lambda kits are as follows:

Kit	LOB	LOD	LOQ
FLC Kappa	0 mg/L	0.8 mg/L	4.5 mg/L
FLC Lambda	0 mg/L	1.1 mg/L	3.8 mg/L

d) Hook Effect (Antigen Excess)
No interference driven by the Hook effect was observed with the FLC Kappa and FLC Lambda kits.

e) Traceability
In the absence of an international reference standard, the calibration of the assay is traceable to an internally assigned master calibrator.

f) Analytical specificity

Biological Interferences:
The common interfering factors with the FLC Kappa and FLC Lambda kits (conjugated bilirubin, unconjugated bilirubin, total protein, hemoglobin, triglycerides and rheumatoid factor) were evaluated in studies based on the Clinical Laboratory Standards Institute (CLSI - USA) EP7-A2 guideline “Interference Testing in Clinical Chemistry; Approved Guideline - Second Edition” and the

Clinical Laboratory Standards Institute (CLSI -USA) EP07, 3rd Edition guideline “Interference Testing in Clinical Chemistry”. The results are summarized below.

No interference with the FLC Kappa and FLC Lambda kits was detected due to the serum sample’s high concentration of the following interfering factors tested at levels equal to the concentrations listed below:

Endogenous (Biological)	FLC Kappa	FLC Lambda
Conjugated bilirubin	66.6 mg/dL	66.6 mg/dL
Unconjugated bilirubin	40 mg/dL	40 mg/dL
Total Protein	150 g/L	150 g/L
Hemoglobin	10 g/L	10 g/L
Triglycerides	20 g/L	20 g/L
Rheumatoid Factor	2000 IU/mL	250 IU/mL

Drug Interferences:
The common interfering factors with the FLC Kappa and FLC Lambda kits (melphalan, dexamethazon daratumumab, bortezomib, lenalidomide, pomalidomide, carfilzomib, isatuximab) were evaluated in studies based on the Clinical Laboratory Standards Institute (CLSI - USA) EP7-A2 guideline “Interference Testing in Clinical Chemistry; Approved Guideline - Second Edition” and Clinical Laboratory Standards Institute (CLSI - USA) EP07, 3rd Edition guideline “Interference Testing in Clinical Chemistry”. The results are summarized below.
No interference with the FLC Lambda kit was detected due to the serum sample’s high concentration of the following interfering factors tested at levels equal to the concentrations listed below:

Drug	FLC Kappa	FLC Lambda
Melphalan	4 mg/L	4 mg/L
Dexamethazon	12 mg/L	12 mg/L
Daratumumab	1 g/L	1 g/L
Bortezomib	2 mg/L	2 mg/L
Lenalidomide	4 mg/L	4 mg/L
Pomalidomide	1 mg/L	1 mg/L
Carfilzomib	1 mg/L	1 mg/L
Isatuximab	1 g/L	1 g/L

g) Stability

Shelf-life, in-use studies were conducted using the FLC Kappa and FLC Lambda kits and FLC controls Level 1 and Level 2. All results met stability acceptance criteria and product stability claims as listed in the tables below:

Stability of Kit (FLC Kappa and FLC Lambda)

Kit	Shelf Life	In-use
FLC Kappa	9 months at 2 - 8 °C	5 uses within 1 month and 15 cumulative hours maximum at room temperature (19-25°C)
FLC Lambda	9 months at 2 - 8 °C	5 uses within 1 month and 15 cumulative hours maximum at room temperature (19-25°C)

h) Expected values/ Reference range

The reference range intervals for the FLC Kappa and FLC Lambda kits were performed following the CLSI EP28-A3c, “Defining, Establishing, and Verifying Reference Intervals in the Clinical Laboratory’.

The studies were performed using a total of 238 apparently healthy adults (US-population). For Kappa free light chain concentration and Lambda free light chain concentration, the reference intervals were calculated nonparametrically and represent the central 95% range of the population, with a 95% confidence level:

Kappa free light chain concentration: 6.4 – 17.4 mg/L
Lambda free light chain concentration: 8.4 – 21.8 mg/L

For the [Kappa free light chain] / [Lambda free light chain] ratio, the reference interval represents 100% of the samples:
[Kappa free light chain] / [Lambda free light chain] ratio: 0.46 - 1.51

The Package insert states*:” It is recommended each laboratory establish its own reference values.”*

i) Comparison studies

Serum samples were tested with the Sebia FLC Kappa and FLC Lambda kits and results were compared to the predicate device. The 222 serum samples were tested spanning the dynamic range of one or both assays used in this study performed in the USA.

Quantitative comparison

The FLC Kappa and FLC Lambda kits was evaluated in a study based on the Clinical and Laboratory Standards Institute (CLSI - USA) EP09-A3 guideline "Measurement Procedure Comparison and Bias Estimation Using Patient Samples; Approved Guideline – Third Edition". The results for Kappa and Lambda free light chain concentrations (mg/L) were analyzed using statistical tools recommended by CLSI.

The levels of Kappa free light chains were measured in 216 serum samples with normal and abnormal Kappa free light chain concentration. The measured values for Kappa free light chain concentrations from both procedures were analyzed by a weighted Deming regression analysis. The results of the regression analysis are tabulated below (y = FLC Kappa):

Kit	N	Sample Range Sebia FLC mg/L	Slope	95% CI (Slope)	Y-Intercept	95% CI (Y-Intercept)	R^2
FLC Kappa	216	1.0-1947.0	0.557	0.5125-0.6021	0.912	0.752-1.072	0.917

The levels of Lambda free light chains were measured in 221 serum samples with normal and abnormal Lambda free light chain concentration. The measured values for Lambda free light chain concentrations from both procedures were analyzed by a weighted Deming regression analysis. The results of the regression analysis are tabulated below (y = FLC Lambda):

Kit	N	Sample Range Sebia FLC mg/L	Slope	95% CI (Slope)	Y-Intercept	95% CI (Y-Intercept)	R^2
FLC Lambda	221	1.6-860.4	0.608	0.5224-0.6937	2.243	1.149-3.337	0.749

Qualitative comparison

[Kappa free light chain] / [Lambda free light chain] ratio ([Kappa FLC] / [Lambda FLC] ratio)
The levels of Kappa free light chains and Lambda free light chains were measured in 216 serum samples using the FLC Kappa and the FLC Lambda kits and a commercially available nephelometric technique (reference), for the calculation of the [Kappa FLC] / [Lambda FLC] ratio of each sample.

The positive percent agreement (PPA) and negative percent agreement (NPA) of the FLC Kappa and FLC Lambda kits compared to the commercially available nephelometric technique have been calculated. The results are tabulated below:

	Range of values FLC Kappa / Lambda Ratio	Positive Percent Agreement (%)	Negative Percent Agreement (%)
Kappa free light chain / Lambda free light chain Ratio	0,00 - 671,38	82,3	89,3

j) Clinical Study
Diagnosis of multiple myeloma and AL amyloidosis
A total of 510 samples were included in the clinical study for FLC Kappa and FLC Lambda assays. This study included 177 samples from patients diagnosed with multiple myeloma and 144 samples from patients diagnosed with AL amyloidosis, and 189 non-myeloma/non-amyloidosis subjects with various clinical conditions.
The levels of Kappa free light chains and Lambda free light chains were measured in the serum samples using the FLC Kappa and the FLC Lambda kits for the calculation of the [Kappa FLC] / [Lambda FLC] ratio of each sample.

The clinical sensitivity calculated using [Kappa FLC] / [Lambda FLC] ratio for the clinical diagnosis of Multiple Myeloma (n=366) is as follows:

		Clinical diagnosis of Multiple Myeloma		
		Positive	Negative	Total
Sebia FLC Kappa and Lambda ratio	Positive	171	28	199
	Negative	6	161	167
	Total	177	189	366

Clinical sensitivity: 96.6% (95% confidence interval: 94.0% to 99.3%)
Clinical specificity: 85.1% (95% confidence interval: 79.4% to 89.5%)

The Clinical sensitivity using [Kappa FLC] / [Lambda FLC] ratio for the clinical diagnosis of AL Amyloidosis (n=333) is as follows:

		Clinical diagnosis of AL Amyloidosis		
		Positive	Negative	Total
Sebia FLC Kappa and Lambda ratio	Positive	131	28	159
	Negative	13	161	174
	Total	144	189	333

Clinical sensitivity: 91.0% (95% confidence interval: 86.3% to 95.7%)
Clinical specificity: 85.1% (95% confidence interval: 79.4% to 89.5%)

7. CONCLUSION

The submitted information in this premarket notification is complete and supports a substantial equivalence decision.