November 17, 2017
Siemens Healthcare Diagnostics Products GmbH
Christine Perkins
Regulatory Specialist
Emil-von-Behring-Str. 76
Marburg, DE 35041

Re: K171742
Trade/Device Name: N Latex FLC kappa assay, N Latex FLC Lambda assay, N FLC Standard SL, N FLC Control SL1 & SL2
Regulation Number: 21 CFR 866.5550
Regulation Name: Immunoglobulin (light chain specific) immunological test system
Regulatory Class: Class II
Product Code: DFH, DEH
Dated: October 19, 2017
Received: October 20, 2017

Dear Christine Perkins:

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. 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); good manufacturing practice requirements as set forth in the quality systems (QS) regulation (21 CFR

Part 820); 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 the CDRH's Office of Surveillance and Biometrics/Division of Postmarket Surveillance.

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,

Kelly Oliner

For,
Lea Carrington
Director
Division of Immunology
and Hematology 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: 06/30/2020
See PRA Statement below.

510(k) Number *(if known)*
K171742

Device Name
N Latex FLC kappa, N Latex FLC lambda; N FLC Standard SL; N FLC Control SL1 and SL2

Indications for Use *(Describe)*
N Latex FLC kappa and lambda assays:

In-vitro diagnostic reagents for the quantitative determination of free light chains (FLC), type kappa or type lambda, in human serum and EDTA plasma by means of particle-enhanced immunonephelometry using the BN Systems. FLC measurements are used as an aid in the diagnosis of multiple myeloma (MM) and amyloidosis (AL).
N FLC Supplementary Reagent:

Supplementary reagent for the immunonephelometric determination of free light chains (FLC), type kappa and type lambda on BN Systems.
A mixture of both supplementary reagents is used to suppress interference by rheumatoid factors and human anti-mouse antibodies (HAMA).
N FLC Standard SL:

Establishment of reference curves for the determination of free light chains (FLC), type kappa and type lambda on the BN Systems.
N FLC Controls SL1 and SL2:

The N FLC Controls SL1 and SL2 are for use as assayed accuracy controls and precision controls in the determination of free light chains (FLC), type kappa and type lambda by immunonephelometry with the BN 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.

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510(k) Summary per 21 CFR 807.92

This 510(k) Summary of Safety and Effectiveness is being submitted in accordance with the requirements of the Safe Medical Device Act of 1990 and 21 CFR 807.92.

The assigned 510(k) number is: ____K171742_____

5.1 Submitter

Siemens Healthcare Diagnostics Products GmbH
Emil-von-Behring-Str. 76
35041 Marburg, Germany

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Fax:	302-631-6299
Date of Preparation:	November 14, 2017

5.2 Device Information

Trade Name:	N Latex FLC kappa assay N Latex FLC lambda assay
Common or Usual Name:	Light Chain immunological test system
Classification Name:	Immunoglobulin (light chain specific) immunological test system per 21CFR 866.5550
Product Code:	DFH (kappa) DEH (lambda)
Regulatory Class:	II
510(k) Review Panel:	Clinical Immunology (82)
Trade Name:	N FLC Standard SL
Common or Usual Name:	Calibrator, Multi-Analyte Mixture per 21 CFR 862.1150
Product Code:	JIX

Regulatory Class:	II
510(k) Review Panel:	Clinical Chemistry (82)
Trade Name:	N FLC Control SL1 & SL2
Common or Usual Name:	Multi-Analyte Controls per 21 CFR 862.1660
Product Code:	JJY
Regulatory Class:	I
510(k) Panel:	Clinical Chemistry (82)

5.3 Predicate Devices

The Binding Site Freelite® Human Kappa Free Kit for use on the Siemens BN™ II - K031016

The Binding Site Freelite® Human Lambda Free Kit for use on the Siemens BN™ II - K031016

5.4 Device Description / Test Principle

The N Latex FLC (free light chain) assays are *in vitro* diagnostic reagents for the quantitative determination of free light chains, type kappa or type lambda, in human serum and EDTA plasma by means of particle-enhanced immunonephelometry using the BN™ II and BN ProSpec® Systems. Used in conjunction with other clinical and laboratory findings, FLC measurements are used as an aid in the diagnosis of multiple myeloma (MM) and amyloidosis (AL).

Used in conjunction with the assay reagents, N FLC Standard SL is for use in the establishment of reference curves for the determination of free light chains, type kappa and type lambda on the BN™ II and BN ProSpec® Systems. The N FLC Control SL 1 and 2 products are for use as assayed accuracy controls and precision controls in the determination of free light chains, type kappa and type lambda by immunonephelometry with the BN™ II and BN ProSpec® Systems.

The FLC test systems are based upon the principles of particle-enhanced immunonephelometry. Polystyrene particles coated with monoclonal antibodies to human free light chains, type kappa or lambda, respectively, are agglutinated when mixed with samples containing FLC. These aggregates scatter a beam of light passed through the sample. The intensity of the scattered light is proportional to the concentration of the respective protein in the sample. The result is evaluated by comparison with a standard of known concentration.

5.5 Intended Use / Indications for Use

N Latex FLC kappa and N Latex FLC lambda assays

In-vitro diagnostic reagents for the quantitative determination of free light chains (FLC), type kappa or type lambda in human serum and EDTA-plasma by means of particle-enhanced immunonephelometry using the BN Systems. FLC measurements are used as an aid in the diagnosis of multiple myeloma (MM) and amyloidosis (AL).

N FLC Supplementary Reagent

Supplementary reagent for the immunonephelometric determination of free light chains (FLC), type kappa and type lambda on BN Systems. A mixture of both supplementary reagents is used to suppress interference by rheumatoid factors and human anti-mouse antibodies (HAMA).

N FLC Standard SL

Establishment of reference curves for the determination of free light chains (FLC), type kappa and type lambda on the BN Systems.

N FLC Control SL1 and SL2

The N FLC Controls SL1 and SL2 are for use as assayed accuracy controls and precision controls in the determination of free light chains (FLC), type kappa and type lambda by immunonephelometry with the BN Systems.

Special Conditions for Use:

For prescription use only.

Special instrument requirements:

BN II (K943997) and BN ProSpec Systems (K001647)

Comparison of Technological Characteristics

	Siemens Healthcare N Latex FLC kappa N Latex FLC lambda	**Binding Site Predicate Device** Freelite® Human Kappa Free and Freelite® Human Lambda Free kits on the Siemens BN™II K031016
Indications for Use	*In-vitro* diagnostic reagents for the quantitative determination of free light chains (FLC), type kappa or type lambda, in human serum and EDTA plasma by means of particle-enhanced immunonephelometry using the BN Systems. FLC measurements are used as an aid in the diagnosis of multiple myeloma (MM) and amyloidosis (AL).	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. 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.
Sample Type	Human serum and EDTA plasma	Human serum and urine
Technology	Nephelometry Polystyrene particles coated with monoclonal antibodies	Nephelometry Polystyrene particles coated with polyclonal antibodies
Instrument System	Siemens BN II and BN ProSpec Systems	Siemens BN II
Analytical measuring range (Calibrator lot dependent)	kappa: 3.4 to 110 mg/L lambda: 1.9 to 60 mg/L	Kappa: 5.9 to 190 mg/L Lambda: 5.0 to 160 mg/L
Reference Interval	kappa: 8.24 – 28.90 mg/L lambda: 9.10 – 32.60 mg/L Ratio: 0.53 to 1.51	Kappa: 3.30 to 19.40 mg/L Lambda: 5.71 to 26.30 mg/L Ratio: 0.26 to 1.65

Comparison of Calibrators

	New Device N FLC Standard SL for the BN Systems	**Predicate Device** Human Kappa Free Standard Human Lambda Free Standard K031016
Indications for Use	Establishment of reference curves for the determination of free light chains (FLC), type kappa and type lambda on the BN Systems.	Used for the establishment of reference curves for the determination of Freelite® Kappa and Lambda light chains on the BN II System.
Matrix	Consists of a stabilized liquid containing human free light chain proteins, human serum albumin and protease inhibitors. Contains sodium azide (<1 g/L) as a preservative.	Consists of human sera that contain kappa free light chain and lambda free light chain respectively. They are supplied in a stabilized liquid form and contain 0.099% sodium azide, 0.1% E-amino-n-caproic acid (EACA) and 0.01% benzamidine as preservatives.
Volume	3 x 1.0 mL	2 x 1.0 mL
Number of levels	One	One
Analytical Values (Control lot dependent)	kappa: 22 mg/L lambda: 32 mg/L	Kappa: 19.99 mg/L Lambda: 16.21 mg/L
Reference material	Internal reference preparation	Internal reference preparation

Comparison of Controls

	New Device N FLC Control SL1 N FLC Control SL2	**Predicate Device** Human Kappa Free Control, Human Kappa Free High Control Human Lambda Free Control, Human Lambda Free High Control K031016
Indications for Use	The N FLC Controls SL1 and SL2 are for use as assayed accuracy controls and precision controls in the determination of free light chains (FLC), type kappa and type lambda by immunonephelometry with the BN Systems.	Used as quality controls for the Freelite® Kappa and Lambda assays on the Siemens BN II
Matrix	Controls are stabilized liquids containing human free light chain proteins, human serum albumin and protease inhibitors. The concentration of the free light chains (FLC), type kappa and type lambda is calibrated against standard preparations and is lot-dependent. The controls contain sodium azide (<1 g/L) as a preservative.	Controls consist of human sera that contain kappa free light and lambda free light chain. They are supplied in a stabilized liquid form and contain 0.099% sodium azide, 0.1% E-amino-n-caproic acid (EACA) and 0.01% benzamidine as preservatives.
Volume	SL1: 3 vials x 1.0 mL SL2: 3 vials x 1.0 mL	1 vial x 1.5 mL for each level of control: 2 levels of Kappa Free controls 2 levels of Lambda Free controls
Assigned Values (lot dependent)	Level 1: kappa: 13 mg/L lambda: 13 mg/L Level 2: kappa: 32 mg/L lambda: 32 mg/L	Human Kappa Free Control: 14.90 mg/L Human Kappa Free High Control: 30.10 mg/L Human Lambda Free Control: 27.7 mg/L Human Lambda Free High Control: 55.10 mg/L

The differences between the predicate devices and proposed reagents, calibrators and controls do not result in a change to the intended use, the indications for use, or the safety and efficacy when used according to the product labeling.

5.6 Performance Data

The following performance data were provided in support of the substantial equivalence determination.

5.6.1 Analytical Performance

5.6.1.1 Precision and Reproducibility

The precision of the N Latex FLC kappa and N Latex FLC lambda FLC assays were evaluated according to Clinical and Laboratory Standards Institute EP05-A3 guideline. Serum samples were obtained from commercial sources and samples with values close to normal, abnormal and very abnormal analyte levels were pooled to achieve target concentrations spanning the linear range of each FLC assay. In the study, the tests were performed on three levels of serum specimens (S1 – S3), and two levels of controls (C1, C2). These specimens included one sample within 25% of the cutoff/upper limit of normal for FLC kappa and FLC lambda. Testing was performed on three BN II and three BN ProSpec® instruments with two replicates per run, two runs per day using three lots of the assay-specific reagents. The precision data was analyzed according to three-way nested ANOVA and the results of mean (mg/L) and Coefficient of Variation [CV (%)] are summarized below:

N Latex FLC: One lot of assay-specific reagents on three BN II instruments

ID	Mean (mg/L)	Within-Run		Between-Run		Between-Day		Between-Instrument		Total Precision	
		SD[a] (mg/L)	CV[b] (%)	SD (mg/L)	CV (%)	SD (mg/L)	CV (%)	SD (mg/L)	CV (%)	SD (mg/L)	CV (%)
kappa											
S1	11.43	0.20	1.75	0.20	1.74	0.07	0.58	0.27	2.34	0.39	3.45
S2	25.54	0.43	1.68	0.32	1.26	0.23	0.88	0.52	2.04	0.78	3.06
S3	81.31	1.91	2.35	1.28	1.58	1.84	2.26	0.95	1.17	3.10	3.81
C1	14.60	0.32	2.17	0.20	1.39	0.21	1.41	0.51	3.47	0.66	4.55
C2	37.49	0.64	1.71	0.62	1.66	0.61	1.62	0.57	1.52	1.22	3.26
lambda											
S1	10.91	0.17	1.59	0.36	3.27	0.00	0.00	0.47	4.27	0.61	5.60
S2	27.84	0.35	1.24	0.51	1.85	0.22	0.79	1.72	6.18	1.84	6.61
S3	44.46	0.66	1.49	0.68	1.52	0.29	0.66	2.90	6.52	3.06	6.89
C1	13.83	0.23	1.65	0.29	2.09	0.20	1.44	0.56	4.07	0.70	5.07
C2	37.70	0.45	1.20	0.78	2.07	0.66	1.74	2.33	6.18	2.58	6.85

[a] Standard deviation

[b] Coefficient of variation

N Latex FLC: One lot of assay-specific reagents on three BN ProSpec® instruments

ID	Mean (mg/L)	Within-Run		Between-Run		Between-Day		Between-Instrument		Total Precision	
		SD[c] (mg/L)	CV[d] (%)	SD (mg/L)	CV (%)	SD (mg/L)	CV (%)	SD (mg/L)	CV (%)	SD (mg/L)	CV (%)
kappa											
S1	11.03	0.27	2.47	0.00	0.00	0.09	0.80	0.50	4.56	0.58	5.24
S2	25.05	0.47	1.88	0.27	1.08	0.09	0.37	1.21	4.84	1.33	5.32
S3	79.04	1.78	2.25	1.84	2.33	0.00	0.00	5.50	6.96	6.07	7.68
C1	14.19	0.39	2.78	0.22	1.55	0.13	0.94	0.57	4.03	0.74	5.22
C2	36.33	0.70	1.92	0.87	2.39	0.00	0.00	1.69	4.66	2.03	5.58
lambda											
S1	10.87	0.27	2.52	0.00	0.00	0.12	1.12	0.36	3.27	0.47	4.28
S2	27.27	0.67	2.46	0.29	1.05	0.00	0.00	0.76	2.78	1.05	3.86
S3	44.69	0.96	2.15	0.64	1.43	0.00	0.00	1.76	3.84	2.11	4.71
C1	13.82	0.27	1.94	0.27	1.97	0.00	0.00	0.23	1.64	0.44	3.22
C2	37.09	0.69	1.87	0.79	2.14	0.00	0.00	0.15	0.41	1.07	2.87

[c] Standard deviation

[d] Coefficient of variation

N Latex FLC: Three lots of assay-specific reagents on one BN II instrument

ID	Mean (mg/L)	Within-Run		Between-Run		Between-Day		Between-Lot		Total Precision	
		SD[e] (mg/L)	CV[f] (%)	SD (mg/L)	CV (%)	SD (mg/L)	CV (%)	SD (mg/L)	CV (%)	SD (mg/L)	CV (%)
kappa											
S1	11.66	0.17	1.49	0.17	1.44	0.04	0.30	0.70	5.99	0.74	6.35
S2	25.91	0.38	1.46	0.34	1.32	0.00	0.00	0.90	3.48	1.04	4.00
S3	82.35	1.51	1.84	1.87	2.27	0.98	1.19	3.52	4.27	4.37	5.31
C1	14.39	0.23	1.62	0.09	0.62	0.00	0.00	0.61	4.21	0.66	4.55
C2	37.40	0.47	1.26	0.60	1.59	0.00	0.00	1.95	5.20	2.09	5.58
lambda											
S1	10.30	0.14	1.37	0.143	1.39	0.11	1.02	0.85	8.25	0.879	8.54
S2	26.35	0.34	1.30	0.32	1.23	0.14	0.52	1.55	5.90	1.63	6.19
S3	41.59	0.65	1.57	0.29	0.70	0.46	1.10	3.83	9.22	3.93	9.44
C1	13.07	0.22	1.70	0.25	1.88	0.00	0.00	0.87	6.63	0.93	7.10
C2	35.13	0.42	1.18	0.68	1.93	0.00	0.00	2.06	5.88	2.21	6.30

[e] Standard deviation

[f] Coefficient of variation

N Latex FLC: Three lots of assay-specific reagents on one BN ProSpec® instrument

ID	Mean (mg/L)	Within-Run		Between-Run		Between-Day		Between-Lot		Total Precision	
		SD[g] (mg/L)	CV[h] (%)	SD (mg/L)	CV (%)	SD (mg/L)	CV (%)	SD (mg/L)	CV (%)	SD (mg/L)	CV (%)
kappa											
S1	11.18	0.34	2.92	0.00	0.00	0.15	1.26	0.85	7.20	0.93	7.87
S2	26.15	0.60	2.29	0.31	1.18	0.00	0.00	1.19	4.55	1.37	5.23
S3	81.79	1.94	2.37	1.76	2.15	0.00	0.00	5.44	6.66	6.04	7.39
C1	14.88	0.43	2.87	0.45	3.01	0.00	0.00	0.89	6.00	1.09	7.30
C2	37.93	0.70	1.85	1.12	2.96	0.00	0.00	2.22	5.85	2.58	6.81
lambda											
S1	10.79	0.363	3.36	0.000	0.00	0.140	1.30	0.766	7.10	0.86	7.97
S2	27.24	0.64	2.34	0.62	2.27	0.00	0.00	0.83	3.06	1.22	4.47
S3	44.11	1.02	2.30	0.79	1.79	0.00	0.00	3.09	7.01	3.35	7.59
C1	13.89	0.24	1.71	0.40	2.90	0.00	0.00	0.65	4.67	0.80	5.76
C2	37.12	0.68	1.83	1.29	3.48	0.00	0.00	0.97	2.61	1.75	4.72

[g] Standard deviation

[h] Coefficient of variation

5.6.1.2 Measuring range (Linearity and LoQ)

The linearity studies were performed according to CLSI EP06-A: 2003, *Evaluation of the Linearity of Quantitative Measurement Procedures: A Statistical Approach*; Approved Guideline.
A test specimen was diluted serially in kappa or lambda depleted plasma or serum to yield a minimum of 9 levels within the claimed measuring range of the assay. Serum and EDTA plasma specimens from four healthy donors from Sanquin blood bank (one donor each for kappa EDTA plasma and serum and one donor each for lambda EDTA plasma and serum) were spiked with purified polyclonal FLC kappa and FLC lambda and subsequently diluted with FLC depleted plasma until concentrations of FLC kappa and lambda were below the initial measuring range. The diluted samples were measured in three independent measurements.

Limit of Quantitation studies were performed in accordance with CLSI EP17-A2: 2012, *Evaluation of Detection Capability for Clinical Laboratory Measurement Procedures*.

Five individual serum samples with very low concentrations of FLC kappa and five individual samples with very low concentrations of FLC lambda were diluted with PBS

containing 1% human serum albumin (HSA) to a kappa concentration of 0.19 mg/L and lambda concentration of 0.52 mg/L.
The samples were run 10 times on two lots of reagents, on two systems to obtain the concentration for FLC kappa and FLC lambda.

Aliquoted samples were tested twice on two different systems, BN II and BN ProSpec, using two different FLC kappa and FLC lambda reagent lots, on three consecutive days. The systems were programmed to run the samples at the lowest possible dilution of 1:5 for each assay to obtain results low enough for determination of the LoQ.

A typical LoQ for N Latex FLC kappa of 0.195 mg/L with a total error of 10.57 % and a typical LoQ for N Latex FLC lambda of 0.532 mg/L with a total error of 10.01 % was determined.

Linearity data and LoQ studies support Siemens' claim that the measuring range of the N Latex FLC assays are:

- FLC kappa, 3.4 to 110 mg/L
- FLC lambda, 1.9 to 60 mg/L

5.6.1.3 High Dose Hook Effect (Antigen Excess)

Serum samples with high concentrations of FLC kappa and FLC lambda were manually diluted until the concentrations of the samples were at the low end of the initial measuring range. The results of the dilutions are compared to the upper limit of the calibration curve. When pre-reaction bit values (signals) for either assay are higher than the bit value of the upper end of the calibration curve, on either instrument, a new dilution and measurement are started automatically by the system.

Due to the built-in pre-reaction protocols on BN II and BN ProSpec, no hook effect was observed as false negatives when samples up to 27,100 mg/L for FLC kappa and up to 57,300 mg/L for FLC lambda were tested.

5.6.1.6 Specificity

The N Latex FLC kappa and lambda assays were evaluated for interference on BN Systems according to CLSI guideline EP7-A210. Following concentrations of listed endogenous and exogenous substances were found to cause no interference up to the indicated concentrations:

Interferent	No Interference up to...
Acetamidophenol	1 324 µmol/L
Acetylsalicylic acid	3.62 µmol/L
Amikacin	136.8 µmol/L
Aminophylline Hydrate (Theophylline)	222 µmol/L
Ascorbic acid	342 µmol/L
Bilirubin conjugated	1 025 µmol/L
Bilirubin unconjugated	618 µmol/L
Caffeine	308 µmol/L
Carbamazepine	127 µmol/L
Chloramphenicol	155 µmol/L
Chlordiazepoxide	33.3 µmol/L
Chlorpromazine	6.3 µmol/L
Cimetidine	79.2 µmol/L
Creatinine	5 mg/dL
Dexamethasone	1.53 µmol/L
Dextran	60 g/L
Dextropropoxyphene	4.91 µmol/L
Diazepam	18 µmol/L
Digoxin	7.8 nmol/L
Erythromycin	81.6 µmol/L
Ethanol	100 mg/dL
Ethosuximide	1 770 µmol/L
Furosemide	181 µmol/L
Gentamicin	21 µmol/L
Hemoglobin	10 g/L
Heparin Ammonium Salt	3 000 U/L
Heparin Lithium Salt	3 000 U/L
Heparin Sodium Salt	3 000 U/L
Ibuprofen	2 425 µmol/L
Lidocaine	51.2 µmol/L
Lithium Chloride	3.2 mmol/L
Melphalan	4 000 ng/mL
Nicotine	6.2 µmol/L

Interferent	No Interference up to...
Penicillin	161 µmol/L
Pentobarbital	431 µmol/L
Phenytoin	198 µmol/L
Primidone	183 µmol/L
RF	2 000 IU/mL
Total Protein	143 g/L
Triglycerides	5 g/L
Urea	42.9 mmol/L
Uric acid	1.4 mmol/L
Valproic acid	3 467 µmol/L

5.7 Clinical Studies

5.7.1 Expected values / Reference interval

A reference interval study for N Latex FLC kappa and N Latex FLC assay was performed according to CLSI EP28-A3C, '*Defining, Establishing, and Verifying Reference Intervals in the Clinical Laboratory*'.

The reference intervals were determined from a US-population of 201 apparently healthy subjects. The reference intervals were calculated non-parametrically and represent the central 95 % range of the population.

The following reference intervals apply for serum and plasma samples from healthy adults:

	2.5th-97.5th percentile
FLC kappa	8.24–28.9 mg/L
FLC lambda	9.10–32.6 mg/L

The calculation of the κ/λ ratios resulted in 0.88 (0.53 to 1.51) (median, 1.0st – 99.0th percentile).

The sponsor recommends that each laboratory should determine its own reference intervals since values may vary depending on the individual population studied.

5.7.2 Clinical Sensitivity and Specificity

A total of 342 samples were included in the clinical validation study for the N Latex FLC kappa and lambda assay. This validation set included 96 samples from Multiple Myeloma patients, 83 samples from AL Amyloidosis patients and 163 samples from non-myeloma patients with various clinical conditions: 24 polyclonal immunoglobulin stimulation; 16 Chronic Kidney Disease (CKD) and 123 other clinical conditions.

Clinical sensitivity and specificity summary of the N Latex FLC kappa and lambda ratio for Multiple Myeloma are shown in the table below:

		Clinical Diagnosis of Multiple Myeloma		
		Positive	**Negative**	**Total**
N Latex FLC kappa and lambda ratio	Positive	92	5	97
	Negative	4	158	162
	Total	96	163	259

Clinical Sensitivity: 95.8 % (95 % Confidence Interval: 89.8 to 98.4 %)
Clinical Specificity: 96.9 % (95 % Confidence Interval: 93.0 to 98.7 %)

Clinical sensitivity and specificity summary of the N Latex FLC kappa and lambda ratio for AL Amyloidosis are shown in the table below:

		Clinical Diagnosis of Amyloidosis		
		Positive	**Negative**	**Total**
N Latex FLC kappa and lambda ratio	Positive	69	5	74
	Negative	14	158	172
	Total	83	163	246

Clinical Sensitivity: 83.1 % (95 % Confidence Interval: 73.7 to 89.7 %)
Clinical Specificity: 96.9 % (95 % Confidence Interval: 93.0 to 98.7 %)

5.7.3 Method comparison with predicate device

152 serum samples from patients with monoclonal gammopathy were assayed by immunofixation (IFE), with N Latex FLC and in parallel with another commercially available particle-enhanced immunonephelometric method (comparison method).

N Latex FLC kappa versus Comparison Method

Comparison Method ⇒ / N Latex FLC kappa ⇓	< 3.3 mg/L	3.3 - 19.4 mg/L	> 19.4 mg/L	total N
< 8.24 mg/L	6	11	0	17
8.24 - 28.9 mg/L	3	23	6	32
> 28.9 mg/L	0	1	102	103
total N	9	35	108	152

overall agreement rate: 131 / 152 = 86.2 %

N Latex FLC lambda versus Comparison Method

Comparison Method ⇒ / N Latex FLC lambda ⇓	< 5.7 mg/L	5.7 - 26.3 mg/L	> 26.3 mg/L	total N
< 9.10 mg/L	16	10	0	26
9.10 - 32.6 mg/L	6	23	2	31
> 32.6 mg/L	0	10	85	95
total N	22	43	87	152

overall agreement rate: 124 / 152 = 81.6 %

5.8 Proposed Labeling

The labeling is adequate and satisfies requirements of 21 CFR Part 809.10.

5.9 Traceability

5.9.1 N FLC Standard SL

Calibration of the assay is traceable to an internal master calibrator; there is no international standard reference material.

5.9.2 N FLC Control SL1 and SL2

N FLC Controls are traceable to the master calibrator.