February 5, 2018

W.H.P.M., Inc.
% Joe Shia
Manager
LSI Consulting
504E Diamond Ave., Suite I
Gaithersburg, MD 20877

Re: K171695
Trade/Device Name: First Sign Multi-Drug Dip Card Test
First Sign Multi-Drug Cup Test
First Sign Drug of Abuse Dip Card Test Marijuana
First Sign Drug of Abuse Cup Test Marijuana
Regulation Number: 21 CFR 862.3100
Regulation Name: Amphetamine test system
Regulatory Class: Class II
Product Code: NFT, LDJ, NFY, NGG
Dated: December 26, 2017
Received: December 28, 2017

Dear Joe Shia:

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 Part 801 and Part 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.

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.

For comprehensive regulatory information about medical devices and radiation-emitting products, including information about labeling regulations, please see Device Advice (https://www.fda.gov/MedicalDevices/DeviceRegulationandGuidance/) and CDRH Learn (http://www.fda.gov/Training/CDRHLearn). Additionally, you may contact the Division of Industry and Consumer Education (DICE) to ask a question about a specific regulatory topic. See the DICE website (http://www.fda.gov/DICE) for more information or contact DICE by email (DICE@fda.hhs.gov) or phone (1-800-638-2041 or 301-796-7100).

Sincerely,

Kellie B. Kelm -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: 06/30/2020
See PRA Statement below.

510(k) Number *(if known)*
k171695

Device Name
First Sign® Drug of Abuse Cup Test Marijuana
First Sign® Drug of Abuse Dip Card Test Marijuana

Indications for Use *(Describe)*
First Sign® Drug of Abuse Cup Test Marijuana is a qualitative lateral flow immunoassay intended for the detection of Marijuana in human urine at cut-off concentration of 20 ng/mL.

The tests provide only preliminary test results. A more specific alternative method must be used to obtain a confirmed analytical result. Gas Chromatography/Mass Spectrometry is the preferred confirmatory method. Clinical consideration and professional judgment should be used when you get any drug of abuse test result. It should be used particularly when the preliminary result is positive.
For in vitro diagnostic use only. The test is intended for prescription use.

First Sign® Drug of Abuse Dip Card Test Marijuana is a qualitative lateral flow immunoassay intended for the detection of Marijuana in human urine at cut-off concentration of 20 ng/mL.

The tests provide only preliminary test results. A more specific alternative method must be used to obtain a confirmed analytical result. Gas Chromatography/Mass Spectrometry is the preferred confirmatory method. Clinical consideration and professional judgment should be used when you get any drug of abuse test result. It should be used particularly when the preliminary result is positive.

For in vitro diagnostic use only. The test is intended for prescription use.

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.

DO NOT SEND YOUR COMPLETED FORM TO THE PRA STAFF EMAIL ADDRESS BELOW.

The burden time for this collection of information is estimated to average 79 hours per response, including the time to review instructions, search existing data sources, gather and maintain the data needed and complete and review the collection of information. Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden, to:

Department of Health and Human Services
Food and Drug Administration
Office of Chief Information Officer
Paperwork Reduction Act (PRA) Staff
PRAStaff@fda.hhs.gov

"An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB number."

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Food and Drug Administration

Indications for Use

Form Approved: OMB No. 0910-0120
Expiration Date: 06/30/2020
See PRA Statement below.

510(k) Number *(if known)*
k171695

Device Name
First Sign® Multi-Drug Cup Test
First Sign® Multi-Drug Dip Card Test

Indications for Use *(Describe)*
First Sign Multi-Drug Cup Test is a qualitative lateral flow immunoassay intended for the detection of Amphetamine, Cocaine, and Methamphetamine in human urine at cut-off concentrations of 500 ng/mL, 150 ng/mL, and 500 ng/mL, respectively.

The tests provide only preliminary test results. A more specific alternative method must be used to obtain a confirmed analytical result. Gas Chromatography/Mass Spectrometry is the preferred confirmatory method. Clinical consideration and professional judgment should be used when you get any drug of abuse test result. It should be used particularly when the preliminary result is positive.
For in vitro diagnostic use only. The tests are intended for over-the-counter use.

First Sign® Multi-Drug Dip Card Test is a qualitative lateral flow immunoassay intended for the detection of Amphetamine, Cocaine, and Methamphetamine in human urine at cut-off concentrations of 500 ng/mL, 150 ng/mL, and 500 ng/mL, respectively.

The tests provide only preliminary test results. A more specific alternative method must be used to obtain a confirmed analytical result. Gas Chromatography/Mass Spectrometry is the preferred confirmatory method. Clinical consideration and professional judgment should be used when you get any drug of abuse test result. It should be used particularly when the preliminary result is positive.

For in vitro diagnostic use only. The tests are intended for over-the-counter use.

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)

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510(k) SUMMARY

1. Date: February 2, 2018

2. Submitter
W.H.P.M., Inc.
5358 Irwindale Ave.
Irwindale, CA 91706

3. Contact person:
John Wan
W.H.P.M., Inc.
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Irwindale, CA 91706
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4. Device Name: First Sign® Multi-Drug Cup Test
First Sign® Multi-Drug Dip Card Test
First Sign® Drug of Abuse Cup Test Marijuana
First Sign® Drug of Abuse Dip Card Test Marijuana

Product Code	Classification	Regulation Section	Panel
NFT Amphetamine	II	21 CFR § 862.3100, Amphetamine Test System	Toxicology (91)
LDJ Cannabinoids	II	21 CFR § 862.3870, Cannabinoids Test System	Toxicology (91)
NFY Cocaine	II	21 CFR § 862.3250, Cocaine and Cocaine Metabolites Test System	Toxicology (91)
NGG Methamphetamine	II	21 CFR § 862.3610, Methamphetamine Test System	Toxicology (91)

5. Predicate Devices:
K122809, Advin Multi-Drug Screen Test

6. Intended Use
First Sign® Multi-Drug Cup Test is a qualitative lateral flow immunoassay intended for the detection of Amphetamine, Cocaine, and Methamphetamine in human urine at cut-off concentrations of 500ng/mL, 150 ng/mL, and 500 ng/mL, respectively.

The tests provide only preliminary test results. A more specific alternative method must be used to obtain a confirmed analytical result. Gas Chromatography/Mass Spectrometry is the preferred

confirmatory method. Clinical consideration and professional judgment should be used when you get any drug of abuse test result. It should be used particularly when the preliminary result is positive. For in vitro diagnostic use only. The tests are intended for over-the-counter use.

First Sign® Multi-Drug Dip Card Test is a qualitative lateral flow immunoassay intended for the detection of Amphetamine, Cocaine, and Methamphetamine in human urine at cut-off concentrations of 500 ng/mL, 150 ng/mL, and 500 ng/mL, respectively.

The tests provide only preliminary test results. A more specific alternative method must be used to obtain a confirmed analytical result. Gas Chromatography/Mass Spectrometry is the preferred confirmatory method. Clinical consideration and professional judgment should be used when you get any drug of abuse test result. It should be used particularly when the preliminary result is positive. For in vitro diagnostic use only. The tests are intended for over-the-counter use.

First Sign® Drug of Abuse Cup Test Marijuana is a qualitative lateral flow immunoassay intended for the detection of Marijuana in human urine at cut-off concentration of 20 ng/mL.

The tests provide only preliminary test results. A more specific alternative method must be used to obtain a confirmed analytical result. Gas Chromatography/Mass Spectrometry is the preferred confirmatory method. Clinical consideration and professional judgment should be used when you get any drug of abuse test result. It should be used particularly when the preliminary result is positive. For in vitro diagnostic use only. The test is intended for prescription use.

First Sign® Drug of Abuse Dip Card Test Marijuana is a qualitative lateral flow immunoassay intended for the detection of Marijuana in human urine at cut-off concentration of 20 ng/mL.

The tests provide only preliminary test results. A more specific alternative method must be used to obtain a confirmed analytical result. Gas Chromatography/Mass Spectrometry is the preferred confirmatory method. Clinical consideration and professional judgment should be used when you get any drug of abuse test result. It should be used particularly when the preliminary result is positive. For in vitro diagnostic use only. The test is intended for prescription use.

7. Device Description

First Sign Multi-Drug Cup Test, First Sign Multi-Drug Dip Card Test, First Sign Drug of Abuse Cup Test Marijuana, and First Sign Drug of Abuse Dip Card Marijuana are lateral flow, immunochromatographic assays. The First Sign Multi-Drug Cup Test and the First Sign Multi-Drug Dip Card Test are for the qualitative detection of Amphetamine, Cocaine, and Methamphetamine in human urine. First Sign Drug of Abuse Cup Test Marijuana, and First Sign Drug of Abuse Dip Card Marijuana are for the qualitative detection of Marijuana in human urine. The products are single-use in vitro diagnostic devices, which come in the formats of Dip Cards or Cups. Each test kit contains a Test Device (in one of the two formats), a package insert and a urine cup for sample collection. Each test device is sealed with a desiccant in an aluminum pouch.

8. Substantial Equivalence Information

A summary comparison of features of the candidate device and the predicate device is provided in following tables

Table 1: Features Comparison of First Sign® Multi-Drug Cup Test and the Predicate Device

Item	**Candidate Device** First Sign® Multi-Drug Cup Test	**Predicate Device (K122809)**
Indication(s) for Use	For the qualitative determination of Amphetamine, Cocaine, and Methamphetamine in human urine.	Same
Methodology	Competitive binding, lateral flow immunochromatographic assays based on the principle of antigen antibody immunochemistry.	Same
Specimen Type	Human urine	Same
Cut-Off Values	Amphetamine 500 ng/mL Cocaine 150 ng/ml Methamphetamine 500 ng/ml	Amphetamine 500 ng/mL Cocaine 150 ng/ml Methamphetamine 500 ng/ml
Intended Population	For over-the-counter use.	Same
Configurations	Cup	Same

Table 2: Features Comparison of First Sign® Multi-Drug Dip Card Test and the Predicate Device

Item	**Candidate Device** First Sign® Multi-Drug Dip Card Test	**Predicate Device (K122809)**
Indication(s) for Use	For the qualitative determination of Amphetamine, Cocaine, and Methamphetamine in human urine.	Same
Methodology	Competitive binding, lateral flow immunochromatographic assays based on the principle of antigen antibody immunochemistry.	Same
Specimen Type	Human urine	Same
Cut-Off Values	Amphetamine 500 ng/mL Cocaine 150 ng/ml Methamphetamine 500 ng/ml	Amphetamine 500 ng/mL Cocaine 150 ng/ml Methamphetamine 500 ng/ml
Intended Population	For over-the-counter use.	Same
Configurations	Dip Card	Same

Table 3: Features Comparison of First Sign® Drug of Abuse Cup Test Marijuana and the Predicate Device

Item	Candidate Device First Sign® Drug of Abuse Cup Test Marijuana	Predicate Device (K122809)
Indication(s) for Use	For the qualitative determination of Marijuana in human urine.	Same
Methodology	Competitive binding, lateral flow immunochromatographic assays based on the principle of antigen antibody immunochemistry.	Same
Specimen Type	Human urine	Same
Cut-Off Values	Marijuana 20 ng/ml	Marijuana 50 ng/ml
Intended Population	For prescription use.	Same
Configurations	Cup	Same

Table 4: Features Comparison of First Sign® Drug of Abuse Dip Card Test Marijuana and the Predicate Device

Item	Candidate Device First Sign® Drug of Abuse Dip Card Test Marijuana	Predicate Device (K122809)
Indication(s) for Use	For the qualitative determination of Marijuana in human urine.	Same
Methodology	Competitive binding, lateral flow immunochromatographic assays based on the principle of antigen antibody immunochemistry.	Same
Specimen Type	Human urine	Same
Cut-Off Values	Marijuana 20 ng/ml	Marijuana 50 ng/ml
Intended Population	For prescription use.	Same
Configurations	Dip Card	Same

9. Test Principle

Each assay test is a lateral flow chromatographic immunoassay. During testing, a urine specimen migrates upward by capillary action. If target drugs are present in the urine specimen below its cut-off concentration, it will not saturate the binding sites of its specific antibody (monoclonal mouse antibody) coated on the particles. The antibody-coated particles will then be captured by immobilized drug-

conjugate and a visible colored line will show up in the test line region. The colored line will not form in the test line region if the target drug level exceeds its cut-off concentration because it will saturate all the binding sites of the antibody coated on the particles. A band should form in the control region of the devices regardless of the presence of drug or metabolite in the sample.

10. Performance Characteristics

Analytical Performance

a. Precision

Precision studies were carried out for samples with concentrations of -100% cut-off, -75% cut-off, -50% cut-off, -25% cut-off, at the cut-off, +25% cut-off, +50% cut-off, +75% cut-off and +100% cut-off. These samples were prepared by spiking drug in negative urine samples. Each drug concentration was confirmed by GC/MS. All sample aliquots were blind-labeled and randomized by the person who prepared samples and did not take part in the sample testing. For each concentration, tests were performed two runs per day for 25 days by three different operators for each format of devices. Different set of operators tested each format. The results obtained are summarized in the following tables:

AMP Dip Card Format

Result / Drug	-100% Cut-off	-75% Cut-off	-50% Cut-off	-25% Cut-off	Cut-off	+25% Cut-off	+50% Cut-off	+75% Cut-off	+100% Cut-off
Lot 1	**50-/0+**	**50-/0+**	**50-/0+**	**50-/0+**	**3-/47+**	**50+/0-**	**50+/0-**	**50+/0-**	**50+/0-**
Lot 2	**50-/0+**	**50-/0+**	**50-/0+**	**50-/0+**	**2-/48+**	**50+/0-**	**50+/0-**	**50+/0-**	**50+/0-**
Lot 3	**50-/0+**	**50-/0+**	**50-/0+**	**50-/0+**	**3-/47+**	**50+/0-**	**50+/0-**	**50+/0-**	**50+/0-**

AMP Cup Format

Result / Drug	-100% Cut-off	-75% Cut-off	-50% Cut-off	-25% Cut-off	Cut-off	+25% Cut-off	+50% Cut-off	+75% Cut-off	+100% Cut-off
Lot 4	**50-/0+**	**50-/0+**	**50-/0+**	**50-/0+**	**3-/47+**	**50+/0-**	**50+/0-**	**50+/0-**	**50+/0-**
Lot 5	**50-/0+**	**50-/0+**	**50-/0+**	**50-/0+**	**2-/48+**	**50+/0-**	**50+/0-**	**50+/0-**	**50+/0-**
Lot 6	**50-/0+**	**50-/0+**	**50-/0+**	**50-/0+**	**2-/48+**	**50+/0-**	**50+/0-**	**50+/0-**	**50+/0-**

COC Dip Card Format

Result / Drug	-100% Cut-off	-75% Cut-off	-50% Cut-off	-25% Cut-off	Cut-off	+25% Cut-off	+50% Cut-off	+75% Cut-off	+100% Cut-off
Lot 1	**50-/0+**	**50-/0+**	**50-/0+**	**50-/0+**	**2-/48+**	**50+/0-**	**50+/0-**	**50+/0-**	**50+/0-**
Lot 2	**50-/0+**	**50-/0+**	**50-/0+**	**50-/0+**	**3-/47+**	**50+/0-**	**50+/0-**	**50+/0-**	**50+/0-**
Lot 3	**50-/0+**	**50-/0+**	**50-/0+**	**50-/0+**	**3-/47+**	**50+/0-**	**50+/0-**	**50+/0-**	**50+/0-**

COC Cup Format

Result / Drug	-100% Cut-off	-75% Cut-off	-50% Cut-off	-25% Cut-off	Cut-off	+25% Cut-off	+50% Cut-off	+75% Cut-off	+100% Cut-off
Lot 4	**50-/0+**	**50-/0+**	**50-/0+**	**50-/0+**	**3-/47+**	**50+/0-**	**50+/0-**	**50+/0-**	**50+/0-**
Lot 5	**50-/0+**	**50-/0+**	**50-/0+**	**50-/0+**	**3-/47+**	**50+/0-**	**50+/0-**	**50+/0-**	**50+/0-**
Lot 6	**50-/0+**	**50-/0+**	**50-/0+**	**50-/0+**	**3-/47+**	**50+/0-**	**50+/0-**	**50+/0-**	**50+/0-**

MET Dip Card Format

Result / Drug	-100% Cut-off	-75% Cut-off	-50% Cut-off	-25% Cut-off	Cut-off	+25% Cut-off	+50% Cut-off	+75% Cut-off	+100% Cut-off
Lot 1	**50-/0+**	**50-/0+**	**50-/0+**	**50-/0+**	**3-/47+**	**50+/0-**	**50+/0-**	**50+/0-**	**50+/0-**
Lot 2	**50-/0+**	**50-/0+**	**50-/0+**	**50-/0+**	**4-/46+**	**50+/0-**	**50+/0-**	**50+/0-**	**50+/0-**
Lot 3	**50-/0+**	**50-/0+**	**50-/0+**	**50-/0+**	**3-/47+**	**50+/0-**	**50+/0-**	**50+/0-**	**50+/0-**

MET Cup Format

Result / Drug	-100% Cut-off	-75% Cut-off	-50% Cut-off	-25% Cut-off	Cut-off	+25% Cut-off	+50% Cut-off	+75% Cut-off	+100% Cut-off
Lot 4	**50-/0+**	**50-/0+**	**50-/0+**	**50-/0+**	**2-/48+**	**50+/0-**	**50+/0-**	**50+/0-**	**50+/0-**
Lot 5	**50-/0+**	**50-/0+**	**50-/0+**	**50-/0+**	**3-/47+**	**50+/0-**	**50+/0-**	**50+/0-**	**50+/0-**
Lot 6	**50-/0+**	**50-/0+**	**50-/0+**	**50-/0+**	**2-/48+**	**50+/0-**	**50+/0-**	**50+/0-**	**50+/0-**

THC Dip Card Format

Result / Drug	-100% Cut-off	-75% Cut-off	-50% Cut-off	-25% Cut-off	Cut-off	+25% Cut-off	+50% Cut-off	+75% Cut-off	+100% Cut-off
Lot 1	**50-/0+**	**50-/0+**	**50-/0+**	**50-/0+**	**3-/47+**	**50+/0-**	**50+/0-**	**50+/0-**	**50+/0-**
Lot 2	**50-/0+**	**50-/0+**	**50-/0+**	**50-/0+**	**3-/47+**	**50+/0-**	**50+/0-**	**50+/0-**	**50+/0-**
Lot 3	**50-/0+**	**50-/0+**	**50-/0+**	**50-/0+**	**2-/48+**	**50+/0-**	**50+/0-**	**50+/0-**	**50+/0-**

THC Cup Format

Result / Drug	-100% Cut-off	-75% Cut-off	-50% Cut-off	-25% Cut-off	Cut-off	+25% Cut-off	+50% Cut-off	+75% Cut-off	+100% Cut-off
Lot 4	**50-/0+**	**50-/0+**	**50-/0+**	**50-/0+**	**3-/47+**	**50+/0-**	**50+/0-**	**50+/0-**	**50+/0-**
Lot 5	**50-/0+**	**50-/0+**	**50-/0+**	**50-/0+**	**4-/46+**	**50+/0-**	**50+/0-**	**50+/0-**	**50+/0-**
Lot 6	**50-/0+**	**50-/0+**	**50-/0+**	**50-/0+**	**3-/47+**	**50+/0-**	**50+/0-**	**50+/0-**	**50+/0-**

b. Linearity

Not applicable.

c. Stability

The devices are stable at 86oF (4-30℃) for 24 months based on the accelerated stability study at 50℃. Control materials are not provided with the device. The labeling provides information on how to obtain control materials.

d. Cut-off

A total of 150 samples equally distributed at concentrations of -50% cut-off; -25% cut-off; cut-off; +25% cut-off; +50% cut-off of each target drug were tested using three different lots of each device by three different operators. Results were all positive at and above +25% cut-off and all negative at and below -25% cut-off for the four target drugs. The following cut-off values for the test devices have been verified.

Target Drug	Calibrator	Cut-off (ng/mL)
Amphetamine	d-Amphetamine	500
Cocaine	Benzoylecgonine	150
Methamphetamine	d-Methamphetamine	500
Marijuana	Marijuana	20

e. Interference

Potential interfering substances found in human urine of physiological or pathological conditions were added to drug-free urine and to urine containing target drugs at 25% below and 25% above cut-off levels. These urine samples were tested using three lots of each device for all formats.

Compounds that showed no interference at a concentration of 100μg/mL (except of specified) are summarized in the following table. There were no differences observed for different formats.

Acetaminophen (4-Acetamidophenol)	Erythromycin	Oxalic acid
Acetophenetidin	β-Estradiol	Oxazepam
N-Acetylprocainamide	Fenoprofen	Oxolinic acid
Acetylsalicylic acid	Furosemide	Oxymetazoline
Albumin (1mg/mL)	Gentisic acid	Papaverine
Aminopyrine	Hemoglobin (1mg/mL)	Penicillin-G
D-Amphetamine	Hydralazine	Pentobarbital
Amoxicillin	Hydrochlorothiazide	Perphenazine
Ampicillin	Hydrocodone	Phenelzine
Apomorphine	Hydrocortisone	Phencyclidine
L-Ascorbic acid	O-Hydroxyhippuric acid	Prednisone
Aspartame	3-Hydroxytyramine	Procaine
Atropine	Ibuprofen	DL-Propranolol
Benzilic acid	D,L-Isoproterenol	D-Propoxyphene
Benzoic acid	Isoxsuprine	D-Pseudoephedrine
Benzoylecgonine	Ketamine	Quinine
Bilirubin	Ketoprofen	Ranitidine
Cannabidiol	Labetalol	Salicylic acid
Chloralhydrate	Loperamide	Secobarbital
Chloramphenicol	Maprotiline	Serotonin (5- Hydroxytyramine)
Chlorothiazide	Meperidine	Sulfamethazine
Chlorpromazine	Meprobamate	Sulindac
Chloroquine	Methadone	Tetrahydrocortisone3-(β-D-glucuronide)
Cholesterol	Methamphetamine	Tetrahydrozoline

Clonidine	Methoxyphenamine	Thiamine
Codeine	Morphinie-3-β-d-glucuronide	Thioridazine
Cortisone	Nalidixic acid	Triamterene
(-) Cotinine	Naloxone	DL-Tyrosine
Creatinine	Naltrexone	Trifluoperazine
Deoxycorticosterone	Naproxen	Trimethoprim
Dextromethorphan	Niacinamide	D L-Tryptophan
Diclofenac	Nifedipine	Tyramine
Diflunisal	Norcodeine	Uric acid
Digoxin	Norethindrone	Verapamil
Diphenhydramine	D-Norpropoxyphene	Zomepirac
Ecgonine methyl ester	Noscapine	
EMDP	D,L-Octopamine	

f. Specificity

To test the specificity, drug metabolites and other components that are likely to interfere in urine samples were tested using three lots of each device for all formats. The obtained lowest detectable concentration was used to calculate the cross-reactivity. There were no differences observed for different formats.

Amphetamine	**Result**	**%Cross-Reactivity**
(D-Amphetamine, Cutoff = 500 ng/mL)	Positive at 500 ng/mL	100%
L-Amphetamine	Positive at 60000 ng/mL	0.8%
D,L - Amphetamine	Positive at 1000 ng/mL	50%
Methylenedioxyamphetamine (MDA)	Positive at 600 ng/mL	83%
R-(-)-Apomorphine	Positive at 13000 ng/mL	4%
β-Phenylethylamine	Positive at 8000 ng/mL	6%
Tyramine	Positive at 5000 ng/mL	10%
Tryptamine	Positive at 100000 ng/mL	0.5%
Hydroxyamphetamine	Positive at 600 ng/mL	83%
D-Pseudoephedrine	Negative at $\geq 10^5$ ng/mL	<0.5%
D-Methamphetamine	Negative at $\geq 10^5$ ng/mL	<0.5%
L-Methamphetamine	Negative at $\geq 10^5$ ng/mL	<0.5%
(±)-Methamphetamine	Negative at $\geq 10^5$ ng/mL	<0.5%
Ephedrine	Negative at $\geq 10^5$ ng/mL	<0.5%
Methylenedioxyethylamphetamine (MDE)	Negative at $\geq 10^5$ ng/mL	<0.5%
3,4–Methylenedioxymethamphetamine (MDMA)	Negative at $\geq 10^5$ ng/mL	<0.5%
Phentermine	Negative at $\geq 10^5$ ng/mL	<0.5%

Cocaine	**Result**	**%Cross-Reactivity**
(Benzoylecgonine, Cutoff = 150 ng/mL)	Positive at 150 ng/mL	100%

Cocaine HCL	Positive at 3000 ng/mL	5%
Norcocaine	Negative at $\geq 10^5$ ng/mL	<0.15%
Cocaethylene	Negative at $\geq 10^5$ ng/mL	<0.15%
Ecgonine	Negative at $\geq 10^5$ ng/mL	<0.15%

Methamphetamine	**Result**	**%Cross-Reactivity**
(D-Methamphetamine, Cutoff = 500 ng/mL)	Positive at 500 ng/mL	100%
(±)3,4-Methylenedioxy-n-ethylamphetamine(MDEA)	Positive at 20000 ng/mL	2.5%
(±)-Methamphetamine	Positive at 1000 ng/mL	50%
P-Hydroxymethamphetamine	Positive at 16000 ng/mL	3%
(±)3,4-MDMA	Positive at 2000 ng/mL	25%
L-Methamphetamine	Positive at 5000 ng/mL	10%
Fenfluramine	Positive at 40000 ng/mL	1.3%
L-Amphetamine	Positive at 60000 ng/mL	0.8%
D-Pseudoephedrine	Negative at $\geq 10^5$ ng/mL	<0.5%
Trimethobenzamide	Negative at $\geq 10^5$ ng/mL	<0.5%
Chloroquine	Negative at $\geq 10^5$ ng/mL	<0.5%
Ephedrine	Negative at $\geq 10^5$ ng/mL	<0.5%
Procaine (Novocaine)	Negative at $\geq 10^5$ ng/mL	<0.5%
Ranitidine (Zantac)	Negative at $\geq 10^5$ ng/mL	<0.5%
D-Amphetamine	Negative at $\geq 10^5$ ng/mL	<0.5%
Oxazepam	Negative at $\geq 10^5$ ng/mL	<0.5%
Morphine	Negative at $\geq 10^5$ ng/mL	<0.5%
(+/-) 3,4-MDA	Negative at $\geq 10^5$ ng/mL	<0.5%

Marijuana	**Result**	**%Cross-Reactivity**
(11-Nor-Δ^9- Tetrahydrocannabinol-9-COOH, Cutoff = 20 ng/mL)	Positive at 20 ng/mL	100%
11-Hydroxy-Δ^9-Tetrahydrocannabinol	Positive at 8000 ng/mL	0.25%
Δ^8-Tetrahydrocannabinol	Positive at 5000 ng/mL	0.4%
Δ^9-Tetrahydrocannabinol	Positive at 3000 ng/mL	0.7%
11-Nor-Δ^8- Tetrahydrocannabinol-9-COOH	Positive at 30 ng/mL	67%
11-Nor-Δ^9-THC-carboxy glucuronide	Positive at 5000 ng/mL	0.4%
Cannabinol	Negative at $\geq 10^5$ ng/mL	<0.02%
Cannabidiol	Negative at $\geq 10^5$ ng/mL	<0.02%

g. Effect of Urine Specific Gravity and Urine pH

To investigate the effect of urine specific gravity and urine pH, urine samples with a range of 1.000 to 1.035 specific gravity or urine samples with a range of pH 4 to 9 were spiked with target drugs at 25% below and 25% above cut-off levels. These samples were tested using three lots of each

device for all formats. Results were all positive for samples at and above +25% Cut-Off and all negative for samples at and below -25% Cut-Off. There were no differences observed for different formats.

h. Comparison Studies

The method comparison studies were performed in-house with three different laboratory assistants for each format of the device. Operators ran 80 (40 negative and 40 positive) unaltered clinical samples for each target drug. The samples were blind labeled and compared to GC/MS results. The results are presented in the tables below:

AMP Dip Card format		Negative	Low Negative by GC/MS (less than -50%)	Near Cutoff Negative by GC/MS (Between -50% and cut-off)	Near Cutoff Positive by GC/MS (Between the cut-off and +50%)	High Positive by GC/MS (greater than +50%)
Viewer A	Positive Negative	0 10	0 10	1 19	13 1	26 0
Viewer B	Positive Negative	0 10	0 10	0 20	13 1	26 0
Viewer C	Positive Negative	0 10	0 10	1 19	13 1	26 0

Discordant Results

Viewer	Sample Number	GC/MS (ng/mL) Result	Dipcard Format Viewer Results
Viewer A	94912062	496	Positive
Viewer C	94911565	474	Positive
Viewer A	94912145	546	Negative
Viewer B	94912089	528	Negative
Viewer C	94912145	546	Negative

AMP Cup format		Negative	Low Negative by GC/MS (less than -50%)	Near Cutoff Negative by GC/MS (Between -50% and cut-off)	Near Cutoff Positive by GC/MS (Between the cut-off and +50%)	High Positive by GC/MS (greater than +50%)
Viewer A	Positive Negative	0 10	0 10	0 20	13 1	26 0
Viewer B	Positive	0	0	1	13	26

	Negative	10	10	19	1	0
Viewer C	Positive Negative	0 10	0 10	1 19	14 0	26 0

Discordant Results

Viewer	Sample Number	GC/MS (ng/mL) Result	Cup Format Viewer Results
Viewer B	94911565	474	Positive
Viewer C	94912058	481	Positive
Viewer A	94912089	528	Negative
Viewer B	94912145	546	Negative

COC Dip Card format		Negative	Low Negative by GC/MS (less than -50%)	Near Cutoff Negative by GC/MS (Between -50% and cut-off)	Near Cutoff Positive by GC/MS (Between the cut-off and +50%)	High Positive by GC/MS (greater than +50%)
Viewer A	Positive Negative	0 10	0 10	0 20	13 1	26 0
Viewer B	Positive Negative	0 10	0 10	0 20	13 1	26 0
Viewer C	Positive Negative	0 10	0 10	1 19	13 1	26 0

Discordant Results

Viewer	Sample Number	GC/MS (ng/mL) Result	Dipcard Format Viewer Results
Viewer C	94911516	149	Positive
Viewer A	94912178	151	Negative
Viewer B	94911045	168	Negative
Viewer C	94911339	160	Negative

COC Cup format		Negative	Low Negative by GC/MS (less than -50%)	Near Cutoff Negative by GC/MS (Between -50% and cut-off)	Near Cutoff Positive by GC/MS (Between the cut-off and +50%)	High Positive by GC/MS (greater than +50%)
Viewer A	Positive	0	0	1	14	26

	Negative	10	10	19	0	0
Viewer B	Positive Negative	0 10	0 10	1 19	13 1	26 0
Viewer C	Positive Negative	0 10	0 10	0 20	13 1	26 0

Discordant Results

Viewer	Sample Number	GC/MS (ng/mL) Result	Cup Format Viewer Results
Viewer A	94911516	149	Positive
Viewer B	94911033	139	Positive
Viewer B	94912178	151	Negative
Viewer C	94911339	160	Negative

MET Dip Card format		Negative	Low Negative by GC/MS (less than -50%)	Near Cutoff Negative by GC/MS (Between -50% and cut-off)	Near Cutoff Positive by GC/MS (Between the cut-off and +50%)	High Positive by GC/MS (greater than +50%)
Viewer A	Positive Negative	0 10	0 10	1 19	13 1	26 0
Viewer B	Positive Negative	0 10	0 10	0 20	13 1	26 0
Viewer C	Positive Negative	0 10	0 10	1 19	13 1	26 0

Discordant Results

Viewer	Sample Number	GC/MS (ng/mL) Result	Dipcard Format Viewer Results
Viewer A	94911195	495	Positive
Viewer C	94912082	448	Positive
Viewer A	94912048	514	Negative
Viewer B	94912073	533	Negative
Viewer C	94912048	514	Negative

MET Cup format		Negative	Low Negative by GC/MS (less than -50%)	Near Cutoff Negative by GC/MS	Near Cutoff Positive by GC/MS	High Positive by GC/MS (greater than +50%)

				(Between -50% and cut-off)	(Between the cut-off and +50%)	
Viewer A	Positive Negative	0 10	0 10	1 19	13 1	26 0
Viewer B	Positive Negative	0 10	0 10	0 20	13 1	26 0
Viewer C	Positive Negative	0 10	0 10	1 19	13 1	26 0

Discordant Results

Viewer	Sample Number	GC/MS (ng/mL) Result	Cup Format Viewer Results
Viewer A	94912072	445	Positive
Viewer C	94912082	448	Positive
Viewer A	94912073	533	Negative
Viewer B	94912073	533	Negative
Viewer C	94912048	514	Negative

THC Dip Card format		Negative	Low Negative by GC/MS (less than -50%)	Near Cutoff Negative by GC/MS (Between -50% and cut-off)	Near Cutoff Positive by GC/MS (Between the cut-off and +50%)	High Positive by GC/MS (greater than +50%)
Viewer A	Positive Negative	0 10	0 10	1 19	13 1	26 0
Viewer B	Positive Negative	0 10	0 10	1 19	13 1	26 0
Viewer C	Positive Negative	0 10	0 10	0 20	13 1	26 0

Discordant Results

Viewer	Sample Number	GC/MS (ng/mL) Result	Dipcard Format Viewer Results
Viewer A	94912036	18	Positive
Viewer B	94911685	17.8	Positive
Viewer A	94911819	22.6	Negative
Viewer B	94912007	21.3	Negative

Viewer	Sample Number	GC/MS (ng/mL) Result	Dipcard Format Viewer Results
Viewer C	94911788	22	Negative

THC Cup format		Negative	Low Negative by GC/MS (less than -50%)	Near Cutoff Negative by GC/MS (Between -50% and cut-off)	Near Cutoff Positive by GC/MS (Between the cut-off and +50%)	High Positive by GC/MS (greater than +50%)
Viewer A	Positive Negative	0 10	0 10	1 19	13 1	26 0
Viewer B	Positive Negative	0 10	0 10	1 19	14 0	26 0
Viewer C	Positive Negative	0 10	0 10	1 19	13 1	26 0

Discordant Results

Viewer	Sample Number	GC/MS (ng/mL) Result	Cup Format Viewer Results
Viewer A	94911670	19.7	Positive
Viewer B	94911686	17	Positive
Viewer C	94911685	17.8	Positive
Viewer A	94911788	22	Negative
Viewer C	94911819	22.6	Negative

i. Lay-user study

A lay user study was performed at three intended user sites with 320 lay persons testing the devices. They had diverse educational and professional backgrounds and ranged in age from 21 to > 50 years. Urine samples were prepared at the following concentrations; +/-100%, +/-75%, +/-50%, +/-25% of the cutoff by spiking drugs into drug free-pooled urine specimens. The concentrations of the samples were confirmed by GC/MS. Each sample was aliquoted into individual containers and blind-labeled. Each participant was provided with the package insert, 1 blind labeled sample and a device. The results are summarized below.

Comparison between GC/MS and Lay Person Results

AMP DipCard

% of Cutoff	Number of samples	Concentration by GC/MS (ng/mL)	Lay person results		The percentage of correct results (%)
			No. of Positive	No. of Negative	
-100% Cutoff	20	0	0	20	100%

-75% Cutoff	20	130	0	20	100%
-50% Cutoff	20	245	0	20	100%
-25% Cutoff	20	374	1	19	95%
+25% Cutoff	20	649	20	0	100%
+50% Cutoff	20	768	20	0	100%
+75% Cutoff	20	857	20	0	100%
+100% Cutoff	20	1019	20	0	100%

COC DipCard

% of Cutoff	Number of samples	Concentration by GC/MS (ng/mL)	Lay person results		The percentage of correct results (%)
			No. of Positive	No. of Negative	
-100% Cutoff	20	0	0	20	100%
-75% Cutoff	20	37	0	20	100%
-50% Cutoff	20	73	0	20	100%
-25% Cutoff	20	109	0	20	100%
+25% Cutoff	20	178	18	2	90%
+50% Cutoff	20	223	20	0	100%
+75% Cutoff	20	258	20	0	100%
+100% Cutoff	20	301	20	0	100%

MET DipCard

% of Cutoff	Number of samples	Concentration by GC/MS (ng/mL)	Lay person results		The percentage of correct results (%)
			No. of Positive	No. of Negative	
-100% Cutoff	20	0	0	20	100%
-75% Cutoff	20	129	0	20	100%
-50% Cutoff	20	259	0	20	100%
-25% Cutoff	20	393	1	19	95%
+25% Cutoff	20	669	20	0	100%
+50% Cutoff	20	730	20	0	100%
+75% Cutoff	20	930	20	0	100%
+100% Cutoff	20	1028	20	0	100%

AMP Cup

% of Cutoff	Number of samples	Concentration by GC/MS (ng/mL)	Lay person results		The percentage of correct results
			No. of	No. of	

			Positive	Negative	(%)
-100% Cutoff	20	0	0	20	100%
-75% Cutoff	20	130	0	20	100%
-50% Cutoff	20	245	0	20	100%
-25% Cutoff	20	374	0	20	100%
+25% Cutoff	20	649	19	1	95%
+50% Cutoff	20	768	20	0	100%
+75% Cutoff	20	857	20	0	100%
+100% Cutoff	20	1019	20	0	100%

COC Cup

% of Cutoff	Number of samples	Concentration by GC/MS (ng/mL)	Lay person results		The percentage of correct results (%)
			No. of Positive	No. of Negative	
-100% Cutoff	20	0	0	20	100%
-75% Cutoff	20	37	0	20	100%
-50% Cutoff	20	73	0	20	100%
-25% Cutoff	20	109	1	19	95%
+25% Cutoff	20	178	20	0	100%
+50% Cutoff	20	223	20	0	100%
+75% Cutoff	20	258	20	0	100%
+100% Cutoff	20	301	20	0	100%

MET Cup

% of Cutoff	Number of samples	Concentration by GC/MS (ng/mL)	Lay person results		The percentage of correct results (%)
			No. of Positive	No. of Negative	
-100% Cutoff	20	0	0	20	100%
-75% Cutoff	20	129	0	20	100%
-50% Cutoff	20	259	0	20	100%
-25% Cutoff	20	393	1	19	95%
+25% Cutoff	20	669	19	1	95%
+50% Cutoff	20	730	20	0	100%
+75% Cutoff	20	930	20	0	100%
+100% Cutoff	20	1028	20	0	100%

Lay-users were also given surveys on the ease of understanding the package insert instructions. All lay users indicated that the device instructions can be easily followed. A Flesch-Kincaid reading analysis was performed on each package insert and the scores revealed a reading Grade Level of 7.

j. Clinical Studies

Not applicable.

11. Conclusion

Based on the test principle and acceptable performance characteristics including precision, cut-off, interference, specificity and method comparison of the devices, it's concluded that the First Sign® Multi-Drug Cup Test, First Sign® Multi-Drug Dip Card Test, First Sign® Drug of Abuse Cup Test Marijuana and First Sign® Drug of Abuse Dip Card Test Marijuana are substantially equivalent to the predicate.