



13475 Blackhills Road  
 San Diego, CA 92129  
 Phone: 858-385-0556  
 Toll Free: 888-786-7835  
 Fax: 858-630-3797  
 Email: support@akbiosource.com

Molecular Devices® Plus384™  
 Preventive Diagnostics / Operational Qualification Summary Sheet

Company	Contact	Instrument Serial Number
Street Address	Phone	Purchase Order Number
City, State	Zip	Country
		Date of Certification

This instrument does not meet Manufacturer's Operational Specifications, as of the date of this document.

Data Collection Initiated By: \_\_\_\_\_

Reviewed By: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Next Operational Qualification Due: \_\_\_\_\_

Validation Plate Serial Number: \_\_\_\_\_

Calibration Date: \_\_\_\_\_

Calibration Due: \_\_\_\_\_

## 1. Lamp Intensity

Start time: 24-Mar-2009 10:00:51 End time: 24-Mar-2009 10:07:31

Item	Data	Spec	Result
Max Reference (484 nm channel 3)	10051	<= 44000	Pass
Max Signal (484 nm channel 3)	14849	<= 44000	Pass
Min Reference (998 nm channel 2)	1011	>= 800	Pass
Min Signal (998 nm channel 3)	1527	>= 800	Pass

## 2. Electronic Stability

Start time: 24-Mar-2009 10:07:32 End time: 24-Mar-2009 10:07:39

Item	Data	Spec	Result
Max Signal Mean	107.8	<= 1500	Pass
Max Reference Mean	19.6	<= 400	Pass
Max Signal Std Dev	15.8	<= 150	Pass
Max Reference Std Dev	2.2	<= 70	Pass



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### 3. Optical Intensity Alignment

Start time: 24-Mar-2009 10:07:41 End time: 24-Mar-2009 10:08:04

Item	Wavelength	Data	Spec (<)	Result
Signal	190	2.14	2.5	Pass
Reference	190	2.04	2.5	Pass
Signal/Reference	190	1.11	1.5	Pass
Signal	352	2.20	2.1	Fail
Reference	352	2.18	2.1	Fail
Signal/Reference	352	1.06	1.3	Pass
Signal	514	1.87	2.1	Pass
Reference	514	1.86	2.1	Pass
Signal/Reference	514	1.06	1.3	Pass
Signal	676	1.86	2.1	Pass
Reference	676	1.88	2.1	Pass
Signal/Reference	676	1.07	1.3	Pass
Signal	838	1.84	2.1	Pass
Reference	838	1.87	2.1	Pass
Signal/Reference	838	1.05	1.3	Pass
Signal	1000	1.50	2.5	Pass
Reference	1000	1.48	2.5	Pass
Signal/Reference	1000	1.04	1.5	Pass

### 4. Monochromator Alignment

Start time: 24-Mar-2009 10:08:06 End time: 24-Mar-2009 10:10:15

Item	Data	Spec (<=)	Result
Alignment	0.0958	0.4000	Pass

### 5. Cross-Talk and Alignment

Start time: 24-Mar-2009 10:10:17 End time: 24-Mar-2009 10:12:37

Wavelength	Data	Min Spec	Max Spec	Result
514 Air (Min)	-0.0006	-0.0030		Pass
514 Air (Max)	0.0020		0.0150	Pass
514 Dark	4.0000	3.3000		Pass



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## 6. Stray Light

Start time: 24-Mar-2009 10:12:39 End time: 24-Mar-2009 10:13:06

Wavelength	Data	Spec	Result
220 nm	3.9421	>= 3.15	Pass
340 nm	3.0012	>= 3.15	Fail
405 nm	2.3555	>= 3.15	Fail
650 nm	1.9810	>= 2.67	Fail

## 7. Linearity (Specification: Slope = Certificate Value $\pm$ 10%, RSQ <200nm $\geq$ 0.970, RSQ >200nm $\geq$ 0.980)

Start time: 24-Mar-2009 10:13:07 End time: 24-Mar-2009 10:13:39

Wavelength	Slope	Min Spec	Max Spec	Result	RSQ	Min Spec	Result
190	4.2775	3.8574	4.7146	Pass	0.9888	0.9700	Pass
352	3.7813	3.4866	4.2614	Pass	1.0000	0.9800	Pass
514	3.6537	3.2292	3.9468	Pass	0.9994	0.9800	Pass
676	3.4329	3.0789	3.7631	Pass	0.9985	0.9800	Pass
838	3.2651	2.9736	3.6344	Pass	0.9977	0.9800	Pass
1000	3.1638	2.9736	3.6344	Pass	0.9972	0.9800	Pass

## 8.1. Flash Integrity - Signal (Specification: >0.5 and <1.5)

Start time: 24-Mar-2009 10:13:41 End time: 24-Mar-2009 10:14:03

Reference	Min Ref	Min Spec	Max Ref	Max Spec	Result
Channel 0	0.69	0.5	1.11	1.5	Pass
Channel 1	0.74	0.5	1.09	1.5	Pass
Channel 2	0.79	0.5	1.07	1.5	Pass
Channel 3	0.83	0.5	1.06	1.5	Pass
Channel 4	0.87	0.5	1.06	1.5	Pass
Channel 5	0.88	0.5	1.06	1.5	Pass
Channel 6	0.89	0.5	1.07	1.5	Pass
Channel 7	0.88	0.5	1.09	1.5	Pass



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### 8.2. Flash Integrity - Reference (Specification: >0.5 and <1.5)

Start time: 24-Mar-2009 10:13:41 End time: 24-Mar-2009 10:14:03

Reference	Min Ref	Min Spec	Max Ref	Max Spec	Result
Channel 0	0.69	0.5	1.11	1.5	Pass
Channel 1	0.75	0.5	1.09	1.5	Pass
Channel 2	0.79	0.5	1.07	1.5	Pass
Channel 3	0.84	0.5	1.06	1.5	Pass
Channel 4	0.87	0.5	1.06	1.5	Pass
Channel 5	0.88	0.5	1.06	1.5	Pass
Channel 6	0.90	0.5	1.07	1.5	Pass
Channel 7	0.89	0.5	1.08	1.5	Pass

### 9. Photometric Accuracy (Specification: Certificate Values $\pm 1\% \pm 0.006$ Values >2.00D: +/-6% +/-0.010, >3.00D: +/-10% +/-0.010)

Start time: 24-Mar-2009 10:14:06 End time: 24-Mar-2009 10:14:36

Wavelength	Column	Data	Min Spec	Max Spec	Result
190	3 (A-D)	0.0529	0.0452	0.0582	Pass
	3 (E-H)	0.2594	0.2484	0.2656	Pass
	4 (A-D)	0.3199	0.3046	0.3228	Pass
	4 (E-H)	0.5672	0.5491	0.5723	Pass
	5 (A-D)	1.1333	1.1084	1.1430	Pass
	5 (E-H)	2.3642	2.1982	2.5000	Pass
352	6 (A-D)	3.7396	3.3645	4.1343	Pass
	6 (E-H)	4.0000	3.5900	4.4100	Pass
	3 (A-D)	0.0346	0.0264	0.0390	Pass
	3 (E-H)	0.1130	0.1043	0.1185	Pass
514	4 (A-D)	0.2532	0.2412	0.2582	Pass
	4 (E-H)	0.4997	0.4844	0.5064	Pass
	5 (A-D)	1.0034	0.9842	1.0162	Pass
	5 (E-H)	1.9208	1.8895	1.9397	Pass
	6 (A-D)	2.8664	2.6809	3.0445	Pass
	6 (E-H)	3.8144	3.3957	4.1725	Pass



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	3 (E-H)	0.0871	0.0785	0.0923	Pass
	4 (A-D)	0.2486	0.2362	0.2530	Pass
	4 (E-H)	0.5237	0.5081	0.5305	Pass
	5 (A-D)	1.0421	1.0218	1.0546	Pass
	5 (E-H)	1.8689	1.8374	1.8866	Pass
	6 (A-D)	2.8388	2.6550	3.0152	Pass
	6 (E-H)	3.6514	3.2535	3.9987	Pass
676	3 (A-D)	0.0323	0.0240	0.0366	Pass
	3 (E-H)	0.0766	0.0684	0.0820	Pass
	4 (A-D)	0.2426	0.2315	0.2483	Pass
	4 (E-H)	0.5091	0.4939	0.5159	Pass
	5 (A-D)	1.0135	0.9934	1.0256	Pass
	5 (E-H)	1.7378	1.7089	1.7555	Pass
	6 (A-D)	2.7284	2.5521	2.8991	Pass
	6 (E-H)	3.4124	3.0316	3.7274	Pass
838	3 (A-D)	0.0311	0.0229	0.0355	Pass
	3 (E-H)	0.0691	0.0609	0.0743	Pass
	4 (A-D)	0.2339	0.2220	0.2386	Pass
	4 (E-H)	0.4876	0.4727	0.4943	Pass
	5 (A-D)	0.9809	0.9604	0.9920	Pass
	5 (E-H)	1.6402	1.6095	1.6541	Pass
	6 (A-D)	2.6348	2.4614	2.7970	Pass
	6 (E-H)	3.2352	2.8588	3.5162	Pass
1000	3 (A-D)	0.0302	0.0223	0.0349	Pass
	3 (E-H)	0.0634	0.0554	0.0686	Pass
	4 (A-D)	0.2219	0.2114	0.2278	Pass
	4 (E-H)	0.4661	0.4508	0.4720	Pass
	5 (A-D)	0.9471	0.9267	0.9575	Pass
	5 (E-H)	1.5730	1.5423	1.5855	Pass
	6 (A-D)	2.5694	2.4020	2.7300	Pass
	6 (E-H)	3.1349	2.7541	3.3883	Pass



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**10. Photometric Precision** (Specification: Average  $\pm 1\% \pm 0.003$  Values  $> 2.00D$ :  $\pm 6\% \pm 0.006$ ,  $> 3.00D$ :  $\pm 10\% \pm 0.006$ )

Start time: 24-Mar-2009 10:14:39 End time: 24-Mar-2009 10:15:21

Column	Min	Max	Average	Min Spec	Max Spec	Result
Column 3 Row A	0.0339	0.0341	0.0340	0.0300	0.0380	Pass
Column 3 Row B	0.0328	0.0333	0.0330	0.0290	0.0370	Pass
Column 3 Row C	0.0334	0.0336	0.0335	0.0295	0.0375	Pass
Column 3 Row D	0.0357	0.0363	0.0361	0.0320	0.0402	Pass
Column 3 Row E	0.0851	0.0853	0.0852	0.0796	0.0907	Pass
Column 3 Row F	0.0837	0.0840	0.0838	0.0783	0.0894	Pass
Column 3 Row G	0.0799	0.0801	0.0800	0.0746	0.0854	Pass
Column 3 Row H	0.0796	0.0799	0.0798	0.0744	0.0851	Pass
Column 4 Row A	0.2448	0.2450	0.2449	0.2346	0.2552	Pass
Column 4 Row B	0.2462	0.2466	0.2464	0.2360	0.2568	Pass
Column 4 Row C	0.2471	0.2473	0.2472	0.2368	0.2576	Pass
Column 4 Row D	0.2500	0.2502	0.2501	0.2396	0.2606	Pass
Column 4 Row E	0.5203	0.5205	0.5204	0.5018	0.5390	Pass
Column 4 Row F	0.5187	0.5190	0.5188	0.5003	0.5374	Pass
Column 4 Row G	0.5182	0.5184	0.5183	0.4997	0.5368	Pass
Column 4 Row H	0.5193	0.5208	0.5198	0.5012	0.5384	Pass
Column 5 Row A	1.0274	1.0276	1.0275	0.9937	1.0613	Pass
Column 5 Row B	1.0299	1.0300	1.0300	0.9961	1.0639	Pass
Column 5 Row C	1.0314	1.0316	1.0315	0.9975	1.0654	Pass
Column 5 Row D	1.0338	1.0339	1.0339	0.9999	1.0679	Pass
Column 5 Row E	1.7762	1.7767	1.7765	1.7202	1.8328	Pass
Column 5 Row F	1.7939	1.7945	1.7942	1.7374	1.8510	Pass
Column 5 Row G	1.8088	1.8097	1.8094	1.7521	1.8667	Pass
Column 5 Row H	1.8288	1.8295	1.8292	1.7713	1.8871	Pass
Column 6 Row A	2.8184	2.8251	2.8215	2.6462	2.9968	Pass
Column 6 Row B	2.7958	2.8002	2.7986	2.6247	2.9726	Pass
Column 6 Row C	2.7774	2.7823	2.7803	2.6075	2.9531	Pass
Column 6 Row D	2.7450	2.7501	2.7478	2.5769	2.9187	Pass
Column 6 Row E	3.4449	3.4668	3.4564	3.1047	3.8080	Pass
Column 6 Row F	3.4704	3.5083	3.4919	3.1367	3.8471	Pass
Column 6 Row G	3.5137	3.5657	3.5347	3.1752	3.8942	Pass
Column 6 Row H	3.5664	3.6001	3.5849	3.2204	3.9494	Pass



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**11. Wavelength Accuracy** (Specification: Certificate Value  $\pm 3\text{nm}$ )

Start time: 24-Mar-2009 10:15:24 End time: 24-Mar-2009 10:39:58

Results	Data	Spec (Cert +/- 3nm)	Result
Holmium Peak 1	360	-0.7	Pass
Holmium Peak 2	445	-0.8	Pass
Holmium Peak 3	460	0.2	Pass
Holmium Peak 4	536	-0.2	Pass
Holmium Peak 5	637	0.0	Pass
Didymium Peak 1	328	-1.0	Pass
Didymium Peak 2	358	-0.1	Pass
Didymium Peak 3	529	0.4	Pass
Didymium Peak 4	584	-1.2	Pass
Didymium Peak 5	806	0.7	Pass

SAMPLE