

**510(k) SUBSTANTIAL EQUIVALENCE DETERMINATION  
DECISION SUMMARY  
ASSAY ONLY TEMPLATE**

**A. 510(k) Number:**

k070788

**B. Purpose for Submission:**

Modification of assay performance claims for this assay in saliva samples

**C. Measurand:**

Cortisol

**D. Type of Test:**

Quantitative immunoassay

**E. Applicant:**

Roche Diagnostics

**F. Proprietary and Established Names:**

Elecsys Cortisol Immunoassay  
Elecsys Cortisol CalSet

**G. Regulatory Information:**

1. Regulation section:

21 CFR 862.1205  
21 CFR 862.1150

2. Classification:

II

3. Product code:

NHG  
JIT

4. Panel:

Chemistry (75)

**H. Intended Use:**

1. Intended use(s):

See Indications for use.

2. Indication(s) for use:

Elecsys Cortisol Immunoassay

Immunoassay for the in vitro quantitative determination of cortisol in human serum, plasma, urine, and saliva. The determination of cortisol is used for the recognition and treatment of functional disorders of the adrenal gland.

The electrochemiluminescence immunoassay “ECLIA” is intended for use on Elecsys and cobas e immunoassay analyzers.

Elecsys Cortisol CalSet

Elecsys Cortisol CalSet is used for calibrating the quantitative Elecsys Cortisol assay on the Elecsys immunoassay analyzers.

3. Special conditions for use statement(s):

These devices are for prescription use.

4. Special instrument requirements:

Elecsys 1010/2010, MODULAR ANALYTICS E170, or cobas e 411/601 analyzers

**I. Device Description:**

The Elecsys Cortisol Assay is a two step sandwich immunoassay with streptavidin microparticles and electrochemiluminescence detection. Results are determined using a calibration curve that is generated specifically on each instrument by a 2-point calibration and a master curve provided with the reagent bar code. The Elecsys Cortisol Assay is intended for use on the Elecsys Immunoassay Family of Analyzers. The Salivette device is required for the collection of saliva for testing. The Elecsys Cortisol CalSet is the calibration material for the assay.

**J. Substantial Equivalence Information:**

1. Predicate device name(s):

Elecsys Cortisol Assay

2. Predicate K number(s):

k043175

3. Comparison with predicate:

<b>Similarities</b>		
<b>Item</b>	<b>Device</b>	<b>Predicate</b>
Intended Use/Indications for Use	Quantitative determination of cortisol in human serum, plasma, urine, and saliva, for recognition and treatment of functional disorders of the adrenal gland	Same
Test Principle	Competitive assay, electrochemiluminescent	Same
Measuring Range	1 – 1750 nmol/L	Same
	Calibration of the quantitative Elecsys Cortisol assay on the Elecsys immunoassay analyzers	Same

<b>Differences</b>		
<b>Item</b>	<b>Device</b>	<b>Predicate</b>
Platforms	Elecsys 1010, Elecsys 2010, and MODULAR ANALYTICS E170, cobas e 411 and cobas e 601 analyzers	Elecsys 1010, Elecsys 2010, and MODULAR ANALYTICS E170 analyzers
Performance Claims	Limit of Blank $\leq 0.5$ nmol/L Limit of Detection $\leq 1.0$ nmol/L Limit of Quantitation 8.5 nmol/L	Analytical sensitivity $< 0.5$ nmol/L Functional sensitivity $< 2.0$ nmol/L

Differences		
Item	Device	Predicate
	Between-run (saliva) 37.1% CV @ 0.93* nmol/L 7.2% CV @ 7.72 nmol/L 6.2% CV @ 16.9 nmol/L 4.9% CV @ 34.6 nmol/L 4.1% CV @ 42.5 nmol/L  *below LoD. Values below 8.5 nmol/L are not reliable as the coefficient of variation is >20%.	Between run (saliva) 33.4% CV @ 2.08 nmol/L 11.5% CV @ 8.05 nmol/L 7.1% CV @ 13.1 nmol/L 4.9% CV @ 34.6 nmol/L 4.1% CV @ 42.5 nmol/L

**K. Standard/Guidance Document Referenced (if applicable):**

CLSI EP17-A: “Protocol for Determination of Limits of Detection and Limits of Quantitation; Approved Guideline”

CLSI EP5-A2: Evaluation of Precision Performance of Quantitative Measurement Methods; Approved Guideline-Second Edition”

**L. Test Principle:**

The Elecsys Cortisol Assay is a two step sandwich immunoassay with streptavidin microparticles and electrochemiluminescence detection. Results are determined using a calibration curve that is generated specifically on each instrument by a 2-point calibration and a master curve provided with the reagent bar code. The Elecsys Cortisol Assay is intended for use on the Elecsys Immunoassay Family of Analyzers. The Salivette device is required for the collection of saliva for testing. The Elecsys Cortisol CalSet is the calibration material for the assay.

**M. Performance Characteristics (if/when applicable):**

1. Analytical performance:

*a. Precision/Reproducibility:*

Between-run precision of the Elecsys Cortisol Test System was evaluated on Elecsys 2010 / cobas e 411 analyzer using a modified CLSI replication experiment. The protocol consisted of testing one replicate of each control (PC=PreciControl) or sample (HS=human saliva, SHS=spiked human saliva) per day for 10 days. Between-run precision was calculated according to EP5-A2.

Sample	N	Mean	SD (nmol/L)	CV (%)
PCU 1	10	362.742	7.0723	1.9
PCU 2	10	775.496	16.5517	2.1
HS low	10	2.082	0.6962	33.4
HS medium	10	8.049	0.9238	11.5
HS high	10	13.142	0.9375	7.1
SHS low	10	0.930*	0.3449	37.1
SHS medium	10	34.574	1.6868	4.9
SHS high	10	42.47	1.76	4.1

\*sample concentration is above the Limit of Blank, but below the Limit of Detection of this assay. (see Detection Limit section below). Values below 8.5 nmol/L are not reliable as the coefficient of variation is >20%.

*b. Linearity/assay reportable range:*

The measuring range is 1.00-1750 nmol/L or 0.036-63.0 µg/dL (defined by the limit of detection and the maximum of the master curve). Performance of the device across the measuring range was established in k000270, k021218, and k043175. Performance information at the low end of the assay range is summarized in the Detection Limit section below.

*c. Traceability, Stability, Expected values (controls, calibrators, or methods):*

Established in k000270, k021218, and k043175.

*d. Detection limit:*

The limit of blank and limit of detection were determined in accordance with the CLSI EP17-A requirements.

The limit of blank ( $\leq 0.50$  nmol/L or  $\leq 0.018$  µg/dL) is the 95<sup>th</sup> percentile value from  $n \geq 60$  measurements of an analyte-free sample over several independent series. The limit of blank corresponds to the concentration below which analyte-free samples are found with a probability of 95%.

The limit of detection ( $\leq 1.00$  nmol/L or  $\leq 0.036$  µg/dL) is determined based on the limit of blank and the standard deviation of low concentration samples. The limit of detection corresponds to the lowest analyte concentration which can be detected (value above the limit of blank with a probability of 95%).

The limit of quantitation (8.50 nmol/L or 0.07 µg/dL) is the lowest analyte concentration that can be reproducibly measured with a between-run coefficient of variation of  $\leq 20\%$ . It has been determined using low concentration saliva samples.

Because the %CV of low concentration samples is high, values below the LoQ should be reported with caution. The package insert has been revised to read: **“When reporting values below 8.5 nmol/L, the client report should be annotated with the following information. “Values below 8.5 nmol/L are not reliable as the coefficient of variation is  $\geq 20\%$ .”**

- e. *Analytical specificity:*  
Established under submissions k000270, k021218, and k043175.
  - f. *Assay cut-off:*  
Not applicable.
2. Comparison studies:
- a. *Method comparison with predicate device:*  
Established under submissions k000270, k021218, and k043175.
  - b. *Matrix comparison:*  
Established under submissions k000270, k021218, and k043175.
3. Clinical studies:
- a. *Clinical Sensitivity:*  
Not applicable
  - b. *Clinical specificity:*  
Not applicable
  - c. Other clinical supportive data (when a. and b. are not applicable):  
Not applicable
4. Clinical cut-off:  
Not applicable
5. Expected values/Reference range:

The following values were determined in saliva samples from 154 healthy individuals (5th-95th percentile) using Elecsys Cortisol.

Morning hours 8-10 AM: 1.90 - 19.1 nmol/L  
Afternoon hours 2:30 - 3:30 PM: 2.05 - 11.9 nmol/L

**N. Proposed Labeling:**

The labeling is sufficient and it satisfies the requirements of 21 CFR Part 809.10.

**O. Conclusion:**

The submitted information in this premarket notification is complete and supports a substantial equivalence decision.