SUMMARY OF SAFETY AND EFFECTIVENESS

Assigned 510(k) Number

The assigned 510(k) number is <u>K093987</u>

Sponsor Name and Address

Siemens Healthcare Diagnostics Inc.
5210 Pacific Concourse Drive
Los Angeles, CA
90045-6900
(310) 645-8200

MAR 2 8 2011

Contact

Donna Velasquez
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Device Name

Trade name:	IMMULITE® 2000 3gAllergy™ Specific IgE Assay
Classification:	Class II
Classification Names:	Radioallergosorbent (RAST) Immunological Test System
Regulation Number:	866.5750
Product Code:	DHB
Catalog Numbers:	L2KUN6 (600 tests)

Description of Device

IMMULITE® 2000 3gAllergy™ Specific IgE is a solid-phase, two-step, chemiluminescent immunoassay that exploits liquid phase kinetics in a bead format.[1,2] (U.S. Patent No. 4,778,751) It represents a significant advance over conventional methods relying on allergens attached to a solid-phase support, such as a paper disk.

The allergens are covalently bound to a soluble polymer/co-polymer matrix, which in turn is labeled with a ligand. The use of an amino acid co-polymer amplifies the amount of allergen that the matrix can support.

Incubation Cycles: 2 × 30 minutes.

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[1] El Shami AS, Alaba O. Liquid-phase *in vitro* allergen-specific IgE assay with *in situ* immobilization. Adv Biosci 1989;74:191–201.

[2] Alaba O, El Shami AS. Evaluation of non-specific IgE binding: comparison of two *in vitro* allergen assays. Adv Biosci 1989;74:203–14.

Indications for Use

For *in vitro* diagnostic use with the IMMULITE® 2000 Analyzer — for the quantitative measurement of allergen-specific IgE in human serum, as an aid in the clinical diagnosis of IgE-mediated allergic disorders. The test results are to be used in conjunction with clinical findings and other laboratory tests.

Establishment Information

IMMULITE® 2000 3gAllergy Specific IgE assay is manufactured by Siemens Healthcare Diagnostics Inc. at the following locations:

Siemens Healthcare Diagnostics Inc.
5210 Pacific Concourse Drive
Los Angeles, CA 90045-6900
FDA Establishment #: 3005250747

Predicate

The purpose of this 510(k) submission is for clearance of twenty one additional specific allergens, named in the table below, to be used with the IMMULITE® 2000 3gAllergy™ Specific IgE on the IMMULITE® 2000 analyzer.

1	M12 – Aureobasidium pullulans	12	A310 – nDer p 1
2	D201 – Blomia tropicalis	13	A316 – nDer p 2
3	T401 – Brazilian Peppertree	14	A345 – nFel d 1
4	E78 – Budgerigar Feathers	15	F351 – nPen m 1
5	E201 – Canary Feathers	16	E91 – Parrot Feathers
6	E85 – Chicken Feathers	17	M305 – Penicillium brevi-compactum
7	T43 – Loblolly Pine	18	E7 – Pigeon Droppings
8	A3050 – nAsp r 1	19	W36 – Rabbit Bush
9	A174 – nCan f 1	20	O201 - Tobacco
10	A295 – nDer f1	21	E89 – Turkey Feathers
11	A302 – nDer f 2		

FDA clearance was previously obtained for the assay kit and 196 specific allergens and allergen panels (K013134, K021206, K013135 and K021208).

Please note that the FDA clearances indicated above were in the name of Diagnostic Products Corporation which was acquired by Siemens Medical Solutions Diagnostics in July 2006.

Siemens Medical Solutions Diagnostics was renamed Siemens Healthcare Diagnostics Inc. on January 1, 2008.

Precision

Precision studies were performed in accordance with Clinical Laboratory Standard Institute (CLSI) guidance: *Evaluation of Precision Performance of Quantitative Methods; Approved Guideline-Second Edition.* CLSI document EP5-A2 (ISBN 1-56238-542-9). CLSI, 940 West Valley Road, Suite 1400, Wayne, Pennsylvania 19087-1898 USA, 2004, assaying two aliquots of each test sample in two runs per day on 20 different days (Positives 1-3). Additional studies for Positives 4 were done assaying two aliquots of each test sample in two runs per day on 10 different days. Analysis of variance was used to estimate the within-run and total precision.

Three allergen lots were tested using three positive samples and one negative sample. Intra-assay and inter-assay precision for the positive samples were evaluated by calculating the kU/L dose percent coefficients of variation (%CV) for each positive sample. Non-specific binding (NSB) was monitored by testing the negative control sample.

Representative precision claims for each allergen tested are presented below:

		Within-Run		Total	
Allergen Precision Claims					
Sample	Mean kU/L	SD kU/L	CV %	SD kU/L	CV %
Allergen = Aureobasidium pullulans, Lot 115					
Positive #1	0.72	0.027	3.75	0.041	5.69
Positive #2	0.96	0.037	3.85	0.041	4.27
Positive #3	12.19	0.529	4.34	0.788	6.46
Positive #4	0.54	0.072	13.28	0.081	14.90
Allergen = Blomia tropicalis, Lot 118					
Positive #1	36.21	1.403	3.87	1.645	4.54
Positive #2	1.73	0.133	7.69	0.169	9.77
Positive #3	2.55	0.079	3.10	0.121	4.75
Positive #4	0.42	0.023	5.36	0.031	7.20
Allergen = Brazilian Peppertree, Lot 115					
Positive #1	6.03	0.179	2.97	0.282	4.68
Positive #2	53.50	1.456	2.72	1.922	3.59
Positive #3	1.52	0.070	4.61	0.079	5.20
Allergen = Budgerigar Feathers, Lot 117					
Positive #1	0.45	0.026	5.78	0.029	6.44
Positive #2	1.35	0.070	5.19	0.095	7.04
Positive #3	1.89	0.094	4.97	0.159	8.41
Positive #4	4.34	0.144	3.32	0.165	3.81
Allergen = Canary Feathers, Lot 115					
Positive #1	0.74	0.028	3.78	0.038	5.14
Positive #2	0.99	0.033	3.33	0.048	4.85
Positive #3	6.80	0.271	3.99	0.312	4.59
Positive #4	0.41	0.05	3.76	0.027	6.71
Allergen = Chicken Feathers, Lot 117					
Positive #1	20.40	0.771	3.78	1.778	8.72
Positive #2	4.98	0.186	3.73	0.645	12.95
Positive #3	1.00	0.026	2.60	0.071	7.10
Allergen = Loblolly Pine, Lot 111					
Positive #1	1.05	0.036	3.43	0.052	4.95

Positive #2	0.87	0.051	5.86	0.055	6.32
Positive #3	6.00	0.295	4.92	0.381	6.35
Positive #4	0.31	0.016	5.25	0.021	6.71
Allergen = nAsp r 1, Lot 111					
Positive #1	1.78	0.082	4.61	0.111	6.24
Positive #2	62.51	2.541	4.06	3.704	5.93
Positive #3	0.46	0.026	5.65	0.033	7.17
Allergen = nCan f 1, Lot 112					
Positive #1	3.29	0.122	3.71	0.178	5.41
Positive #2	9.03	0.386	4.27	0.503	5.57
Positive #3	21.90	0.796	3.63	0.887	4.05
Allergen = nDer f 1, Lot 111					
Positive #1	3.22	0.142	4.41	0.179	5.56
Positive #2	9.16	0.394	4.30	0.486	5.31
Positive #3	65.82	2.478	3.76	3.046	4.63
Allergen = nDer f 2, Lot 111					
Positive #1	71.90	2.835	3.94	3.325	4.62
Positive #2	12.63	0.666	5.27	0.941	7.45
Positive #3	13.61	0.646	4.75	0.800	5.88
Positive #4	0.54	0.028	5.44	0.039	7.36
Allergen = nDer p 1, Lot 112					
Positive #1	50.96	2.143	4.21	2.450	4.81
Positive #2	7.38	0.328	4.44	0.427	5.79
Positive #3	38.26	1.791	4.68	2.087	5.45
Positive #4	0.45	0.018	4.11	0.027	5.96
Allergen = nDer p 2, Lot 111					
Positive #1	29.76	1.319	4.43	1.887	6.34
Positive #2	13.79	0.698	5.06	0.922	6.69
Positive #3	9.55	1.127	11.80	1.203	12.60
Positive #4	0.34	0.021	6.35	0.029	8.62
Allergen = nFel d 1, Lot 111					
Positive #1	5.08	0.249	4.90	0.353	6.95
Positive #2	20.83	1.016	4.88	1.171	5.62
Positive #3	1.75	0.071	4.06	0.093	5.31
Allergen = nPen m 1, Lot 111					

Positive #1	3.21	0.146	4.55	5.26	5.26
Positive #2	2.25	0.094	4.18	6.71	6.76
Positive #3	30.79	1.409	4.58	5.14	5.26
Positive #4	0.42	0.020	4.64	0.025	5.88
Allergen = Parrot Feathers, Lot 116					
Positive #1	1.14	0.056	4.91	0.073	6.40
Positive #2	0.32	0.020	6.25	0.025	7.81
Positive #3	0.77	0.307	39.87	0.362	47.01
Positive #3	0.72	0.038	5.28	0.091	12.64
Positive #4	10.74	0.461	4.29	0.025	5.88
Allergen = Penicillium brevi-compactum, Lot 114					
Positive #1	1.87	0.109	5.83	0.127	6.79
Positive #2	1.37	0.053	3.87	0.070	5.11
Positive #3	4.87	0.190	3.90	0.226	4.64
Positive #4	0.43	0.013	3.05	0.018	4.15
Allergen = Pigeon Droppings, Lot 120					
Positive #1	0.48	0.033	6.88	0.042	8.75
Positive #2	6.22	0.401	6.45	0.497	7.99
Positive #3	5.33	0.232	4.35	0.261	4.90
Positive #4	2.27	0.111	4.88	0.178	7.85
Allergen = Rabbit Bush, Lot 111					
Positive #1	2.48	0.098	3.95	0.142	5.73
Positive #2	3.61	0.124	3.43	0.205	5.68
Positive #3	52.20	1.571	3.01	2.321	4.45
Positive #4	0.46	0.017	3.69	0.029	6.26
Allergen = Tobacco, Lot 111					
Positive #1	4.83	0.165	3.42	0.313	6.48
Positive #2	2.34	0.074	3.16	0.084	3.59
Positive #3	0.48	0.016	3.33	0.023	4.79
Allergen = Turkey Feathers, Lot 116					
Positive #1	0.54	0.021	3.89	0.027	5.00
Positive #2	0.75	0.027	3.60	0.035	4.67
Positive #3	30.23	1.004	3.32	1.345	4.45

Linearity

For each allergen, two samples were diluted in 2-fold serial dilutions to 5 levels. The undiluted (neat) and diluted samples were tested with the specific allergen to demonstrate linearity at concentrations within the assay limits. Regression statistics for each allergen comparing observed to expected data are presented below.

Linearity

Allergen	Regression Equation	N	Slope 95% CI	Intercept 95% CI
M12 – Aureobasidium Pullulans	Y = 0.9964x -0.0296	9	0.968 – 1.025	-0.089 – 0.029
D201 – Blomia tropicalis	Y = 0.9877x +0.0284	12	0.967 – 1.008	-0.063 – 0.119
T401 – Brazilian Peppertree	Y = 0.9818x +0.215	12	0.939 – 1.024	0.070 – 0.360
E78 – Budgerigar Feathers	Y = 0.939x +0.224	10	0.85 – 1.03	0.102 – 0.346
E201 – Canary Feathers	Y = 1.012x +0.2368	11	0.907 – 1.117	-0.049 – 0.522
E85 – Chicken Feathers	Y = 1.012x +0.2814	12	0.964 – 1.059	-0.079 – 0.642
T43 – Loblolly Pine	Y = 1.009x -0.1098	12	0.994 – 1.023	-0.177 – 0.043
A3050 – nAsp r 1	Y = 1.005x –0.0923	10	0.989 – 1.021	-0.299 – 0.114
A174 – nCan f 1	Y = 0.993x +0.0659	12	0.985 – 1.001	0.037 – 0.095
A295 – nDer f 1	Y = 1.002x +0.1762	12	0.979 – 1.024	-0.018 – 0.370
A302 – nDer f 2	Y = 0.994x +0.0236	12	0.982 – 1.006	-0.038 – 0.085
A310 – nDer p 1	Y = 0.996x -0.0213	12	0.978 – 1.104	-0.122 – 0.079
A316 – nDer p 2	Y = 0.997x +0.0978	12	0.987 – 1.007	0.042 – 0.154
A345 – nFel d 1	Y = 0.997x +0.0484	12	0.964 – 1.030	-0.203 – 0.299
F351 – nPen m 1	Y = 1.002x +0.1198	11	0.982 – 1.022	0.009 – 0.231
E91 – Parrot Feathers	Y = 0.992x +0.4060	12	0.919 – 1.065	0.066 – 0.746
M305 – Penicillium brevi-compactum	Y = 0.979x +0.2574	12	0.864 – 1.093	-0.001 – 0.516
E7 – Pigeon Droppings	Y = 0.959x +0.0758	10	0.893 – 1.025	0.0369 – 0.1147

Allergen	Regression Equation	N	Slope 95% CI	Intercept 95% CI
W36 – Rabbit Bush	Y = 0.982x +0.4142	12	0.914 – 1.050	0.150 – 0.679
0201 - Tobacco	Y = 0.964x +0.2661	12	0.916 – 1.012	0.139 – 0.393
E89 – Turkey Feathers	Y = 0.993x +0.2334	12	0.932 – 1.053	0.058 – 0.409

Specificity (Inhibition) Studies

Specificity of each allergen was verified through competitive inhibition testing using a single serum sample or pool of sera. A negative sample was used to measure the background response.

To initiate the inhibition experiment, 70 µL of undiluted and 3-4 levels of 5-fold serially diluted inhibitor extract were mixed with 250 µL of sample or pool to achieve final inhibitor concentrations of 218.75, 43.75, 8.75, 1.75, 0.35, 0.08, 0.07, 0.02, 0.01, 0.003 µg/mL. This mixture was incubated at room temperature (15-28 °C) for 1 hour allowing the immunological reaction to occur. Each sample mixture containing the inhibitor extract and the appropriate controls was assayed with 1 lot of each allergen. The percent (%) inhibition was calculated according to the following formula:

$$\left[\frac{(\text{Response of pos. control}_{(\text{pos. sample} - \text{neg. sample})} - \text{sample response with inhibitor extract})}{(\text{Response of pos. control}_{(\text{pos. sample} - \text{neg. sample})})} \right] \cdot X\ 100$$

The inhibition plots demonstrate that the allergens tested are inhibited by the relevant inhibitor extract in a concentration dependent fashion. Also, the target % inhibition of 50% for the highest inhibitor concentration tested was met. These results indicate specificity of Aureobasidium pullulans, Blomia tropicalis, Brazilian Peppertree, Budgerigar Feathers, Canary Feathers, Chicken Feathers, Loblolly Pine, nAsp r 1, nCan f 1, nDer f 1, nDer f 2, nDer p 1, nDer p 2, nFel d 1, nPen m 1, Parrot Feathers, Penicillium brevi-compactum, Pigeon Droppings, Rabbit Bush, Tobacco, and Turkey Feather allergens.

Inhibition Using Negative Controls

Additional inhibition studies were conducted to show that the specific allergens are not cross-reacting to the unrelated allergens. Procedures were followed according to CLSI ILA20-A, Appendix-D. Testing was performed using one positive sample with three unrelated allergen extracts at 1 mg/ml. A negative sample was used to measure the background response. Results on the following specific allergen(s) were below 7% except for Loblolly Pine: Aureobasidium pullulans, Blomia tropicalis, Brazilian Peppertree, Budgerigar Feathers, Canary Feathers, Chicken Feathers, nAsp r 1, nCan f 1, nDer f 1, nDer f 2, nDer p 1, nDer p 2, nFel d 1, nPen m 1, Parrot Feathers, Penicillium brevi-compactum, Pigeon Droppings, Rabbit Bush, Tobacco and Turkey Feathers.

Clinical Performance Studies

Clinical performance was demonstrated by testing serum samples against specific allergens from clinically diagnosed atopic and non-atopic individuals. Allergen-specific testing was obtained using the IMMULITE® 2000 3gAllergy™ assay.

Data summary agreement of the IMMULITE® 2000 3gAllergy results to clinical data is presented in the table below.

IMMULITE® 2000	Clinical Data				
	Clinical	Normal	Total		
Positive	648	38	686		
Negative	260	2,194	2,454		
Total	908	2,232	3,140		
	71.4%	98.3%	90.5%	.	
	Sensitivity	Specificity	Agreement		
Lower Conf	68%	98%	89%		
Upper Conf	74%	99%	92%		
Allergens included: Aureobasidium pullulans, Blomia tropicalis, Brazilian Peppertree, Budgerigar Feathers, Canary Feathers, Chicken Feathers, Loblolly Pine, nAsp r 1, nCan f 1, nDer f 1, nDer f 2, nDer p 1, nDer p 2, nFel d 1, nPen m 1, Parrot Feathers, Penicillium brevi-compactum, Pigeon Droppings, Rabbit Bush, Tobacco, and Turkey Feathers.					

IMMULITE® 2000 3gAllergy assay results for all allergens compare well with clinical documentation of presence or absence of signs, symptoms and other diagnostic evidence of allergen sensitivity.

Conclusions for all Studies

Allergens including : Aureobasidium pullulans, Blomia tropicalis, Brazilian Peppertree, Budgerigar Feathers, Canary Feathers, Chicken Feathers, Loblolly Pine, nAsp r 1, nCan f 1, nDer f 1, nDer f 2, nDer p 1, nDer p 2, nFel d 1, nPen m 1, Parrot Feathers, Penicillium brevi-compactum, Pigeon Droppings, Rabbit Bush, Tobacco, and Turkey Feathers for use with the IMMULITE® 2000 3gAllergy Specific IgE assay demonstrate acceptable analytical performance including precision, linearity and specificity. IMMULITE® 2000 assay results compare well with clinical documentation of presence or absence of signs, symptoms and other diagnostic evidence of allergen sensitivity. Substantial equivalence was demonstrated to clinical data, supporting the following intended use of the IMMULITE® 2000 3gAllergys Specific IgE assay and the twenty seven previously listed allergens:

> For *in vitro* diagnostic use with the IMMULITE® 2000 Analyzer — for the quantitative measurement of allergen-specific IgE in human serum, as an aid in the clinical diagnosis of IgE-mediated allergic disorders. The test results are to be used in conjunction with clinical findings and other laboratory tests.

MAR 2 8 2011

Siemens Healthcare Diagnostics Inc.
c/o Ms. Donna Velasquez
Regulatory Technical Specialist
5210 Pacific Concourse Drive
Los Angeles, CA 90045

Re: k093987
  Trade/Device Name: IMMULITE® 2000 3G Allergy™ Specific IgE Assay Kit
  Regulation Number: 21 CFR §866.5750
  Regulation Name: Radioallergosorbent (RAST) immunological test system
  Regulatory Class: Class II
  Product Codes: DHB
  Dated: March 8, 2011
  Received: March 11, 2011

Dear Ms. Velasquez :

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.

If your device is classified (see above) into class II (Special Controls), it may be subject to such
additional controls. Existing major regulations affecting your device can be found in Title 21,
Code of Federal Regulations (CFR), Parts 800 to 895. 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); and good manufacturing practice requirements as set forth in the quality systems (QS) regulation (21 CFR Part 820). This letter will allow you to begin marketing your device as described in your Section 510(k) premarket notification. The FDA finding of substantial equivalence of your device to a legally marketed predicate device results in a classification for your device and thus, permits your device to proceed to the market.

If you desire specific advice for your device on our labeling regulation (21 CFR Parts 801 and 809), please contact the Office of *In Vitro* Diagnostic Device Evaluation and Safety at (301) 796-5450. 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 Small Manufacturers, International and Consumer Assistance at its toll-free number (800) 638-2041 or (301) 796-7100 or at its Internet address http://www.fda.gov/cdrh/industry/support/index.html.

Sincerely yours,

Reena Philp

for Maria M. Chan, Ph.D.
Director
Division of Immunology and Hematology Devices
Office of *In Vitro* Diagnostic Device Evaluation and Safety
Center for Devices and Radiological Health

Enclosure

Indication for Use

510(k) Number (if known): <u>K093987</u>

Device Name: IMMULITE 3gAllergy™ Specific IgE Assay

Indication For Use:

For *in vitro* diagnostic use with the IMMULITE 2000 Analyzer — for the quantitative measurement of allergen-specific IgE in human serum, as an aid in the clinical diagnosis of IgE-mediated allergic disorders. The test results are to be used in conjunction with clinical findings and other laboratory tests.

Prescription Use ___√___   And/Or   Over the Counter Use ____.
(21 CFR Part 801 Subpart D)   (21 CFR Part 801 Subpart C)

(PLEASE DO NOT WRITE BELOW THIS LINE; CONTINUE ON ANOTHER PAGE IF NEEDED)

Concurrence of CDRH, Office of In Vitro Diagnostic Device Evaluation and Safety (OIVD)

Reena Philip

Division Sign-Off
Office of In Vitro Diagnostic Device
Evaluation and Safety

510(k) *093987* .