DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Food and Drug Administration
10903 New Hampshire Avenue
Document Control Center – WO66-G609
Silver Spring, MD 20993-0002

SIEMENS HEALTHCARE DIAGNOSTICS INC.
ALEX HSU
REGULATORY AND CLINICAL AFFAIRS SPECIALIST
511 BENEDICT AVE.
TARRYTOWN NY 10591

April 22, 2015

Re: K141999
Trade/Device Name: ADVIA Centaur TSH
Regulation Number: 21 CFR 862.1690
Regulation Name: Thyroid stimulating hormone test system
Regulatory Class: II
Product Code: JLW
Dated: March 25, 2015
Received: March 26, 2015

Dear Alex Hsu:

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)*
k141999

Device Name
ADVIA Centaur TSH

Indications for Use *(Describe)*
For in vitro diagnostic use in the quantitative determination of thyroid-stimulating hormone (TSH, thyrotropin) in serum using the ADVIA Centaur, ADVIA Centaur XP and ADVIA Centaur XPT systems. Measurements of thyroid stimulating hormone produced by the anterior pituitary are used in the diagnosis of thyroid or pituitary 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.

This section applies only to requirements of the Paperwork Reduction Act of 1995.

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510(k) Summary of Safety and Effectiveness

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

The assigned 510(k) Number is: k141999

1. Date Prepared

April 21, 2015

2. Applicant Information

Contact: Alex Hsu
Regulatory and Clinical Affairs Specialist

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3. Regulatory Information

Table 1. Regulatory Information for ADVIA Centaur TSH Assay

Trade Name	ADVIA Centaur® TSH
Model Numbers	08700387 (5-pack); 04911359 (1-pack)
Common Name	Radioimmunoassay, thyroid-stimulating hormone
Classification Name	Thyroid stimulating hormone test system
FDA Classification	Class II
Review Panel	Clinical Chemistry (75)
Product Code	JLW
Regulation Number	862.1690

4. Predicate Device Information

The ADVIA Centaur TSH assay was originally cleared by the FDA on 04/30/1991 (k910981) as the ACS TSH Immunoassay.

5. Description of Device Modifications

No changes were made to the ADVIA Centaur TSH assay reagents, calibrators or master curve value assignment in order to run on the ADVIA Centaur XPT.

Previously, the lower limit of detection was based on analytical sensitivity, whereas it is now based on Limit of Quantitation (LoQ). As result, the lower limit of detection has been revised from 0.01 µIU/mL to 0.05 µIU/mL. Accordingly, the analytical measuring range was also modified from 0.01–150 µIU/mL to 0.05–150 µIU/mL.

Table 2. List of Assay Modifications

Item	ADVIA Centaur TSH (Unmodified Predicate Device)	ADVIA Centaur TSH (Modified Candidate Device)
Platforms	ADVIA Centaur ADVIA Centaur XP	ADVIA Centaur ADVIA Centaur XP ADVIA Centaur XPT
Intended Use	For *in vitro* diagnostic use in the quantitative determination of thyroid-stimulating hormone (TSH, thyrotropin) in serum using the ADVIA Centaur and ADVIA Centaur XP systems.	For *in vitro* diagnostic use in the quantitative determination of thyroid-stimulating hormone (TSH, thyrotropin) in serum using the ADVIA Centaur, ADVIA Centaur XP and ADVIA Centaur XPT systems. Measurements of thyroid stimulating hormone produced by the anterior pituitary are used in the diagnosis of thyroid or pituitary disorders.
Lower Limit of Detection	0.01 µIU/mL Based on Analytical Sensitivity	0.05 µIU/mL Based on Limit of Quantitation
Expected Values	Includes reference ranges for: Euthyroid Hyperthyroid Hypothyroid	Includes reference ranges for: Euthyroid

Table 3. List of Instrument Modifications

Item	ADVIA Centaur XP	ADVIA Centaur XPT
User Interface CPU	Sun Sparc based CPU running Solaris (UNIX based) OS, with additional Intel based Application PC (APC) for QC, online documentation running on Windows XP	Single Intel Quad processor based PC, with a new User Interface application with integrated APC applications running on Windows 7
Real Time Control CPU	Sun Sparc based CPU running Solaris (UNIX based) OS for instrument control and data collection and analysis;	Real Time application rewritten to run on a RoHS compliant ARM 9 based CPU running Nucleus OS;
Microcontrollers	Multiple distributed real-time Microcontrollers	Same (now RoHS compliant)
QC Software	ADVIA QC application providing Stored control results, Levy-Jennings plotting, and statistics, integrated on the Application PC (APC) within the product	ADVIA QC application now integrated into the UI application
Display Monitor	19" LCD Touch Screen color monitor with Graphical User Interface;	22” LCD Touch Screen Color monitor supporting a resolution of 1680 x 1050 with Graphical User Interface

Table 3. List of Instrument Modifications

Item	ADVIA Centaur XP	ADVIA Centaur XPT
External Printer	No network capable printer	Support for new high speed and networked printers
Remote Diagnostics	External Modem for Remote Diagnostics Interface and application Software for remote diagnostics over the Internet via Server hosted on a separate Application PC (APC) within the product;	Same functionality integrated into the UI application
Barcode Reader	Stationary and handheld barcode scanners for identification of patient samples Multiple barcode formats supported including 128, 2 of 5, Code39, Codabar;	Same plus added support for 2D barcodes
Data Archival	Data Management, instrument data can be archived to floppy disks or CD	System supports DVDs & memory sticks
Cleaning Procedures	Monthly cleaning procedures	Monthly cleaning has been eliminated
Mounting of Reagent Compartment **Refrigeration Hardware**	Reagent compartment mounted at the left side of the instrument. Thermo-electric devices for refrigeration oriented in various directions.	Same physical location of reagent compartment. Thermo-electric devices for refrigeration oriented in uniform direction.

6. Comparison of Similarities and Differences between the Predicate Device and the Candidate Device

Table 4. Similarities/Differences: Unmodified and Modified ADVIA Centaur TSH Assays

Item	ADVIA Centaur TSH (Unmodified Predicate Device)	ADVIA Centaur TSH (Modified Candidate Device)
Instrument Platforms	ADVIA Centaur ADVIA Centaur XP	ADVIA Centaur ADVIA Centaur XP ADVIA Centaur XPT
Intended Use	For *in vitro* diagnostic use in the quantitative determination of thyroid-stimulating hormone (TSH, thyrotropin) in serum using the ADVIA Centaur and ADVIA Centaur XP systems.	For *in vitro* diagnostic use in the quantitative determination of thyroid-stimulating hormone (TSH, thyrotropin) in serum using the ADVIA Centaur, ADVIA Centaur XP and ADVIA Centaur XPT systems. Measurements of thyroid stimulating hormone produced by the anterior pituitary are used in the diagnosis of thyroid or pituitary disorders.
Methodology	Two-site sandwich immunoassay using direct chemiluminometric technology	Same
Reagents	ReadyPack Primary Reagent Pack contains both Solid Phase and Lite Reagent in separate wells	Same
Lite Reagent	Monoclonal mouse anti-TSH antibody labeled with acridinium ester	Same
Solid Phase	Polyclonal sheep anti-TSH antibody covalently coupled to paramagnetic particles	Same
Specimen Type	Serum	Same
Sample Volume	200 µL	Same
Calibration	2-point calibration using Calibrator B	Same
Lower Limit of Detection	0.01 µIU/mL Based on Analytical Sensitivity	0.05 µIU/mL Based on Limit of Quantitation
Expected Values	Includes reference ranges for: Euthyroid Hyperthyroid Hypothyroid	Includes reference ranges for: Euthyroid

Table 5. Similarities/Differences: ADVIA Centaur XP and ADVIA Centaur XPT Instruments

Item	ADVIA Centaur XP	ADVIA Centaur XPT
Principles of Operation	Chemiluminescence using magnetic-particle Solid Phase and chemiluminescent label (acridinium ester) Lite Reagent	Same
Optical System	Photo Multiplier Tube (PMT) used in photon counting mode	Same
Temperature Control	Reactions are controlled at 37°C Reagents stored at 4°C to 8°C	Same
Cleaning Procedures	Monthly cleaning procedures	Monthly cleaning has been eliminated
Mounting of Reagent Compartment **Refrigeration Hardware**	Reagent compartment mounted at the left side of the instrument. Thermo-electric devices for refrigeration oriented in various directions.	Same physical location of reagent compartment. Thermo-electric devices for refrigeration oriented in uniform direction.
Test Processing	Random Access and Batch; Cuvettes are incubated in a circular, insulated track (Incubation Ring) that advances the cuvette at 15 second intervals and incubates the cuvette at 37°C. The incubation ring moves the cuvettes from the sample probe to the ancillary and reagent probes.	Same
Assay Protocols	Assay specific parameters contained in Test Definitions (TDefs) for each assay. 7.5 min incubation, single step; or 20 min incubation, single step;or 7.5 min / 20 min incubation, 2-step; or 20 min / 20 min incubation, 2-step	Same
Specimens	Serum or plasma; Sample cups or primary tubes; Dilutions allowed on a per-assay basis; Capability of diluting samples requiring pretreatment	Same
Disposables	Reaction cuvettes; Sample Pipette Tips	Same
Calibration	2 point user run calibration; 6 to 10 point stored calibration for each reagent; Calibrators checked with barcode; Calibrator lot numbers stored and displayed	Same

Table 5. Similarities/Differences: ADVIA Centaur XP and ADVIA Centaur XPT Instruments

Item	ADVIA Centaur XP	ADVIA Centaur XPT
Throughput	120 to 240 tests/hr	Same
Time to First Result	15 min, 30 min, 60 min depending upon assay protocol	Same
Dimensions	Floor Model, 60H x 42D x 58L 1200 lbs	Same
User Interface CPU	Sun Sparc based CPU running Solaris (UNIX based) OS, with additional Intel based Application PC (APC) for QC, online documentation running on Windows XP	Single Intel Quad processor based PC, with a new User Interface application with integrated APC applications running on Windows 7
Real Time Control CPU	Sun Sparc based CPU running Solaris (UNIX based) OS for instrument control and data collection and analysis;	Real Time application rewritten to run on a RoHS compliant ARM 9 based CPU running Nucleus OS;
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Barcode Reader	Stationary and handheld barcode scanners for identification of patient samples Multiple barcode formats supported including 128, 2 of 5, Code39, Codabar;	Same plus added support for 2D barcodes
Data Archival	Data Management, instrument data can be archived to floppy disks or CD	System supports DVDs & memory sticks

7. Summary of Design Control Activities

Design control activities, as outlined in 21CFR 820.30, were completed for the ADVIA Centaur XPT system.

A risk analysis (Failure Modes and Event Analysis) was undertaken to assess risks of using the device. This evaluation followed the Siemens Healthcare Diagnostics procedure for risk analysis, which is based on ISO 14971:2007, Medical devices – Application of risk management to medical devices. The risk analysis concluded that all identified risks were properly mitigated and no unacceptable risks are present.

The performance of the ADVIA Centaur TSH assay using the ADVIA Centaur XPT system was verified to ensure equivalent performance when used on the predicate ADVIA Centaur XP system. All verification testing met pre-determined acceptance criteria. Therefore, the introduction of the ADVIA Centaur XPT system does not negatively impact the performance, safety or effectiveness of the ADVIA Centaur TSH assay.

8. Conclusions

The performance of the ADVIA Centaur TSH assay on the ADVIA Centaur XPT system is substantially equivalent to the ADVIA Centaur TSH assay running on the currently-marketed predicate ADVIA Centaur XP system.

The ADVIA Centaur XPT system has the same operating principles, assay performance characteristics and intended use as the predicate device, the ADVIA Centaur XP system. The results of performance testing and verification activities demonstrate that the design modifications to the ADVIA Centaur XPT do not impact its safety or effectiveness and do not alter its performance claims.

Furthermore, there have been no changes to the intended use of the ADVIA Centaur TSH assay, other than to include the ADVIA Centaur XPT, as described in the labeling, or the fundamental scientific technology of the device.