DEPARTMENT OF HEALTH & HUMAN SERVICES Public Health Service

Food and Drug Administration
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May 17, 2017

NanoEnTek, Inc
Dr. Sunmi Han
12F, 5, Digital-ro, 26-gil
Guro-gu, Seoul 08389
KOREA

Re: K162378
Trade/Device Name: FREND™ PSA Plus
Regulation Number: 21 CFR 866.6010
Regulation Name: Tumor-Associated Antigen Immunological Test System
Regulatory Class: II
Product Code: LTJ
Dated: April 18, 2017
Received: April 19, 2017

Dear Dr. Han:

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 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 Division of Industry and Consumer Education 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. 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.

You may obtain other general information on your responsibilities under the Act from the Division of Industry and Consumer Education 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,

Kelly Oliner -S

FOR
Leonthena R. Carrington, MS, MBA, MT(ASCP)
Director
Division of Immunology and Hematology Devices
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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: January 31, 2017
See PRA Statement below.

510(k) Number *(if known)*
K162378

Device Name
FREND™ PSA Plus

Indications for Use *(Describe)*
The NanoEnTek FREND™PSA Plus is designed for in vitro DIAGNOSTIC USE ONLY for the quantitative measurement of total Prostate Specific Antigen (PSA) in human serum, Li-heparinized plasma, and K3-EDTA plasma using the FREND™ System. This device is indicated for the serial measurement of total PSA to be used as an aid in the management of patients with prostate cancer.

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.

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510(k) Summary

As required by the Safe Medical Devices Act (SMDA) of 1990 and in accordance with 21 CFR §807.92, a 510(k) summary is provided

A. Applicant

Company Name: NanoEnTek, Inc.
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Contact Person: Sunmi Han
Phone Number: +82-2-6220-7887
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B. 510(k) Preparer Information (Contact Person)

Company Name: NanoEnTek, Inc.
Contact Person: Sunmi Han
Phone Number: +82-2-6220-7887
Facsimile Number: +82-2-6220-7999
Email: shan@nanoentek.com

C. Purpose for Submission

Measuring range and sample volume change on FREND™ PSA Plus

D. Measurand:

Total Prostate Specific Antigen

E. Type of Test:

Quantitative, Fluorescence Immunoassay

F. Proprietary and Established Device Name:

FREND™ PSA Plus

G. Regulatory Information:

Proprietary Name	FREND™ PSA Plus
Regulation Number	21 CFR §866.6010
Product Code	LTJ Tumor Associated Antigen Immunologic Test System
Classification	Class II with special controls
Classification Name	Prostate-Specific Antigen (Psa) For Management of Prostate Cancers
Panel	Immunology

H. Intended Use:

1. Intended Use(s):

   See indications for use below:

2. Indication(s) for use:

The NanoEnTek FREND™ PSA Plus is designed for *in vitro* DIAGNOSTIC USE ONLY for the quantitative measurement of total Prostate Specific Antigen (PSA) in human serum, Li-heparinized plasma, and K_3-EDTA plasma using the FREND™ System. This device is indicated for the serial measurement of total PSA to be used as an aid in the management of patients with prostate cancer.

3. Special conditions for use statement(s):
   For prescription use only

4. Special instrument requirements:
   NanoEnTek FREND™ System

I. Device Description

The FREND™ PSA Plus is a rapid fluorescence immunoassay that measures prostate specific antigen (PSA) in human serum and in lithium heparin and K_3-EDTA plasma using the FREND™ system. The FREND™ PSA Plus is intended for use as an aid for prostate cancer management.

The FREND™ PSA Plus Test is a single use fluorescence immunoassay designed to quantify the concentration of total PSA in serum and lithium heparin and K_3-EDTA plasma samples. The specimen is added by the operator to the sample inlet with a transfer pipet, allowing the appropriate volume of sample (35 µL) to be delivered into the FREND™ PSA Plus Test Cartridge. The Cartridge is then placed into the FREND™ System, which is programmed to begin analysis once the sample has reacted with the reagents. The reaction and analysis time is approximately 4 minutes. The PSA quantification is based on the amount of fluorescence detected by the FREND™ System at the FREND™ PSA Plus Test Cartridge window. A higher level of fluorescence is indicative of a higher PSA concentration. In other words, the magnitude of the fluorescent signal is directly proportional to the amount of total PSA in the sample.
The total PSA detection range of the FREND™ PSA Plus Test System is 0.08 to 25 ng/mL. Results are determined via a lot-specific calibration curve which is generated by the manufacturer using a six-point calibration determined from values averaged from five replicates at each level. The established curve is uploaded to the FREND™ via the PSA Plus Code-chip and is valid until the lot expiration date. The established curve is saved in the code-chip and valid until the expiration date of the test cartridge lot.

The FREND™ PSA Plus Test cartridge is a disposable plastic device that houses the reagents and contains a port or opening (inlet) where the sample is applied. Once the sample is applied, it will mix with the reagents and travel towards the detection area via capillary action.

The FREND™ System is a portable, automated FREND™ cartridge reader. The FREND™ System is based on quantitative immunoassay technology capable of quantifying single or multiple analytes by measuring laser-induced fluorescence in a single-use disposable reagent cartridge. The FREND™ cartridge utilizes micro-fluidics lateral flow technology where the analyte of interest in the sample forms immune complexes while moving through the fluidics pathway in the cartridge. The

concentration of the analyte of interest in an unknown sample is calculated using the ratio of the fluorescent intensity of the test zone and the reference zone.

FREND™ System is a bench top fluorescence reader containing a touchscreen user interface. The System has a slot that accepts the sample loaded FREND™ PSA Plus Test Cartridge, and is programmed to analyze the Test when the sample has fully reacted with the on-board in cartridge reagents. Results of the test are displayed on the screen and can be printed on an optional printer.

The FREND™ System software controls the graphical user interface, communication with hardware, database management and data analysis. The software also controls the functions of the mechanical components including the motor, laser, printer control and acquisition of data from the sensor. The user can set the time and date and enter patient ID through the graphic user interface. The user cannot make any changes to the software.

The FREND™ PSA Plus includes the following in the kit:

- 25 FREND™ PSA Plus cartridges
- 30 Disposable pipette tips
- 1 FREND™ PSA Plus Code Chip
- 1 FREND™ PSA Plus Package Insert

The FREND™ System (previously cleared in K124056, K131928, K152422, K153577, and K162754) is not provided with the kit but is required for the use of the FREND™ PSA Plus test cartridge.

J. Substantial Equivalence Information:

A general comparison of the similarities and differences of the assays is presented in the table below:

Item	FREND™ PSA Plus (modified)	FREND™ PSA Plus (K124056)
Intended Use	The NanoEnTek FREND™ PSA Plus is designed for *in vitro* DIAGNOSTIC USE ONLY for the quantitative measurement of total Prostate Specific Antigen (PSA) in human serum, Li-heparinized plasma, and K_3-EDTA plasma using the FREND™ System. This device is indicated for the serial measurement of total PSA to be used as an aid in the management of patients with prostate cancer.	Same
Sample Type	Human serum, Li-heparinized and K_3-EDTA plasma	Same
Analyte	Total PSA	Same
Type of Test	Fluorescent Immunoassay	Same
Interpretation of Results	Interpolation from a lot-specific calibration curve	Same

Item	FREND™ PSA Plus (modified)	FREND™ PSA Plus (K124056)
Dynamic Range	0.08 ~ 25 ng/mL	0.1 ~ 25 ng/mL
Test Cartridge	Disposable single-use cartridge	Same
Sample size	35 μL	30 μL
Random Access/Degree of Automation	No random access, manual manipulation	Same

K. Performance Characteristics

1. Analytical performance

a. Precision/Reproducibility

Three different lots of FREND™ PSA Plus were evaluated in the NanoEnTek, Inc. facility. Precision data was determined as described in the CLSI protocol EP5-A3. Four clinical samples were assayed in replicates of two at two separated times per day for twenty days using three lots of cartridge. Results are shown below in table format. Allowable total imprecision was 0.05 ng/mL up to 0.5 ng/mL then 10% at concentrations >0.5 ng/mL but < 25 ng/mL. All elements of this testing process met the specifications set. Imprecision was found to be acceptable on all three lot numbers.

Clinical Sample Precision

	Mean	Repeatability	Between Run	Between Day	Within Lot	Between Lot	Reproducibility

	(ng/mL)	SD	%CV	SD	%CV	SD	%CV	SD	%CV	SD	%CV	SD	%CV
Low1	0.08	0.011	14.1%	0.002	2.6%	0.002	2.4%	0.011	14.6%	0.000	0.0%	0.011	14.6%
Low2	0.10	0.012	12.3%	0.000	0.0%	0.002	2.0%	0.012	12.5%	0.000	0.0%	0.012	12.5%
Medium	4.00	0.290	7.2%	0.063	1.6%	0.000	0.0%	0.297	7.4%	0.000	0.0%	0.297	7.4%
High	21.40	1.196	5.6%	0.513	2.4%	0.000	0.0%	1.301	6.1%	0.086	0.4%	1.304	6.1%

b. Multi-site precision study

The site-to-site imprecision study was performed at three different sites using single lot of FREND^{TM} PSA Plus assay on three different FREND^{TM} system by three different operators. Within laboratory imprecision for each of three sites and combined reproducibility are summarized below.

	Sample	N	Mean (ng/mL)	Within Run		Between Day		Within Laboratory	
				SD	CV	SD	CV	SD	CV
Site 1	C	25	0.257	0.020	8.0%	0.004	1.5%	0.021	8.1%
	D	25	2.814	0.131	4.7%	0.084	3.0%	0.155	5.5%
	E	25	11.048	1.089	9.9%	0.000	0.0%	1.089	9.9%
Site 2	C	25	0.256	0.029	11.3%	0.014	5.5%	0.032	12.6%
	D	25	2.952	0.330	11.2%	0.000	0.0%	0.330	11.2%
	E	25	11.763	1.326	11.3%	0.920	7.8%	1.614	13.7%
Site 3	C	25	0.260	0.027	10.5%	0.013	5.0%	0.030	11.7%
	D	25	2.855	0.130	4.5%	0.044	1.5%	0.137	4.8%
	E	25	11.644	0.965	8.3%	0.000	0.0%	0.965	8.3%

Sample	N	Mean (ng/mL)	Repeatability		Between Day		Within Site		Between Site/ Operator/ Instrument		Reproducibility (TOTAL)	
			SD	CV	SD	CV	SD	CV	SD	CV	SD	CV
C	75	0.258	0.026	10.1%	0.011	4.4%	0.028	11.0%	0.000	0.0%	0.028	11.0%
D	75	2.874	0.218	7.6%	0.034	1.2%	0.221	7.7%	0.053	1.8%	0.227	7.9%
E	75	11.485	1.137	9.9%	0.485	4.2%	1.236	10.8%	0.219	1.9%	1.255	10.9%

c. Linearity/assay reportable range:

A study was done to demonstrate the linearity of the assay according to the dilution protocol outlined in CLSI EP6-A: Evaluation of the Linearity of Quantitative Measurement Procedures: A Statistical Approach. At each dilution level, the samples were tested in quadruplicate or quintuplicate to determine the measured value of tPSA. Linearity was

demonstrated across a range of 0.05 ~ 25.53 ng/mL, in support of the FREND™ PSA Plus reportable range of 0.08 ng/mL ~ 25 ng/mL.

d. Traceability and Expected values (controls, calibrators, or methods):

The FREND™ PSA Plus assay is traceable to the WHO International Standard Prostate Specific Antigen (90:10) NIBSC code: 96/670. The internal standard is manufactured by gravimetric methods based on the PSA Ag ACT complex (Scripps P0624-90010) or WHO standard material (NIBSC 96/670). At each concentration level, the PSA levels of calibrators are confirmed by measurement on ARCHITECT *i* total PSA assay (P910007) or TOSOH AIA ST PA Test (P910065). There is no need for calibration by the operator as the calibration information is coded in the individual cartridge.

e. Stability

Real-time stability testing for the total PSA reagent kit was performed for the previous submission (K124056) according to CLSI EP25-A, Evaluation of Stability of In Vitro Diagnostic Reagents. No additional stability studies were submitted for this submission. Reagent stability studies based on procedures and criteria in the NanoEnTek quality system showed that the cartridges for FREND™ PSA Plus are good for at least one year from the date of manufacture if stored refrigerated appropriately as directed.

f. Detection Limit:

The limit of Detection (LoD) for the FREND™ PSA Plus was established at 0.03 ng/mL according to the CLSI EP17-A2 protocol. The LoQ of the FREND™ PSA Plus was established at 0.08 ng/mL.

g. High Dose Hook Effect Testing (Prozone Detection): The presence of high dose hook effect was tested by analyzing a concentrated sample of purified PSA antigen both neat and on dilution. No High Dose Hook effect was seen in samples with a PSA concentration as high as 1200 ng/mL.

h. Analytical Specificity (Interference studies)

Interference is defined to be recovery outside of 15% of the known specimen mean concentration. Lack of interference (recovery from 85% to 115% of the expected) is considered acceptable performance. Results are summarized in the table below.

Substances		Conc.	Average %Recovery	
			Level 1 (1ng/mL)	Level 2 (4 ng/mL)
Endogenous	Hemoglobin	500 mg/dL	91.2	104.8
	Bilirubin (unconj.)	200 μg/mL	95.2	98.4
	Triglycerides	3 g/dL	107.1	101.2
	Total protein	50 mg/mL	97.4	107.8

Pharmaceuticals	Acetaminophen	250 ng/mL	101.4	101.1
	Aspirin	600 μg/mL	100.0	100.4
	ibuprofen	500 μg/mL	102.6	104.1
	Flutamide	10 μg/mL	94.0	95.9
	Diethylstilbestrol(DES)	5 μg/mL	91.8	104.1
	Goserelin	40 μg/mL	103.3	100.7
	Leuprolide	275 ng/mL	75.7	94.3
	Finasteride	250 ng/mL	105.5	105.7
	Tamsulosin	100 ng/mL	96.7	107.1
	Docetaxel	10 μg/mL	94.3	103.6
Potential cross-reactant	Prostatic acid phosphatase	10 ng/mL	105.0	95.3
Heterophilic Antibodies	RF	1075 IU/mL	108.9	106.3
	HAMA	70 ng/mL	92.3	93.1

No interference/cross-reactivity outside the acceptable recovery range (100 ± 15%) was found.

i. Assay cut-off:

Not applicable

2. Comparison studies

a. Method comparison with predicate device:

The sample volume comparison study was performed at the NanoEnTek laboratory according to CLSI EP09-A3. Total PSA concentrations in 64 serum samples were measured using FREND™ PSA Plus assay with two different sample volumes (35μL and 30μL). Passing-Bablok regression analysis of 30 microliter (x) compared to lithium 35 microliter results (y) yielded the following results, indicating FREND™ PSA Plus can be measured equally well with both 30μL and 35μL of samples. The results are summarized in the table below.

Slope: 0.978 (95% CI: 0.956 to 1.013)	y-Intercept: -0.093 (95% CI: -0.086 to 0.074)
Number of Samples: 64	Correlation-r: 0.994

b. Matrix comparison:

The matrix comparison study was performed at the NanoEnTek laboratory according to CLSI EP14-A3. Total PSA concentrations in 40 sample pairs, each with serum, lithium heparin plasma and K_3-EDTA plasma aliquots, were measured using the FREND™ PSA Plus. The range tested is 0.08 - 23.59 ng/mL with serum samples. Passing-Bablok regression analysis of serum results (x) compared to lithium heparin

plasma or K_3-EDTA plasma results (y) yielded the following results, indicating FREND™ PSA Plus can be measured equally well in serum, lithium heparin plasma and K_3-EDTA plasma. The results are summarized in the table below.

Lithium Heparin Plasma vs. Serum	
Slope: 0.9610 (95% CI: 0.8942 to 1.0309)	y-Intercept: 0.0259 (95% CI: -0.1521 to 0.2418)
K_3-EDTA Plasma vs. Serum	
Slope: 1.0300 (95% CI: 0.9851 to 1.0897)	y-Intercept: -0.0766 (95% CI: -0.3704 to 0.0783)

c. Other studies:

Comparison studies were done in a CLIA-certified laboratory testing facility (CentraState Medical Center). Samples were validated simultaneously using the same aliquot of sample. If that was not practical, two separate aliquots of each sample, freshly defrosted prior to analysis, were used – one for each method. The instrument reagent system used for additional comparison study was the Abbott ARCHITECT total PSA assay (P910007) run on the Abbott ARCHITECT I System. Total number of sample tested for method comparison was 207. Results generated using the FREND™ PSA Plus on FREND™ System (y) were compared to those obtained using a previously FDA approved ARCHITECT total PSA assay (x) by Passing-Bablok regression analysis.

Slope: 0.975 (95% CI 0.936 to 1.014)	y-Intercept: -0.047 (95% CI -0.101 to -0.0004)
Number of samples: 207	Range Tested: 0.08 to 23.56 ng/mL
R: 0.976	

Comparability using CLSI guideline EP09-A3, shows that the difference in concentration between what was measured by the test device and the expected concentration is less than the allowable difference and the two methods compare favorably.

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)

Serially monitored subjects:

As an important part of the clinical studies performed to characterize the FREND™ PSA Plus, serial samples collected longitudinally from patients previously diagnosed with

prostate cancer and treated in a variety of ways over the clinical course of their disease (including prostatectomy, cryoablation, lymph node resection, TURP, chemotherapy, hormone therapy alone or in combination) were assayed for tPSA with the FREND™ PSA Plus on the FREND™ system (modified). The same samples were also measured for tPSA by the predicate PSA method (FREND™ PSA Plus, K124056).

For each point to point in a sample serial set, the change in the tPSA concentration was compared to the change in the clinical status of the patients as measured by other laboratory tests, patient interviews, physical examinations, and imaging studies of a variety of types. There were a total of 194 such determinations for each assay.

These changes in the tPSA marker concentration were defined as significant or not by multiplying the overall %CV of the assay at the midrange (as determined by the test imprecision study) by a factor of 2.5 to define a percentage change difference higher than would be expected because of assay imprecision. For both modified and predicate FREND™ PSA Plus assays with an overall mid-range %CV of 8%, significance was set at a change in excess of 20%. Any increase in value from one time period to the next that did not exceed 20% was logged as ≤ 20% Change. For the low range of the assays (<1 ng/mL), the difference bigger than 0.2 ng/mL was considered a significant change.

Disease status for the patients falls into one of four different categories by the physician - NED (no evidence of disease), Responding, Stable and Progression. The table below shows each disease status as determined for the (modified) FREND™ PSA Plus results for all subjects compared to the Clinical Status changes.

		NED	Responding	Stable	Progression	Total
Predicate (K124056)	**Positive**	18	0	5	48	71
	Negative	78	10	10	25	123
	Total	96	10	15	73	194
Modified FREND PSA Plus	**Positive**	16	1	6	46	69
	Negative	80	9	9	27	125
	Total	96	10	15	73	194

The table below is stratifying the results based on the cancer stage at the time of diagnosis.

As per the guidelines from American Cancer Society, the TNM category information is combined (along with the Gleason score and PSA level) to get the overall stage of the cancer.

Predicate (K124056)					
Change	Clinical Status				
	NED	Responding	Stable	Progressive	Total
Stage I					
Positive	0	0	0	3	3
Negative	4	1	0	0	5
Total	4	1	0	3	8
Stage II					
Positive	5	0	2	22	29
Negative	39	4	2	11	56
Total	44	4	4	33	85
Stage III					
Positive	8	0	1	14	23
Negative	20	4	4	9	37
Total	28	4	5	23	60
Stage IV					
Positive	3	0	2	9	14
Negative	13	1	4	5	23
Total	16	1	6	14	37
Stage unknown					
Positive	2	0	0	0	2
Negative	2	0	0	0	2
Total	4	0	0	0	4

Test device					
Change	Clinical Status				
	NED	Responding	Stable	Progressive	Total
Stage I					
Positive	0	0	0	2	2
Negative	4	1	0	1	6
Total	4	1	0	3	8
Stage II					
Positive	5	0	2	22	29
Negative	39	4	2	11	56
Total	44	4	4	33	85
Stage III					
Positive	7	0	2	15	24
Negative	21	4	3	8	36
Total	28	4	5	23	60
Stage IV					
Positive	3	1	2	7	13
Negative	13	0	4	7	24
Total	16	1	6	14	37
Stage unknown					
Positive	1	0	0	0	1
Negative	3	0	0	0	3
Total	4	0	0	0	4

The table below shows the summary of diagnostic performance of both the predicate and the modified devices.

	PSA Plus (K124056)		Modified PSA Plus	
	Proportion	95% CI	Proportion	95% CI
Sensitivity (PC)	0.658	0.543 to 0.756	0.630	0.515 to 0.732
Specificity (NC)	0.810	0.731 to 0.870	0.810	0.731 to 0.870
Total Concordance	0.753	0.686 to 0.812	0.742	0.674 to 0.802
Positive Likelihood ratio	3.459	2.335 to 5.207	3.315	2.227 to 5.008
Negative Likelihood ratio	0.423	0.298 to 0.573	0.457	0.328 to 0.609
Positive Predictive value	0.676	0.582 to 0.758	0.667	0.571 to 0.750
Negative Predictive value	0.797	0.738 to 0.845	0.784	0.727 to 0.832

Subgroup analysis (surgery group, non-surgery group, and prostatectomy group) shows that there is no statistically significant difference between the diagnostic performances for the modified FREND™ PSA Plus assay and previously cleared FREND™ PSA Plus assay.

Surgery Group (N=119)		Clinical Status				
		NED	Responding	Stable	Progression	Total
Predicate (K124056)	Positive	12	0	1	31	44
	Negative	53	6	3	13	75
	Total	65	6	4	44	119
Test device	Positive	11	1	1	27	40
	Negative	54	5	3	17	79
	Total	65	6	4	44	119

Non-surgery Group (N=75)		Clinical Status				
		NED	Responding	Stable	Progression	Total
Predicate (K124056)	Positive	6	0	4	17	27
	Negative	25	4	7	12	48
	Total	31	4	11	29	75
Test device	Positive	5	0	5	19	29
	Negative	26	4	6	10	46
	Total	31	4	11	29	75

Prostatectomy Group (N=53)		Clinical Status				
		NED	Responding	Stable	Progression	Total
Predicate (K124056)	Positive	5	0	0	12	17
	Negative	31	2	0	3	36
	Total	36	2	0	15	53
Test device	Positive	4	0	0	10	14
	Negative	32	2	0	5	39
	Total	36	2	0	15	53

For both modified and predicate FRENDTM PSA Plus assays with an overall med-range %CV of 8%, significance was set at a change in excess of 20%. Any increase in value from one time period to the next that did not exceed 20% was logged as $\leq$ 20% change. For the low range of the assays (<1 ng/mL), the difference bigger than 0.2 ng/mL was considered a significant change. Positive, negative and overall concordances determined on the serial sets of samples for the two methods showed no significant difference in the ability of the assay to mirror the patient clinical status.

4. Clinical cut-off:

Not applicable

5. Expected values/Reference range:

According to CLSI C28-A3, serum samples from a total of 121 normal, apparently healthy adult individuals with $\geq$50 years of age were assayed on 3 lots of the FREND^{TM} PSA Plus assay using a single FREND^{TM} System to establish a reference interval. The newly established reference limits of the FREND^{TM} PSA Plus are 2.92 ng/mL (95th percentile) and 4.59 ng/mL (99th percentile).

L. Proposed Labeling

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

M. Conclusion

The modified FREND™ PSA Plus is as safe and effective as the "Predicate Device", - the previously cleared FREND™ PSA Plus assay. FREND™ PSA Plus has a similar Intended Use and Indications for Use for monitoring of prostate cancer patients, similar technological and performance characteristics, and principles of operation as its predicate device. The differences between the FREND™ PSA Plus and its predicate devices raise no new issues of safety or effectiveness. Performance data, analytical and clinical, demonstrate that the modified FREND™ PSA Plus is as safe and effective as the "Predicate Device".