DEPARTMENT OF HEALTH & HUMAN SERVICES Public Health Service

Food and Drug Administration
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Silver Spring, MD 20993-0002

BIOMERIEUX SA
AURELIE PERMEZEL
REGULATORY AFFAIRS SPECIALIST
5 RUE DES AQUEDUCS
CRAPONNE 69290 FRANCE

June 8, 2015

Re: K132058
Trade/Device Name: VIDAS® FT4
Regulation Number: 21 CFR 862.1695
Regulation Name: Free thyroxine test system
Regulatory Class: II
Product Code: CEC
Dated: May 26, 2015
Received: May 27, 2015

Dear Aurelie Permezel:

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 Parts 801 and 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.

If you desire specific advice for your device on our labeling regulations (21 CFR Parts 801 and 809), please contact the Division of Industry and Consumer Education at its toll-free number (800) 638 2041 or (301) 796-7100 or at its Internet address http://www.fda.gov/MedicalDevices/ResourcesforYou/Industry/default.htm. 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.

You may obtain other general information on your responsibilities under the Act from the Division of Industry and Consumer Education at its toll-free number (800) 638-2041 or (301) 796-7100 or at its Internet address http://www.fda.gov/MedicalDevices/ResourcesforYou/Industry/default.htm.

Sincerely yours,

Katherine Serrano -S

For: Courtney H. Lias, Ph.D.
Director
Division of Chemistry and Toxicology Devices
Office of In Vitro Diagnostics
and Radiological Health
Center for Devices and Radiological Health

Enclosure

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Food and Drug Administration

Indications for Use

Form Approved: OMB No. 0910-0120
Expiration Date: January 31, 2017
See PRA Statement below.

510(k) Number *(if known)*
k132058

Device Name
VIDAS® FT4

Indications for Use *(Describe)*
VIDAS® FT4 is an automated quantitative enzyme immunoassay for use on the instruments of the VIDAS® family, for the determination of free thyroxine (FT4) in human serum or plasma (lithium heparin), using the ELFA technique (Enzyme Linked Fluorescent Assay). Measurement of Free Thyroxin is intended for use as an aid in the diagnosis and treatment monitoring of thyroid disorders.

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

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

VIDAS® FT4

A. Submitter Information

Submitter's Name:	bioMérieux SA
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Contact Person:	Aurélie PERMEZEL
Phone Number:	+33 4 78 87 74 83
Fax Number:	+33 4 78 87 20 75
Date of Preparation:	May 26th, 2015

B. Device Name

Trade Name:	VIDAS® FT4
Common Name:	FT4 Assay
Classification Name:	21 CFR 862.1695 – Free thyroxine test system, Class II Product code CEC

C. Predicate Device Name

Trade Name:	Elecsys® FT4 Assay (K961489)

D. Device Description

VIDAS® FT4 is an automated quantitative enzyme immunoassay for use on the instruments of the VIDAS® family, for the determination of free thyroxine (FT4) in human serum or plasma (lithium heparin), using the ELFA technique (Enzyme Linked Fluorescent Assay). Measurement of free thyroxine is intended for use as an aid in the diagnosis and treatment monitoring of thyroid disorders.

The assay principle combines a one-step enzyme immunoassay competition method with a final fluorescent detection (ELFA).
The Solid Phase Receptacle (SPR®) serves as the solid phase as well as the pipetting device for the assay. Reagents for the assay are ready-to-use and pre-dispensed in the sealed reagent strips. All of the assay steps are performed automatically by the instrument. The reaction medium is cycled in and out of the SPR several times.

The sample is collected and transferred into the well containing an alkaline phosphatase-labeled anti-T4 antibody (conjugate). The antigen present in the sample and the T4 antigen coated on the interior of the SPR compete for the available sites on the specific anti-T4 antibody conjugated to alkaline phosphatase.

During the final detection step, the substrate (4-Methyl-umbelliferyl phosphate) is cycled in and out of the SPR. The conjugate enzyme catalyzes the hydrolysis of this substrate into a fluorescent product (4-Methyl-umbelliferone) the fluorescence of which is measured at 450 nm. The intensity of the fluorescence is inversely proportional to the concentration of free thyroxine present in the sample. At the end of the assay, results are automatically calculated by the instrument in relation to the calibration curve stored in memory, and then printed out.

E. Intended Use

VIDAS® FT4 is an automated quantitative enzyme immunoassay for use on the instruments of the VIDAS® family, for the determination of free thyroxine (FT4) in human serum or plasma (lithium heparin), using the ELFA technique (Enzyme Linked Fluorescent Assay). Measurement of free thyroxine is intended for use as an aid in the diagnosis and treatment monitoring of thyroid disorders.

F. Technological Characteristics Summary

A general comparison of the similarities and differences of the assays is presented in the table below.

Item	VIDAS® FT4 assay	Elecsys® FT4 Assay (K961489)
General Comparison		
Intended Use	VIDAS® FT4 is an automated quantitative enzyme immunoassay for use on the instruments of the VIDAS® family, for the determination of free thyroxine (FT4) in human serum or plasma (lithium heparin), using the ELFA technique (Enzyme Linked Fluorescent Assay). Measurement of free thyroxine is intended for use as an aid in the diagnosis and treatment monitoring of thyroid disorders.	Immunoassay for the in vitro quantitative determination of free thyroxine in human serum and plasma. The electrochemiluminescence Immunoassay "ECLIA" is intended for use on Elecsys and Cobas e immunoassay analysers.
Specimen	Serum and plasma	Same
Analyte	Free thyroxine	Same
Automated	Yes	Same
Assay Technique	Enzyme-linked fluorescent assay (ELFA)	Electrochemiluminescence Immunoassay "ECLIA"
Assay Principle	Labeled antibody competition method	Same

G. Nonclinical Tests

A summary of the performance results is presented in the table below.

Analytical specificity

Interferences with bilirubin, lipids, hemoglobin, HAMA (human anti-mouse antibodies), albumin and TBG (Thyroid binding globulin):

Interferences have been studied according to the recommendations of CLSI® document EP7-A2.
The following substances, studied in serum at FT4 analyte levels close to the lower and higher limits of the euthyroid range, showed no significant interference up to the concentration indicated, on the instruments of the VIDAS® family.

Bilirubin	22.5 mg/dL
Lipids	750 mg/dL
Hemoglobin	500 mg/dL
HAMA	0.2 mg/dL
Albumin	6300 mg/dL

Samples containing abnormal TBG levels (very high or very low) should be not used with this assay.

No interference was observed with samples containing HAMA up to 0.2 mg/dL when tested with VIDAS® FT4 assay. For assays employing antibodies, the possibility exists for interference by heterophile antibodies in the patient sample. Patients who have been regularly exposed to animals or have received immunotherapy or diagnostic procedures utilizing immunoglobulins or immunoglobulin fragments may produce antibodies, e.g. HAMA, that interfere with immunoassays. Additionally, other heterophile antibodies such as human anti-goat antibodies may be present in patient samples. Such interfering antibodies may cause erroneous results. Carefully evaluate the results of patients suspected of having these antibodies.

Drugs interferences:

The following drugs, showed no significant interference up to the concentration indicated.

Drug	Highest concentration at which no interference was observed
Acetylsalicylic Acid	32.61 mg/dL
Amiodarone	0.58 mg/dL
Carbamazepine	1.5 mg/dL
Danazol	24 mg/dL
Diclofenac	0.315 mg/dL
Diphenyldantoin	2.5 mg/dL
Dipyrone	580.08 mg/dL
Furosemide	0.075 mg/dL
Isotretinonine	1.20 mg/dL
Lithium	13.56 mg/dL
Mefenamic Acid	0.5625 mg/dL
Mestranol	0.002 mg/dL
Methimazole	2.40 mg/dL
Norethindrone	0.001 mg/dL
Phenylbutazone	5 mg/dL
Propanolol	0.20 mg/dL
Propylthiouracil	3.08 mg/dL

Potential interferences of structurally related molecules:

The following substances showed no significant interference with tested FT4 concentrations of approximately 1.2 ng/dL and 2.5 ng/dL:

Tested compound	No interference* observed up to the concentration of	Cross reactivity (%) *
3,5-diiodotyrosine	16.770 µg/dL (167.70 µg/L)	0.00095 %
3,5- diodothyronine	27.310 µg/dL (273.10 µg/L)	0.00040 %
L-triiodothyronine	0.678 µg/dL (6.78 µg/L)	0.02655 %

*The studies were performed according to the recommendation of the CLSI document EP07-A2 up to the concentration indicated on the VIDAS and miniVIDAS instruments.

Analytical sensitivity

Detection and quantitation limits studies were performed on both VIDAS® and miniVIDAS® instruments determined according to CLSI EP17-A2 recommendations. The limits reported below applies for both instruments:

Limit of Blank (LoB): 0.02 ng/dL
Limit of Detection (LoD): 0.07 ng/dL
Limit of Quantitation (LoQ): 0.13 ng/dL

The Limit of Blank (LoB) was determined using one blank sample tested in 12 replicates per day (single run on VIDAS® instrument, 2 runs on miniVIDAS® instrument) for 5 days with each lot (2 lots on one VIDAS® instrument and 1 lot on one miniVIDAS® instrument). N=60 measures per lot on each instrument.

The Limit of Detection (LoD) was determined using low concentration samples (6 samples on VIDAS® instrument, 4 samples on miniVIDAS® instrument), tested in 5 replicates per day (single run) for 5 days with each lot(2 lots on one VIDAS® instrument and 1 lot on one miniVIDAS® instrument). N=150 measures per lot on VIDAS® instrument and N=100 measures per lot on miniVIDAS® instrument.

The Limit of Quantitation (LoQ), as determined by functional sensitivity, corresponds to the lowest analyte concentration that can be reproducibly measured with a within-laboratory precision CV of ≤ 20 %. It was determined based on the within-laboratory precision profile estimated using 9 low concentration samples tested in 5 replicates per day (single run) for 8 days with 2 lots, on one VIDAS® instrument and one miniVIDAS® instrument. N=40 measures per sample and per lot on each instrument.

Measurement range

The VIDAS® FT4 measurement range extends from 0.13 ng/dL up to 6.61 ng/dL. Values below the lower limit of the measurement range are reported as < 0.13 ng/dL. Values above the upper limit of the measurement range are reported as > 6.61 ng/dL.

Metrological traceability

The VIDAS® FT4 assay is standardized against the Elecsys® FT4 assay (Roche Diagnostic).

Value assignment procedure for calibrator (S1) and control (C1)

Reference Calibrators are assigned values via a method comparison between VIDAS® FT4 and Roche Elecsys FT4. The VIDAS® FT4 kit calibrator (S1) and control (C1) are assigned values based upon these reference calibrators.

Linearity

The VIDAS® FT4 assay is linear over the whole measurement range (0.13 ng/dL to 6.61 ng/dL). The linearity was conducted on the VIDAS® and the miniVIDAS® instruments and evaluated according to the recommendations of CLSI® document EP6-A.

Matrix Comparison

A matrix comparison study was performed using 31 sample sets. Each sample set consisted of a reference tube type (Silicone coated glass tube) and one of the blood collection tubes (Plastic tube with clot activator, Plastic tube with clot activator and separation gel, Plastic tube with lithium heparin, Plastic tube with lithium heparin and separation gel) collected from one donor during one draw. Samples between 0.13 ng/dL to 6.45 ng/dL were analyzed on VIDAS® instrument. Passing-Bablok regression was used to compare the samples collected in the reference tube (x) and the samples collected in each collection tube (y) after 24 hours at 18-25°C:

Collection tube	Regression analysis	Correlation coefficient (r)
Plastic tube with clot activator	Y = 0.98X + 0.01	0.999
Plastic tube with separation gel	Y = 1.02X + 0.02	0.999
Plastic tube with lithium heparin	Y = 0.99X - 0.01	0.997
Plastic tube with lithium heparin and separation gel	Y = 1.00 X + 0.00	0.999

H. Clinical Tests

Precision

The study was performed according to the recommendations of CLSI® document EP5-A2. Panel members covering the measuring range were tested in duplicate, in 2 runs per day, for 20 days, on 3 VIDAS® and 3 miniVIDAS® instruments . Testing included 2 lots with 10 days per lot. For each lot, 2 separate calibrations were performed. There were 5 testing days per calibration per lot.
The precision performance characteristics of the VIDAS® FT4 assay using 6 samples tested on VIDAS® instruments, are as follows:

Sample	N	Mean (ng/dL)	Repeatability		Reproducibility	
			SD (ng/dL)	CV (%)	SD (ng/dL)	CV (%)
S1	240	0.31	0.02	6.3	0.04	13.4
S2	240	0.79	0.03	3.6	0.07	8.3
S3	240	1.54	0.05	3.1	0.11	7.4
S4	240	2.57	0.06	2.5	0.13	5.1
S5	240	4.00	0.09	2.3	0.24	5.9
S6	240	5.78	0.17	3.0	0.38	6.5

The precision performance characteristics on 5 samples tested on miniVIDAS® instruments, are as follows:

Sample	N	Mean (ng/dL)	Repeatability		Reproducibility	
			SD (ng/dL)	CV (%)	SD (ng/dL)	CV (%)
P1	240	0.24	0.03	11.2	0.04	15.4
P2	240	0.78	0.03	3.7	0.04	5.6
P3	240	1.45	0.05	3.3	0.07	4.9
P4	240	3.04	0.07	2.3	0.10	3.4
P5	240	5.64	0.11	2.0	0.16	2.8

Correlation

A method comparison study was performed to compare VIDAS® FT4 assay to a commercially available Free T4 EIA according to the recommendations of the CLSI® document EP9-A2.

The VIDAS® FT4 assay was tested on both VIDAS® and miniVIDAS® instruments. Fifty-four (54) samples were included in the study.

The results of the correlations are shown below:

Instrument	n	Range tested (ng/dL)	Slope	95% CI	Intercept	95% CI	Correlation coefficient (r)	95% CI
VIDAS®	54	0.41 – 6.42	1.03	0.99 ; 1.06	-0.02	-0.13 ; 0.05	0.988	0.980 ; 0.993
miniVIDAS®	54	0.52 - 6.35	1.04	1.00 ; 1.08	0.01	-0.06 ; 0.12	0.987	0.977 ; 0.992

Reference range / Expected Values

The 2.5th and 97.5th percentiles reference interval for the VIDAS® FT4 assay was determined to be 0.77 -1.51 ng/dL. The 90% confidence interval for the lower limit was 0.70 – 0.79 ng/dL and the 90% confidence interval for the upper limit was 1.41 – 1.59 ng/dL. The reference range was determined by testing a total of 544 apparently healthy subjects from a population > 18 years in age with the following characteristics: 45.5% males, 55.5% female, 83.8% Caucasian, 6.1% African-American, 9.6% Hispanic and 0.6% Asian.

I. Conclusion

The results from the nonclinical and clinical studies submitted in this premarket notification are complete and demonstrate that the VIDAS® FT4 is substantially equivalent to the predicate device identified in Item C of this summary.