



GUANGDONG XINYU TECHNOLOGY INDUSTRIAL CO.,LTD

Technical Report: (8816)172-0003

Jul 21, 2016

Date Received: Jun 20, 2016

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GUANGDONG XINYU TECHNOLOGY INDUSTRIAL
CO.,LTD
LAIMEI INDUSTRIAL ZONE,CHENGHAI DISTRICT,
SHANTOU, GUANGDONG

Sample Description:	SEE ATTACHMENT	Sample Size:	N/A
Vendor:	N/A	Style No(s):	SEE ATTACHMENT
Manufacturer:	N/A	SKN/SKU No.:	N/A
Buyer:	N/A	PO No.:	N/A
Labeled Age Grade:	FOR STYLE#19~27, 44~47, 52, 53, 56, 57, 77~83, 86, 91, 96 SAMPLE(S) = NOT PRESENT, FOR STYLE#28, 29, 50, 51 SAMPLE(S) = AGES 6+, FOR OTHERS = 8+		
Appropriate Age Grade:	NOT REQUESTED	Ref #:	N/A
Client Specified Age Grade:	8+	Country of Origin:	CHINA
Tested Age Grade:	OVER 8 YEARS OF AGE	Country of Destination:	N/A
UPC Code:	SEE ATTACHMENT	Rated Voltage:	SEE ATTACHMENT
Test Starting Date:	JUN 20, 2016	Test Finished Date:	JUL 21, 2016

EXECUTIVE SUMMARY:

The sample(s) was tested to the following requirement(s) and the data provided is for informational purposes only:

- The classification in accordance with standard EN 60825-1.

BUREAU VERITAS SHENZHEN CO.,LTD
DONGGUAN BRANCH

Kay Liu
Manager, Toys Lab

RT/CC

REMARK

If there are questions or concerns on this report, please contact the following persons:

Report Enquiry: (86) 0769 85935656 Ext. 8819 CPSAnalytical.DG@cn.bureauveritas.com

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ATTACHMENT:

Sample Description:

RC TOYS

1.) PORCHE 918 SPYDER - 2.4GHZ - A PKG
2.) LAFERRARI - 2.4 GHZ - A PKG
3.) VENENO - 2.4GHZ - A PKG
4.) 430 SCUDERIA - 27.145MHZ
5.) 599XX - 27.145MHZ
6.) ENZO FERRARI - 27.145 MHZ
7.) NISSAN GT-R - 27.145MHZ
8.) 458 ITALIA - 27.145MHZ - A PKG
9.) MERCEDES-BEN SLS AMG - 27.145MHZ - A PKG
10.) CAMORO - 27.145MHZ - A PKG
11.) LAMBORGHINI GALLARDO LP 570-4 SUPERLEGGERA - 27.145MHZ
12.) 458 CHALLENGE - 27.145MHZ - A PKG
13.) 488 GTB - 2.4GHZ - A PKG
14.) GT 500 - RED - 2.4GHZ
15.) FORD GT - 2.4 GHZ
16.) PORSCHE 918 SPYDER - 2.4 GHZ - B PKG
17.) 599 XX - 2.4 GHZ - A PKG
18.) GT 500 - POLICE - 2.4 GHZ
19.) BENTLEY CONTINENTAL GT SPEED - 2.4 GHZ
20.) VENENO - 2.4 GHZ - B PKG
21.) F12 BERLINETTA - 2.4 GHZ
22.) 488 GTB - 2.4 GHZ - B PKG
23.) PORSCHE GT3 RS - BLUE - 2.4 GHZ
24.) PORSCHE GTS RS - BLACK - 2.4 GHZ
25.) LAMBORGHINI AVENT ADOR LP 700-4 - 2.4 GHZ - A PKG
26.) 599XX - 2.4 GHZ - B PKG
27.) FXX K - 2.4 GHZ - A PKG
28.) CRUISER
29.) BOAT
30.) SF15-T - A PKG
31.) F14- T - A PKG
32.) LAFERRARI - 2.4 GHZ - B PKG
33.) PORSCHE 918 SPYDER - 2.4 GHZ - C PKG
34.) LAMBORGHINI GAUARDO SUPERLEGGERA - 27.145 MHZ
35.) NISSAN 370Z - 27.145 MHZ
36.) F430 CHALLENGE - 1 - 27.145 MHZ
37.) 458 CHALLENGE - 27.145 MHZ - B PKG
38.) F430 CHALLENGE - 14 - 27.145 MHZ
39.) CAMARO - 27.145 MHZ- B PKG
40.) MERCEDES - BENZ SLS AMG - 27.145 MHZ - B PKG
41.) FERRARI FXX - 27.145 MHZ
42.) 458 ITALIA - 27.145 MHZ - B PKG
43.) LAFERRARI - 2.4 GHZ - C PKG
44.) 458 ITALIA - 27.145 MHZ - C PKG
45.) FXX - 27.145 MHZ
46.) SF15-T - B PKG
47.) F14-T- B PKG
48.) F138 - A PKG
49.) SF15-T - C PKG

To be continued



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ATTACHMENT:

Sample Description:

RC TOYS

- 50.) JACKNIFE - 27 MHZ
- 51.) BLAZE SPLENDOR
- 52.) WILDMAX - 2.4 GHZ
- 53.) MACAN TURBO - 27.145 MHZ - A PKG
- 54.) BMW X6 - 27.145 MHZ
- 55.) LAMBORGHINI URUS - 27.145 MHZ
- 56.) TOYOTA LANDCRUISER PRADO - 27.145 MHZ
- 57.) LAMBORGHINI WRUS - 27.145 MHZ
- 58.) PORSCHE GT3 RS - BLACK - 27.145 MHZ
- 59.) PORSCHE GT3 RS - WHITE - 27.145 MHZ
- 60.) PORSCHE CAYENNE TURBO - 27.145 MHZ
- 61.) MERCEDES - BENZ ML 500 - 27.145 MHZ
- 62.) AUDI Q7 - 27.145 MHZ
- 63.) MACAN TURBO - 27.145 MHZ - B PKG
- 64.) PORD F-150 SUPERCAB - 27.145 MHZ
- 65.) STORM BUSTER - BLUE
- 66.) STORM BUSTER - RED
- 67.) ALLIGATOR - 27.145 MHZ
- 68.) JEEP - 27.145 MHZ
- 69.) F J CRUISER - 27.145 MHZ
- 70.) ATTACH CHAMP - DARK BLUE - 27.145
- 71.) ATTACH CHAMP - RED - 27.145
- 72.) ATTACH CHAMP - BLUE - 27.145
- 73.) DUCATI 1199
- 74.) M1A2 ABRAMS
- 75.) F14-T - C PKG
- 76.) F138 - B PKG
- 77.) AIR REBOUND - 27 MHZ
- 78.) LAMBORGHINI AVENTADOR LP 700-4 -2.4 GHZ - B PKG
- 79.) PORSCHE 918 SPYDER - 2.4 GHZ - D PKG
- 80.) VENENO - 2.4 GHZ - C PKG
- 81.) 485 ITALIA - 2.4 GHZ
- 82.) SPEED BUG - RED - 27.145 MHZ
- 83.) SPEED BUG - GREEN - 27.145 MHZ
- 84.) LAFFERRARI - 2.4 GHZ - D PKG
- 85.) FXX K - 2.4 GHZ - B PKG
- 86.) LAMBORGHINI MURCIELAGO LP 670-4 SV - 2.4 GHZ
- 87.) PORSCHE 911 GT3 RS - 2.4 GHZ
- 88.) CAMARO - 2.4 GHZ
- 89.) FORD MUSTANG - 2.4 GHZ
- 90.) TSI DSG
- 91.) FORD GT - WHITE - 2.4 GHZ
- 92.) LAFERRARI - 2.4 GHZ - E PKG
- 93.) BMW X 6
- 94.) PORSCHE 918 SPYDER - E PKG
- 95.) VOLKSWAGEN SCIROCCOR
- 96.) ATTACH CHAMP



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ATTACHMENT:

Style No(s):

XQRC32-1AAA(3729),XQRC32-2AAA(3730),XQRC32-3AAA(3731),XQRC32-4AAA(3732),XQRC32-5AAA(3733),
XQRC32-6AAA(3734),XQRC32-7AAA(3735),XQRC32-8AAA(3736),XQRC32-9AAA(3737),XQRC32-10AAA(3738),
XQRC32-11AAA(3739),3433(3740),XQ066-AA(3012),XQ075-AA(3024),XQ072-AA(3020),
XQRC24-2AA(3715),XQRC24-3AA(3716),XQRC24-5AA(3718),XQRC24-6AA(3719),XQRC24-7AA(3720),
XQRC24-8AA(3721),XQRC24-12AAA(3724),XQRC24-13AA(3725),3431(3727),3493(3743),
XQTK24-1AA(3166),XQ066(3011),XQRC24-3(3142),XQRC24-13,XQRC18-3AA(3649),
XQRC18-4AA(3650),XQRC18-4PAA(3651),XQRC18-7AA(3654),3709,3381(3685),
3429(3688),3491(3742),XQRC18-7(3546),XQRC18-15(3554),XQRC18-16(3555),
XQRC18-19(3558),XQRC18-20(3559),XQRC18-22(3560),XQRC18-23(3561),3382(3583),
3430(3586),3606,3607,3492,XQRC10-1,
XQRC10-2,XQRC10-5(3509),XQRC10-6(3510),3276(3511),XQRC12-7(3518),
XQRC12-12(3521),XQRC12-16(3523),XQRC12-17(3524),3605,3380(3582),
XQRC12-12AA(3630),3706,3379(3684),XQRC16-1AA(3634),XQRC16-2AA(3635),XQRC16-3AA(3636),
XQRC16-5AA(3638),XQRC16-6AA(3639),XQRC16-9AA(3641),XQRC16-10AA(3642),3344(3686),
3419(3687),XQRC16-2(3526),XQRC16-4(3528),XQRC16-10(3534),3343(3584),
XQXD10-3(3574/3260),XQXD24-1(3175),XQXS24-1(3181),XQXD24-1AA(3680),XQXD14-1AA(3678),
XQXS24-1AAA(3681),XQXS14-1AA(3683),3337(3575),3338(3677),3391(3571),
3447,3501,3506,XQGS24-1(3041),3317,
3283(3580),3434(3581),3263,3264,3750

UPC Code:

4895181837400, 4895181837387, 4895181837394, 6947261389075, 4895181831644, 4895181837097,
4895181836502, 4895181835864, 4895181836540, 4895181836519, 4895181835604, 4895181835598,
4895181835581, 4895181836076, 4895181835543, 4895181835550, 4895181835468, 4895181836069,
4895181832634, 4895181832641, 4895181834911, 4895181833815, 4895181835611, 4895181836885,
6947262389051, 4895181837219, 4895181831477, 4895181837257, 4895181836083, 4895181834935,
840212132836, 4895181835710, 4895181835741, 4895181833433, 6947262389129, 6954075601102,
4895181835499, 4895181834195, 4895181833440, 4895181833372, 6947262320115, 4891321110006,
6947262320078, 4895181833174, 6947262389105, 4895181833808, 4895181835239, 4895181834348,
4895181835185, 4895181837509, 4895181835246, 4895181835147, 4895181835307, 4895181837066,
4895181835109, 4895181835093, 4895181837578, 4895181832764, 4895181837561

Rated Voltage:

7.2V RX 1:10
3.6V RX 1:24 RECHARGE
4.8V RX 1:16 RECHARGE
3.2V RX 1:18 RECHARGE
6.0V RX 1:18
7.5V RX 1:16
9.0V RX MIA2 ABRAMS
4.5V RX 1:24
5.0V USB CHARGER
3.0V TX1, TX2
9.0V TX3, TX4, TX5, TX6, TX8, TX10
6.0V TX7
3.0V TX9



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SUMMARY OF TEST RESULTS

The sample is classified as class 1 Laser Product according to EN60825-1.

Test Executed	Test Standard	Limit
Tests for Classification of Laser Products	Sec. 8, Sec. 9, EN 60825-1: 1994 + A11: 1996 + A2: 2001 + A1: 2002	Table 1, EN 60825-1: 1994 + A11: 1996 + A2: 2001 + A1: 2002



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Test method and equipment:

The following test equipment are applied for the tests:

Equip. No	Equipment Name	Brand Name	Model
M006003L	Digital Light Meter	TES	TES-1336A
M006004L	Digital Light Meter	Sper Scientific	840020
M008005L	Digital Caliper (0-12")	Mitutoyo	CD-12"C
M008006L	Digital Caliper (0-12")	Mitutoyo	CD-12"C
M015003L	Stainless Steel Ruler (0-12")	Endo Keiki	NIL
M019001L	Optical Sensor Head	Advantest	Q82214
M019002L	Optical Power Meter + Optical Sensor Interface Unit	Advantest	Q8221 / Q82203
M019003L	Optical Spectrum Analyzer	Advantest	Q8341
M019004L	Optical Sensor Head	Advantest	Q82214
M019005L	Optical Power Meter + Optical Sensor Interface Unit	Advantest	Q8221 / Q82203
T031001L	Laser Test Fixture + Sample Platform	NIL	NIL
T032001L	7mm Sensor Aperture Stop	NIL	NIL
T032003L	Ø0.5mm Field Stop Aperture	NIL	NIL
T032004L	Ø5mm Field Stop Aperture	NIL	NIL
T033001L	Filter (Yellow)	Lee Filter	101
T033002L	Filter (Green)	Lee Filter	124
T033003L	Filter (Red)	Lee Filter	182
T033004L	Filter (Blue)	Lee Filter	195

The measurements are carried out with the measurement set up following Section 9 of EN 60825-1.

The measurement condition 2 specified in Section 9.3 and Table 10 of EN 60825-1 is adopted.



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Description of the lasers or LEDs under test:

Source No.	Feature
Led 1	CW, Multi- λ additive, white led, RX, 1:10 Ford GT
Led 2	CW, Single- λ , Red led, RX, 1:10 Ford GT
Led 3	CW, Single- λ , Red led, TX1, 1:10 Ford GT
Led 4	CW, Single- λ , Red led, USB charger 1, 1:10 Ford GT
Led 5	CW, Multi- λ additive, white led, RX, das auto, TSI DSG
Led 6	CW, Multi- λ additive, white led, RX, 1:10 Lamborghini
Led 7	CW, Single- λ , Red led, RX, 1:10 Lamborghini
Led 8	CW, Multi- λ additive, white led, RX, 1:10 Ford
Led 9	CW, Single- λ , Red led, RX, 1:10 Ford
Led 10	CW, Multi- λ additive, white led, RX, 1:10 Porsche
Led 11	CW, Single- λ , Red led, RX, 1:10 Porsche
Led 12	CW, Multi- λ additive, white led, RX, 1:10 Camaro
Led 13	CW, Single- λ , Red led, RX, 1:10 Camaro
Led 14	CW, Multi- λ additive, white led, RX, 1:12 FXXK
Led 15	CW, Single- λ , Red led, RX, 1:12 FXXK
Led 16	CW, Multi- λ additive, white led, RX, 1:12 LaFerrari
Led 17	CW, Single- λ , Red led, RX, 1:12 LaFerrari
Led 18	CW, Multi- λ additive, white led, RX, 1:12 Porsche
Led 19	CW, Single- λ , Red led, RX, 1:12 Porsche
Led 20	CW, Multi- λ additive, white led, RX, 1:12 Lamborghini (Red)
Led 21	CW, Single- λ , Red led, RX, 1:12 Lamborghini (Red)
Led 22	CW, Multi- λ additive, white led, RX, 1:12 Lamborghini (Orange)
Led 23	CW, Single- λ , Red led, RX, 1:12 Lamborghini (Orange)
Led 24	CW, Multi- λ additive, white led, RX, 1:12 Ferrari
Led 25	CW, Single- λ , Red led, RX, 1:12 Ferrari
Led 26	CW, Single- λ , Red led, USB charger 3, 1:12 recharge cars
Led 27	CW, Single- λ , Red led, TX8, 1:12 race car
Led 28	CW, Single- λ , Red led, RX, MIA2 Abrams.
Led 29	CW, Single- λ , Red led, TXT, MIA2 Abrams
Led 30	CW, Single- λ , Red led, TX4, 1:6 Motorcycle.
Led 31	CW, Multi- λ additive, white led, RX, 1:16 Porsche cayenne turbo
Led 32	CW, Multi- λ additive, white led, RX, 1:16 Porsche macan turbo
Led 33	CW, Multi- λ additive, white led, RX, 1:16 Porsche GT3RS
Led 34	CW, Multi- λ additive, white led, RX, 1:16 AUDI
Led 35	CW, Multi- λ additive, white led, RX, 1:16 BENZ



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Description of the lasers or LEDs under test:

Source No.	Feature
Led 36	CW, Multi- λ additive, white led, RX, 1:16 Lamborghini
Led 37	CW, Single- λ , Red led, USB charger 4, 1:16 recharge cars
Led 38	CW, Multi- λ additive, white led, RX, 1:16 BMW
Led 39	CW, Multi- λ additive, white led, RX, 1:16 Lamborghini
Led 40	CW, Multi- λ additive, white led, RX, 1:16 Porsche
Led 41	CW, Multi- λ additive, white led, RX, 1:16 Toyota
Led 42	CW, Single- λ , Red led, TX6, 1:16 cars
Led 43	CW, Multi- λ additive, white led, RX, Off load
Led 44	CW, Single- λ , Red led, TX10, Air rebound
Led 45	CW, Single- λ , Red led, TX5, 1:24 Race car
Led 46	CW, Multi- λ additive, white led, RX, 1:24 Ferrari
Led 47	CW, Single- λ , Red led, TX3, 1:24 cars
Led 48	CW, Single- λ , Red led, USB charger 2, 1:24 recharge cars
Led 49	CW, Multi- λ additive, white led, RX, 1:24 FXX & F430
Led 50	CW, Single- λ , Red led, RX, 1:18 Ferrari
Led 51	CW, Single- λ , Red led, TX9, ship
Led 52	CW, Single- λ , Red led, RX, 1:18
Led 53	CW, Single- λ , Red led, RX, 1:18 3586
Led 54	CW, Single- λ , Red led, RX, 1:18 3561
Led 55	CW, Single- λ , blue led, RX, 1:18 3561
Led 56	CW, Single- λ , Red led, TX2, 1:18



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RESULTS:

I) TESTS DURING OPERATION

Basic Parameters of the lasers or LEDs

Single-wavelength source:

Parameters	Unit	Led 2	Led 3	Led 4	Led 7	Led 9
Color of the laser/LED	(e.g. Red / Amber / Yellow / Green / Blue, etc.)	Red	Red	Red	Red	Red
Wavelength (λ) measured / Given by manufacturer	(nm)	640	629	631	631	631
Time Base estimated	(sec)	100	100	100	100	100
Apparent source size (a) measured	(mm)	>10	0.22	>10	>10	>10
Angular subtense (α) estimated	(mrad)	>100	2.23	>100	>100	>100
Is the laser or LED continuous wave or pulsed?		CW	CW	CW	CW	CW
Break Point (T_2)	(second)	100	10.17	100	100	100

Multi-Wavelength Source (Additive):

Parameters	Unit	Led 1		Led 5		Led 6		Led 8	
Color of the laser/LED	(e.g. White)	Blue	Green	Blue	Green	Blue	Green	Blue	Green
Wavelength (λ) measured / Given by manufacturer	(nm)	456	543	453	536	448	544	448	544
Time Base estimated	(sec)	100		100		100		100	
Apparent source size (a) measured	(mm)	>10		>10		>10		>10	
Angular subtense (α) estimated	(mrad)	>100		>100		>100		>100	
Is the laser or LED continuous wave or pulsed?		CW		CW		CW		CW	
Break Point (T_2)	(second)	100		100		100		100	



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RESULTS:

I) TESTS DURING OPERATION

Basic Parameters of the lasers or LEDs

Single-wavelength source:

Parameters	Unit	Led 11	Led 13	Led 15	Led 17	Led 19
Color of the laser/LED	(e.g. Red / Amber / Yellow / Green / Blue, etc.)	Red	Red	Red	Red	Red
Wavelength (λ) measured / Given by manufacturer	(nm)	631	631	630	630	632
Time Base estimated	(sec)	100	100	100	100	100
Apparent source size (a) measured	(mm)	>10	>10	>10	>10	>10
Angular subtense (α) estimated	(mrad)	>100	>100	>100	>100	>100
Is the laser or LED continuous wave or pulsed?		CW	CW	CW	CW	CW
Break Point (T_2)	(second)	100	100	100	100	100

Multi-Wavelength Source (Additive):

Parameters	Unit	Led 10		Led 12		Led 14		Led 16	
Color of the laser/LED	(e.g. White)	Blue	Green	Blue	Green	Blue	Green	Blue	Green
Wavelength (λ) measured / Given by manufacturer	(nm)	448	544	448	544	448	541	448	541
Time Base estimated	(sec)	100		100		100		100	
Apparent source size (a) measured	(mm)	>10		>10		>10		>10	
Angular subtense (α) estimated	(mrad)	>100		>100		>100		>100	
Is the laser or LED continuous wave or pulsed?		CW		CW		CW		CW	
Break Point (T_2)	(second)	100		100		100		100	



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RESULTS:

I) TESTS DURING OPERATION

Basic Parameters of the lasers or LEDs

Single-wavelength source:

Parameters	Unit	Led 21	Led 23	Led 25	Led 26	Led 27
Color of the laser/LED	(e.g. Red / Amber / Yellow / Green / Blue, etc.)	Red	Red	Red	Red	Red
Wavelength (λ) measured / Given by manufacturer	(nm)	632	632	632	632	626
Time Base estimated	(sec)	100	100	100	100	100
Apparent source size (a) measured	(mm)	>10	>10	>10	>10	0.45
Angular subtense (α) estimated	(mrad)	>100	>100	>100	>100	4.45
Is the laser or LED continuous wave or pulsed?		CW	CW	CW	CW	CW
Break Point (T_2)	(second)	100	100	100	100	10.71

Multi-Wavelength Source (Additive):

Parameters	Unit	Led 18		Led 20		Led 22		Led 24	
Color of the laser/LED	(e.g. White)	Blue	Green	Blue	Green	Blue	Green	Blue	Green
Wavelength (λ) measured / Given by manufacturer	(nm)	451	544	451	544	451	544	451	544
Time Base estimated	(sec)	100		100		100		100	
Apparent source size (a) measured	(mm)	>10		>10		>10		>10	
Angular subtense (α) estimated	(mrad)	>100		>100		>100		>100	
Is the laser or LED continuous wave or pulsed?		CW		CW		CW		CW	
Break Point (T_2)	(second)	100		100		100		100	



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RESULTS:

I) TESTS DURING OPERATION

Basic Parameters of the lasers or LEDs

Single-wavelength source:

Parameters	Unit	Led 29	Led 30	Led 37	Led 42	Led 44
Color of the laser/LED	(e.g. Red / Amber / Yellow / Green / Blue, etc.)	Red	Red	Red	Red	Red
Wavelength (λ) measured / Given by manufacturer	(nm)	634	629	628	642	627
Time Base estimated	(sec)	100	100	100	100	100
Apparent source size (a) measured	(mm)	0.31	0.24	>10	0.26	0.29
Angular subtense (α) estimated	(mrad)	3.09	2.42	>100	2.58	2.89
Is the laser or LED continuous wave or pulsed?		CW	CW	CW	CW	CW
Break Point (T_2)	(second)	10.38	10.22	100	10.26	10.33

Multi-Wavelength Source (Additive):

Parameters	Unit	Led 28		Led 31		Led 32		Led 33	
Color of the laser/LED	(e.g. White)	Blue	Green	Blue	Green	Blue	Green	Blue	Green
Wavelength (λ) measured / Given by manufacturer	(nm)	453	541	450	541	450	541	450	541
Time Base estimated	(sec)	100		100		100		100	
Apparent source size (a) measured	(mm)	1.91		>10		>10		>10	
Angular subtense (α) estimated	(mrad)	19.14		>100		>100		>100	
Is the laser or LED continuous wave or pulsed?		CW		CW		CW		CW	
Break Point (T_2)	(second)	15.1		100		100		100	



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RESULTS:

I) TESTS DURING OPERATION

Basic Parameters of the lasers or LEDs

Single-wavelength source:

Parameters	Unit	Led 45	Led 47	Led 48	Led 50	Led 51
Color of the laser/LED	(e.g. Red / Amber / Yellow / Green / Blue, etc.)	Red	Red	Red	Red	Red
Wavelength (λ) measured / Given by manufacturer	(nm)	629	628	631	628	627
Time Base estimated	(sec)	100	100	100	100	100
Apparent source size (a) measured	(mm)	0.24	0.23	>10	0.25	0.27
Angular subtense (α) estimated	(mrad)	2.38	2.34	>100	2.5	2.7
Is the laser or LED continuous wave or pulsed?		CW	CW	CW	CW	CW
Break Point (T_2)	(second)	10.21	10.2	100	10.24	10.28

Multi-Wavelength Source (Additive):

Parameters	Unit	Led 34		Led 35		Led 36		Led 38	
Color of the laser/LED	(e.g. White)	Blue	Green	Blue	Green	Blue	Green	Blue	Green
Wavelength (λ) measured / Given by manufacturer	(nm)	450	541	450	541	450	541	450	545
Time Base estimated	(sec)	100		100		100		100	
Apparent source size (a) measured	(mm)	>10		>10		>10		>10	
Angular subtense (α) estimated	(mrad)	>100		>100		>100		>100	
Is the laser or LED continuous wave or pulsed?		CW		CW		CW		CW	
Break Point (T_2)	(second)	100		100		100		100	



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RESULTS:

I) TESTS DURING OPERATION

Basic Parameters of the lasers or LEDs

Single-wavelength source:

Parameters	Unit	Led 52	Led 53	Led 54	Led 55	Led 56
Color of the laser/LED	(e.g. Red / Amber / Yellow / Green / Blue, etc.)	Red	Red	Red	Blue	Red
Wavelength (λ) measured / Given by manufacturer	(nm)	628	630	632	465	628
Time Base estimated	(sec)	100	100	100	100	100
Apparent source size (a) measured	(mm)	0.25	0.18	>10	>10	0.22
Angular subtense (α) estimated	(mrad)	2.46	1.76	>100	>100	2.23
Is the laser or LED continuous wave or pulsed?		CW	CW	CW	CW	CW
Break Point (T_2)	(second)	10.23	10.06	100	100	10.17

Multi-Wavelength Source (Additive):

Parameters	Unit	Led 39		Led 40		Led 41		Led 43	
Color of the laser/LED	(e.g. White)	Blue	Green	Blue	Green	Blue	Green	Blue	Green
Wavelength (λ) measured / Given by manufacturer	(nm)	450	545	450	545	450	545	449	542
Time Base estimated	(sec)	100		100		100		100	
Apparent source size (a) measured	(mm)	>10		>10		>10		>10	
Angular subtense (α) estimated	(mrad)	>100		>100		>100		>100	
Is the laser or LED continuous wave or pulsed?		CW		CW		CW		CW	
Break Point (T_2)	(second)	100		100		100		100	



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RESULTS:

I) TESTS DURING OPERATION

Basic Parameters of the lasers or LEDs

Multi-Wavelength Source (Additive):

Parameters	Unit	Led 46		Led 49	
		Blue	Green	Blue	Green
Color of the laser/LED	(e.g. White)	Blue	Green	Blue	Green
Wavelength (λ) measured / Given by manufacturer	(nm)	453	547	451	539
Time Base estimated	(sec)	100		100	
Apparent source size (a) measured	(mm)	1.91		>10	
Angular subtense (α) estimated	(mrad)	19.05		>100	
Is the laser or LED continuous wave or pulsed?		CW		CW	
Break Point (T_2)	(second)	15.07		100	



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RESULTS:

For continuous wave (CW) lasers or LEDs:

Note: a laser or LED operating with a continuous output for a period equal to or greater than 0.25 second.

A) TESTS AGAINST RETINAL PHOTOCHEMICAL HAZARD (RPH):

Single-wavelength source:

Parameters	Unit	Led 2	Led 3	Led 4	Led 7	Led 9
Limiting angle of acceptance (γ_p)	(mrad)	NA	NA	NA	NA	NA
Measurement aperture (d)	(mm)	NA	NA	NA	NA	NA
Measurement distance (r)	(mm)	NA	NA	NA	NA	NA
Exposure time (t)	(sec)	NA	NA	NA	NA	NA
Radiant power (P)	(μ W)	NA	NA	NA	NA	NA
Radiant energy (Q)	(μ J)	NA	NA	NA	NA	NA
The corresponding RPH AEL for Class 1 Laser	< μ W or μ J>	NA	NA	NA	NA	NA

Multi-wavelength source (Additive):

Parameters	Unit	Led 1		Led 5		Led 6		Led 8	
Wavelength (λ)	(nm)	456	543	453	536	448	544	448	544
Limiting angle of acceptance (γ_p)	(mrad)	11		11		11		11	
Measurement aperture (d)	(mm)	7		7		7		7	
Measurement distance (r)	(mm)	100		100		100		100	
Exposure time (t)	(sec)	100		100		100		100	
Radiant power (P)	(μ W)	NA	NA	NA	NA	NA	NA	NA	NA
Radiant energy (Q)	(μ J)	47.54	27.99	2.37	1.63	179.22	92.82	181.88	95.64
The corresponding RPH AEL for Class 1 Laser	(μ J)	5061.33	278397	4402.15	208000.6	3900	291517.5	3900	291517.5
$\Sigma[(P/AEL)]$, or $\Sigma[(Q/AEL)]$	None	<1		<1		<1		<1	



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RESULTS:

For continuous wave (CW) lasers or LEDs:

Note: a laser or LED operating with a continuous output for a period equal to or greater than 0.25 second.

A) TESTS AGAINST RETINAL PHOTOCHEMICAL HAZARD (RPH):

Single-wavelength source:

Parameters	Unit	Led 11	Led 13	Led 15	Led 17	Led 19
Limiting angle of acceptance (γ_p)	(mrad)	NA	NA	NA	NA	NA
Measurement aperture (d)	(mm)	NA	NA	NA	NA	NA
Measurement distance (r)	(mm)	NA	NA	NA	NA	NA
Exposure time (t)	(sec)	NA	NA	NA	NA	NA
Radiant power (P)	(μ W)	NA	NA	NA	NA	NA
Radiant energy (Q)	(μ J)	NA	NA	NA	NA	NA
The corresponding RPH AEL for Class 1 Laser	< μ W or μ J>	NA	NA	NA	NA	NA

Multi-wavelength source (Additive):

Parameters	Unit	Led 10		Led 12		Led 14		Led 6	
Wavelength (λ)	(nm)	448	544	448	544	448	541	448	541
Limiting angle of acceptance (γ_p)	(mrad)	11		11		11		11	
Measurement aperture (d)	(mm)	7		7		7		7	
Measurement distance (r)	(mm)	100		100		100		100	
Exposure time (t)	(sec)	100		100		100		100	
Radiant power (P)	(μ W)	NA	NA	NA	NA	NA	NA	NA	NA
Radiant energy (Q)	(μ J)	178.37	90.25	171.62	89.9	124.85	64.51	133.45	70.95
The corresponding RPH AEL for Class 1 Laser	(μ J)	3900	291517.5	3900	291517.5	3900	253901.1	3900	253901.1
$\Sigma[(P/AEL)]$, or $\Sigma[(Q/AEL)]$	None	<1		<1		<1		<1	



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RESULTS:

For continuous wave (CW) lasers or LEDs:

Note: a laser or LED operating with a continuous output for a period equal to or greater than 0.25 second.

A) TESTS AGAINST RETINAL PHOTOCHEMICAL HAZARD (RPH):

Single-wavelength source:

Parameters	Unit	Led 21	Led 23	Led 25	Led 26	Led 27
Limiting angle of acceptance (γ_p)	(mrad)	NA	NA	NA	NA	NA
Measurement aperture (d)	(mm)	NA	NA	NA	NA	NA
Measurement distance (r)	(mm)	NA	NA	NA	NA	NA
Exposure time (t)	(sec)	NA	NA	NA	NA	NA
Radiant power (P)	(μ W)	NA	NA	NA	NA	NA
Radiant energy (Q)	(μ J)	NA	NA	NA	NA	NA
The corresponding RPH AEL for Class 1 Laser	< μ W or μ J>	NA	NA	NA	NA	NA

Multi-wavelength source (Additive):

Parameters	Unit	Led 18		Led 20		Led 22		Led 24	
Wavelength (λ)	(nm)	451	544	451	544	451	544	451	544
Limiting angle of acceptance (γ_p)	(mrad)	11		11		11		11	
Measurement aperture (d)	(mm)	7		7		7		7	
Measurement distance (r)	(mm)	100		100		100		100	
Exposure time (t)	(sec)	100		100		100		100	
Radiant power (P)	(μ W)	NA	NA	NA	NA	NA	NA	NA	NA
Radiant energy (Q)	(μ J)	111.3	63.44	104.96	56.09	110.1	58.31	114.84	64.33
The corresponding RPH AEL for Class 1 Laser	(μ J)	4074.41	300652.4	4074.41	300652.4	4074.41	300652.4	4074.41	300652.4
$\Sigma[(P/AEL)]$, or $\Sigma[(Q/AEL)]$	None	<1		<1		<1		<1	



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RESULTS:

For continuous wave (CW) lasers or LEDs:

Note: a laser or LED operating with a continuous output for a period equal to or greater than 0.25 second.

A) TESTS AGAINST RETINAL PHOTOCHEMICAL HAZARD (RPH):

Single-wavelength source:

Parameters	Unit	Led 29	Led 30	Led 37	led 42	led 44
Limiting angle of acceptance (γ_p)	(mrad)	NA	NA	NA	NA	NA
Measurement aperture (d)	(mm)	NA	NA	NA	NA	NA
Measurement distance (r)	(mm)	NA	NA	NA	NA	NA
Exposure time (t)	(sec)	NA	NA	NA	NA	NA
Radiant power (P)	(μ W)	NA	NA	NA	NA	NA
Radiant energy (Q)	(μ J)	NA	NA	NA	NA	NA
The corresponding RPH AEL for Class 1 Laser	< μ W or μ J>	NA	NA	NA	NA	NA

Multi-wavelength source (Additive):

Parameters	Unit	Led 28		Led 31		Led 32		Led 33	
Wavelength (λ)	(nm)	453	541	450	541	450	541	450	541
Limiting angle of acceptance (γ_p)	(mrad)	11		11		11		11	
Measurement aperture (d)	(mm)	7		7		7		7	
Measurement distance (r)	(mm)	100		100		100		100	
Exposure time (t)	(sec)	100		100		100		100	
Radiant power (P)	(μ W)	NA	NA	NA	NA	NA	NA	NA	NA
Radiant energy (Q)	(μ J)	161.43	107.68	230.15	139.66	201.99	123.2	217.68	130.79
The corresponding RPH AEL for Class 1 Laser	(μ J)	4402.15	253901.1	3900	261857.3	3900	261857.3	3900	261857.3
$\Sigma[(P/AEL)]$, or $\Sigma[(Q/AEL)]$	None	<1		<1		<1		<1	



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RESULTS:

For continuous wave (CW) lasers or LEDs:

Note: a laser or LED operating with a continuous output for a period equal to or greater than 0.25 second.

A) TESTS AGAINST RETINAL PHOTOCHEMICAL HAZARD (RPH):

Single-wavelength source:

Parameters	Unit	Led 45	Led 47	Led 48	Led 50	Led 51
Limiting angle of acceptance (γ_p)	(mrad)	NA	NA	NA	NA	NA
Measurement aperture (d)	(mm)	NA	NA	NA	NA	NA
Measurement distance (r)	(mm)	NA	NA	NA	NA	NA
Exposure time (t)	(sec)	NA	NA	NA	NA	NA
Radiant power (P)	(μ W)	NA	NA	NA	NA	NA
Radiant energy (Q)	(μ J)	NA	NA	NA	NA	NA
The corresponding RPH AEL for Class 1 Laser	< μ W or μ J>	NA	NA	NA	NA	NA

Multi-wavelength source (Additive):

Parameters	Unit	Led 34		Led 35		Led 36		Led 38	
Wavelength (λ)	(nm)	450	541	450	541	450	541	450	545
Limiting angle of acceptance (γ_p)	(mrad)	11		11		11		11	
Measurement aperture (d)	(mm)	7		7		7		7	
Measurement distance (r)	(mm)	100		100		100		100	
Exposure time (t)	(sec)	100		100		100		100	
Radiant power (P)	(μ W)	NA	NA	NA	NA	NA	NA	NA	NA
Radiant energy (Q)	(μ J)	222.38	135.02	225.53	136.4	2.98	1.91	4.14	2.99
The corresponding RPH AEL for Class 1 Laser	(μ J)	3900	261857.3	3900	261857.3	3900	261857.3	3948.8	309930.7
$\Sigma[(P/AEL)]$, or $\Sigma[(Q/AEL)]$	None	<1		<1		<1		<1	



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RESULTS:

For continuous wave (CW) lasers or LEDs:

Note: a laser or LED operating with a continuous output for a period equal to or greater than 0.25 second.

A) TESTS AGAINST RETINAL PHOTOCHEMICAL HAZARD (RPH):

Single-wavelength source:

Parameters	Unit	Led 52	Led 53	Led 54	Led 55	Led 56
Limiting angle of acceptance (γ_p)	(mrad)	NA	NA	NA	NA	NA
Measurement aperture (d)	(mm)	NA	NA	NA	NA	NA
Measurement distance (r)	(mm)	NA	NA	NA	NA	NA
Exposure time (t)	(sec)	NA	NA	NA	NA	NA
Radiant power (P)	(μ W)	NA	NA	NA	NA	NA
Radiant energy (Q)	(μ J)	NA	NA	NA	NA	NA
The corresponding RPH AEL for Class 1 Laser	< μ W or μ J>	NA	NA	NA	NA	NA

Multi-wavelength source (Additive):

Parameters	Unit	Led 39		Led 40		Led 41		Led 43	
Wavelength (λ)	(nm)	450	545	450	545	450	545	449	542
Limiting angle of acceptance (γ_p)	(mrad)	11		11		11		11	
Measurement aperture (d)	(mm)	7		7		7		7	
Measurement distance (r)	(mm)	100		100		100		100	
Exposure time (t)	(sec)	100		100		100		100	
Radiant power (P)	(μ W)	NA	NA	NA	NA	NA	NA	NA	NA
Radiant energy (Q)	(μ J)	4.32	3.13	26.64	12.69	28.35	13.59	157.16	106.19
The corresponding RPH AEL for Class 1 Laser	(μ J)	3948.8	309930.7	3948.8	309930.7	3948.8	309930.7	3900	269938.4
$\Sigma[(P/AEL)]$, or $\Sigma[(Q/AEL)]$	None	<1		<1		<1		<1	



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RESULTS:

For continuous wave (CW) lasers or LEDs:

Note: a laser or LED operating with a continuous output for a period equal to or greater than 0.25 second.

A) TESTS AGAINST RETINAL PHOTOCHEMICAL HAZARD (RPH):

Multi-wavelength source (Additive):

Parameters	Unit	Led 46		Led 49	
Wavelength (λ)	(nm)	453	547	451	539
Limiting angle of acceptance (θ)	(mrad)	11		11	
Measurement aperture (d)	(mm)	7		7	
Measurement distance (r)	(mm)	100		100	
Exposure time (t)	(sec)	100		100	
Radiant power (P)	(μ W)	NA	NA	NA	NA
Radiant energy (Q)	(μ J)	132.24	65.13	33.24	24.14
The corresponding RPH AEL for Class 1 Laser	(μ J)	4402.15	345036.2	4074.41	235106.5
$\Sigma[(P/AEL)]$, or $\Sigma[(Q/AEL)]$	None	<1		<1	



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RESULTS:

B) TESTS AGAINST RETINAL THERMAL HAZARD (RTH):

Single-wavelength source:

Parameters	Unit	Led 2	Led 3	Led 4	Led 7	Led 9
Angle of acceptance (γ)	(mrad)	100	≥ 2.23	100	100	100
Measurement aperture (d)	(mm)	7	7	7	7	7
Measurement distance (r)	(mm)	100	16.39	100	100	100
Exposure time (t)	(sec)	100	100	1.02	100	100
Radiant power (P)	(μ W)	NA	0.77	NA	NA	NA
Radiant energy (Q)	(μ J)	807.21	NA	0.35	600.35	597.17
The corresponding RTH AEL for Class 1 Laser	< μ W or μ J>	1475730 (μ J)	581.64 (μ W)	47364.93 (μ J)	1475730 (μ J)	1475730 (μ J)

Multi-wavelength source (Additive):

Parameters	Unit	Led 1		Led 5		Led 6		Led 8	
Wavelength (λ)	(nm)	456	543	453	536	448	544	448	544
Angle of acceptance (γ)	(mrad)	100		100		100		100	
Measurement aperture (d)	(mm)	7		7		7		7	
Measurement distance (r)	(mm)	100		100		100		100	
Exposure time (t)	(sec)	100		100		100		100	
Radiant power (P)	(μ W)	NA	NA	NA	NA	NA	NA	NA	NA
Radiant energy (Q)	(μ J)	173.45	122.71	39.55	28.35	5453.77	3806.05	5484.64	3822.16
The corresponding RTH AEL for Class 1 Laser	(μ J)	1475730	1475730	1475730	1475730	1475730	1475730	1475730	1475730
$\Sigma[(P/AEL)]$, or $\Sigma[(Q/AEL)]$	None	<1		<1		<1		<1	



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RESULTS:

B) TESTS AGAINST RETINAL THERMAL HAZARD (RTH):

Single-wavelength source:

Parameters	Unit	Led 11	Led 13	Led 15	Led 17	Led 19
Angle of acceptance (γ)	(mrad)	100	100	100	100	100
Measurement aperture (d)	(mm)	7	7	7	7	7
Measurement distance (r)	(mm)	100	100	100	100	100
Exposure time (t)	(sec)	100	100	100	100	100
Radiant power (P)	(μ W)	NA	NA	NA	NA	NA
Radiant energy (Q)	(μ J)	588.37	592.1	448.22	570.86	658.99
The corresponding RTH AEL for Class 1 Laser	(μ J)	1475730	1475730	1475730	1475730	1475730

Multi-wavelength source (Additive):

Parameters	Unit	Led 10		Led 12		Led 14		Led 6	
Wavelength (λ)	(nm)	448	544	448	544	448	541	448	541
Angle of acceptance (γ)	(mrad)	100		100		100		100	
Measurement aperture (d)	(mm)	7		7		7		7	
Measurement distance (r)	(mm)	100		100		100		100	
Exposure time (t)	(sec)	100		100		100		100	
Radiant power (P)	(μ W)	NA	NA	NA	NA	NA	NA	NA	NA
Radiant energy (Q)	(μ J)	5473.03	3809.16	5419.33	3776.39	3724.6	2805.27	3789.26	2857.23
The corresponding RTH AEL for Class 1 Laser	(μ J)	1475730	1475730	1475730	1475730	1475730	1475730	1475730	1475730
$\Sigma[(P/AEL)]$, or $\Sigma[(Q/AEL)]$	None	<1		<1		<1		<1	



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RESULTS:

B) TESTS AGAINST RETINAL THERMAL HAZARD (RTH):

Single-wavelength source:

Parameters	Unit	Led 21	Led 23	Led 25	Led 26	Led 27
Angle of acceptance (γ)	(mrad)	100	100	100	100	≥ 4.45
Measurement aperture (d)	(mm)	7	7	7	7	7
Measurement distance (r)	(mm)	100	100	100	100	22.16
Exposure time (t)	(sec)	100	100	100	0.98	100
Radiant power (P)	(μ W)	NA	NA	NA	NA	NA
Radiant energy (Q)	(μ J)	635.44	653.82	641.84	1.5	NA
The corresponding RTH AEL for Class 1 Laser	< μ W or μ J>	1475730 (μ J)	1475730 (μ J)	1475730 (μ J)	45788.9 (μ J)	1148.24 (μ W)

Multi-wavelength source (Additive):

Parameters	Unit	Led 18		Led 20		Led 22		Led 24	
Wavelength (λ)	(nm)	451	544	451	544	451	544	451	544
Angle of acceptance (γ)	(mrad)	100		100		100		100	
Measurement aperture (d)	(mm)	7		7		7		7	
Measurement distance (r)	(mm)	100		100		100		100	
Exposure time (t)	(sec)	100		100		100		100	
Radiant power (P)	(μ W)	NA	NA	NA	NA	NA	NA	NA	NA
Radiant energy (Q)	(μ J)	4053.94	2642.02	4008.86	2615.01	4025.25	2623.77	4047.42	2639.5
The corresponding RTH AEL for Class 1 Laser	(μ J)	1475730	1475730	1475730	1475730	1475730	1475730	1475730	1475730
$\Sigma[(P/AEL)]$, or $\Sigma[(Q/AEL)]$	None	<1		<1		<1		<1	



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RESULTS:

B) TESTS AGAINST RETINAL THERMAL HAZARD (RTH):

Single-wavelength source:

Parameters	Unit	Led 29	Led 30	Led 37	led 42	led 44
Angle of acceptance (γ)	(mrad)	≥ 3.09	≥ 2.42	100	≥ 2.58	≥ 2.89
Measurement aperture (d)	(mm)	7	7	7	7	7
Measurement distance (r)	(mm)	18.84	16.98	100	17.43	18.3
Exposure time (t)	(sec)	100	100	1.17	100	100
Radiant power (P)	(μ W)	8.75	0.42	NA	1.01	0.79
Radiant energy (Q)	(μ J)	NA	NA	1.45	NA	NA
The corresponding RTH AEL for Class 1 Laser	< μ W or μ J>	802.78 (μ W)	632.75 (μ W)	52498.41 (μ J)	672.59 (μ W)	752.07 (μ W)

Multi-wavelength source (Additive):

Parameters	Unit	Led 28		Led 31		Led 32		Led 33	
Wavelength (λ)	(nm)	453	541	450	541	450	541	450	541
Angle of acceptance (γ)	(mrad)	≥ 19.14		100		100		100	
Measurement aperture (d)	(mm)	7		7		7		7	
Measurement distance (r)	(mm)	44.27		100		100		100	
Exposure time (t)	(sec)	100		100		100		100	
Radiant power (P)	(μ W)	75.74	57.91	NA	NA	NA	NA	NA	NA
Radiant energy (Q)	(μ J)	NA	NA	5172.5	3747.52	4585.04	3435.14	4644.42	3481.72
The corresponding RTH AEL for Class 1 Laser	< μ W or μ J>	4530.7 (μ W)	4530.7 (μ W)	1475730 (μ J)	1475730 (μ J)	1475730 (μ J)	1475730 (μ J)	1475730 (μ J)	1475730 (μ J)
$\Sigma[(P/AEL)]$, or $\Sigma[(Q/AEL)]$	None	<1		<1		<1		<1	



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RESULTS:

B) TESTS AGAINST RETINAL THERMAL HAZARD (RTH):

Single-wavelength source:

Parameters	Unit	Led 45	Led 47	Led 48	Led 50	Led 51
Angle of acceptance (γ)	(mrad)	≥ 2.38	≥ 2.34	100	≥ 2.5	≥ 2.7
Measurement aperture (d)	(mm)	7	7	7	7	7
Measurement distance (r)	(mm)	16.85	16.74	100	17.2	17.77
Exposure time (t)	(sec)	100	100	1.01	100	100
Radiant power (P)	(μ W)	0.81	0.38	NA	6.09	1.52
Radiant energy (Q)	(μ J)	NA	NA	0.3	NA	NA
The corresponding RTH AEL for Class 1 Laser	< μ W or μ J>	621.58 (μ W)	612 (μ W)	47016.23 (μ J)	651.88 (μ W)	702.83 (μ W)

Multi-wavelength source (Additive):

Parameters	Unit	Led 34		Led 35		Led 36		Led 38	
Wavelength (λ)	(nm)	450	541	450	541	450	541	450	545
Angle of acceptance (γ)	(mrad)	100		100		100		100	
Measurement aperture (d)	(mm)	7		7		7		7	
Measurement distance (r)	(mm)	100		100		100		100	
Exposure time (t)	(sec)	100		100		100		100	
Radiant power (P)	(μ W)	NA	NA	NA	NA	NA	NA	NA	NA
Radiant energy (Q)	(μ J)	4673.55	3501.34	5102.34	3718.22	100.63	73.13	126.66	99.26
The corresponding RTH AEL for Class 1 Laser	(μ J)	1475730	1475730	1475730	1475730	1475730	1475730	1475730	1475730
$\Sigma[(P/AEL)]$, or $\Sigma[(Q/AEL)]$	None	<1		<1		<1		<1	



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RESULTS:

B) TESTS AGAINST RETINAL THERMAL HAZARD (RTH):

Single-wavelength source:

Parameters	Unit	Led 52	Led 53	Led 54	Led 55	Led 56
Angle of acceptance (γ)	(mrad)	≥ 2.46	≥ 1.76	100	100	≥ 2.23
Measurement aperture (d)	(mm)	7	7	7	7	7
Measurement distance (r)	(mm)	17.09	14.9	100	100	16.39
Exposure time (t)	(sec)	100	100	0.34	0.31	100
Radiant power (P)	(μ W)	8.58	9.13	NA	NA	0.66
Radiant energy (Q)	(μ J)	NA	NA	1.34	5.9	NA
The corresponding RTH AEL for Class 1 Laser	< μ W or μ J>	642.32 (μ W)	461.38 (μ W)	20778.58 (μ J)	19387.78 (μ J)	581.64 (μ W)

Multi-wavelength source (Additive):

Parameters	Unit	Led 39		Led 40		Led 41		Led 43	
Wavelength (λ)	(nm)	450	545	450	545	450	545	449	542
Angle of acceptance (γ)	(mrad)	100		100		100		100	
Measurement aperture (d)	(mm)	7		7		7		7	
Measurement distance (r)	(mm)	100		100		100		100	
Exposure time (t)	(sec)	100		100		100		100	
Radiant power (P)	(μ W)	NA	NA	NA	NA	NA	NA	NA	NA
Radiant energy (Q)	(μ J)	136.07	104.79	752.91	473.09	791.1	503.41	3979.41	3055.93
The corresponding RTH AEL for Class 1 Laser	(μ J)	1475730	1475730	1475730	1475730	1475730	1475730	1475730	1475730
$\Sigma[(P/AEL)]$, or $\Sigma[(Q/AEL)]$	None	<1		<1		<1		<1	



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RESULTS:

B) TESTS AGAINST RETINAL THERMAL HAZARD (RTH):

Multi-wavelength source (Additive):

Parameters	Unit	Led 46		Led 49	
Wavelength (λ)	(nm)	453	547	451	539
Angle of acceptance (γ)	(mrad)	≥ 19.05		100	
Measurement aperture (d)	(mm)	7		7	
Measurement distance (r)	(mm)	44.17		100	
Exposure time (t)	(sec)	100		100	
Radiant power (P)	(μ W)	49.65	33.95	NA	NA
Radiant energy (Q)	(μ J)	NA	NA	831.32	642.13
The corresponding RTH AEL for Class <u>1</u> Laser	< μ W or μ J>	4512.44 (μ W)	4512.44 (μ W)	1475730 (μ J)	1475730 (μ J)
$\Sigma[(P/AEL)],$ or $\Sigma[(Q/AEL)]$	None	<1		<1	



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RESULTS:

II) TESTS WITH PARTS SUCH AS LENSES, REFLECTORS OR FILTERS THAT COULD AFFECT FOCUSING REMOVED

Basic Parameters of the lasers or LEDs

Single-wavelength source:

Parameters	Unit	Led 2	Led 4	Led 7	Led 15	Led 19
Color of the laser/LED	(e.g. Red / Amber / Yellow / Green / Blue, etc.)	Red	Red	Red	Red	Red
Wavelength (λ) measured / Given by manufacturer	(nm)	640	631	631	630	632
Time Base estimated	(sec)	100	100	100	100	100
Apparent source size (a) measured	(mm)	0.25	0.11	0.19	0.28	0.18
Angular subtense (α) estimated	(mrad)	2.54	≤ 1.5	1.87	2.77	1.76
Is the laser or LED continuous wave or pulsed?		CW	CW	CW	CW	CW
Break Point (T_2)	(second)	10.25	10	10.09	10.3	10.06

Multi-Wavelength Source (Additive):

Parameters	Unit	Led 1		Led 5		Led 6		Led 14	
Color of the laser/LED	(e.g. White)	Blue	Green	Blue	Green	Blue	Green	Blue	Green
Wavelength (λ) measured / Given by manufacturer	(nm)	456	543	453	536	448	544	448	541
Time Base estimated	(sec)	100		100		100		100	
Apparent source size (a) measured	(mm)	1.8		1.86		1.95		1.9	
Angular subtense (α) estimated	(mrad)	17.97		18.56		19.53		19.02	
Is the laser or LED continuous wave or pulsed?		CW		CW		CW		CW	
Break Point (T_2)	(second)	14.7		14.9		15.24		15.06	



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RESULTS:

II) TESTS WITH PARTS SUCH AS LENSES, REFLECTORS OR FILTERS THAT COULD AFFECT FOCUSING REMOVED

Basic Parameters of the lasers or LEDs

Single-wavelength source:

Parameters	Unit	Led 26	Led 37	Led 48	Led 54	Led 55
Color of the laser/LED	(e.g. Red / Amber / Yellow / Green / Blue, etc.)	Red	Red	Red	Red	Blue
Wavelength (λ) measured / Given by manufacturer	(nm)	632	628	631	632	465
Time Base estimated	(sec)	100	100	100	100	100
Apparent source size (a) measured	(mm)	0.11	0.11	0.11	0.11	0.17
Angular subtense (α) estimated	(mrad)	≤ 1.5	≤ 1.5	≤ 1.5	≤ 1.5	1.72
Is the laser or LED continuous wave or pulsed?		CW	CW	CW	CW	CW
Break Point (T_2)	(second)	10	10	10	10	10.05

Multi-Wavelength Source (Additive):

Parameters	Unit	Led 18		Led 31		Led 36		Led 38	
Color of the laser/LED	(e.g. White)	Blue	Green	Blue	Green	Blue	Green	Blue	Green
Wavelength (λ) measured / Given by manufacturer	(nm)	451	544	450	541	450	541	450	545
Time Base estimated	(sec)	100		100		100		100	
Apparent source size (a) measured	(mm)	1.92		1.92		1.92		1.85	
Angular subtense (α) estimated	(mrad)	19.22		19.24		19.24		18.51	
Is the laser or LED continuous wave or pulsed?		CW		CW		CW		CW	
Break Point (T_2)	(second)	15.13		15.14		15.14		14.88	



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RESULTS:

II) TESTS WITH PARTS SUCH AS LENSES, REFLECTORS OR FILTERS THAT COULD AFFECT FOCUSING REMOVED

Basic Parameters of the lasers or LEDs

Multi-Wavelength Source (Additive):

Parameters	Unit	Led 40		Led 43		Led 49	
Color of the laser/LED	(e.g. White)	Blue	Green	Blue	Green	Blue	Green
Wavelength (λ) measured / Given by manufacturer	(nm)	450	545	449	542	451	539
Time Base estimated	(sec)	100		100		100	
Apparent source size (a) measured	(mm)	1.85		1.84		1.83	
Angular subtense (α) estimated	(mrad)	18.51		18.44		18.32	
Is the laser or LED continuous wave or pulsed?		CW		CW		CW	
Break Point (T_2)	(second)	14.88		14.86		14.82	



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RESULTS:

For continuous wave (CW) lasers or LEDs:

Note: a laser or LED operating with a continuous output for a period equal to or greater than 0.25 second.

A) TESTS AGAINST RETINAL PHOTOCHEMICAL HAZARD (RPH):

Single-wavelength source:

Parameters	Unit	Led 2	Led 4	Led 7	Led 15	Led 19
Limiting angle of acceptance (γ_p)	(mrad)	NA	NA	NA	NA	NA
Measurement aperture (d)	(mm)	NA	NA	NA	NA	NA
Measurement distance (r)	(mm)	NA	NA	NA	NA	NA
Exposure time (t)	(sec)	NA	NA	NA	NA	NA
Radiant power (P)	(μ W)	NA	NA	NA	NA	NA
Radiant energy (Q)	(μ J)	NA	NA	NA	NA	NA
The corresponding RPH AEL for Class 1 Laser	< μ W or μ J>	NA	NA	NA	NA	NA

Multi-wavelength source (Additive):

Parameters	Unit	Led 1		Led 5		Led 6		Led 14	
Wavelength (λ)	(nm)	456	543	453	536	448	544	448	541
Limiting angle of acceptance (γ_p)	(mrad)	11		11		11		11	
Measurement aperture (d)	(mm)	7		7		7		7	
Measurement distance (r)	(mm)	100		100		100		100	
Exposure time (t)	(sec)	100		100		100		100	
Radiant power (P)	(μ W)	NA	NA	NA	NA	NA	NA	NA	NA
Radiant energy (Q)	(μ J)	206.75	138.32	7.58	5	556.33	296.89	433.21	225.2
The corresponding RPH AEL for Class 1 Laser	(μ J)	5061.33	278397	4402.15	208000.6	3900	291517.5	3900	253901.1
$\Sigma[(P/AEL)]$, or $\Sigma[(Q/AEL)]$	None	<1		<1		<1		<1	



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RESULTS:

For continuous wave (CW) lasers or LEDs:

Note: a laser or LED operating with a continuous output for a period equal to or greater than 0.25 second.

A) TESTS AGAINST RETINAL PHOTOCHEMICAL HAZARD (RPH):

Single-wavelength source:

Parameters	Unit	Led 26	Led 37	Led 48	Led 54	Led 55
Limiting angle of acceptance (γ_p)	(mrad)	NA	NA	NA	NA	NA
Measurement aperture (d)	(mm)	NA	NA	NA	NA	NA
Measurement distance (r)	(mm)	NA	NA	NA	NA	NA
Exposure time (t)	(sec)	NA	NA	NA	NA	NA
Radiant power (P)	(μ W)	NA	NA	NA	NA	NA
Radiant energy (Q)	(μ J)	NA	NA	NA	NA	NA
The corresponding RPH AEL for Class 1 Laser	< μ W or μ J>	NA	NA	NA	NA	NA

Multi-wavelength source (Additive):

Parameters	Unit	Led 18		Led 31		Led 36		Led 38	
Wavelength (λ)	(nm)	451	544	450	541	450	541	450	545
Limiting angle of acceptance (γ_p)	(mrad)	11		11		11		11	
Measurement aperture (d)	(mm)	7		7		7		7	
Measurement distance (r)	(mm)	100		100		100		100	
Exposure time (t)	(sec)	100		100		100		100	
Radiant power (P)	(μ W)	NA	NA	NA	NA	NA	NA	NA	NA
Radiant energy (Q)	(μ J)	352.7	209.26	805.2	488.29	12.97	9.27	13.24	9.6
The corresponding RPH AEL for Class 1 Laser	(μ J)	4074.41	30052.4	3900	261857.3	3900	261857.3	3948.8	309930.7
$\Sigma[(P/AEL)]$, or $\Sigma[(Q/AEL)]$	None	<1		<1		<1		<1	



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RESULTS:

For continuous wave (CW) lasers or LEDs:

Note: a laser or LED operating with a continuous output for a period equal to or greater than 0.25 second.

A) TESTS AGAINST RETINAL PHOTOCHEMICAL HAZARD (RPH):

Multi-wavelength source (Additive):

Parameters	Unit	Led 40		Led 43		Led 49	
Wavelength (λ)	(nm)	450	545	449	542	451	539
Limiting angle of acceptance (θ)	(mrad)	11		11		11	
Measurement aperture (d)	(mm)	7		7		7	
Measurement distance (r)	(mm)	100		100		100	
Exposure time (t)	(sec)	100		100		100	
Radiant power (P)	(μ W)	NA	NA	NA	NA	NA	NA
Radiant energy (Q)	(μ J)	74.75	34.89	506	355.73	105.28	77.18
The corresponding RPH AEL for Class <u>1</u> Laser	(μ J)	3948.8	309930.7	3900	269938.4	4074.41	235106.5
$\Sigma[(P/AEL)]$, or $\Sigma[(Q/AEL)]$	None	<1		<1		<1	



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RESULTS:

B) TESTS AGAINST RETINAL THERMAL HAZARD (RTH):

Single-wavelength source:

Parameters	Unit	Led 2	Led 4	Led 7	Led 15	Led 19
Angle of acceptance (γ)	(mrad)	≥ 2.54	≥ 1.5	≥ 1.87	≥ 2.77	≥ 1.76
Measurement aperture (d)	(mm)	7	7	7	7	7
Measurement distance (r)	(mm)	17.33	14	15.27	17.98	14.9
Exposure time (t)	(sec)	100	1.02	100	100	100
Radiant power (P)	(μ W)	76.39	NA	57.33	62.59	68.2
Radiant energy (Q)	(μ J)	NA	3.73	NA	NA	NA
The corresponding RTH AEL for Class 1 Laser	< μ W or μ J>	663.04 (μ W)	710.47 (μ J)	490.3 (μ W)	721.9 (μ W)	461.38 (μ W)

Multi-wavelength source (Additive):

Parameters	Unit	Led 1		Led 5		Led 6		Led 14	
Wavelength (λ)	(nm)	456	543	453	536	448	544	448	541
Angle of acceptance (γ)	(mrad)	≥ 17.97		≥ 18.56		≥ 19.53		≥ 19.02	
Measurement aperture (d)	(mm)	7		7		7		7	
Measurement distance (r)	(mm)	42.93		43.61		44.71		44.14	
Exposure time (t)	(sec)	100		100		100		100	
Radiant power (P)	(μ W)	6.24	4.51	2.04	1.46	298.03	209.21	211.36	156.09
Radiant energy (Q)	(μ J)	NA	NA	NA	NA	NA	NA	NA	NA
The corresponding RTH AEL for Class 1 Laser	(μ W)	4282.54	4282.54	4407.72	4407.72	4612.62	4612.62	4505.91	4505.91
$\Sigma[(P/AEL)]$, or $\Sigma[(Q/AEL)]$	None	<1		<1		<1		<1	



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RESULTS:

B) TESTS AGAINST RETINAL THERMAL HAZARD (RTH):

Single-wavelength source:

Parameters	Unit	Led 26	Led 37	Led 48	Led 54	Led 55
Angle of acceptance (γ)	(mrad)	≥ 1.5	≥ 1.5	≥ 1.5	≥ 1.5	≥ 1.72
Measurement aperture (d)	(mm)	7	7	7	7	7
Measurement distance (r)	(mm)	14	14	14	14	14.76
Exposure time (t)	(sec)	0.98	1.17	1.01	0.34	0.31
Radiant power (P)	(μ W)	NA	NA	NA	NA	NA
Radiant energy (Q)	(μ J)	15.91	15.44	2.87	14.11	62.81
The corresponding RTH AEL for Class 1 Laser	(μ J)	686.83	787.48	705.24	311.68	332.97

Multi-wavelength source (Additive):

Parameters	Unit	Led 18		Led 31		Led 36		Led 38	
Wavelength (λ)	(nm)	451	544	450	541	450	541	450	545
Angle of acceptance (γ)	(mrad)	≥ 19.22		≥ 19.24		≥ 19.24		≥ 18.51	
Measurement aperture (d)	(mm)	7		7		7		7	
Measurement distance (r)	(mm)	44.36		44.38		44.38		43.56	
Exposure time (t)	(sec)	100		100		100		100	
Radiant power (P)	(μ W)	221.52	150.54	282.6	206.05	6.62	4.73	6.96	5.48
Radiant energy (Q)	(μ J)	NA	NA	NA	NA	NA	NA	NA	NA
The corresponding RTH AEL for Class 1 Laser	(μ W)	4547.63	4547.63	4551.54	4551.54	4551.54	4551.54	4398.53	4398.53
$\Sigma[(P/AEL)]$, or $\Sigma[(Q/AEL)]$	None	<1		<1		<1		<1	



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RESULTS:

B) TESTS AGAINST RETINAL THERMAL HAZARD (RTH):

Multi-wavelength source (Additive):

Parameters	Unit	Led 40		Led 43		Led 49	
Wavelength (λ)	(nm)	450	545	449	542	451	539
Angle of acceptance (γ)	(mrad)	≥ 18.51		≥ 18.44		≥ 18.32	
Measurement aperture (d)	(mm)	7		7		7	
Measurement distance (r)	(mm)	43.56		43.47		43.34	
Exposure time (t)	(sec)	100		100		100	
Radiant power (P)	(μ W)	41.38	26.42	224.59	173.82	47.34	36.71
Radiant energy (Q)	(μ J)	NA	NA	NA	NA	NA	NA
The corresponding RTH AEL for Class <u>1</u> Laser	(μ W)	4398.53	4398.53	4382.76	4382.76	4357.76	4357.76
$\Sigma[(P/AEL)]$, or $\Sigma[(Q/AEL)]$	None	<1		<1		<1	

III) TESTS UNDER FAULT CONDITIONS

Details: No electronic component can be short-circuited.

N/A = Not Applicable

Note: The above results were transferred from (8516)179-0581 dated on Jul 19, 2016.

RESULTS:



RESULTS:



RESULTS:



RESULTS:



RESULTS:



RESULTS:



RESULTS:



END OF REPORT