510(k) SUBSTANTIAL EQUIVALENCE DETERMINATION
DECISION SUMMARY

I Background Information:

A 510(k) Number

K230648

B Applicant

Beckman Coulter, Inc.

C Proprietary and Established Names

Access hsTnI

D Regulatory Information

Product Code(s)	Classification	Regulation Section	Panel
MMI	Class II	21 CFR 862.1215 - Creatine Phosphokinase/Creatine Kinase Or Isoenzymes Test System	CH - Clinical Chemistry

II Submission/Device Overview:

A Purpose for Submission:

Modification of an existing device

B Measurand:

Cardiac Troponin I

C Type of Test:

Quantitative Immunoassay

III Intended Use/Indications for Use:

A Intended Use(s):
See Indications for Use below.

B Indication(s) for Use:
Access hsTnI is a paramagnetic particle, chemiluminescent immunoassay for the quantitative determination of cardiac troponin I (cTnI) levels in human serum and plasma using the Access 2 Immunoassay Systems to aid in the diagnosis of myocardial infarction (MI).

C Special Conditions for Use Statement(s):

Rx - For Prescription Use Only

D Special Instrument Requirements:

Access 2 Immunoassay Systems

IV Device/System Characteristics:

A Device Description:

Same as described in K172787.

B Principle of Operation:

The principle of operation is unchanged from the previous clearance described in K172787. The device has been modified to resolve assay carryover by improving the washing capabilities of the candidate test system.

V Substantial Equivalence Information:

A Predicate Device Name(s):
Access hsTnI

B Predicate 510(k) Number(s):
K172787

C Comparison with Predicate(s):

Device & Predicate Device(s):	K230648	K172787
Device Trade Name	Access hsTnI	Access hsTnI
General Device Characteristic Similarities		
Intended Use/Indications For Use	Quantitative determination of cardiac	same

	troponin I (cTnI) levels in human serum and plasma to aid in the diagnosis of myocardial infarction (MI).	
Assay Principle	Chemiluminescent sandwich assay	Same
Sample Type	Serum and Lithium Heparin plasma	Same
Analytical Measuring Range	2.0 pg/mL to 27,027 pg/mL	Same
Open Reagent Pack Stability	Stable at 2 to 10°C for 64 days after opening	Same
General Device Characteristic Differences		
System software	RV mix occurs at earlier cycle.	RV mix only occurs at the end of the 4th cycle.
Assay Protocol	Three (3) probe washes and one (1) NAOH exposure after reagent probe's final contact with reaction solutions and RV mix.	One (1) probe wash after probe's final interaction with reaction solutions and RV mix.
Dilution factor/Recovery & Extended Recovery Range	1:5 with new limitation to address potential carryover	1:10

VI Standards/Guidance Documents Referenced:

CLSI EP06-Ed2: Evaluation of the Linearity of Quantitative Measurement Procedures: A Statistical Approach; Approved Guideline

CLSI EP17-A2: Evaluation of Detection Capability for Clinical Laboratory Measurement Procedures; Approved Guideline – Second Edition

CLSI EP05-A3: Evaluation of Precision of Qualitative Measurement Methods Procedures; Approved Guideline – Third Edition

CLSI EP09c: Measurement Procedure Comparison and Bias Estimation Using Patient Samples; Approved Guideline – Third Edition

VII Performance Characteristics (if/when applicable):

A Analytical Performance:

1. Precision/Reproducibility:

The sponsor evaluated precision of the Access hsTnI assay on the Access 2 Immunoassay system in several studies following the recommendations in CLSI EP5-A3.

Four lithium heparin plasma samples with troponin concentrations spanning the assay range were each tested on a single Access 2 in duplicate, in two runs per day, over 20 days for a total of 40 runs and a minimum of 80 replicates per platform using a single reagent pack lot at a single site. All four samples used were unique pools of native patient samples. The two highest concentration samples (1,200 and 15,000 pg/mL targets) were spiked with a natively sourced troponin.

The within-laboratory (total) imprecision includes within-run (repeatability), between-run, and between-day variance components. Variance components analysis was used to estimate within-run, between run, and between-day, %CV and SD. Results for this study are shown below:

Access 2 Imprecision Analysis and Results Summary									
hsTnI Summary:		Within-Run		Between-Run		Between-Day		Within-Laboratory (Total)	
Target Sample Concentration (pg/mL)	Sample Concentration Mean (pg/mL)	SD	CV %	SD	CV %	SD	CV %	SD	CV%
9.0	11.49	0.249	2.17	0.1	0.79	0.4	3.9	0.52	4.54
18.8	23.4	0.592	2.53	0.2	0.94	0.5	2.0	0.79	3.39
1,200	924.6	19.956	2.16	2.9	0.32	18.7	2.0	27.53	2.98
15,000	12,844.5	411.617	3.2	270.2	2.1	202.6	1.6	532.45	4.15

The results of the study support that the enhanced washing protocol did not impact the precision of the test system.

2. Linearity:

The sponsor evaluated the linearity of the Access hsTnI assay on the Access 2 Instrument following the recommendations in CLSI EP06-A2 using both serum and lithium heparin plasma sample types covering the full range of the assay. The results of the study demonstrate that the mitigation (the enhanced washing procedure) did not impact the linearity of the test system.

Hook Effect:
Same as described in K172787.

Dilution Recovery:
The sponsor has changed the validated dilution scheme and provided data to support a dilution ratio of 1:5.

3. Analytical Specificity/Interference:

   The Analytical Specificity/Interference performance was evaluated in K172787 and the claims are unchanged.

4. Assay Reportable Range:

   2.0 - 27,027 pg/mL.

   The sponsor performed studies to evaluate intra-assay carryover and included a limitation in the labeling describing the carryover observed. In the study, when a sample with cTnI > 150,000 pg/mL (ng/L) was tested on an Access 2 system, intra-assay carryover was observed if an Access hsTnI was tested after a high cTnI sample. The extent of carryover observed was directly proportional to the cTnI concentration that was present in the high sample. In the studies, the estimated carryover was 3-5 pg/mL (ng/L) from a high sample at 270,000 pg/mL (ng/L) and 5-8 pg/mL (ng/L) from a high sample at 500,000 pg/mL (ng/L).

5. Traceability, Stability, Expected Values (Controls, Calibrators, or Methods):

   Traceability and stability is the same as described in K172787, except the stability of frozen samples has been updated to support the storage of frozen samples at -20°C for up to 180 days.

6. Detection Limit:

   Studies were performed to determine the Limit of Blank (LoB), Limit of Detection (LoD) and Limit of Quantitation (LoQ) for the Access hsTnI assay on the Access 2 instrument using the recommendations in CLSI EP17-A2. Blank samples were used in the LoB studies, lithium heparin samples and serum samples were used in the LoD and LoQ studies. The results provided for LoB, LoD, and LoQ demonstrate that the modification to the assay workflow did not impact the claimed measuring range of 2.0-27,027 pg/mL.

7. Assay Cut-Off:

   The Assay Cut-off was evaluated in K172787.

B Comparison Studies:

1. Method Comparison with Predicate Device:

   Two method comparison studies were completed to assess the impact of the modification using a protocol based on CLSI EP09c. The first study evaluated 40 Lithium Heparin Plasma and 49 Serum samples across three (3) Access 2 instruments. The second method comparison

study was performed to evaluate 51 Lithium Heparin Plasma and 53 Serum samples across two (2) Access 2 instruments. Each sample was measured using the proposed test system and the predicate test system. Each sample was measured in duplicate. The first replicate result from each sample was utilized to fit a Passing-Bablok linear regression model. Representative results are shown below:

Instrument	Sample Type	Sample #	Claimed Range	Range of Samples	Regression Equation	Correlation coefficient/R
Access 2	Plasma	41	2.0-27,027	8.4 to 24112	y= 0.98514x + -1.293997	0.998
	Serum	51		2.2 to 23977	y=0.98254 + -0.143634	0.997

The results of the method comparison study (including analyses around the cutoffs) show that the performance of the assay is unchanged since its clearance in K172787.

2. Thermal Method Comparison:

Two Thermal Sensitivity studies were completed to assess the impact of the design change on the Thermal Sensitivity of the hsTnI immunoassay on the Access 2 Immunoassay system using a protocol based on CLSI EP09c. In the first study, more than 80 samples (Lithium Heparin Plasma and Serum) were analyzed across 2 Access 2 instruments. Each sample was measured at each of three different ambient room temperature conditions and calibration temperature conditions (18°C, 23°C and 28°C). The second study evaluated more than 80 samples (Lithium Heparin Plasma and Serum) across 2 Access 2 instruments. The results were analyzed using Passing-Bablok linear regression comparing each potential run temperature/calibration temperature combination.

The results of the thermal method comparison studies support that the performance of the assay is unchanged since its clearance in K172787.

3. Matrix Comparison:

The sponsor provided data to support the use of lithium heparin samples and serum samples.

C Clinical Studies:

1. Clinical Sensitivity:

The sponsor provided information to support that the modification to the candidate device did not impact the clinical performance claims described in K172787.

2. Clinical Specificity:

   See Clinical Sensitivity above.

3. Other Clinical Supportive Data (When 1. and 2. Are Not Applicable):

   Not applicable.

D Clinical Cut-Off:

The sponsor provided information to support that the modification to the candidate device did not impact the clinical cutoffs described in K172787.

E Expected Values/Reference Range:

The sponsor provided information to support that the modification to the candidate device did not impact the 99th percentile upper reference limits described in K172787.

VIII Proposed Labeling:

The labeling supports the finding of substantial equivalence for this device.

IX Conclusion:

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