

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

A. 510(k) Number:

k083764

B. Purpose for Submission:

New Device

C. Measurand:

Amphetamine and methamphetamine

D. Type of Test:

Qualitative and semi-quantitative immunoassay

E. Applicant:

Roche Diagnostics Corporation

F. Proprietary and Established Names:

ONLINE Amphetamines II

G. Regulatory Information:

1. Regulation section:
21 CFR § 862.3100, Enzyme Immunoassay, Amphetamine
21 CFR § 862.3610, Methamphetamine test system
2. Classification:
Class II
3. Product code:
DKZ - enzyme immunoassay, amphetamine
LAF - gas chromatography, methamphetamine
4. Panel:
91 (Toxicology)

H. Intended Use:

1. Intended use(s):
See Indications for use below.
2. Indication(s) for use:
Amphetamines II (AMP II) is an in vitro diagnostic test for the qualitative and semiquantitative detection of amphetamines and methamphetamines on automated clinical chemistry analyzers at cutoff concentrations of 300 ng/mL, 500 ng/mL and 1000 ng/mL when calibrated with *d*-methamphetamine. Semiquantitative test results may be obtained that permit laboratories to assess assay performance as part of a quality control program. Semiquantitative assays are intended to determine an appropriate dilution of the specimen for confirmation by a confirmatory method such as gas chromatography/mass spectrometry (GC/MS).
Amphetamines II provides only a preliminary analytical test result. A more specific alternate chemical method must be used in order to obtain a confirmed analytical result. Gas chromatography/mass spectrometry (GC/MS) is the preferred

confirmatory method. Clinical consideration and professional judgment should be applied to any drug of abuse test result, particularly when preliminary positive results are used.

3. Special conditions for use statement(s):

Amphetamines II provides only a preliminary analytical test result. A more specific alternate chemical method must be used in order to obtain a confirmed analytical result. Gas chromatography/mass spectrometry (GC/MS) is the preferred confirmatory method. Clinical consideration and professional judgment should be applied to any drug of abuse test result, particularly when preliminary positive results are used.

For prescription use only

4. Special instrument requirements:

Roche/Hitachi 917

I. Device Description:

ONLINE Amphetamines II assay consists of ready for use reagent solutions. Reagent 1 (R1) contains conjugated drug derivatives in buffer with bovine serum albumin (BSA) and 0.09 % sodium azide. Reagent 2 (R2) contains antibody/microparticle working solution with microparticles attached to anti-drug antibodies (mouse monoclonal) in buffer with bovine serum albumin (BSA) and 0.09 % sodium azide.

J. Substantial Equivalence Information:

1. Predicate device name(s):

Abuscreen ONLINE Amphetamines

2. Predicate 510(k) number(s):

k983699

3. Comparison with predicate:

Feature	Amphetamines II Assay (k083764)	Predicate Device: Abuscreen ONLINE Amphetamines (K983699)
Methodology	KIMS, Kinetic interaction of microparticles in solution	KIMS, Kinetic interaction of microparticles in solution
Sample Type	Urine	Urine
Intended Use	Qualitative and semi-quantitative detection of amphetamines and methamphetamines	Qualitative and semi-quantitative detection of amphetamine and methamphetamine

Reagents	<p>1. <u>Conjugate Working Solution</u>: Conjugated amphetamine and methamphetamine, in buffer with bovine serum albumin (BSA) and 0.09% sodium azide.</p> <p>2. <u>Antibody/Microparticle Working Solution</u>: Microparticles attached to amphetamine, and methamphetamine, antibodies (mouse monoclonal) in buffer with bovine serum albumin (BSA) and 0.09% sodium azide.</p>	<p>1. <u>Antibody Working Solution</u>: Amphetamine and methamphetamine monoclonal antibodies (mouse) in buffer with bovine serum albumin and preservative.</p> <p>2. <u>Microparticle Working Solution</u>: Conjugated amphetamine derivative microparticles in buffer and preservative.</p>
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K. Standard/Guidance Document Referenced (if applicable):

CLSI EP5-A2, Evaluation of Precision Performance of Quantitative Measurement Methods, Approved Guideline.

L. Test Principle:

The ONLINE Amphetamines II assay is based on the kinetic interaction of microparticles in a solution (KIMS) as measured by changes in light transmission. In the absence of sample drug, soluble drug-polymer conjugates bind to antibody-bound microparticles, causing the formation of particle aggregates. As the aggregation reaction proceeds in the absence of sample, the absorbance increases. When a urine sample contains the drug in question, this drug competes with the conjugate-bound drug derivative for microparticle-bound antibody. Antibody bound to sample drug is no longer available to promote particle aggregation, and subsequent particle lattice formation is inhibited. The presence of sample drug diminishes the increasing absorbance in proportion to the concentration of drug in the sample. Sample drug content is determined relative to the value obtained for a known cutoff concentration of drug.

M. Performance Characteristics (if/when applicable):

1. Analytical performance:

a. *Precision/Reproducibility:*

The sponsor conducted two separate precision studies using Hitachi 917 analyzer for samples containing d-methamphetamine and d-amphetamine. Precision was determined according to a CLSI (EP5-A2) precision protocol. Samples were prepared by spiking a negative human urine pool with either d-methamphetamine or d-amphetamine at the following concentrations: zero drug, -75%, -50%, and -25% below the cutoff, cutoff, and +25%, +50%, +75%, and +100% above the cutoff. The d-methamphetamine and d-amphetamine stock solutions had an analytically confirmed concentration of 1 mg/mL based upon Certificate of Analysis. Samples were tested in 2 replicates per run, 2 runs per day for 21 days, total n=84. During precision testing with d-amphetamine, 9 calibrations were performed. During

precision testing with d-methamphetamine, 8 calibrations were performed. Results of the study are presented below:

d-Amphetamine:

Qualitative - 300 ng/mL Cutoff

Sample Concentration ng/mL	Percent Cut-off (%)	# Observations	Results	
			# Neg/ #Pos	
			# Negative	# Positives
0	0	84	84	0
128	-75	84	84	0
200	-50	84	84	0
262	-25	84	84	0
334	Cut-off	84	9	75
378	+25	84	0	84
438	+50	84	0	84
484	+75	84	0	84
555	+100	84	0	84

Semi-Quantitative - 300 ng/mL Cutoff

Sample Concentration ng/mL	Percent Cut-off (%)	# Observations	Results	
			# Neg/ #Pos	
			# Negative	# Positives
0	0	84	84	0
128	-75	84	84	0
200	-50	84	84	0
262	-25	84	83	1
334	Cut-off	84	5	79
378	+25	84	0	84
438	+50	84	0	84
484	+75	84	0	84
555	+100	84	0	84

Qualitative - 500 ng/mL Cutoff

Sample Concentration ng/mL	Percent Cut-off (%)	# Observations	Results	
			# Neg/ #Pos	
			# Negative	# Positives
0	0	84	84	0
143	-75	84	84	0
268	-50	84	84	0
392	-25	84	84	0
527	Cut-off	84	8	76
656	+25	84	0	84
723	+50	84	0	84

934	+75	84	0	84
1054	+100	84	0	84

Semi-Quantitative - 500 ng/mL Cutoff

Sample Concentration ng/mL	Percent Cut-off (%)	# Observations	Results # Neg/ #Pos	
			# Negative	# Positives
0	0	84	84	0
143	-75	84	84	0
268	-50	84	84	0
392	-25	84	84	0
527	Cut-off	84	2	82
656	+25	84	0	84
723	+50	84	0	84
934	+75	84	0	84
1054	+100	84	0	84

Qualitative - 1000 ng/mL Cutoff

Sample Concentration ng/mL	Percent Cut-off (%)	# Observations	Results # Neg/ #Pos	
			# Negative	# Positives
0	0	84	84	0
293	-75	84	84	0
554	-50	84	84	0
755	-25	84	84	0
1093	Cut-off	84	9	75
1384	+25	84	0	84
1629	+50	84	0	84
1877	+75	84	0	84
2122	+100	84	0	84

Semi-Quantitative - 1000 ng/mL Cutoff

Sample Concentration ng/mL	Percent Cut-off (%)	# Observations	Results # Neg/ #Pos	
			# Negative	# Positives
0	0	84	84	0
293	-75	84	84	0
554	-50	84	84	0
755	-25	84	84	0
1093	Cut-off	84	1	83
1384	+25	84	0	84
1629	+50	84	0	84
1877	+75	84	0	84
2122	+100	84	0	84

d-methamphetamine:

Qualitative - 300 ng/mL Cutoff

Sample Concentration ng/mL	Percent Cut-off (%)	# Observations	Results # Neg/ #Pos	
			# Negative	# Positives
45	0	84	84	0
98	-75	84	84	0
174	-50	84	84	0
251	-25	84	84	0
334	Cut-off	84	2	82
407	+25	84	0	84
447	+50	84	0	84
577	+75	84	0	84
658	+100	84	0	84

Semi-Quantitative - 300 ng/mL Cutoff

Sample Concentration ng/mL	Percent Cut-off (%)	# Observations	Results # Neg/ #Pos	
			# Negative	# Positives
45	0	84	84	0
98	-75	84	84	0
174	-50	84	84	0
251	-25	84	83	1
334	Cut-off	84	4	80
407	+25	84	0	84
447	+50	84	0	84
577	+75	84	0	84
658	+100	84	0	84

Qualitative - 500 ng/mL Cutoff

Sample Concentration ng/mL	Percent Cut-off (%)	# Observations	Results # Neg/ #Pos	
			Negative	Positives
38	0	84	84	0
143	-75	84	84	0
268	-50	84	84	0
392	-25	84	84	0
527	Cut-off	84	8	76
656	+25	84	0	84
723	+50	84	0	84
934	+75	84	0	84
1054	+100	84	0	84

Semi-Quantitative - 500 ng/mL Cutoff

Sample Concentration ng/mL	Percent Cut-off (%)	# Observations	Results # Neg/ #Pos	
			# Negative	# Positives
38	0	84	84	0
143	-75	84	84	0
268	-50	84	84	0
392	-25	84	84	0
527	Cut-off	84	13	71
656	+25	84	0	84
723	+50	84	0	84
934	+75	84	0	84
1054	+100	84	0	84

Qualitative - 1000 ng/mL Cutoff

Sample Concentration ng/mL	Percent Cut-off (%)	# Observations	Results # Neg/ #Pos	
			# Negative	# Positives
61	0	84	84	0
293	-75	84	84	0
554	-50	84	84	0
755	-25	84	84	0
1093	Cut-off	84	5	79
1384	+25	84	0	84
1629	+50	84	0	84
1877	+75	84	0	84
2122	+100	84	0	84

Semi-Quantitative - 1000 ng/mL Cutoff

Sample Concentration ng/mL	Percent Cut-off (%)	# Observations	Results # Neg/ #Pos	
			# Negative	# Positives
61	0	84	84	0
293	-75	84	84	0
554	-50	84	84	0
755	-25	84	84	0
1093	Cut-off	84	4	80
1384	+25	84	0	84
1629	+50	84	0	84
1877	+75	84	0	84
2122	+100	84	0	84

b. Linearity/assay reportable range:

Linearity across the range was confirmed by serially diluting a spiked urine pool containing drug in desired levels listed in the table below. Each sample was assayed on Hitachi 917 analyzer in the semi-quantitative mode. The results were averaged and compared to the expected result and the percent recovery was calculated.

Sponsor calculated the % recovery by dividing the recovered result by the target concentration and then multiplying by 100. Results are presented below:

300 cutoff			500 cutoff			1000 cutoff		
Expected	Observed	% Recovery	Expected	Observed	% Recovery	Expected	Observed	% Recovery
0	44		0	18		0	38	
42.6	81	190.14	72	94	130.56	72.6	108	148.76
85.2	112	131.46	144	161	111.81	145.2	166	114.33
127.8	146	114.24	216	227	105.09	217.8	233	106.98
170.4	182	106.81	288	284	98.61	290.4	286	98.48
213	213	100	360	357	99.17	363	363	100
255.6	251	98.2	432	435	100.69	435.6	426	97.8
298.2	296	99.26	504	499	99.01	508.2	495	97.4
340.8	320	93.9	576	573	99.48	580.8	561	96.59
383.4	362	94.42	648	634	97.84	653.4	662	101.32
426	402	94.37	720	720	100	726	719	99.04
						1240.5	1205	97.14
						1860.75	1857	99.8
						2481	2481	100
						3101.25	3046	98.22

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

The assay is calibrated using d-methamphetamine. Calibrators for cutoff levels (300 ng/mL, 500 ng/mL, 1000 ng/mL) included in this device has been previously cleared in k060645. Control materials for three cutoff levels have been previously cleared in k080183, k090939.

The sponsor provided the stability study protocols for reagent stability, and it is based on the real time stability studies conducted at 2-8°C. The on-board stability for open vials is 56 days. The sponsor recommends that users should not freeze the reagents.

d. Detection limit:

Performance at low drug concentrations in the semi-quantitative assay was characterized by determination of recovery (see section b above).

e. Analytical specificity:

Cross-reactivity was determined by spiking various concentrations of structurally similar drug compounds into drug-free urine. The cross reactivity studies were conducted for both semiquantitative and qualitative modes to determine the approximate quantity of each compound that is equivalent in assay reactivity to the 300, 500, and 1000 ng/mL assay cutoff. The table below shows the semiquantitative

results of the study for each assay cutoff. Similar results were generated for qualitative mode of the device.

Compound	ng/mL Equivalent to 300 ng/mL	Approx. Percent Cross-reactivity	ng/mL Equivalent to 500 ng/mL	Approx. Percent Cross-reactivity	ng/mL Equivalent to 500 ng/mL	Approx. Percent Cross-reactivity
MDMA	104	288	196	255	509	197
MDA	249	120	394	127	771	130
<i>d</i> -Amphetamine	251	120	494	101	981	102
MDEA	303	99	668	75	1553	64
<i>d</i> -Methamphetamine	305	98	488	102	998	100
MBDB HCl	323	93	598	84	1175	85
BDB HCl	717	42	1358	37	2420	41
<i>l</i> -Methamphetamine	2524	12	4383	11	8748	11
<i>l</i> -Amphetamine	7085	4	13342	4	24220	4
Phendimetrazine	31818	0.94	65566	0.76	138504	0.72
Phentermine	70391	0.43	123457	0.41	238663	0.42
<i>d</i> -Pseudoephedrine	73822	0.41	112613	0.44	261780	0.38
Tyramine	85115	0.35	141643	0.35	284091	0.35
<i>l</i> -Ephedrine	89655	0.33	141643	0.35	308642	0.32
<i>d,l</i> -Phenylpropanolamine HCl	211268	0.14	344828	0.15	606061	0.17
<i>d</i> -Ephedrine	215827	0.14	458716	0.11	657895	0.15

The cross-reactivity studies for structurally unrelated compounds were conducted using urine spiked with drug to low positive (+25%) concentration and a high negative (-25%) concentration for each cutoff level (300, 500, 1000 ng/mL) to determine the potential interference of the assay with variety of endogenous and pharmaceutical substances. Aliquots of pooled drug-free human urine and urine samples were further spiked with structurally unrelated compounds at a concentration of 100000 ng/mL (except for LSD [(2500 ng/mL)] and Δ -THC-9-

carboxylic acid [10000 ng/mL]). The results indicated that each compound listed below did not interfere with the accurate measurements of the device.

Acetaminophen	Diphenhydramine	Morphine
Acetylsalicylic acid	Diphenylhydantoin	Naloxone
Amitriptyline	Doxepin	Naltrexone
Ascorbic Acid	Ecgonine	Naproxen
Aspartame	Ecgonine methyl ester	Niacinamide
Benzocaine	Erythromycin	Nicotine
Benzoyllecgonine	Furosemide	Nifedipine
Caffeine	Guaiacol glycerol ether	Nordiazepam
Cannabidiol	Hydrochlorothiazide	Omeprazole
Cocaine	Ibuprofen	Oxazepam
Codeine	Ketamine	Penicillin G
Desipramine HCl	Levothyroxine	Phencyclidine
Dextromethorphan	LSD	Phenobarbital
Dextropropoxyphene	Meperidine	Quinine
Diazepam	Methadone	Secobarbital
Digoxin	Methaqualone	Tetracycline
		Δ^9 -THC

Additionally, two separate studies were conducted for amphetamine and methamphetamine to evaluate the potential interference from substances found in urine. Both studies tested in semi-quantitative and qualitative modes. For both studies, the potentially interfering compound was spiked into human urine samples containing either d-amphetamine or d-methamphetamine at concentrations roughly equivalent to the $\pm 25\%$ cutoff concentration. The d-amphetamine and d-methamphetamine stock solutions had an analytically confirmed concentration of 1 mg/mL based upon Certificate of Analysis. The results generated using a Roche/Hitachi 917 analyzer is listed below.

d-Amphetamine:

<i>Qualitative (ng/mL)</i>		300 ng/mL Cutoff		500 ng/mL Cutoff		1000 ng/mL Cutoff	
Compound	Compound Concentration	Neg Level	Pos Level	Neg Level	Pos Level	Neg Level	Pos Level
Acetone	1 %	NEG	POS	NEG	POS	NEG	POS
Ascorbic Acid	1 %	NEG	POS	NEG	POS	NEG	POS
Conjugated Bilirubin	0.1 mg/mL	NEG	POS	NEG	POS	NEG	POS
Creatinine	2.75 mg/mL	NEG	POS	NEG	POS	NEG	POS
Ethanol	1 %	NEG	POS	NEG	POS	NEG	POS

<i>Qualitative (ng/mL)</i>		300 ng/mL Cutoff		500 ng/mL Cutoff		1000 ng/mL Cutoff	
Glucose	20 mg/mL	NEG	POS	NEG	POS	NEG	POS
Hemoglobin	1 mg/mL	NEG	POS	NEG	POS	NEG	POS
Human serum albumin	5 mg/mL	NEG	POS	NEG	POS	NEG	POS
Oxalic Acid	2 mg/mL	NEG	POS	NEG	POS	NEG	POS
Sodium Chloride	0.25 M	NEG	POS	NEG	POS	NEG	POS
Urea	5 %	NEG	POS	NEG	POS	NEG	POS

d-Methamphetamine

<i>Semiquantitative (ng/mL)</i>		300 ng/mL Cutoff		500 ng/mL Cutoff		1000 ng/mL Cutoff	
Compound	Compound Concentration	Neg Level	Pos Level	Neg Level	Pos Level	Neg Level	Pos Level
Acetone	1 %	NEG	POS	NEG	POS	NEG	POS
Ascorbic Acid	1.5 %	NEG	POS	NEG	POS	NEG	POS
Conjugated Bilirubin	0.1 mg/mL	NEG	POS	NEG	POS	NEG	POS
Creatinine	5 mg/mL	NEG	POS	NEG	POS	NEG	POS
Ethanol	1 %	NEG	POS	NEG	POS	NEG	POS
Glucose	20 mg/mL	NEG	POS	NEG	POS	NEG	POS
Hemoglobin	1 mg/mL	NEG	POS	NEG	POS	NEG	POS
Human serum albumin	5 mg/mL	NEG	POS	NEG	POS	NEG	POS
Oxalic Acid	2 mg/mL	NEG	POS	NEG	POS	NEG	POS
Sodium Chloride	0.5 M	NEG	POS	NEG	POS	NEG	POS
Urea	6 %	NEG	POS	NEG	POS	NEG	POS

There is the possibility that other substances and/or factors not listed above may interfere with the test and cause false results, e.g., technical or procedural errors.

The sponsor includes a note in the labeling about not assaying the Tina-quant Hemoglobin A1c Gen. 2 and the Amphetamines II assay on the same analyzer as follows:

“When you are running Amphetamines II, and Tina-quant Hemoglobin A1c Gen. 2 assay on a Hitachi 917 system, please avoid processing Amphetamines II as the first test from standby status. If no other testing is pending then a dummy test sample should be processed to prevent the Amphetamines II from being the first test from standby (Dummy test order any test having an R1 (not HbA1c).”

To test for possible positive and/or negative interference from specific gravity, the sponsor prepared samples containing drug at control levels ($\pm 25\%$ of each cutoff concentration) with specific gravities ranging from 1.001 to 1.020. No positive or negative interference due to specific gravity was observed.

To test for potential negative interference from pH the sponsor prepared samples containing drug at control levels ($\pm 25\%$ of each cutoff concentration) with pH ranging from 4.5 to 8.0. No negative interference due to pH was observed.

f. *Assay cut-off:*

There are three cutoff concentrations claimed for both d-amphetamine and d-methamphetamine: 300 ng/mL; 500 ng/mL; 1000 ng/mL.

2. Comparison studies:

a. *Method comparison with predicate device:*

The sponsor conducted an initial method comparison study to evaluate the performance of the device for d-methamphetamine. This study involved 190 unaltered clinical samples (114 negative and 76 positive) evaluated by the methamphetamine assay and also tested for methamphetamine using GC/MS. The agreement between GC/MS and new device results for both qualitative and semi-quantitative modes of the device are listed in the tables below.

Qualitative Assay Results:

Roche ONLINE DAT AMPHII assay	Less than half the cutoff concentration by GC/MS analysis	Near Cutoff Negative (Between 50% below the cutoff and the cutoff concentration)	Near Cutoff Positive (Between the cutoff and 50% above the cutoff concentration)	High Positive (greater than 50% above the cutoff concentration)
<i>300 ng/mL Cutoff</i>				
Positive	2	1	7	69
Negative	108	3	0	0

500 ng/mL Cutoff				
Positive	0	0	6	69
Negative	110	4	0	0
1000 ng/mL Cutoff				
Positive	0	0	7	66
Negative	110	5	0	1

Semi-Quantitative Assay Results:

Roche ONLINE DAT AMPII assay	Less than half the cutoff concentration by GC/MS analysis	Near Cutoff Negative (Between 50% below the cutoff and the cutoff concentration)	Near Cutoff Positive (Between the cutoff and 50% above the cutoff concentration)	High Positive (greater than 50% above the cutoff concentration)
300 ng/mL Cutoff				
Positive	1	1	7	69
Negative	109	3	0	0
500 ng/mL Cutoff				
Positive	0	1	6	69
Negative	110	3	0	0
1000 ng/mL Cutoff				
Positive	0	0	7	66
Negative	110	5	0	1

The sponsor evaluated the cause for the discrepant results generated between the new device and GC/MS for samples tested under qualitative and semi-quantitative modes. The results are listed in the table below.

Cutoff Value (ng/mL)	Roche ONLINE DAT Methamphetamine OBSERVED Result	Roche ONLINE DAT Methamphetamine EXPECTED Result	GC/MS (ng/mL)	Drug / Metabolite
300 (SQ & Q)	Positive	Negative	174	d-methamphetamine
300 (SQ & Q)	Positive	Negative	58710 278	Pseudoephedrine Ephedrine
300 Q	Positive	Negative	76730 124	Pseudoephedrine Ephedrine
500 (SQ)	Positive	Negative	181 173	d-amphetamine d-methamphetamine
1000 (SQ & Q)	Negative	Positive	2834	d-amphetamine

The sponsor conducted two additional studies for both d-amphetamine and d-methamphetamine assays. The results were compared with GC/MS results for each cutoff concentration used in the new device. The sponsor used 40 unaltered urine samples negative for amphetamine or methamphetamine, including 4 near cutoff negative samples (i.e. values between cutoff and -50% of the cutoff by GC/MS for each drug), and 40 unaltered urine samples positive for amphetamine or methamphetamine including 4 near cutoff positive samples (i.e. values between cutoff and +50% of the cutoff by GC/MS for each drug).

New Device Results vs. stratified GC/MS Values for the d-Amphetamine assay:

The results for d-amphetamine listed in the tables below demonstrated a 92.5% negative agreement at the 300 ng/mL and 500 ng/mL cutoff concentrations with GC/MS for both the semiquantitative and qualitative assays. For d-amphetamine cutoff concentration of 1000 ng/mL, the device produced 95% and 97.5% negative agreement with GC/MS results for semiquantitative and qualitative assays, respectively. 100 % positive agreement was observed between GC/MS and the new device for both semiquantitative and qualitative assays at all cutoff levels. The comparison between GC/MS and new device results are listed in the tables below.

Qualitative Assay Results:

Roche ONLINE DAT AMPII assay	Less than half the cutoff concentration by GC/MS analysis	Near Cutoff Negative (Between 50% below the cutoff and the cutoff concentration)	Near Cutoff Positive (Between the cutoff and 50% above the cutoff concentration)	High Positive (greater than 50% above the cutoff concentration)
<i>300 ng/mL Cutoff</i>				
Positive	0	3	4	36
Negative	36	1	0	0
<i>500 ng/mL Cutoff</i>				
Positive	0	3	4	36
Negative	36	1	0	0
<i>1000 ng/mL Cutoff</i>				
Positive	0	1	4	36
Negative	36	3	0	0

Semi-quantitative Assay Results:

Roche ONLINE DAT AMPII assay	Less than half the cutoff concentration by GC/MS analysis	Near Cutoff Negative (Between 50% below the cutoff and the cutoff concentration)	Near Cutoff Positive (Between the cutoff and 50% above the cutoff concentration)	High Positive (greater than 50% above the cutoff concentration)
<i>300 ng/mL Cutoff</i>				
Positive	0	3	4	36
Negative	36	1	0	0
<i>500 ng/mL Cutoff</i>				
Positive	0	3	4	36
Negative	36	1	0	0
<i>1000 ng/mL Cutoff</i>				

Positive	0	2	4	36
Negative	36	2	0	0

The sponsor evaluated the cause for the discrepant results generated between the new device and GC/MS for negative samples, and determined that the samples contained d-methamphetamine that also produced a signal due to cross-reactivity. The results between GC/MS and new device cross reactivity data for d-amphetamine at 300 ng/mL cut-off are listed in the tables below.

Cutoff Value (ng/mL)	Roche ONLINE DAT Amphetamines OBSERVED Result	EXPECTED Result for d-amphetamine	GC/MS (ng/mL)	Drug / Metabolite
300 (SQ & Q) ¹	Positive	Negative	157 363	<i>d</i> -Amphetamine <i>d</i> -Methamphetamine
300 (SQ & Q)	Positive	Negative	181 173	<i>d</i> -Amphetamine <i>d</i> -Methamphetamine
300 (SQ & Q)	Positive	Negative	220 171	<i>d</i> -Amphetamine <i>d</i> -Methamphetamine
500 (SQ & Q)	Positive	Negative	438 121	<i>d</i> -Amphetamine <i>d</i> -Methamphetamine
500 (SQ & Q)	Positive	Negative	457 1152	<i>d</i> -Amphetamine <i>d</i> -Methamphetamine
500 (SQ & Q)	Positive	Negative	443 706	<i>d</i> -Amphetamine <i>d</i> -Methamphetamine
1000 (SQ)	Positive	Negative	961	<i>d</i> -Amphetamine
1000 (SQ & Q)	Positive	Negative	837 1163	<i>d</i> -Amphetamine <i>d</i> -Methamphetamine

¹SQ – Semi-quantitative mode; Q – Qualitative mode

New Device Results vs. stratified GC/MS Values for d-Methamphetamine:

The results for d-methamphetamine listed in the tables below indicated that for all cutoff concentrations, 90% negative agreement with GC/MS values for both the semiquantitative and qualitative assays was observed. 100 % positive agreement was seen between GC/MS and the new device for both semiquantitative and qualitative assays at all cutoff levels. The agreement between GC/MS and new device results are listed in the tables below.

Qualitative Assay Results:

Roche ONLINE DAT AMPII assay	Less than half the cutoff concentration by GC/MS analysis	Near Cutoff Negative (Between 50% below the cutoff and the cutoff concentration)	Near Cutoff Positive (Between the cutoff and 50% above the cutoff concentration)	High Positive (greater than 50% above the cutoff concentration)
300 ng/mL Cutoff				
Positive	0	4	4	36
Negative	36	0	0	0
500 ng/mL Cutoff				
Positive	0	4	4	36
Negative	36	0	0	0
1000 ng/mL Cutoff				
Positive	0	4	4	36
Negative	36	0	0	0

Semi-quantitative Assay Results:

Roche ONLINE DAT AMPII assay	Less than half the cutoff concentration by GC/MS analysis	Near Cutoff Negative (Between 50% below the cutoff and the cutoff concentration)	Near Cutoff Positive (Between the cutoff and 50% above the cutoff concentration)	High Positive (greater than 50% above the cutoff concentration)
300 ng/mL Cutoff				
Positive	0	4	4	36
Negative	36	0	0	0
500 ng/mL Cutoff				
Positive	0	4	4	36
Negative	36	0	0	0

1000 ng/mL Cutoff				
Positive	0	4	4	36
Negative	36	0	0	0

The sponsor evaluated the root cause for the discrepant results generated between the new device and GC/MS for negative samples, and determined that the samples contained d-amphetamine that also produced a signal due to the presence of antibody targeting d-amphetamine in the device. The results between GC/MS and new device cross reactivity data for d-methamphetamine at 300 ng/mL cut-off are listed in the tables below.

Cutoff Value (ng/mL)	Roche ONLINE DAT Amphetamines II ACTUAL Result	EXPECTED Result for d-methamphetamine	GC/MS (ng/mL)	Drug / Metabolite
300 (SQ & Q)	Positive	Negative	173 181	<i>d</i> -Methamphetamine <i>d</i> -Amphetamine
300 (SQ & Q)	Positive	Negative	278 101	<i>d</i> -Methamphetamine <i>d</i> -Amphetamine
300 (SQ & Q)	Positive	Negative	220 171	<i>d</i> -Methamphetamine <i>d</i> -Amphetamine
300 (SQ & Q)	Positive	Negative	291 145	<i>d</i> -Methamphetamine <i>d</i> -Amphetamine
500 (SQ & Q)	Positive	Negative	488 466	<i>d</i> -Methamphetamine <i>d</i> -Amphetamine
500 (SQ & Q)	Positive	Negative	325 171	<i>d</i> -Methamphetamine <i>d</i> -Amphetamine
500 (SQ & Q)	Positive	Negative	291 145	<i>d</i> -Methamphetamine <i>d</i> -Amphetamine
500 (SQ & Q)	Positive	Negative	472 650	<i>d</i> -Methamphetamine <i>d</i> -Amphetamine
1000 (SQ & Q)	Positive	Negative	706 443	<i>d</i> -Methamphetamine <i>d</i> -Amphetamine
1000 (SQ & Q)	Positive	Negative	540 693	<i>d</i> -Methamphetamine <i>d</i> -Amphetamine

1000 (SQ & Q)	Positive	Negative	769 395	<i>d</i> -Methamphetamine <i>d</i> -Amphetamine
1000 (SQ & Q)	Positive	Negative	572 432	<i>d</i> -Methamphetamine <i>d</i> -Amphetamine

b. Matrix comparison:
Not applicable

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:
Not Applicable

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.