K121951

5.0 510(k) SUMMARY

APR 4 2013

SUBMITTED BY:

Kelly R. Sauer
Regulatory Affairs Specialist
DiaSorin Inc.
1951 Northwestern Avenue
P.O. Box 285
Stillwater, MN 55082-0285
Phone (651) 351-5884
Fax (651) 351-5669
Email: kelly.sauer@diasorin.com

DATE PREPARED: March 25, 2013

NAME OF DEVICE:

Trade Name: LIAISON® FT4
LIAISON® Control Thyroid 1
LIAISON® Control Thyroid 2
LIAISON® Control Thyroid 3

Common Names/Descriptions: Free Thyroxine Assay

Classification Names: Free Thyroxine Test System: Class II
21 CFR 862.1695; Clinical Chemistry (75)
Quality Control Material: Class I, reserved
21 CFR 862.1660; Clinical Chemistry (75)

Product Code: CEC, JJX

PREDICATE DEVICE: Roche Elecsys® FT4
Reference K961489 (assay)
Elecsys® PreciControl Universal
Reference K090541 (control set)

DEVICE DESCRIPTION:

INTENDED USE:
The DiaSorin LIAISON® FT4 assay is an *in vitro* chemiluminescent immunoassay (CLIA) intended for the quantitative determination of free thyroxine (FT4) in human serum using the LIAISON® Analyzer. It is intended for use as aid in the clinical assessment of thyroid status.

The DiaSorin LIAISON® Control Thyroid 1, LIAISON® Control Thyroid 2 and LIAISON® Control Thyroid 3 are intended for use as assayed quality control samples to monitor the accuracy and precision of the DiaSorin LIAISON® FT4 assay.

KIT DESCRIPTION:

The LIAISON® FT4 assay's method for quantitative determination of FT4 is based on the Solid Phase Antigen Linked Technique (SPALT) principle. A T4-protein-conjugate is coated on the magnetic particles (solid phase); a monoclonal antibody is linked to an isoluminol derivative (isoluminol-antibody conjugate). All assay steps and incubations are performed by the LIAISON® Analyzer.

Results are determined by a 2 point calibration conversion of the master curve to a working curve. The light signal, and hence the amount of isoluminol-antibody conjugate, is measured by a photomultiplier as relative light units (RLU) and is inversely related to FT4 concentration present in calibrators, patient samples or controls.

COMPARISON TO PREDICATE DEVICE:

The DiaSorin LIAISON® FT4 assay is substantially equivalent in principle and performance to the Roche Elecsys® FT4 Test (K961489) which was FDA cleared June 11, 1996.

Table 1: Table of Assay Similarities and Differences

Characteristic	New Device LIAISON® FT4	Predicate Device Roche Elecsys® FT4 (K961489)
Intended Use	The DiaSorin LIAISON® FT4 Assay is a chemiluminescent immunoassay (CLIA) intended for the quantitative determination of free thyroxine (FT4) in human serum using the LIAISON® Analyzer.	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 analyzers.
Indications for Use	For use as an aid in the clinical assessment of thyroid status	Same
Measured Analyte	Free thyroxine	Free thyroxine
Assay Type	Chemiluminescent Immunoassay	Electrochemiluminescent immunoassay
Calibration	Two-point verification of stored master curve.	Same
Reagent Integral Storage	On-board or in refrigerator@ 2-8°C	Same
Sample Handling/Processing	Automated	Same
Unit of Measure	ng/dL or pmol/L	Same
Reference range	Serum 0.69 – 1.59 ng/dL (8.93 –20.4 pmol/L)	Serum 0.93 – 1.70 ng/dL (12.0 – 21.9 pmol/L)
Measuring range	0.29 - 7.7 ng/dL (3.73 - 99.1 pmol/L)	0.023 – 7.77ng/dL (0.300 – 100.0 pmol/L)
Sample Matrix	Human serum	Human serum and plasma

Sample size	50µL	15µL
Conjugate Antibody	Mouse monoclonal anti-thyroxine	Sheep polyclonal anti-thyroxine
Assay time	17 minutes	18 minutes
Open storage 2-8°C	2 weeks	12 weeks
Open storage on analyzer	2 weeks	4 weeks
Calibrators	2 levels – Included in integral	2 levels – Not included with kit
Controls	3 levels	2 levels

DiaSorin LIAISON® Control Thyroid 1, LIAISON® Control Thyroid 2, LIAISON® Control Thyroid 3 and Elecsys® PreciControl Universal Similarities and Differences

Table 2: Table of Control Similarities and Differences		
Characteristic	**New Device LIAISON® Control Thyroid 1 LIAISON® Control Thyroid 2 LIAISON® Control Thyroid 3**	**Predicate Device Elecsys® PreciControl Universal (K090541)**
Intended Use	Intended for use as quality control samples to monitor the accuracy and precision of the DiaSorin LIAISON® FT4 assay	Intended for use as quality control of Elecsys® immunoassays on the Elecsys® and Cobas® e immunoassay analyzers
Matrix	Human serum	Same
Reagent Format	Lyophilized	Same
Storage	Unopened store at 2-8° C until expiration date	Same
Levels	Three concentrations : Low, medium, high	Two concentrations : Low and high
Reagent Format	4 vials x 5.0 mL each level Each level provided separately	2 vials x 3.0 ml each level
Handling	Reconstitue with 5.0 mL distilled water and allow to stand15 minutes before use	Reconstitute with 3.0 mL distilled water and allow to stand 30 minutes before use.
Open Storage	Reconstituted : 48 hours at 2-8° C For longer storage periods, frozen to -20 °C	Reconstituted : On analyzer at 20-25° C up to 5 hrs ; 3 days at 2-8° C; -20° C for up to 1 month

PERFORMANCE DATA:

Method Comparison:
A total of 201 samples were tested by the LIAISON® FT4 assay and a commercially available immunoassay. The method comparison study was performed according to CLSI EP9-A2 guideline.

Passing & Bablok regression analysis was performed on the results across the range of LIAISON® FT4 assay yielding agreement of y =1.0707x - 0.1211, R^2 = 0.9633. The 95% confidence intervals for the slope were 1.03 to 1.09 and 95% confidence intervals for the intercept were -0.17 to -0.08 ng/dL.

Reference Range/Expected Values:
Human serum samples from 130 apparently healthy adults were tested to determine the reference range for the LIAISON® FT4 assay.

Apparently Healthy Adults	Median	Observed 95% Normal Range
Serum (130)	1.08 ng/dL	0.69 – 1.59 ng/dL
	13.9 pmol/L	8.93 – 20.4 pmol/L

Consider these limits as guidelines only. Each laboratory should establish its own reference range

Reproducibility/Precision:

20 Day Study Design

A twenty day reproducibility/precision study was performed at DiaSorin Inc. A coded panel comprised of 4 frozen serum samples was prepared by DiaSorin. The LIAISON® Control Thyroid (3 levels) were also tested in the study. The CLSI document EP5-A2 was consulted in the preparation of the testing protocol.

The precision panel samples and kit controls were tested on one lot of LIAISON® FT4 assay in two replicates per run, 2 runs per day for 20 operating days for a total of 80 replicate results per sample.

The mean, standard deviation, and coefficient of variation (%CV) of the results were computed for each of the tested samples.

Results:
The 20 day results are summarized in Table 3 as sample overall mean FT4 concentration in ng/dL, computed SDs and %CVs for between run and total.

Table 3: Reproducibility/Precision Results – 20 day

Sample	N	Mean (ng/dL)	Between Run		TOTAL	
			SD	%CV	SD	%CV
Kit Control 1	80	1.02	0.02	1.8%	0.08	7.9%
Kit Control 2	80	3.18	0.07	2.3%	0.22	6.9%
Kit Control 3	80	6.59	0.33	4.9%	0.46	7.0%
Sample 1	80	1.19	0.03	2.7%	0.09	8.0%
Sample 2	80	1.90	0.05	2.4%	0.14	7.5%
Sample 3	80	5.56	0.17	3.1%	0.40	7.1%
Sample 4	80	5.72	0.17	2.9%	0.40	7.1%

5 Day Study Design

An additional five day precision study was performed at DiaSorin. The sample panel consisted of three frozen serum samples prepared by DiaSorin with FT4 concentrations near medical decision points.

The precision panel samples were tested on one lot of LIAISON® FT4 assay in twelve replicates per run, one run per day for 5 operating days for a total of 60 replicate results per sample.

Results:
The 5 day results are summarized in Table 4 as sample overall mean FT4 concentration in ng/dL, computed SDs and %CVs for between run and total.

Table 4: Reproducibility/Precision Results – 5 day

Sample	N	Mean (ng/dL)	Between Run		TOTAL	
			SD	%CV	SD	%CV
Sample 1 (hypo)	60	0.851	0.08	9.7	0.08	9.5%
Sample 2 (normal)	60	1.57	0.14	9.0	0.13	8.6%
Sample 3 (hyper)	60	3.25	0.24	7.4	0.24	7.5%

Dilution Linearity:
An aliquot of a buffer sample containing phosphate buffered saline (PBS), 5% BSA was spiked with T4 and diluted with the same buffer. This yielded a sample with T4 levels spanning the measuring range of the LIAISON® FT4 assay (0.29 – 7.7 ng/dL). The sample was analyzed by the LIAISON® FT4 assay following CLSI EP6-A. The sample was diluted into ten evenly spaced intervals including the neat sample and tested in four replicates for each dilution on the LIAISON® Analyzer.

Results:
The results were analyzed by a linear regression of measured FT4 concentration versus expected FT4. The resulting regression equation:
Measured FT4 = 1.025 (Expected FT4) + 0.084, R = 0.998

LIAISON® FT4 Assay is linear across the measuring range of the assay (0.29 – 7.7 ng/dL).

Traceability, Stability, Target Values:
Traceability: The LIAISON® FT4 kit calibrators are referenced to an 'in-house" Primary Reference Standard preparation.

Calibrator Value Assignment: Calibrator concentrations are assigned through an internal procedure. Master standards are prepared from intermediate stock solutions. Concentrations are assigned by testing in 10 different assays against the Primary Reference Standard. The master calibrators are then used to assign values to the kit calibrators using multiple LIAISON® analyzers with several kits calibrators over several runs to determine the target values.

Calibrator Stability: Reagent integral is stable until the expiration date printed on the label when stored as directed and for 2 weeks (14 days) on board the LIAISON® analyzer or opened and stored at 2-8°C.

Calibration curve stability was performed and demonstrated that kit performance was acceptable to 2 weeks from calibration.

LIAISON® FT4 Calibrator 1 is manufactured to have a FT4 level between 0.45 – 0.55 ng/dL.
LIAISON® FT4 Calibrator 2 is manufactured to have a FT4 level between 5.0 – 7.0 ng/dL.

Control Value Assignment: A minimum of 60 valid test results for each control are used in the range assignment. The **LIAISON® Control Thyroid 1, LIAISON® Control Thyroid 2, LIAISON® Control Thyroid 3** are tested on a minimum of 3 LIAISON® Analyzers, using 2 different approved LIAISON® FT4 assay kit lots, at a minimal time period of 3 days. The mean value and the standard deviation (std) is calculated from the test results.
The target value of the controls is given by the calculated mean value. The target range is given by the mean value +/- 3 std.

Control Stability: Lyophilized controls are stable until the expiration date shown on the product labeling when stored as instructed.

Reconstituted controls are stable for up to 48 hours when stored at 2-8°C. For longer storage periods, control aliquots should be frozen to -20°C.

LIAISON® Control Thyroid 1 has a target value of 1.0 ng/dL
LIAISON® Control Thyroid 2 has a target value of 3.0 ng/dL
LIAISON® Control Thyroid 3 has a target value of 6.0 ng/dL

LoB/LoD/LoQ

The Limit of Blank, Limit of Detection and Limit of Quantitation were determined according to CLSI EP17-A: Protocols for Determination of Limits of Detection and Limits of Quantitation.

The following limits were determined with the LIAISON® FT4 assay:

Limit of Blank: ≤ 0.06 ng/dL
Limit of Detection: 0.13 ng/dL
Limit of Quantitation: 0.29 ng/dL

Interfering Substances

Controlled studies of potentially interfering substances showed no interference at the concentration for each substance listed below in the LIAISON® FT4 assay. The testing was based on CLSI-EP7-A2.

Substance/Drug	Concentration Tested
Hemoglobin	1000 mg/dL
Triglycerides	3000 mg/dL
Bilirubin (conj)	20 mg/dL
Bilirubin (unconj)	20 mg/dL
Salicylic acid	741300 ng/dL
Acetylsalicylic acid	907200 ng/dL
Phenylbutazone	1540500 ng/dL
Diphenylhydantoin	1301397 ng/dL
Amiodarone	3396600 ng/dL
8-Anilino-1-naphtalene sulfonic acid ammonium salt	1579200 ng/dL
Furosemide	1626000 ng/dL
Iopanic acid	2842000 ng/dL
DL-propranolol	1520000 ng/dL
Rheumatoid Factor	54 IU/mL

Specificity

The cross-reactivity of the LIAISON® FT4 assay with these substances has been expressed where possible as the ratio of:

- The amount of the T4 required to displace 50% of the maximally bound labeled T4 from the anti-T4 antibody,
- The amount the cross-reactant to give the same 50% displacement.

Amounts for cross-reactant and analyte are taken from the displacement curve. The ratio of the two amounts as percentage-value is the % cross-reactivity of the cross reactant.

Cross-Reactant	% Cross-reactivity
D-T4	100%
3-iodo-L-Tyrosine	0%
3,5-diiodo-L-Tyrosine	0%
3,3',5,5'-tetra-iodothyroacetic acid	0%

CONCLUSION:

The material submitted in this premarket notification is complete and supports the basis for substantial equivalence. The labeling is sufficient and satisfies the requirements of 21 CFR Part 809.10.

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

April 4, 2013

KELLY R SAUER
REGULATORY AFFAIRS SPECIALIST
DIASORIN
1951 NORTHWESTERN AVE.
P.O. BOX 285
STILLWATER MN 55082

Re: K121951
Trade/Device Name: LIAISON® FT4, LIAISON® Control Thyroid 1, LIAISON® Control Thyroid 2, LIAISON® Control Thyroid 3
Regulation Number: 21 CFR 862.1695
Regulation Name: Free thyroxine test system
Regulatory Class: II
Product Code: CEC, JJX
Dated: March 25, 2013
Received: March 28, 2013

Dear Ms. Sauer:

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.

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 Office of *In Vitro* Diagnostics and Radiological Health at (301) 796-5450. Also, please note the regulation entitled, "Misbranding by reference to premarket notification" (21CFR 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 Small Manufacturers, International and Consumer Assistance 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,

Carol C. Benson -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

Indications for Use

510(k) Number (if known): k121951

Device Name: LIAISON® FT4
LIAISON® Control Thyroid 1,
LIAISON® Control Thyroid 2
LIAISON® Control Thyroid 3

Indications for Use:

The DiaSorin LIAISON® FT4 assay is an *in vitro* chemiluminescent immunoassay intended for the quantitative determination of free thyroxine (FT4) in human serum using the LIAISON® Analyzer. It is intended for use as an aid in the clinical assessment of thyroid status.

The DiaSorin LIAISON® Control Thyroid 1, LIAISON® Control Thyroid 2 and LIAISON® Control Thyroid 3 are intended for use as assayed quality control samples to monitor the accuracy and precision of the DiaSorin LIAISON® FT4 assay

Prescription Use __X____ (21 CFR Part 801 Subpart D)

And/Or

Over the Counter Use ____. (21 CFR Part 801 Subpart C)

(PLEASE DO NOT WRITE BELOW THIS LINE; CONTINUE ON ANOTHER PAGE IF NEEDED)

Concurrence of CDRH, Office of In Vitro Diagnostics and Radiological Health (OIR)

Yung W. Chan -S

Division Sign-Off
Office of In Vitro Diagnostics and Radiological Health

510(k)__k121951___