June 26, 2020

Horiba ABX SAS
Caroline Ferrer
Regulatory Affairs Manager
Parc Euromedecine, Rue du Caducee BP7290
Montpellier Cedex 4, 341184
France

Re: K193525
Trade/Device Name: Yumizen C1200 Immunoglobulin A, Yumizen C1200 Immunoglobulin G, Yumizen C1200 Immunoglobulin M
Regulation Number: 21 CFR 866.5510
Regulation Name: Immunoglobulins A, G, M, D, and E immunological test system
Regulatory Class: Class II
Product Code: CZP, DEW, CFN
Dated: December 17, 2019
Received: December 19, 2019

Dear Caroline Ferrer:

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 (Katelin) Mao, Ph.D
Acting Chief
Division of Immunology
and Hematology Devices
OHT7: Office of In Vitro Diagnostics
and Radiological Health
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: 06/30/2020
See PRA Statement below.

510(k) Number *(if known)*
K193525

Device Name
Yumizen C1200 Immunoglobulin A
Yumizen C1200 Immunoglobuline G
Yumizen C1200 Immunoglobulin M

Indications for Use *(Describe)*

Yumizen C1200 Immunoglobulin A reagent is intended for the quantitative in vitro diagnostic determination of Immunoglobulin A (IgA) in serum and lithium heparin plasma by immunoturbidimetry on Yumizen analyzers.Measurement of this immunoglobulin aids in the diagnosis of abnormal protein metabolism and the body's lack of ability to resist infectious agents.This test should be used in conjunction with other laboratory and clinical findings.

Yumizen C1200 Immunoglobulin G reagent is intended for the quantitative in vitro diagnostic determination of Immunoglobulin G (IgG) in serum and lithium heparin plasma by immunoturbidimetry on Yumizen analyzers.Measurement of this immunoglobulin aids in the diagnosis of abnormal protein metabolism and the body's lack of ability to resist infectious agents.This test should be used in conjunction with other laboratory and clinical findings.

Yumizen C1200 Immunoglobulin M reagent is intended for the quantitative in vitro diagnostic determination of Immunoglobulin M (IgM) in serum and lithium heparin plasma by immunoturbidimetry on Yumizen analyzers. Measurement of this immunoglobulin aids in the diagnosis of abnormal protein metabolism and the body's lack of ability to resist infectious agents.
This test should be used in conjunction with other laboratory and clinical findings.

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."

SECTION 007: 510(k) Summary of K193525

This summary of 510(k) safety and effectiveness information is being submitted in accordance with the requirements of SMDA 1990 and 21 CFR 807.92.

1- Date of Summary

Date submitted : 26th June, 2020

2- Company

HORIBA ABX SAS
HORIBA MEDICAL
Parc Euromédecine
Rue du Caducée – BP 7290
34184 Montpellier cedex 4
France

3- Contact person

Contact Person: Caroline Ferrer (caroline.ferrer@horiba.com)
Telephone: + (33) 4 67 14 1843
Fax: + (33) 4 67 14 1517

4- Product Name

Yumizen C1200 Immunoglobulin A (1300023881)
Yumizen C1200 Immunoglobulin G (1300023883)
Yumizen C1200 Immunoglobulin M (1300023884)

5- Device Name and Classification

- **Intended use**

The devices involved by the 510(k) submission file are the following:

Device's names	Intended Use
Yumizen C1200 Immunoglobulin A	**Yumizen C1200 Immunoglobulin A** reagent is intended for the quantitative in vitro diagnostic determination of Immunoglobulin A (IgA) in serum and lithium heparin plasma by immunoturbidimetry on Yumizen analyzers. Measurement of this immunoglobulin aids in the diagnosis of abnormal protein metabolism and the body's lack of ability to resist infectious agents. This test should be used in conjunction with other laboratory and clinical findings.
Yumizen C1200 Immunoglobulin G	**Yumizen C1200 Immunoglobulin G** reagent is intended for the quantitative in vitro diagnostic determination of Immunoglobulin G (IgG) in serum and lithium heparin plasma by immunoturbidimetry on Yumizen analyzers. Measurement of this immunoglobulin aids in the diagnosis of abnormal protein metabolism and the body's lack of ability to resist infectious agents. This test should be used in conjunction with other laboratory and clinical findings.

Yumizen C1200 Immunoglobulin M	**Yumizen C1200 Immunoglobulin M** reagent is intended for the quantitative in vitro diagnostic determination of Immunoglobulin M (IgM) in serum and lithium heparin plasma by immunoturbidimetry on Yumizen analyzers. Measurement of this immunoglobulin aids in the diagnosis of abnormal protein metabolism and the body's lack of ability to resist infectious agents. This test should be used in conjunction with other laboratory and clinical findings.

- **Classification and Description**

Trade/Proprietary Name:	Yumizen C1200 Immunoglobulin A
Device Class:	Class II / 510(k) required
Classification Name:	§866.5510: Immunoglobulins A, G, M, D, and E immunological test systems
Product Code:	CZP
Panel:	Immunology (82)
Trade/Proprietary Name:	Yumizen C1200 Immunoglobulin G
Device Class:	Class II / 510(k) required
Classification Name:	§866.5510: Immunoglobulins A, G, M, D, and E immunological test
Product Code:	DEW
Panel:	Immunology (82)
Trade/Proprietary Name:	Yumizen C1200 Immunoglobulin M
Device Class:	Class II / 510(k) required
Classification Name:	§866.5510: Immunoglobulins A, G, M, D, and E immunological test system
Product Code:	CFN
Panel:	Immunology (82)

6- Substantial Equivalence Information

The following tables show the similarities and differences and demonstrates substantial equivalence between the candidate device and its predicate device identified below.

Predicate Device Name and 510(k) number:

Candidate device	Predicate device	Predicate Manufacturer	Predicate 510(k) number
Yumizen C1200 Immunoglobulin A	Olympus IgA reagent (OSR6X171)	BECKMAN COULTER	K073489
Yumizen C1200 Immunoglobulin G	Olympus IgG reagent (OSR6X172)	BECKMAN COULTER	K073490
Yumizen C1200 Immunoglobulin M	Olympus IgM reagent (OSR6X173)	BECKMAN COULTER	K073487

The following tables show the similarities and differences and demonstrates substantial equivalence between the candidate device and its predicate device identified below.

a. Yumizen C1200 Immunoglobulin A

i. Comparison with predicate Device : Similarities

Item	**Predicate K073489**	**Candidate**
Device Name	OSR6X171	Yumizen C1200 Immunoglobulin A (1300023881)
Intended Use	System reagent for the quantitative determination of IgA immunoglobulins in human serum and plasma on Beckman Coulter AU analyzers. The spectrum of abnormalities in serum immunoglobulin concentrations is broad. Abnormal concentrations range from a virtual absence of one or more of the three major classes of immunoglobulin (IgG, IgA, and IgM) to polyclonal increases in one or more immunoglobulins. Measurement of these immunoglobulins aids in the diagnosis of abnormal protein metabolism and the body's lack of ability to resist infectious agents. For *in vitro* diagnostic use.	**Yumizen C1200 Immunoglobulin A** reagent is intended for the quantitative in vitro diagnostic determination of Immunoglobulin A (IgA) in serum and lithium heparin plasma by immunoturbidimetry on Yumizen analyzers. Measurement of this immunoglobulin aids in the diagnosis of abnormal protein metabolism and the body's lack of ability to resist infectious agents. This test should be used in conjunction with other laboratory and clinical findings.
Reagent format	Liquid	Same

Item	Predicate K073489	Candidate
Measurement	Quantitative	Same
Analytical Range	**Measuring Range** 0.1 – 7.00 g/dL 10-700 mg/L	**Measuring Range** 0.10 – 7.00 g/dL 10-700 mg/L

ii. Comparison with predicate Device: Differences

Item	Predicate K073489	Candidate
Device Name	OSR6X171	Yumizen C1200 Immunoglobulin A (1300023881)
Instrument	Olympus AU400 Clinical Chemistry Analyzer	Yumizen C1200 Clinical chemistry Analyzer
Manufactured by	BECKMAN COULTER	HORIBA ABX SAS
Method	Turbidimetry	Immunoturbidimetry
Packaging	4x14 mL (R1) 4x11 mL (R2)	6x20 mL (R1) 6x20 mL (R2)
Product code	CFN	CZP
Reagent On board Stability	60 days	6 weeks
Reference range	66-433 mg/dL 0.66-4.33 g/L	70-400 mg/dL 0.70-4.00 g/L
Sample Stability	Stable up to 3 days when stored 2-8°C ≤ -20°C stability claim was not defined (specified)	8 months at 20-25°C 8 months at 4-8°C 8 months at -20°C
Sample type	Serum, Lithium-heparin plasma EDTA plasma	Serum Lithium-heparin plasma

b. Yumizen C1200 Immunoglobulin G

i. Comparison with predicate Device : Similarities

Item	Predicate K073490	Candidate
Device Name	OSR6X172	Yumizen C1200 Immunoglobulin G (1300023883)
Intended Use	System reagent for the quantitative determination of IgG immunoglobulins in human serum and plasma on Beckman Coulter AU analyzers. The measurement of IgG aids in the diagnosis of abnormal protein metabolism and the body's lack of ability to resist infectious agents. For *in vitro* diagnostic use.	**Yumizen C1200 Immunoglobulin G** reagent is intended for the quantitative in vitro diagnostic determination of Immunoglobulin G (IgG) in serum and lithium heparin plasma by immunoturbidimetry on Yumizen analyzers. Measurement of this immunoglobulin aids in the diagnosis of abnormal protein metabolism and the body's lack of ability to resist infectious agents. This test should be used in conjunction with other laboratory and clinical findings.
Reagent format	Liquid	Same
Measurement	Quantitative	Same
Shelf-life	Stable up to expiry date on the label if stored at 2-8°C.	Stable up to expiry date on the label if stored at 2-8°C.Store protected from light.
Analytical Range	**Measuring Range** 0.75 – 30.00 g/L 75-3000 mg/dL	**Measuring Range** 0.75 – 30.00 g/L 75-3000 mg/dL

ii. Comparison with predicate Device: Differences

Item	**Predicate** K073490	**Candidate**
Device Name	OSR6X172	Yumizen C1200 Immunoglobulin G (1300023883)
Instrument	Olympus AU400 Clinical Chemistry Analyzer	Yumizen C1200 Clinical chemistry Analyzer
Manufactured by	BECKMAN COULTER	HORIBA ABX SAS
Packaging	4x22mL (R1) 4x20 mL (R2)	6x20 mL (R1) 6x20 mL (R2)
Method	Turbidimetry	Immunoturbidimetry
Product code	CFN	DEW
Reagent On board Stability	90 days	6 weeks
Reference range	635-1741 mg/dL 6.35-17.41 g/L	700-1600 mg/dL 7-16 g/L
Sample Stability	2-8°C for up to 3 days	1 week at 20-25°C 3 months at 4-8°C >6 months at -20°C
Sample type	Serum, Lithium-heparin plasma EDTA	Serum Lithium-heparin plasma

c. Yumizen C1200 Immunoglobulin M

i. Comparison with predicate Device : Similarities

Item	Predicate K073487	Candidate
Device Name	**OSR6X173**	Yumizen C1200 Immunoglobulin M (1300023884)
Intended Use	System reagent for the quantitative determination of IgM immunoglobulins in human serum and plasma on Beckman Coulter AU analyzers. System reagent for the quantitative determination of IgM immunoglobulins in human serum and plasma on Beckman Coulter AU analyzers The spectrum of abnormalities in serum immunoglobulin concentrations is broad. Abnormal concentrations range from a virtual absence of one or more of the three major classes of immunoglobulin (IgA, IgG, and IgM) to polyclonal increases in one or more immunoglobulins. Measurement of these immunoglobulins aids in the diagnosis of abnormal protein metabolism and the body's lack of ability to resist infectious agents. For in vitro diagnostic use.	**Yumizen C1200 Immunoglobulin M** reagent is intended for the quantitative in vitro diagnostic determination of Immunoglobulin M (IgM) in serum and lithium heparin plasma by immunoturbidimetry on Yumizen analyzers. Measurement of this immunoglobulin aids in the diagnosis of abnormal protein metabolism and the body's lack of ability to resist infectious agents. This test should be used in conjunction with other laboratory and clinical findings.
Reagent format	Liquid	Same
Measurement	Quantitative	Same
Procode	CFN	Same
Shelf-life	Stable up to expiry date on the label if stored at 2-8°C.	Stable up to expiry date on the label if stored at 2-8°C.Store protected from light.
Analytical Range	**Measuring Range** 0.20-5.00 g/L 20-500 mg/dL	**Measuring Range** 0.20-5.00 g/L 20-500 mg/dL

ii. Comparison with predicate Device: Differences

Item	Predicate K073487	Candidate
Device Name	**OSR6X173**	Yumizen C1200 Immunoglobulin M (1300023884)
Instrument	Olympus AU400 Clinical Chemistry Analyzer	Yumizen C1200 Clinical chemistry Analyzer
Manufactured by	BECKMAN COULTER	HORIBA ABX SAS
Packaging	4x14mL (R1) 4x11 mL (R2)	6x20 mL (R1) 6x20 mL (R2)
Method	Turbidimetry	Immunoturbidimetry
Reagent On board Stability	90 days	6 weeks
Reference range	0.45-2.81 g/L 45-281 mg/dL	0.4-2.30 g/L 40-230 mg/dL
Sample Stability	2-8°C for up to 3 days	2 months at 20-25°C 4 months at 4-8°C 6 months at -20°C
Sample type	Serum, Lithium-heparin plasma EDTA plasma	Serum Lithium-heparin plasma

7- Special Control/Guidance Document Referenced

a. Standards Followed :

The following standards & FDA guidance documents have been used to support this submission:

CLSI Guidelines:

- **CLSI EP05-A3:** Evaluation of Precision of Quantitative Measurement Procedures– Third Edition - October 2014
- **CLSI EP17-A2:** Evaluation of Detection Capability for Clinical Laboratory Measurement Procedures – Second Edition - June 2012
- **CLSI EP06-A:** Evaluation of the Linearity of Quantitative measurement Procedures A Statistical Approach – First Edition – April 2003
- **CLSI C28-A3:** Defining, Establishing, and Verifying Reference Intervals in the Clinical laboratory- Third Edition – November 2008
- **CLSI EP25-A**: Evaluation of Stability of In Vitro Diagnostic reagents- First Edition- September 2009

b. References cited

- Valtec guideline (Vassault et al., Ann. Biol. Clin., 1986, (44), 686-745)

8- Device Description

a. Ig A

- **Method**

Immunoturbidimetric test. Endpoint determination of the concentration done by photometric measurement. It is an antigen-antibodyreaction of the antibodies with the that is present in the sample.

- **Reagent Yumizen C1200 Ig A**

Yumizen C1200 Immunoglobin A is ready-to-use.

Reagent 1 (R1):
TRIS pH 7.5 100 mmol/L
NaCl 150 mmol/L

Reagent 2 (R2):
TRIS pH 8.0 100 mmol/L
NaCl 300 mmol/L
Anti-human IgA antibody (goat) < 1%

b. Ig G

- **Method**

Immunoturbidimetric test. Endpoint determination of the concentration done by photometric measurement. It is an antigen-antibodyreaction of the antibodies with the that is present in the sample.

- **Reagent Yumizen C1200 Ig G**
  Yumizen C1200 Immunoglobin G is ready-to-use.

  Reagent 1 (R1):
  TRIS pH 7.5 100 mmol/L
  NaCl 150 mmol/L

  Reagent 2 (R2):
  TRIS pH 8.0 100 mmol/L
  NaCl 300 mmol/L
  Anti-human IgG antibody (goat) < 1%

c. Ig M

- **Method**

Immunoturbidimetric test. Endpoint determination of the concentration done by photometric measurement. It is an antigen-antibody reaction of the antibodies present in the sample.

- **Reagent Yumizen C1200 Ig M**
  Yumizen C1200 Immunoglobin M is ready-to-use.
  Reagent 1 (R1):
  TRIS pH 7.5 100 mmol/L
  NaCl 150 mmol/L

  Reagent 2 (R2):
  TRIS pH 8.0 100 mmol/L, NaCl 1150 mmol/L, Anti-human IgM antibody (goat) < 1%

This submission consists in the Yumizen C1200 Immunoglobulin A (1300023881), Yumizen C1200 Immunoglobulin G (1300023883) and Yumizen C1200 Immunoglobulin M (1300023884) reagent for serum and plasma testing for Yumizen C1200 reagent.

The Yumizen C1200 Level 1 Protein Control (1300023944) and Yumizen C1200 Level 2 Protein Control (1300023945) for use on Yumizen C1200 Analyzer and the Yumizen C1200 Protein Cal (1300023893) for use on Yumizen C1200 Analyzer are sold separately.

9- Analytical Performance Characteristics

9.1 Measuring Range

The limit of detection and quantitation was determined according to the CLSI guideline EP17-A2.
The reagent linearity was determined according to CLSI guideline EP06-A.
The limit of quantitation and the linearity studies showed that claimed measuring range is appropriate.

- **Yumizen C1200 Immunoglobulin A**

	Limit of detection	Limit of quantitation	Linearity Evaluated	Measuring range
Serum	0.009 g/L	0.08 g/L	0.21 – 6.60 g/L	0.10 to 7.00 g/L
Serum Post-dilution	NA	NA	NA	7.00 to 21.00 g/L

➢ **Linearity**

The reagent linearity was determined according to CLSI guideline EP06-A.

Description
Samples used for this study are IgA spiked. The different concentrations in IgA were prepared based on the dilution of the highest concentration serum level with commercial depleted serum. Sample dilutions were assayed in quadruplicate within a single run and samples within the measuring range were used to determine linearity:

Range (mg/dL)	**Slope (95%CI)**	**Intercept (95% CI)**	**R^2**
21 – 660	1.027 (1.012 – 1.043)	0.004 (-0.060 – 0.051)	0.9975

- **Yumizen C1200 Immunoglobulin G**

	Limit of detection	Limit of quantitation	Linearity Evaluated	Measuring range
Serum	0.01 g/L	0.53 g/L	0.82 – 29.42 g/L	0.75 to 30.00 g/L
Serum Post-dilution	NA	NA	NA	30.00 to 90.00 g/L

➢ **Linearity**

The reagent linearity was determined according to CLSI guideline EP06-A.

Description
Samples used for this study are IgG spiked. The different concentrations in IgG were prepared based on the dilution of the highest concentration serum level with commercial depleted serum. Sample dilutions were assayed in quadruplicate within a single run and samples within the measuring range were used to determine linearity:

IgG Range (mg/dL)	**Slope (95%CI)**	**Intercept (95% CI)**	**R^2**
82-2942	0.9965 (0.985 – 1.008)	0.2541 (0.07 – 0.44)	0.9986

- **Yumizen C1200 Immunoglobulin M**

	Limit of detection	Limit of quantitation	Linearity Evaluated	Measuring range
Serum	0.01 g/L	0.03 g/L	0.26 – 4.16 g/L	0.20 to 5.00 g/L
Serum Post-dilution	NA	NA	NA	5.00 to 15.00 g/L

➢ **Linearity**

The reagent linearity was determined according to CLSI guideline EP06-A.
Description
Samples used for this study are IgM spiked. The different concentrations in IgM were prepared based on the dilution of the highest concentration serum level with commercial depleted serum. Sample dilutions were assayed in quadruplicate within a single run and samples within the measuring range were used to determine linearity:

IgM Range (mg/dL)	Slope (95%CI)	Intercept (95% CI)	R^2
26 – 416	1.013. (1.001 – 1.025)	– 0.087 (-0.115 – -0.059)	0.9994

9.2 Accuracy and Precision

The acceptance criteria for the assays were:
Within Run: CV limits, for the low, middle and high level are respectively 4.5 %, 3.8 % and 3 %.
Total Precision: CV limits, for the low, middle and high level are respectively 6.0 %, 5.0 % and 4.0%

- **Yumizen C1200 Immunoglobulin A**

Repeatability (within-run precision) and Reproducibility (total precision)

- Total Precision: analyzer variability - 20x2x2 study

Five human sera samples and two levels of Yumizen C1200 Protein Control were tested with two replicates per run, two runs per day for 20 days on each of three analyzers (n=240 per sample). The results are summarized below:

IgA Sample	N	Mean (g/L)	Within-Run (%CV)	Between-Run (%CV)	Between-Day (%CV)	Between-Instrument (%CV)	Total (%CV)
Yumizen C1200 Level 1 Protein Control	240	**1.17**	**0.8**	2.9	0.7	2.0	**3.7**
Yumizen C1200 Level 2 Protein Control	240	**3.65**	**0.9**	2.1	1.4	1.7	**3.1**
Sample 1	240	**0.62**	**0.9**	1.0	1.2	1.7	**2.5**
Sample 2	240	**1.12**	**0.7**	1.0	1.2	0.0	**1.7**
Sample 3	240	**2.39**	**0.8**	1.3	1.4	1.5	**2.6**
Sample 4	240	**4.31**	**1.0**	2.9	1.3	2.0	**3.8**
Sample 5	240	**5.47**	**0.9**	1.2	1.5	2.0	**2.9**

The results are within the specifications

- Lot to Lot variability study: 3x5x2x3

Five human sera samples and two levels of Yumizen C1200 Protein Control were tested in triplicates per run, two runs per day for five days on each of three lots (n=90 per sample). The results are summarized below:

IgA Sample	**N**	**Mean (g/L)**	**Within-Day (%CV)**	**Between-Day (%CV)**	**Within - Batch (%CV)**	**Between-Batch (%CV)**	**Total (%CV)**
Yumizen C1200 Level 1 Protein Control	90	**1.17**	**1.0**	0.7	1.2	0.1	**1.2**
Yumizen C1200 Level 2 Protein Control	90	**3.71**	**1.1**	0.0	1.1	0.2	**1.1**
Sample 1	90	**0.63**	**1.0**	0.5	1.2	0.0	**1.2**
Sample 2	90	**1.13**	**3.0**	2.8	4.1	0.0	**4.1**
Sample 3	90	**2.43**	**1.0**	0.6	1.2	0.3	**1.2**
Sample 4	90	**4.33**	**2.0**	1.4	2.4	0.0	**2.4**
Sample 5	90	**5.63**	**1.2**	0.2	1.2	0.3	**1.3**

The results are within the specifications.

- **Yumizen C1200 Immunoglobulin G**
- Total Precision: analyzer variability - 20x2x2 study

Five human sera samples and two levels of Yumizen C1200 Protein Control were tested with two replicates per run, two runs per day for 20 days on each of three analyzers (n=240 per sample). The results are summarized below:

IgG Sample	**N**	**Mean (g/L)**	**Within-Run (%CV)**	**Between-Run (%CV)**	**Between-Day (%CV)**	**Between-Instrument (%CV)**	**Total (%CV)**
Yumizen C1200 Level 1 Protein Control	240	**6.59**	**1.2**	0.8	1.8	1.7	**2.9**
Yumizen C1200 Level 2 Protein Control	240	**18.85**	**1.8**	0.4	2.3	1.4	**3.3**
Sample 1	240	**3.14**	**1.1**	0.5	1.1	1.8	**2.4**
Sample 2	240	**5.41**	**1.4**	0.5	1.0	0.0	**1.8**
Sample 3	240	**10.27**	**1.5**	0.4	1.5	1.3	**2.5**
Sample 4	240	**17.21**	**1.7**	0.2	1.4	0.9	**2.4**
Sample 5	240	**22.36**	**2.1**	0.0	1.8	1.1	**3.0**

The results are within the specifications.

- Lot variability study : 3x5x2x3

Five human sera samples and two levels of Yumizen C1200 Protein Control were tested in triplicates per run, two runs per day for five days on each lot (n=90 per sample). The results are summarized below:

IgG Sample	N	Mean (g/L)	Within-Day (%CV)	Between-Day (%CV)	Within - Batch (%CV)	Between-Batch (%CV)	Total (%CV)
Yumizen C1200 Level 1 Protein Control	90	**6.36**	**0.9**	1.3	1.6	0.6	**1.7**
Yumizen C1200 Level 2 Protein Control	90	**18.21**	**1.3**	1.3	1.8	0.4	**1.9**
Sample 1	90	**3.06**	**1.2**	1.7	2.0	1.0	**2.3**
Sample 2	90	**5.30**	**1.2**	0.8	1.4	0.8	**1.6**
Sample 3	90	**9.94**	**1.0**	0.8	1.3	1.0	**1.6**
Sample 4	90	**16.66**	**1.3**	1.1	1.7	1.1	**2.0**
Sample 5	90	**21.84**	**1.1**	0.9	1.4	0.4	**1.4**

The results are within the specifications.

- **Yumizen C1200 Immunoglobulin M**

- Total Precision: analyzer variability - 20x2x2 study

Five human sera samples and two levels of Yumizen C1200 Protein Control were tested with two replicates per run, two runs per day for 20 days on each of three analyzers (n=240 per sample). The results are summarized below:

IgM Sample	N	Mean (g/L)	Within-Run (%CV)	Between-Run (%CV)	Between-Day (%CV)	Between-Instrument (%CV)	Total (%CV)
Yumizen C1200 Level 1 Lipid Control	240	**0.88**	**0.6**	0.9	1.8	0.0	**2.1**

IgM Sample	N	Mean (g/L)	Within-Run (%CV)	Between-Run (%CV)	Between-Day (%CV)	Between-Instrument (%CV)	Total (%CV)
Yumizen C1200 Level 2 Lipid Control	240	**2.73**	**0.6**	0.8	1.2	0.9	**1.8**
Sample 1	240	**0.56**	**0.9**	0.8	2.5	0.3	**2.4**
Sample 2	240	**1.20**	**0.5**	0.6	1.4	0.6	**1.7**
Sample 3	240	**1.61**	**0.5**	0.5	1.0	0.7	**1.4**
Sample 4	240	**2.09**	**0.6**	0.5	1.0	0.4	**1.3**
Sample 5	240	**4.43**	**0.7**	0.8	0.7	1.3	**1.8**

The results are within the specifications.

- Lot variability study: 3x5x2x3

Five human sera samples and two levels of Yumizen C1200 Protein Control were tested in triplicates per run, two runs per day for five days on each lot (n=90 per sample). The results are summarized below:

IgM Sample	N	Mean (g/L)	Within-Day (%CV)	Between-Day (%CV)	Within - Batch (%CV)	Between-Batch (%CV)	Total (%CV)
Yumizen C1200 Level 1 Protein Control	90	**0.86**	**0.8**	1.1	1.4	0.8	**1.6**
Yumizen C1200 Level 2 Protein Control	90	**2.76**	**1.0**	0.8	1.3	1.1	**1.7**
Sample 1	90	**0.53**	**1.0**	0.8	1.3	2.4	**2.7**
Sample 2	90	**1.19**	**0.8**	0.3	0.9	0.5	**1.0**
Sample 3	90	**1.60**	**0.7**	0.5	0.9	0.6	**1.1**
Sample 4	90	**2.09**	**0.9**	0.4	1.0	1.0	**1.4**
Sample 5	90	**4.44**	**1.2**	0.8	1.4	1.0	**1.8**

The results are within the specifications.

9.3 Interferences

The Interferences were determined according to the CLSI guideline EP07-A2.
The acceptable bias is defined at +/-10% of the value without interfering substances.
These data in the following table represent the highest values for which no interferences higher than 10% have been observed.

- **Yumizen C1200 Immunoglobulin A**

Serum		
Hemoglobin	290 µmol/L	500 mg/dL
Triglycerides	6.07 mmol/L	531.13 mg/dL
Total Bilirubin	500 µmol/l	29.25 mg/dL
Direct Bilirubin	389 µmol/l	22.76 mg/dL
Ascorbic Acid	340 µmol/L	5.98 mg/dL
Acetylsalicylic Acid	3.62 mmol/L	65.16 mg/dL
Ibuprofen	2.43 mmol/L	50.10 mg/dL
Acetaminophen	1324 µmol/L	20 mg/dL

- **Yumizen C1200 Immunoglobulin G**

Serum		
Hemoglobin	290 µmol/L	500 mg/dL
Triglycerides	5.22 mmol/L	456.75 mg/dL
Total Bilirubin	668 µmol/l	39.05 mg/dL
Direct Bilirubin	314 µmol/l	18.36 mg/dL
Ascorbic Acid	340 µmol/L	5.98 mg/dL
Acetylsalicylic Acid	3.62 mmol/L	65.16 mg/dL
Ibuprofen	2.43 mmol/L	50.10 mg/dL
Acetaminophen	1324 µmol/L	20 mg/dL

- **Yumizen C1200 Immunoglobulin M**

Serum		
Hemoglobin	145 µmol/l	250 mg/dL
Triglycerides	5.95 mmol/L	520.63 mg/dL
Total Bilirubin	477 µmol/l	27.88 mg/dL
Direct Bilirubin	223 µmol/l	13.06 mg/dL
Ascorbic Acid	340 µmol/L	5.98 mg/dL
Acetylsalicylic Acid	3.62 mmol/L	65.16 mg/dL
Ibuprofen	2.43 mmol/L	50.10 mg/dL
Acetaminophen	1324 µmol/L	20 mg/dL

9.4 Matrix comparison on predicate device

- **Yumizen C1200 Immunoglobulin A**

Description:
62 samples were evaluated in duplicate on Yumizen C1200 analyzer using Yumizen C1200 IgA reagent. For this study, each paired samples (sera and heparinized plasma) has been obtained from single donor.

Immunoglobulin A (IgA, g/L)						
Passing Bablok	N	Min	Max	Intercept	Slope	Correlation
Serum	62	0.32	5.43	0.000	1.000	0.999
Heparin Plasma			5.44			

Conclusion :
The results show there is not significant difference between serum specimens and plasma with heparin specimens.

- **Yumizen C1200 Immunoglobulin G**

Description:
45 samples were evaluated in duplicate on Yumizen C1200 analyzer using Yumizen C1200 IgG reagent. For this study, each paired samples (sera and heparinized plasma) has been obtained from single donor.

Immunoglobulin G (IgG, g/L)						
Passing Bablok	N	Min	Max	Intercept	Slope	Correlation
Serum	43	8.10	17.06	0.1703	0.9929	0.988
Heparin Plasma		8.26	16.95			

Conclusion :
The results show there is no significative difference between serum specimens and plasma with heparin specimens.

- **Yumizen C1200 Immunoglobulin M**

Description of Test Procedure/Method
43 samples were evaluated on Yumizen C1200 analyser using Yumizen C1200 Immunoglobulin M reagent. For this study, each paired samples (sera and heparinized plasma) has been obtained from single donor.

Immunoglobulin M (IgM, g/L)						
Passing Bablok	N	Min	Max	Intercept	Slope	Correlation
Serum	43	0.29	2.80	-0.01	1.000	0.999
Plasma		0.29	2.78			

Conclusion
The results show there is no significative difference between serum specimens and plasma with heparin specimens.

9.5 Method comparison with a predicate device

- **Yumizen C1200 Immunoglobulin A**

This study has been carried out using recommendations found in the CLSI EP-9A3 guidance.
Samples: Anonymous remnants of human serum specimens collected from blood bank.
129 native samples have been assayed in duplicate, in ascendant order and descendant order on 6 working days. Only the first replicate of each method will be used for the data analysis reported below.

Passing Bablok	N	Min	Max	Intercept	Slope	Correlation – r^2
(g/L)	129	0.10	6.91	0.02379	0.9941	0.993

- **Yumizen C1200 Immunoglobulin G**

This study has been carried out using recommendations found in the CLSI EP-9A3 guidance.
Samples: Anonymous remnants of human serum specimens collected from blood bank.
214 native samples have been assayed in duplicate, in ascendant order and descendant order on 10 working days. Only the first replicate of each method will be used for the data analysis reported below.

Passing Bablok	N	Min	Max	Intercept	Slope	Correlation – r^2
(g/L)	214	0.96	28.94	-0.1629	1.016	0.993

- **Yumizen C1200 Immunoglobulin M**

This study has been carried out using recommendations found in the CLSI EP-9A3 guidance.
Samples: Anonymous remnants of human serum specimens collected from blood bank.
153 native samples have been assayed in duplicate, in ascendant order and descendant order on 8 working days. Only the first replicate of each method will be used for the data analysis reported below.

Passing Bablok	N	Min	Max	Intercept	Slope	Correlation – r^2
(g/L)	153	0.25	4.41	0.005113	1.005	0.993

9.6 Reagent Stability

9.6.1 Closed stability

The closed stability was determined according to the CLSI guideline EP25-A.

- **Immunoglobulin A**

Stability before opening:
Stable up to the expiry date on the label if stored at 2-8°C.
The Shelf Life of Yumizen C1200 Immunoglobulin A is 24 months.

- **Immunoglobulin G**

Stability before opening:
Stable up to the expiry date on the label if stored at 2-8°C.
The Shelf Life of Yumizen C1200 Immunoglobulin G is 24 months.

- **Immunoglobulin M**

Stability before opening:
Stable up to the expiry date on the label if stored at 2-8°C.
The Shelf Life of Yumizen C1200 Immunoglobulin M is 24 months.

8.6.2 Open stability

The open stability was determined according to the CLSI guideline EP25-A.

On board reagent Stability:

- Yumizen C1200 Immunoglobulin A: The stability claim after opening, on-Board, is 6 weeks.
- Yumizen C1200 Immunoglobulin G: The stability claim after opening, on-Board, is 6 weeks.
- Yumizen C1200 Immunoglobulin M: The stability claim after opening, on-Board, is 6weeks.

9.7 Reference range

The Reference Range was determined according to the CLSI guideline EP28-A3.

- **Ig A**

58 "normal samples" (22 women + 36 men) from blood bank have been assayed with the method in evaluation. Each sample is assayed in duplicates.

The first replicate results results for each subject was compared against reference ranges cited in literature. The verification studies support in the following reference ranges which were established through literature.

0.70 – 4.00 g/l (70 - 400 mg/dl) based on CRM_DA470

Reference:
Dati F, Schumann G, Thomas L, Aguzzi F, Baudner S, Bienvenu J et al. Consensus of a group of professional societies and diagnostic companies on guidelines for interim reference ranges for 14 proteins in serum based on the standardization against the IFCC/BCR/CAP reference material (CRM 470). Eur. J. Clin. Chem. Clin. Biochem. (1996) **34**: 517-20.

- **Ig G**

44 "normal samples" (16 women + 28 men) from blood bank have been assayed with the method in evaluation. Each sample is assayed in duplicates.

The first replicate results for each subject was compared against reference ranges cited in literature. The verification studies support in the following reference ranges which were established through literature.

7 – 16 g/l (700 -1600 mg/dl) based on CRM_DA470

Reference:
Dati F, Schumann G, Thomas L, Aguzzi F, Baudner S, Bienvenu J et al. Consensus of a group of professional societies and diagnostic companies on guidelines for interim reference ranges for 14 proteins in serum based on the standardization against the IFCC/BCR/CAP reference material (CRM 470). Eur. J.Clin. Chem. Clin. Biochem. (1996) 34: 517-20.:

- **Ig M**

74 “normal samples” (29 women + 45 men) from blood bank have been assayed with the method in evaluation. Each sample is assayed in duplicates.

The first replicate results for each subject was compared against reference ranges cited in literature. The verification studies support in the following reference ranges which were established through literature.

0.40 – 2.30 g/l (40 - 230 mg/dl) based on CRM_DA470

Reference:
Dati F, Schumann G, Thomas L, Aguzzi F, Baudner S, Bienvenu J et al. Consensus of a group of professional societies and diagnostic companies on guidelines for interim reference ranges for 14 proteins in serum based on the standardization against the IFCC/BCR/CAP reference material (CRM 470). Eur. J. Clin. Chem. Clin. Biochem. (1996) 34: 517-20.

10. Proposed Labeling

The labeling is written as per the recommendations given in standard EN18113-2.
It takes into account the requirements of 21 CFR Part 809.10.

11. Conclusions for Performance Testing

The performance testing data conclude that the safety and effectiveness of the devices are not compromised, and that they met all acceptance criteria, demonstrating that each device is substantially equivalent to its predicate device.