

**APPLICATION FOR LOW VOLTAGE DIRECTIVE
On Behalf of**

**HUIZHOU XING QI SHI SPORTING GOODS CO., LTD.
For
Electric Bicycle**

**Model No.: Q20-X,Q20MINI-X,Q20PLUS-X,Q20,Q20MIN,Q20-PLUS,
K20,K20Lite,K20MAX,C20,C20Lite,C20Max,C26MAX,E26PRO,
E26PRO-x,H26-X,H26,H26PRO,H26PRO-X,H20-ZD-X,H20PRO-X,
DC26-X,MN20-X,MN26-X,CR20,CR20-X,Q20-Luxe-X,S29PLUS-X,
S29PRO-X,FM-001,Q8,Q8MINI,Q8Lite,Q8PRO,M2000,Q31,Q21,Q22,
Q23,L20,L20 Min,L20 Pro,L20 Max,R20,R20 Pro,R20 Max,L26,
L26 Min,L26 Pro,L26 Max,L8,L8 Pro,L8 Max,L31,L31 Pro,L31 Max,
X1,X1 Pro,X1 Max,X3,X3 Pro,X3 Max,L28,L28 Min,L28 Pro,
L28 Max,U4-260203,Q8-16,Q8MAX,C16,Q16,E26RPO-X**

**Prepared for : HUIZHOU XING QI SHI SPORTING GOODS CO., LTD.
THE LOCATION OF THE EAST DISTRICT OF BOLUO INTELLIGENT
EQUIPMENT INDUSTRIAL PARK, YUANZHOU TOWN, BOLUO
COUNTY (NO. 2, GREENING NORTH ROAD)**

**Prepared By : Shenzhen STL Testing Technology Co., Ltd.
Unit C, 4F, Building A, ShengHengji Industrial Park, No. 137
FuYuan 1 Road, Heping Community, Fuyong Street, Baoan
District, Shenzhen, China**

**Date of Test: Mar .02-16,2026
Date of Report: Mar .16,2026
Report No.: STL2026S0302062C-Y1**

TEST REPORT

EN 62471-2008

Photobiological safety of lamps and lamp systems

Reference No.....: STL2026S0302062C-Y1

Prepared by: *Teddy* Project Engineer
Reviewed by: *Cia* Project Supervisor
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Date of issue.....: Mar .16,2026

Contents.....: 20 Pages

Testing laboratory

Name.....: Shenzhen STL Testing Technology Co., Ltd.
Address.....: Unit C, 4F, Building A, ShengHengji Industrial Park, No. 137 FuYuan 1 Road, Heping Community, Fuyong Street, Baoan District, Shenzhen, China

Testing location.....: Same as above

Applicant

Name.....: HUIZHOU XING QI SHI SPORTING GOODS CO., LTD.
Address.....: THE LOCATION OF THE EAST DISTRICT OF BOLUO INTELLIGENT EQUIPMENT INDUSTRIAL PARK, YUANZHOU TOWN, BOLUO COUNTY (NO. 2, GREENING NORTH ROAD)

Manufacture

Name.....: HUIZHOU XING QI SHI SPORTING GOODS CO., LTD.
Address.....: THE LOCATION OF THE EAST DISTRICT OF BOLUO INTELLIGENT EQUIPMENT INDUSTRIAL PARK, YUANZHOU TOWN, BOLUO COUNTY (NO. 2, GREENING NORTH ROAD)

Test specification

Standard.....: EN 62471-2008
Test procedure: LVD Scheme
Procedure deviation.....: N/A.

Test item

Description.....: Electric Bicycle
Trademark.....: N/A
Model and/or type reference.....: Q20-X,Q20MINI-X,Q20PLUS-X,Q20,Q20MIN,Q20-PLUS,K20, K20Lite,K20MAX,C20,C20Lite,C20Max,C26MAX,E26PRO, E26PRO-x,H26-X,H26,H26PRO,H26PRO-X,H20-ZD-X,H20PRO-X, DC26-X,MN20-X,MN26-X,CR20,CR20-X,Q20-Luxe-X,S29PLUS-X, S29PRO-X,FM-001,Q8,Q8MINI,Q8Lite,Q8PRO,M2000,Q31,Q21, Q22,Q23,L20,L20 Min,L20 Pro,L20 Max,R20,R20 Pro,R20 Max,L26, L26 Min,L26 Pro,L26 Max,L8,L8 Pro,L8 Max,L31,L31 Pro,L31 Max, X1,X1 Pro,X1 Max,X3,X3 Pro,X3 Max,L28,L28 Min,L28 Pro, L28 Max,U4-260203,Q8-16,Q8MAX,C16,Q16,E26RPO-X

Particulars: test item vs. test requirements	
Tested lamp.....	Continuous wave lamps
Tested lamp system.....	N/A
Lamp classification group.....	exempt
Lamp cap.....	N/A
Bulb.....	LED
Rated of the lamp.....	N/A
Furthermore marking on the lamp.....	N/A
Seasoning of lamps according IEC standard.....	N/A
Used measurement instrument.....	Spectroradiometer
Temperature by measurement.....	20-25°C
Information of safety use.....	--
Test case verdicts	
Test case does not apply to the test object.....	N(.A.)
Test item does meet the requirement.....	P(ass)
Test item does not meet the requirement.....	F(ail)
Testing	
Date of receipt of test item :	Mar .02,2026
Date(s) of performance of test :	Mar .02-16,2026
General remarks	
This test report shall not be reproduced except in full without the written approval of the testing laboratory.	
The test results presented in this report relate only to the item tested.	
"(see remark #)" refers to a remark appended to the report.	
"(see appended table)" refers to a table appended to the report.	
Throughout this report a comma is used as the decimal separator.	

Clause	Requirement + Test	Result – Remark	Verdict
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4	EXPOSURE LIMITS		--
4.1	General		P
	The exposure limits in this standard is not less than 0,01 ms and not more than any 8-hour period and should be used as guides in the control of exposure		P
	Detailed spectral data of a light source are generally required only if the luminance of the source exceeds $10^4 \text{ cd} \cdot \text{m}^{-2}$	See clause 4.3	P
4.3	Hazard exposure limits		P
4.3.1	Actinic UV hazard exposure limit for the skin and eye		P
	The exposure limit for effective radiant exposure is $30 \text{ J} \cdot \text{m}^{-2}$ with any 8-hour period		P
	To protect against injury of the eye or skin from ul- traviolet radiation exposure produced by a broad- band source, the effective integrated spectral ir- radiance , ES, of the light source shall not exceed the levels defined by:	See table 4.1	P
	$E_B \cdot t = \sum_{200}^{400} \sum_t E_{\lambda}(\lambda_B t) \cdot S_{UV}(\lambda) \cdot \Delta t \cdot \Delta \lambda \leq 30, \text{ J} \cdot \text{m}^{-2}$		P
	The permissible time for exposure to ultraviolet ra- diation incident upon the unprotected eye or skin shall be computed by:		P
	$t_{\max} = \frac{30}{E_S} S$		P
4.3.2	Near-UV hazard exposure limit for eye		P
	For the spectral region 315 nm to 400 nm (UV-A) the total radiant exposure to the eye shall not exceed 10000 J.m-2 for exposure times less than 1000 s. For exposure times greater than 1000 s (approximately 16 minutes) the UV-A irradiance for the unprotected eye, EUVA, shall not exceed 10 W.m-2.	>1000s	P
	The permissible time for exposure to ultraviolet ra- diation incident upon the unprotected eye for time less than 1000 s, shall be computed by:		P
	$t_{\max} \leq \frac{1000}{E_{UVA}} S$		P
4.3.3	Retinal blue light hazard exposure limit		P

Clause	Requirement + Test	Result – Remark	Verdict
	To protect against retinal photochemical injury from chronic blue-light exposure, the integrated spectral radiance of the light source weighted against the blue-light hazard function, $B(\lambda)$, i.e., the blue-light weighted radiance, L_B , shall not exceed the levels defined by:	See table 4.2	P
	$L_B \cdot t = \sum_{300}^{700} \sum_t L_{\lambda}(\lambda, t) \cdot \Delta t \cdot \Delta \lambda \leq 10^6 \quad J \cdot m^{-2} \cdot sr^{-1}$	$t \leq 10^4 \text{ s} \quad t_{\max} = \frac{10^6}{L_B}$	P
	$L_B = \sum_{300}^{700} L_{\lambda} \cdot B(\lambda) \cdot \Delta \lambda \leq 100 \quad W \cdot m^{-2} \cdot sr^{-1}$	$t > 10^4 \text{ s}$	P
4.3.4	Retinal blue light hazard exposure limit – small source		P
	Thus the spectral irradiance at the eye E_{λ} , weighted against the blue-light hazard function $B(\lambda)$ shall not exceed the levels defined by:		P
	$E_B \cdot t = \sum_{300}^{700} \sum_t E_{\lambda}(\lambda, t) \cdot B(\lambda) \cdot \Delta t \cdot \Delta \lambda \leq 100 \quad J \cdot m^{-2}$	$t \leq 100 \text{ s}$	P
	$E_B = \sum_{300}^{700} E_{\lambda} \cdot B(\lambda) \cdot \Delta \lambda \leq 1 \quad W \cdot m^{-2}$	$t > 100 \text{ s}$	P
4.3.5	Retinal thermal hazard exposure limit		P
	To protect against retinal thermal injury, the integrated spectral radiance of the light source, L_{λ} , weighted by the burn hazard weighting function $R(\lambda)$ (from Figure 4.2 and Table 4.2), i.e., the burn hazard weighted radiance, shall not exceed the levels defined by:		P
	$L_R = \sum_{380}^{1400} L_{\lambda} \cdot R(\lambda) \cdot \Delta \lambda \leq \frac{50000}{a \cdot t^{0.25}} \quad W \cdot m^{-2} \cdot sr^{-1}$	$10 \mu\text{s} \leq t \leq 10 \text{ s}$	P
4.3.6	Retinal thermal hazard exposure limit – weak visual stimulus		P
	For an infrared heat lamp or any near-infrared source where a weak visual stimulus is inadequate to activate the aversion response, the near infrared (780 nm to 1400 nm) radiance, L_{IR} , as viewed by the eye for exposure times greater than 10 s shall be limited to:		P
	$L_{IR} = \sum_{780}^{1400} L_{\lambda} \cdot R(\lambda) \cdot \Delta \lambda \leq \frac{6000}{a} \quad W \cdot m^{-2} \cdot sr^{-1}$	$t > 10 \text{ s}$	N
4.3.7	Infrared radiation hazard exposure limits for the eye		P
	The avoid thermal injury of the cornea and possible delayed effects upon the lens of the eye (cataractogenesis), ocular exposure to infrared radiation, E_{IR} , over the wavelength range 780 nm to 3000 nm, for times less than 1000 s, shall not exceed:		P
	$E_{IR} = \sum_{780}^{3000} E_{\lambda} \cdot \Delta \lambda \leq 18000 \quad W \cdot m^{-2} \cdot t^{-0.75}$	$t \leq 1000 \text{ s}$	N
	For times greater than 1000 s the limit becomes:		P

Clause	Requirement + Test	Result – Remark	Verdict
	$\sum IR = \sum_{780}^{3000} E_{\lambda} \cdot \Delta \lambda \leq 100 \quad W \cdot m^{-2}$	$t > 1000 \text{ s}$	P
4.3.8	Thermal hazard exposure limit for the skin		P
	Visible and infrared radiant exposure (380 nm to 3000 nm) of the skin shall be limited to:		P
	$E_M \cdot t = \sum_{380}^{3000} \sum_t E_{\lambda}(\lambda, t) \cdot \Delta t \cdot \Delta \lambda \leq 20000 \cdot t^{0.25} \text{ J} \cdot m^{-2}$	$t \leq 10 \text{ s}$	P

5	MEASUREMENT OF LAMPS AND LAMP SYSTEMS		--
5.1	Measurement conditions		P
	Measurement conditions shall be reported as part of the evaluation against the exposure limits and the assignment of risk classification.		P
5.1.1	Lamp ageing (seasoning)		P
	Seasoning of lamps shall be done as stated in the appropriate IEC lamp standard.		P
5.1.2	Test environment		P
	For specific test conditions, see the appropriate IEC lamp standard or in absence of such standards, the appropriate national standards or manufacturer's recommendations.		P
5.1.3	Extraneous radiation		P
	Careful checks should be made to ensure that ex- traneous sources of radiation and reflections do not add significantly to the measurement results.		P
5.1.4	Lamp operation		P
	Operation of the test lamp shall be provided in ac- cordance with:		P
	– the appropriate IEC lamp standard, or		N
	– the manufacturer' s recommendation		P
5.1.5	Lamp system operation		N
	The power source for operation of the test lamp shall be provided in accordance with:		N
	– the appropriate IEC standard, or		N
	– the manufacturer' s recommendation		P
5.2	Measurement procedure		P
5.2.1	Irradiance measurements		P
	Minimum aperture diameter 7mm.		P
	Maximum aperture diameter 50 mm.		P
	The measurement shall be made in that position of the beam giving the maximum reading.		P

Clause	Requirement + Test	Result – Remark	Verdict
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	The measurement instrument is adequate calibrated.		P
5.2.2	Radiance measurements		P
5.2.2.1	Standard method		P
	The measurements made with an optical system.		P
	The instrument shall be calibrated to read in absolute radiant power per unit receiving area and per unit solid angle to acceptance averaged over the field of view of the instrument.		P
5.2.2.2	Alternative method		N
	Alternatively to an imaging radiance set-up, an ir- radiance measurement set-up with a circular field stop placed at the source can be used to perform radiance measurements.		N
5.2.3	Measurement of source size		P
	The determination of α , the angle subtended by a source, requires the determination of the 50% emis- sion points of the source.		P
5.2.4	Pulse width measurement for pulsed sources		N
	The determination of Δt , the nominal pulse duration of a source, requires the determination of the time during which the emission is > 50% of its peak value.		N
5.3	Analysis methods		P
5.3.1	Weighting curve interpolations		P
	To standardize interpolated values, use linear in- terpolation on the log of given values to obtain in- termediate points at the wavelength intervals de- sired.		P
5.3.2	Calculations		P
	The calculation of source hazard values shall be performed by weighting the spectral scan by the appropriate function and calculating the total weighted energy.		P
5.3.3	Measurement uncertainty		P
	The quality of all measurement results must be quantified by an analysis of the uncertainty.	See table 5.4 and 5.5	P

6	LAMP CLASSIFICATION		--
	For the purposes of this standard it was decided that the values shall be reported as follows:	See table 6	P

Clause	Requirement + Test	Result – Remark	Verdict
	– for lamps intended for general lighting service, the hazard values shall be reported as either ir- radiance or radiance values at a distance which produces an illuminance of 500 lux, but not at a distance less than 200 mm		N
	– for all other light sources, including pulsed lamp sources, the hazard values shall be reported at a distance of 200 mm		P
6.1	Continuous wave lamps		P
6.1.1	Exempt Group		P
	In the exempt group are lamps, which does not pose any photobiological hazard. The requirement is met by any lamp that does not pose:		P
	– an actinic ultraviolet hazard (ES) within 8-hours exposure (30000 s), nor		P
	– a near-UV hazard (EUVA) within 1000 s, (about 16 min), nor		P
	– a retinal blue-light hazard (LB) within 10000 s (about 2,8 h), nor		P
	– a retinal thermal hazard (LR) within 10 s, nor		P
	– an infrared radiation hazard for the eye (EIR) within 1000 s		P
6.1.2	Risk Group 1 (Low-Risk)		N
	In this group are lamps, which exceeds the limits for the exempt group but that does not pose:		N
	– an actinic ultraviolet hazard (ES) within 10000 s, nor		N
	– a near ultraviolet hazard (EUVA) within 300 s, nor		N
	– a retinal blue-light hazard (LB) within 100 s, nor		N
	– a retinal thermal hazard (LR) within 10 s, nor		N
	– an infrared radiation hazard for the eye (EIR) within 100 s		N
	Lamps that emit infrared radiation without a strong visual stimulus and do not pose a near-infrared retinal hazard (LIR), within 100 s are in Risk Group 1.		N
6.1.3	Risk Group 2 (Moderate-Risk)		N
	This requirement is met by any lamp that exceeds the limits for Risk Group 1, but that does not pose:		N
	– an actinic ultraviolet hazard (ES) within 1000 s exposure, nor		N

Clause	Requirement + Test	Result – Remark	Verdict
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	– a near ultraviolet hazard (E _{UVA}) within 100 s, nor		N
	– a retinal blue-light hazard (L _B) within 0,25 s (aversion response), nor		N
	– a retinal thermal hazard (L _R) within 0,25 s (aversion response), nor		N
	– an infrared radiation hazard for the eye (E _{IR}) within 10 s		N
	Lamps that emit infrared radiation without a strong visual stimulus and do not pose a near-infrared retinal hazard (L _{IR}), within 10 s are in Risk Group 2.		N
6.1.4	Risk Group 3 (High-Risk)		N
	Lamps which exceed the limits for Risk Group 2 are in Group 3.		N
6.2	Pulsed lamps		N
	Pulse lamp criteria shall apply to a single pulse and to any group of pulses within 0,25 s.		N
	A pulsed lamp shall be evaluated at the highest nominal energy loading as specified by the manufacturer.		N
	The risk group determination of the lamp being tested shall be made as follows:		N
	– a lamp that exceeds the exposure limit shall be classified as belonging to Risk Group 3 (High-Risk)		N
	– for single pulsed lamps, a lamp whose weighted radiant exposure or weighted radiance does is below the EL shall be classified as belonging to the Exempt Group		N
	– for repetitively pulsed lamps, a lamp whose weighted radiant exposure or weighted radiance dose is below the EL, shall be evaluated using the continuous wave risk criteria discussed in clause 6.1, using time averaged values of the pulsed emission		N

Spectral weighting function for assessing ultraviolet hazards for skin and eye				P
Wavelength ¹ λ , nm	UV hazard function S _{UV} (λ)	Wavelength λ , nm	UV hazard function S _{UV} (λ)	
200	0,030	313*	0,006	
205	0,051	315	0,003	
210	0,075	316	0,0024	
215	0,095	317	0,0020	
220	0,120	318	0,0016	
225	0,150	319	0,0012	

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Clause	Requirement + Test	Result – Remark	Verdict
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230	0,190	320	0,0010
235	0,240	322	0,00067
240	0,300	323	0,00054
245	0,360	325	0,00050
250	0,430	328	0,00044
254	0,500	330	0,00041
255	0,520	333*	0,00037
260	0,650	335	0,00034
265	0,810	340	0,00028
270	1,000	345	0,00024
275	0,960	350	0,00020
280	0,880	355	0,00016
285	0,770	360	0,00013
290	0,640	365*	0,00011
295	0,540	370	0,000093
297	0,460	375	0,000077
300	0,300	380	0,000064
303	0,120	385	0,000053
305	0,060	390	0,000044
308	0,026	395	0,000036
310	0,015	400	0,000030

¹ Wavelengths chosen are representative: other values should be obtained by logarithmic interpolation at intermediate wavelengths.

* Emission lines of a mercury discharge spectrum.

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Clause	Requirement + Test	Result – Remark	Verdict
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Table 4.2	Spectral weighting functions for assessing retinal hazards from broadband optical sources	P
Wavelength nm	Blue-light hazard function B (λ)	Burn hazard function R (λ)
300	0,01	--
305	0,01	--
310	0,01	--
315	0,01	--
320	0,01	--
325	0,01	--
330	0,01	--
335	0,01	--
340	0,01	--
345	0,01	--
350	0,01	--
355	0,01	--
360	0,01	--
365	0,01	--
370	0,01	--
375	0,01	--
380	0,01	0,1
385	0,013	0,13
390	0,025	0,25
395	0,05	0,5
400	0,10	1,0
405	0,20	2,0
410	0,40	4,0
415	0,80	8,0
420	0,90	9,0
425	0,95	9,5
430	0,98	9,8
435	1,00	10,0
440	1,00	10,0
445	0,97	9,7
450	0,94	9,4
455	0,90	9,0
460	0,80	8,0
465	0,70	7,0
470	0,62	6,2
475	0,55	5,5
480	0,45	4,5
485	0,40	4,0
490	0,22	2,2
495	0,16	1,6
500-600	$10^{[(450-\lambda)/50]}$	1,0
600-700	0,001	1,0
700-1050	--	$10^{[(700-\lambda)/500]}$
1050-1150	--	0,2
1150-1200	--	$0,2 \cdot 10^{0,02(1150-\lambda)}$
1200-1400	--	0,02

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Clause	Requirement + Test	Result – Remark	Verdict
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Table 5.4 Summary of the ELs for the surface of the skin or cornea (irradiance based values)					P
Hazard Name	Relevant equation	Wavelength range nm	Exposure duration sec	Limiting aperture rad (deg)	EL in terms of constant irradiance $W \cdot m^{-2}$
Actinic UV skin & eye	$E_S = \sum E_\lambda \cdot S(\lambda) \cdot \Delta\lambda$	200 – 400	< 30000	1,4 (80)	30/t
Eye UV-A	$E_{UVA} = \sum E_\lambda \cdot \Delta\lambda$	315 – 400	≤ 1000 > 1000	1,4 (80)	10000/t 10
Blue-light small source	$E_B = \sum E_\lambda \cdot B(\lambda) \cdot \Delta\lambda$	300 – 700	≤ 100 > 100	< 0,011	100/t 1,0
Eye IR	$E_{IR} = \sum E_\lambda \cdot \Delta\lambda$	780 – 3000	≤ 1000 > 1000	1,4 (80)	18000/t ^{0,75} 100
Skin thermal	$E_H = \sum E_\lambda \cdot \Delta\lambda$	380 – 3000	< 10	2π sr	20000/t ^{0,75}

Table 5.5 Summary of the ELs for the retina (radiance based values)					P
Hazard Name	Relevant equation	Wavelength range nm	Exposure duration sec	Field of view radians	EL in terms of constant radiance $W \cdot m^{-2} \cdot sr^{-1}$
Blue light	$L_B = \sum L_\lambda \cdot B(\lambda) \cdot \Delta\lambda$	300 – 700	0,25 – 10 10-100 100-10000 ≥ 10000	$0,011 \cdot \sqrt{(t/10)}$ 0,011 $0,0011 \cdot \sqrt{t}$ 0,1	$10^6/t$ $10^6/t$ $10^6/t$ 100
Retinal thermal	$L_R = \sum L_\lambda \cdot R(\lambda) \cdot \Delta\lambda$	380 – 1400	< 0,25 0,25 – 10	0,0017 $0,011 \cdot \sqrt{(t/10)}$	$50000/(\alpha \cdot t^{0,25})$ $50000/(\alpha \cdot t^{0,25})$
Retinal thermal (weak visual stimulus)	$L_{IR} = \sum L_\lambda \cdot R(\lambda) \cdot \Delta\lambda$	780 – 1400	> 10	0,011	6000/α

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Clause	Requirement + Test	Result – Remark	Verdict
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Table 6		Emission limits for risk groups of continuous wave lamps							P
Risk	Action spectrum	Symbol	Units	Emission Measurement					
				Exempt Group		Low risk		Mod risk	
				Limit	Result	Limit	Result	Limit	Result
Actinic UV	S _{UV} (λ)	E _s	W•m ⁻²	0,001	0	0,003	—	0,03	—
Near UV		EUVA	W•m ⁻²	0.33	0	33	—	100	—
Blue light	B(λ)	LB	W•m ⁻² •sr ⁻¹	100	33.35	10000	—	4000000	—
Blue light, small source	B(λ)	EB	W•m ⁻²	1,0*	—	1,0	—	400	—
Retinal thermal	R(λ)	LR	W•m ⁻² •sr ⁻¹	28000/α	2.7×10 ²	28000/α	—	71000/α	—
Retinal thermal, weak visual stimulus**	R(λ)	LIR	W•m ⁻² •sr ⁻¹	6000/α	0	6000/α	—	6000/α	—
IR radiation, eye	--	EIR	W•m ⁻²	100	0	570	—	3200	—
* Small source defined as one with α < 0,011 radian. Averaging field of view at 10000 s is 0,1 radian. ** Involves evaluation of non-GLS source									

Appendix Figure documentation:

FIGURE 1



FIGURE 2



FIGURE 3



FIGURE 4



FIGURE 5



FIGURE 6



FIGURE 7



FIGURE 8



FIGURE 9



FIGURE 10



FIGURE 11



FIGURE 12



FIGURE 13



FIGURE 14



End of Report