

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Photovoltaic devices –

Part 3: Measurement principles for terrestrial photovoltaic (PV) solar devices with reference spectral irradiance data

Dispositifs photovoltaïques –

Partie 3: Principes de mesure des dispositifs solaires photovoltaïques (PV) à usage terrestre incluant les données de l'éclairement énergétique spectral de référence



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

PHOTOVOLTAIC DEVICES –

**Part 3: Measurement principles for terrestrial photovoltaic (PV)
solar devices with reference spectral irradiance data**

FOREWORD

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International Standard IEC 60904-3 has been prepared by IEC technical committee 82: Solar photovoltaic energy systems.

This fourth edition cancels and replaces the third edition published in 2016. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) all spectral data were recalculated due to some minor calculation and rounding errors in the third edition; the global spectral irradiance returned to exactly the data of the second edition;
- b) the angular distribution of the irradiance was clarified.

This publication contains an attached file in the form of an Excel spreadsheet. This file is intended to be used as a complement and does not form an integral part of the publication.

The text of this International Standard is based on the following documents:

CDV	Report on voting
82/1342/CDV	82/1425/RVC

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of the IEC 60904 series, published under the general title *Photovoltaic devices*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

PHOTOVOLTAIC DEVICES –

Part 3: Measurement principles for terrestrial photovoltaic (PV) solar devices with reference spectral irradiance data

1 Scope

This part of IEC 60904 applies to the following photovoltaic devices for terrestrial applications:

- solar cells with or without a protective cover;
- sub-assemblies of solar cells;
- modules; and
- systems.

NOTE The term “test specimen” is used to denote any of these devices.

The principles contained in this document cover testing in both natural and simulated sunlight.

Photovoltaic conversion is spectrally selective due to the nature of the semiconductor materials used in PV solar cells and modules. To compare the relative performance of different PV devices and materials a reference standard solar spectral distribution is necessary. This document includes such a reference solar spectral irradiance distribution.

This document also describes basic measurement principles for determining the electrical output of PV devices. The principles given in this document are designed to relate the performance rating of PV devices to a common reference terrestrial solar spectral irradiance distribution.

The reference terrestrial solar spectral irradiance distribution is given in this document in order to classify solar simulators according to the spectral performance requirements contained in IEC 60904-9.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60891, *Photovoltaic devices – Procedures for temperature and irradiance corrections to measured I-V characteristics*

IEC 60904-1, *Photovoltaic devices – Part 1: Measurement of photovoltaic current-voltage characteristics*

IEC 60904-2, *Photovoltaic devices – Part 2: Requirements for photovoltaic reference devices*

IEC 60904-5, *Photovoltaic devices – Part 5: Determination of the equivalent cell temperature (ECT) of photovoltaic (PV) devices by the open-circuit voltage method*

IEC 60904-7, *Photovoltaic devices – Part 7: Computation of the spectral mismatch correction for measurements of photovoltaic devices*

IEC 60904-8, *Photovoltaic devices – Part 8: Measurement of spectral responsivity of a photovoltaic (PV) device*

IEC 60904-9, *Photovoltaic devices – Part 9: Solar simulator performance requirements*

IEC 61853-4, *Photovoltaic (PV) module performance testing and energy rating - Part 4: Standard reference climatic profiles*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

4 Measurement principles

In current practice the photovoltaic performance of a solar cell or module is determined by exposing it at a known temperature to stable sunlight, natural or simulated, and measuring its current-voltage (I-V) characteristic curve while measuring the magnitude of both the incident irradiance and the PV device temperature. Detailed I-V curve measurement procedures are included in IEC 60904-1. The measured performances can then be corrected to standard test conditions (STC) or other desired conditions of irradiance and temperature according to IEC 60891. The corrected power output at the maximum power voltage and STC is commonly referred to as the rated power.

Incident irradiance can be measured by means of a PV reference device (whose spectral responsivity shall be known) or, if measuring under natural sunlight, by means of a thermopile-type irradiance detector (pyranometer). If a PV reference device is used, it shall satisfy the requirements specified in IEC 60904-2. Temperature determination of the PV device under test shall be made according to IEC 60904-1 or IEC 60904-5.

Since a solar cell has a wavelength-dependent responsivity, its performance is significantly affected by the spectral distribution of the incident radiation, which in natural sunlight varies with factors such as location, weather, time of year, time of day, orientation of the receiving surface, etc., and with a simulator varies with its type and conditions of use according to IEC 60904-9. Regardless of whether the irradiance is measured with either a thermopile-type radiometer (that is not spectrally selective) or with a reference solar device, the spectral irradiance distribution of the incoming light shall be known in order to use IEC 60904-7 to calculate the spectral mismatch between the measured performance and the predicted performance under the global or direct reference solar spectral distribution defined in this document. When performing measurements according to the standard test conditions, the spectral mismatch between the PV device under test and the thermopile is usually much larger than the spectral mismatch between the PV reference device and the PV device under test.

When the spectral responsivity of the PV device is known as determined according to IEC 60904-8, it is also possible to use IEC 60904-7 to compute the performance of that PV device when exposed to light of any known spectral irradiance distribution.

5 Reference solar spectral and angular irradiance distribution

The reference solar spectral distributions are given in Table 1 and Figure 1.

The reference angular distribution is defined for both, the direct and the global spectral distribution, so that the complete radiation hits the solar device perpendicularly under normal incidence. Other, more realistic geometrical and ambient conditions for different climate zones are defined in IEC 61853-4.

The calculation of the spectral distributions was done using the following geometrical and environmental input parameters:

- global distribution (direct + diffuse + albedo) of sunlight (AM1.5 spectrum), corresponding to an integrated irradiance of $1\,000\text{ W}\cdot\text{m}^{-2}$ incident on a sun-facing plane surface tilted at 37° to the horizontal, and
- the direct distribution of sunlight (AM1.5d spectrum), corresponding to an integrated irradiance of $900\text{ W}\cdot\text{m}^{-2}$ incident on a sun-facing plane surface perpendicular to the incident sunlight,

considering the wavelength-dependent albedo of a light bare soil, under the following atmospheric conditions:

- U.S. standard atmosphere with CO_2 concentration increased to current level (370 ppm), a rural aerosol model, and no pollution;
- precipitable water: 1,416 4 cm;
- ozone content: 0,343 8 atm-cm (or 343,8 DU);
- turbidity (aerosol optical depth): 0,084 at 500 nm;
- pressure: 101,325 kPa (i.e. sea level).

Data contained in Table 1 have been generated using the solar spectral model SMARTS, Version 2.9.2. A general description of this model and its suitability to reproduce actual solar spectral irradiance distributions can be found in “Proposed Reference Irradiance Spectra for Solar Energy Systems Testing” by C. A. Gueymard, C. Myers and K. Emery¹, and in the references therein. Table 1 can be obtained using the data contained in Annex A as an input to the model SMARTS Version 2.9.2. The resulting output spectral irradiance values have to be multiplied by a normalization factor (0,997 1) in order to get an integrated irradiance of $1\,000\text{ W}\cdot\text{m}^{-2}$ in the wavelength range 0 to infinity for the global irradiance. This same scaling factor is applied to the direct spectrum giving an integrated irradiance of $900\text{ W}\cdot\text{m}^{-2}$ in the wavelength range 0 to infinity.

At the time of publication of this document the SMARTS Version 2.9.2 spectral model code is available, free of charge, subject to the author's license agreement, at <http://www.nrel.gov/rredc/smarts>. A copy of the model, not for distribution purposes, is kept under IEC TC 82 control.

The contents of Table 1 are included in an attached file in the form of an Excel spreadsheet.

¹ C. A. Gueymard, C. Myers and K. Emery, “Proposed Reference Irradiance Spectra for Solar Energy Systems Testing”, *Solar Energy*, Vol 73, No. 6, pp. 443-467, 2002.

Table 1 – Reference solar spectral irradiance distribution

Wave-length nm	Global spectral irradiance $\text{W} \cdot \text{m}^{-2} \cdot \text{nm}^{-1}$	Global photon flux $\text{m}^{-2} \cdot \text{s}^{-1} \cdot \text{nm}^{-1}$	Cumulative global integrated irradiance $\text{W} \cdot \text{m}^{-2}$	Direct spectral irradiance $\text{W} \cdot \text{m}^{-2} \cdot \text{nm}^{-1}$	Direct photon flux $\text{m}^{-2} \cdot \text{s}^{-1} \cdot \text{nm}^{-1}$	Cumulative direct integrated irradiance $\text{W} \cdot \text{m}^{-2}$
280,0	4,72E-23	6,649E-05	0,00E+00	2,529E-26	3,564E-08	0,000E00
280,5	1,23E-21	1,733E-03	3,19E-22	1,089E-24	1,537E-06	2,785E-25
281,0	5,67E-21	8,025E-03	2,04E-21	6,108E-24	8,640E-06	2,077E-24
281,5	1,56E-19	2,213E-01	4,25E-20	2,740E-22	3,883E-04	7,210E-23
282,0	1,19E-18	1,691E+00	3,79E-19	2,826E-21	4,012E-03	8,472E-22
282,5	4,53E-18	6,443E+00	1,81E-18	1,323E-20	1,882E-02	4,862E-21
283,0	1,84E-17	2,621E+01	7,54E-18	6,745E-20	9,609E-02	2,503E-20
283,5	3,53E-17	5,032E+01	2,10E-17	1,457E-19	2,080E-01	7,832E-20
284,0	7,25E-16	1,036E+03	2,11E-16	4,969E-18	7,105E00	1,357E-18
284,5	2,48E-15	3,550E+03	1,01E-15	2,156E-17	3,088E01	7,990E-18
285,0	7,99E-15	1,146E+04	3,63E-15	8,974E-17	1,287E02	3,581E-17
285,5	4,25E-14	6,107E+04	1,62E-14	6,424E-16	9,232E02	2,188E-16
286,0	1,36E-13	1,964E+05	6,10E-14	2,343E-15	3,374E03	9,653E-16
286,5	8,36E-13	1,205E+06	3,04E-13	1,840E-14	2,654E04	6,152E-15
287,0	2,73E-12	3,942E+06	1,20E-12	7,234E-14	1,045E05	2,884E-14
287,5	1,09E-11	1,573E+07	4,60E-12	3,651E-13	5,284E05	1,382E-13
288,0	6,22E-11	9,011E+07	2,29E-11	2,798E-12	4,056E06	9,290E-13
288,5	1,71E-10	2,485E+08	8,12E-11	9,039E-12	1,313E07	3,888E-12
289,0	5,61E-10	8,162E+08	2,64E-10	3,488E-11	5,074E07	1,487E-11
289,5	2,07E-09	3,015E+09	9,22E-10	1,532E-10	2,233E08	6,189E-11
290,0	6,00E-09	8,758E+09	2,94E-09	5,130E-10	7,490E08	2,285E-10
290,5	1,37E-08	2,010E+10	7,87E-09	1,326E-09	1,940E09	6,883E-10
291,0	3,50E-08	5,120E+10	2,00E-08	3,885E-09	5,691E09	1,991E-09
291,5	1,09E-07	1,597E+11	5,60E-08	1,438E-08	2,111E10	6,558E-09
292,0	2,68E-07	3,932E+11	1,50E-07	4,067E-08	5,978E10	2,032E-08
292,5	4,26E-07	6,267E+11	3,23E-07	7,021E-08	1,034E11	4,804E-08
293,0	8,62E-07	1,272E+12	6,45E-07	1,571E-07	2,318E11	1,049E-07
293,5	2,26E-06	3,345E+12	1,43E-06	4,696E-07	6,938E11	2,616E-07
294,0	4,16E-06	6,160E+12	3,03E-06	9,428E-07	1,395E12	6,147E-07
294,5	6,57E-06	9,743E+12	5,72E-06	1,592E-06	2,360E12	1,248E-06
295,0	1,23E-05	1,820E+13	1,04E-05	3,215E-06	4,775E12	2,450E-06
295,5	2,77E-05	4,127E+13	2,04E-05	7,997E-06	1,190E13	5,253E-06
296,0	4,78E-05	7,117E+13	3,93E-05	1,469E-05	2,190E13	1,093E-05
296,5	7,11E-05	1,062E+14	6,90E-05	2,324E-05	3,469E13	2,041E-05
297,0	9,65E-05	1,443E+14	1,11E-04	3,309E-05	4,947E13	3,449E-05
297,5	1,86E-04	2,779E+14	1,81E-04	6,772E-05	1,014E14	5,970E-05
298,0	2,89E-04	4,336E+14	3,00E-04	1,109E-04	1,664E14	1,044E-04
298,5	3,57E-04	5,362E+14	4,62E-04	1,423E-04	2,138E14	1,677E-04
299,0	4,91E-04	7,386E+14	6,73E-04	2,026E-04	3,050E14	2,539E-04
299,5	8,58E-04	1,294E+15	1,01E-03	3,728E-04	5,620E14	3,978E-04

Wave-length nm	Global spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Global photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative global integrated irradiance $W \cdot m^{-2}$	Direct spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Direct photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative direct integrated irradiance $W \cdot m^{-2}$
300,0	0,0010	1,537E+15	0,00	4,550E-04	6,871E14	0,00
300,5	0,0012	1,878E+15	0,00	5,704E-04	8,629E14	0,00
301,0	0,0019	2,916E+15	0,00	9,166E-04	1,389E15	0,00
301,5	0,0027	4,073E+15	0,00	1,316E-03	1,998E15	0,00
302,0	0,0029	4,428E+15	0,01	1,453E-03	2,209E15	0,00
302,5	0,0043	6,505E+15	0,01	2,185E-03	3,327E15	0,00
303,0	0,0071	1,079E+16	0,01	3,722E-03	5,678E15	0,00
303,5	0,0090	1,368E+16	0,01	4,790E-03	7,319E15	0,01
304,0	0,0094	1,445E+16	0,02	5,083E-03	7,778E15	0,01
304,5	0,0119	1,827E+16	0,02	6,449E-03	9,885E15	0,01
305,0	0,0164	2,520E+16	0,03	8,908E-03	1,368E16	0,02
305,5	0,0187	2,870E+16	0,04	1,016E-02	1,562E16	0,02
306,0	0,0185	2,853E+16	0,05	1,012E-02	1,559E16	0,03
306,5	0,0210	3,247E+16	0,06	1,153E-02	1,780E16	0,03
307,0	0,0278	4,291E+16	0,07	1,520E-02	2,349E16	0,04
307,5	0,0355	5,500E+16	0,09	1,941E-02	3,005E16	0,05
308,0	0,0377	5,850E+16	0,11	2,069E-02	3,208E16	0,06
308,5	0,0413	6,415E+16	0,13	2,268E-02	3,523E16	0,07
309,0	0,0404	6,287E+16	0,15	2,223E-02	3,458E16	0,08
309,5	0,0432	6,728E+16	0,17	2,360E-02	3,677E16	0,09
310,0	0,0508	7,926E+16	0,19	2,775E-02	4,330E16	0,10
310,5	0,0653	1,021E+17	0,22	3,577E-02	5,592E16	0,12
311,0	0,0827	1,294E+17	0,26	4,526E-02	7,086E16	0,14
311,5	0,0838	1,315E+17	0,30	4,602E-02	7,217E16	0,16
312,0	0,0931	1,462E+17	0,34	5,075E-02	7,971E16	0,19
312,5	0,0987	1,553E+17	0,39	5,361E-02	8,434E16	0,21
313,0	0,1070	1,686E+17	0,44	5,815E-02	9,163E16	0,24
313,5	0,1073	1,693E+17	0,49	5,883E-02	9,284E16	0,27
314,0	0,1193	1,886E+17	0,55	6,508E-02	1,029E17	0,30
314,5	0,1302	2,062E+17	0,61	7,027E-02	1,113E17	0,33
315,0	0,1359	2,154E+17	0,68	7,347E-02	1,165E17	0,37
315,5	0,1180	1,875E+17	0,74	6,464E-02	1,027E17	0,40
316,0	0,1231	1,959E+17	0,80	6,689E-02	1,064E17	0,44
316,5	0,1499	2,389E+17	0,87	8,088E-02	1,289E17	0,47
317,0	0,1711	2,730E+17	0,95	9,275E-02	1,480E17	0,52
317,5	0,1819	2,908E+17	1,04	9,942E-02	1,589E17	0,57
318,0	0,1754	2,808E+17	1,13	9,554E-02	1,529E17	0,61
318,5	0,1854	2,972E+17	1,22	9,976E-02	1,599E17	0,66
319,0	0,2041	3,278E+17	1,32	1,094E-01	1,757E17	0,72
319,5	0,1953	3,142E+17	1,42	1,066E-01	1,715E17	0,77
320,0	0,2047	3,297E+17	1,52	1,124E-01	1,811E17	0,82

Wave-length nm	Global spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Global photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative global integrated irradiance $W \cdot m^{-2}$	Direct spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Direct photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative direct integrated irradiance $W \cdot m^{-2}$
320,5	0,2445	3,945E+17	1,63	1,327E-01	2,140E17	0,89
321,0	0,2495	4,032E+17	1,75	1,338E-01	2,161E17	0,95
321,5	0,2377	3,848E+17	1,88	1,278E-01	2,068E17	1,02
322,0	0,2214	3,589E+17	1,99	1,216E-01	1,972E17	1,08
322,5	0,2165	3,514E+17	2,10	1,194E-01	1,938E17	1,14
323,0	0,2116	3,441E+17	2,21	1,159E-01	1,884E17	1,20
323,5	0,2479	4,037E+17	2,32	1,335E-01	2,175E17	1,26
324,0	0,2746	4,478E+17	2,45	1,481E-01	2,415E17	1,33
324,5	0,2824	4,613E+17	2,59	1,542E-01	2,519E17	1,41
325,0	0,2781	4,550E+17	2,73	1,546E-01	2,529E17	1,49
325,5	0,3234	5,299E+17	2,88	1,788E-01	2,930E17	1,57
326,0	0,3801	6,238E+17	3,06	2,081E-01	3,415E17	1,67
326,5	0,4060	6,674E+17	3,25	2,210E-01	3,632E17	1,77
327,0	0,3969	6,534E+17	3,45	2,177E-01	3,584E17	1,88
327,5	0,3835	6,323E+17	3,65	2,122E-01	3,499E17	1,99
328,0	0,3501	5,781E+17	3,83	1,972E-01	3,255E17	2,09
328,5	0,3706	6,128E+17	4,01	2,062E-01	3,409E17	2,19
329,0	0,4211	6,975E+17	4,21	2,323E-01	3,847E17	2,30
329,5	0,4674	7,753E+17	4,43	2,579E-01	4,278E17	2,42
330,0	0,4700	7,808E+17	4,67	2,612E-01	4,338E17	2,55
330,5	0,4268	7,100E+17	4,89	2,403E-01	3,999E17	2,68
331,0	0,4015	6,689E+17	5,10	2,277E-01	3,794E17	2,80
331,5	0,4168	6,956E+17	5,30	2,357E-01	3,933E17	2,91
332,0	0,4350	7,270E+17	5,52	2,444E-01	4,084E17	3,03
332,5	0,4379	7,330E+17	5,74	2,458E-01	4,115E17	3,16
333,0	0,4282	7,178E+17	5,95	2,419E-01	4,055E17	3,28
333,5	0,4061	6,817E+17	6,16	2,320E-01	3,895E17	3,40
334,0	0,4138	6,957E+17	6,37	2,375E-01	3,994E17	3,51
334,5	0,4438	7,473E+17	6,58	2,536E-01	4,270E17	3,64
335,0	0,4625	7,800E+17	6,81	2,640E-01	4,452E17	3,77
335,5	0,4518	7,631E+17	7,03	2,582E-01	4,361E17	3,90
336,0	0,4140	7,002E+17	7,25	2,374E-01	4,016E17	4,02
336,5	0,3810	6,455E+17	7,45	2,203E-01	3,733E17	4,13
337,0	0,3727	6,323E+17	7,64	2,170E-01	3,682E17	4,24
337,5	0,3993	6,785E+17	7,83	2,337E-01	3,970E17	4,36
338,0	0,4329	7,365E+17	8,04	2,525E-01	4,296E17	4,48
338,5	0,4539	7,735E+17	8,26	2,647E-01	4,511E17	4,61
339,0	0,4622	7,888E+17	8,49	2,702E-01	4,611E17	4,74
339,5	0,4731	8,085E+17	8,72	2,777E-01	4,745E17	4,88
340,0	0,5003	8,564E+17	8,97	2,957E-01	5,062E17	5,02
340,5	0,4993	8,558E+17	9,22	2,959E-01	5,072E17	5,17

Wave-length nm	Global spectral irradiance $\text{W} \cdot \text{m}^{-2} \cdot \text{nm}^{-1}$	Global photon flux $\text{m}^{-2} \cdot \text{s}^{-1} \cdot \text{nm}^{-1}$	Cumulative global integrated irradiance $\text{W} \cdot \text{m}^{-2}$	Direct spectral irradiance $\text{W} \cdot \text{m}^{-2} \cdot \text{nm}^{-1}$	Direct photon flux $\text{m}^{-2} \cdot \text{s}^{-1} \cdot \text{nm}^{-1}$	Cumulative direct integrated irradiance $\text{W} \cdot \text{m}^{-2}$
341,0	0,4700	8,068E+17	9,46	2,785E-01	4,781E17	5,31
341,5	0,4680	8,045E+17	9,69	2,777E-01	4,774E17	5,45
342,0	0,4879	8,400E+17	9,93	2,904E-01	4,999E17	5,59
342,5	0,5062	8,728E+17	10,18	3,021E-01	5,208E17	5,74
343,0	0,5134	8,865E+17	10,44	3,077E-01	5,313E17	5,89
343,5	0,4847	8,381E+17	10,69	2,916E-01	5,043E17	6,04
344,0	0,4172	7,225E+17	10,91	2,528E-01	4,378E17	6,18
344,5	0,4019	6,970E+17	11,12	2,437E-01	4,226E17	6,30
345,0	0,4576	7,948E+17	11,33	2,777E-01	4,824E17	6,43
345,5	0,4879	8,486E+17	11,57	2,967E-01	5,161E17	6,58
346,0	0,4764	8,298E+17	11,81	2,905E-01	5,059E17	6,73
346,5	0,4852	8,463E+17	12,05	2,966E-01	5,174E17	6,87
347,0	0,4926	8,605E+17	12,29	3,023E-01	5,281E17	7,02
347,5	0,4754	8,316E+17	12,54	2,927E-01	5,120E17	7,17
348,0	0,4737	8,299E+17	12,77	2,922E-01	5,119E17	7,32
348,5	0,4820	8,455E+17	13,01	2,980E-01	5,228E17	7,46
349,0	0,4643	8,157E+17	13,25	2,878E-01	5,056E17	7,61
349,5	0,4767	8,386E+17	13,48	2,963E-01	5,214E17	7,76
350,0	0,5264	9,276E+17	13,73	3,282E-01	5,782E17	7,91
350,5	0,5658	9,983E+17	14,01	3,537E-01	6,240E17	8,08
351,0	0,5501	9,720E+17	14,29	3,450E-01	6,096E17	8,26
351,5	0,5287	9,355E+17	14,56	3,329E-01	5,891E17	8,43
352,0	0,5164	9,151E+17	14,82	3,258E-01	5,773E17	8,59
352,5	0,4882	8,663E+17	15,07	3,086E-01	5,477E17	8,75
353,0	0,5189	9,221E+17	15,32	3,288E-01	5,843E17	8,91
353,5	0,5706	1,015E+18	15,59	3,625E-01	6,450E17	9,08
354,0	0,6032	1,075E+18	15,89	3,841E-01	6,845E17	9,27
354,5	0,6098	1,088E+18	16,19	3,893E-01	6,947E17	9,46
355,0	0,6096	1,089E+18	16,49	3,903E-01	6,974E17	9,66
355,5	0,5886	1,053E+18	16,79	3,777E-01	6,759E17	9,85
356,0	0,5523	9,897E+17	17,08	3,552E-01	6,366E17	10,03
356,5	0,5179	9,295E+17	17,35	3,340E-01	5,994E17	10,21
357,0	0,4554	8,184E+17	17,59	2,944E-01	5,291E17	10,36
357,5	0,4608	8,293E+17	17,82	2,986E-01	5,374E17	10,51
358,0	0,4288	7,728E+17	18,04	2,785E-01	5,020E17	10,65
358,5	0,3981	7,185E+17	18,25	2,592E-01	4,678E17	10,79
359,0	0,4682	8,461E+17	18,46	3,056E-01	5,523E17	10,93
359,5	0,5639	1,020E+18	18,72	3,691E-01	6,679E17	11,10
360,0	0,5964	1,081E+18	19,01	3,913E-01	7,091E17	11,29
360,5	0,5637	1,023E+18	19,30	3,706E-01	6,725E17	11,48
361,0	0,5187	9,427E+17	19,57	3,418E-01	6,211E17	11,66

Wave-length nm	Global spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Global photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative global integrated irradiance $W \cdot m^{-2}$	Direct spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Direct photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative direct integrated irradiance $W \cdot m^{-2}$
361,5	0,5081	9,246E+17	19,83	3,355E-01	6,105E17	11,83
362,0	0,5327	9,707E+17	20,09	3,525E-01	6,423E17	12,00
362,5	0,5834	1,065E+18	20,37	3,869E-01	7,061E17	12,18
363,0	0,6002	1,097E+18	20,66	3,989E-01	7,289E17	12,38
363,5	0,5837	1,068E+18	20,96	3,888E-01	7,115E17	12,58
364,0	0,6045	1,108E+18	21,26	4,035E-01	7,395E17	12,78
364,5	0,5988	1,099E+18	21,56	4,006E-01	7,351E17	12,98
365,0	0,6218	1,142E+18	21,86	4,169E-01	7,660E17	13,18
365,5	0,6843	1,259E+18	22,19	4,598E-01	8,459E17	13,40
366,0	0,7332	1,351E+18	22,54	4,936E-01	9,095E17	13,64
366,5	0,7344	1,355E+18	22,91	4,955E-01	9,142E17	13,89
367,0	0,7208	1,332E+18	23,28	4,873E-01	9,002E17	14,13
367,5	0,7071	1,308E+18	23,63	4,790E-01	8,862E17	14,37
368,0	0,6657	1,233E+18	23,98	4,519E-01	8,371E17	14,61
368,5	0,6612	1,227E+18	24,31	4,498E-01	8,343E17	14,83
369,0	0,6911	1,284E+18	24,65	4,711E-01	8,750E17	15,06
369,5	0,7425	1,381E+18	25,00	5,071E-01	9,432E17	15,31
370,0	0,7529	1,402E+18	25,38	5,152E-01	9,595E17	15,56
370,5	0,6806	1,269E+18	25,74	4,666E-01	8,703E17	15,81
371,0	0,6914	1,291E+18	26,08	4,749E-01	8,869E17	16,04
371,5	0,7184	1,344E+18	26,43	4,944E-01	9,247E17	16,28
372,0	0,6725	1,259E+18	26,78	4,637E-01	8,684E17	16,52
372,5	0,6407	1,201E+18	27,11	4,426E-01	8,300E17	16,75
373,0	0,6171	1,159E+18	27,42	4,271E-01	8,019E17	16,97
373,5	0,5562	1,046E+18	27,72	3,857E-01	7,252E17	17,17
374,0	0,5548	1,045E+18	27,99	3,854E-01	7,256E17	17,36
374,5	0,5507	1,038E+18	28,27	3,832E-01	7,225E17	17,56
375,0	0,5876	1,109E+18	28,55	4,097E-01	7,734E17	17,75
375,5	0,6497	1,228E+18	28,86	4,538E-01	8,578E17	17,97
376,0	0,6728	1,274E+18	29,19	4,708E-01	8,912E17	18,20
376,5	0,6620	1,255E+18	29,53	4,640E-01	8,795E17	18,44
377,0	0,7102	1,348E+18	29,87	4,987E-01	9,464E17	18,68
377,5	0,7922	1,506E+18	30,25	5,573E-01	1,059E18	18,94
378,0	0,8535	1,624E+18	30,66	6,014E-01	1,144E18	19,23
378,5	0,8318	1,585E+18	31,08	5,872E-01	1,119E18	19,53
379,0	0,7417	1,415E+18	31,47	5,246E-01	1,001E18	19,80
379,5	0,6649	1,270E+18	31,82	4,712E-01	9,002E17	20,05
380,0	0,6987	1,337E+18	32,17	4,961E-01	9,489E17	20,30
380,5	0,7486	1,434E+18	32,53	5,324E-01	1,020E18	20,55
381,0	0,7616	1,461E+18	32,90	5,427E-01	1,041E18	20,82
381,5	0,6864	1,318E+18	33,27	4,899E-01	9,409E17	21,08

Wave-length nm	Global spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Global photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative global integrated irradiance $W \cdot m^{-2}$	Direct spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Direct photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative direct integrated irradiance $W \cdot m^{-2}$
382,0	0,5851	1,125E+18	33,58	4,184E-01	8,045E17	21,31
382,5	0,5061	9,746E+17	33,86	3,626E-01	6,981E17	21,50
383,0	0,4537	8,747E+17	34,10	3,255E-01	6,276E17	21,67
383,5	0,4392	8,479E+17	34,32	3,157E-01	6,094E17	21,83
384,0	0,5082	9,824E+17	34,56	3,658E-01	7,072E17	22,00
384,5	0,6118	1,184E+18	34,84	4,411E-01	8,538E17	22,21
385,0	0,6716	1,302E+18	35,16	4,850E-01	9,399E17	22,44
385,5	0,6418	1,245E+18	35,49	4,641E-01	9,007E17	22,67
386,0	0,6192	1,203E+18	35,80	4,485E-01	8,716E17	22,90
386,5	0,6438	1,253E+18	36,12	4,671E-01	9,089E17	23,13
387,0	0,6496	1,265E+18	36,44	4,721E-01	9,196E17	23,37
387,5	0,6402	1,249E+18	36,76	4,660E-01	9,089E17	23,60
388,0	0,6340	1,238E+18	37,08	4,622E-01	9,027E17	23,83
388,5	0,6295	1,231E+18	37,40	4,596E-01	8,989E17	24,06
389,0	0,6834	1,338E+18	37,73	4,998E-01	9,786E17	24,30
389,5	0,7575	1,485E+18	38,09	5,548E-01	1,088E18	24,57
390,0	0,7947	1,560E+18	38,47	5,829E-01	1,144E18	24,85
390,5	0,8014	1,575E+18	38,87	5,887E-01	1,157E18	25,14
391,0	0,8489	1,671E+18	39,29	6,245E-01	1,229E18	25,45
391,5	0,8609	1,697E+18	39,71	6,343E-01	1,250E18	25,76
392,0	0,7926	1,564E+18	40,13	5,849E-01	1,154E18	26,07
392,5	0,6606	1,305E+18	40,49	4,882E-01	9,646E17	26,34
393,0	0,4784	9,464E+17	40,77	3,540E-01	7,003E17	26,55
393,5	0,3804	7,536E+17	40,99	2,819E-01	5,584E17	26,71
394,0	0,4942	9,803E+17	41,21	3,667E-01	7,274E17	26,87
394,5	0,6819	1,354E+18	41,50	5,066E-01	1,006E18	27,09
395,0	0,8054	1,601E+18	41,87	5,992E-01	1,192E18	27,36
395,5	0,8579	1,708E+18	42,29	6,392E-01	1,273E18	27,67
396,0	0,7544	1,504E+18	42,69	5,628E-01	1,122E18	27,97
396,5	0,5486	1,095E+18	43,02	4,098E-01	8,180E17	28,22
397,0	0,4250	8,493E+17	43,26	3,179E-01	6,353E17	28,40
397,5	0,6276	1,256E+18	43,52	4,701E-01	9,408E17	28,59
398,0	0,8500	1,703E+18	43,89	6,376E-01	1,277E18	28,87
398,5	1,0040	2,014E+18	44,36	7,540E-01	1,513E18	29,22
399,0	1,0662	2,142E+18	44,88	8,017E-01	1,610E18	29,61
399,5	1,0989	2,210E+18	45,42	8,274E-01	1,664E18	30,02
400,0	1,1109	2,237E+18	45,97	8,375E-01	1,686E18	30,43
401,0	1,1569	2,335E+18	47,10	8,744E-01	1,765E18	31,29
402,0	1,2026	2,434E+18	48,28	9,112E-01	1,844E18	32,18
403,0	1,1579	2,349E+18	49,46	8,796E-01	1,784E18	33,08
404,0	1,1767	2,393E+18	50,63	8,959E-01	1,822E18	33,96

Wave-length nm	Global spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Global photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative global integrated irradiance $W \cdot m^{-2}$	Direct spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Direct photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative direct integrated irradiance $W \cdot m^{-2}$
405,0	1,1478	2,340E+18	51,79	8,759E-01	1,786E18	34,85
406,0	1,1194	2,288E+18	52,93	8,563E-01	1,750E18	35,72
407,0	1,0994	2,253E+18	54,04	8,430E-01	1,727E18	36,57
408,0	1,1481	2,358E+18	55,16	8,823E-01	1,812E18	37,43
409,0	1,2263	2,525E+18	56,35	9,444E-01	1,944E18	38,34
410,0	1,0455	2,158E+18	57,48	8,068E-01	1,665E18	39,22
411,0	1,1704	2,422E+18	58,59	9,051E-01	1,873E18	40,07
412,0	1,2442	2,580E+18	59,80	9,641E-01	1,999E18	41,01
413,0	1,1936	2,482E+18	61,02	9,268E-01	1,927E18	41,95
414,0	1,1808	2,461E+18	62,20	9,187E-01	1,915E18	42,88
415,0	1,2222	2,553E+18	63,41	9,529E-01	1,991E18	43,81
416,0	1,2587	2,636E+18	64,65	9,834E-01	2,059E18	44,78
417,0	1,2276	2,577E+18	65,89	9,611E-01	2,018E18	45,75
418,0	1,1743	2,471E+18	67,09	9,212E-01	1,939E18	46,69
419,0	1,2222	2,578E+18	68,29	9,607E-01	2,026E18	47,63
420,0	1,1199	2,368E+18	69,46	8,821E-01	1,865E18	48,56
421,0	1,2720	2,696E+18	70,66	1,004E00	2,127E18	49,50
422,0	1,2547	2,665E+18	71,92	9,921E-01	2,108E18	50,50
423,0	1,2149	2,587E+18	73,15	9,625E-01	2,050E18	51,47
424,0	1,2082	2,579E+18	74,36	9,590E-01	2,047E18	52,43
425,0	1,2452	2,664E+18	75,59	9,902E-01	2,119E18	53,41
426,0	1,2100	2,595E+18	76,82	9,639E-01	2,067E18	54,39
427,0	1,1690	2,513E+18	78,01	9,328E-01	2,005E18	55,33
428,0	1,1805	2,543E+18	79,18	9,435E-01	2,033E18	56,27
429,0	1,0931	2,361E+18	80,32	8,751E-01	1,890E18	57,18
430,0	0,8721	1,888E+18	81,30	6,993E-01	1,514E18	57,97
431,0	0,7916	1,718E+18	82,13	6,359E-01	1,380E18	58,64
432,0	1,3169	2,864E+18	83,19	1,060E00	2,305E18	59,48
433,0	1,2252	2,671E+18	84,46	9,876E-01	2,153E18	60,51
434,0	1,1319	2,473E+18	85,64	9,139E-01	1,997E18	61,46
435,0	1,2416	2,719E+18	86,83	1,004E00	2,199E18	62,42
436,0	1,3619	2,989E+18	88,13	1,103E00	2,421E18	63,47
437,0	1,3903	3,058E+18	89,50	1,127E00	2,480E18	64,59
438,0	1,2203	2,691E+18	90,81	9,908E-01	2,185E18	65,65
439,0	1,1741	2,595E+18	92,01	9,548E-01	2,110E18	66,62
440,0	1,3460	2,981E+18	93,27	1,096E00	2,428E18	67,64
441,0	1,3274	2,947E+18	94,60	1,083E00	2,404E18	68,73
442,0	1,4209	3,161E+18	95,98	1,161E00	2,582E18	69,85
443,0	1,4411	3,214E+18	97,41	1,179E00	2,629E18	71,02
444,0	1,4043	3,139E+18	98,83	1,150E00	2,571E18	72,19
445,0	1,4577	3,265E+18	100,26	1,196E00	2,679E18	73,36

Wave-length nm	Global spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Global photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative global integrated irradiance $W \cdot m^{-2}$	Direct spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Direct photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative direct integrated irradiance $W \cdot m^{-2}$
446,0	1,3070	2,934E+18	101,64	1,073E00	2,410E18	74,50
447,0	1,4860	3,344E+18	103,04	1,222E00	2,750E18	75,64
448,0	1,5037	3,391E+18	104,53	1,239E00	2,793E18	76,87
449,0	1,5001	3,391E+18	106,04	1,237E00	2,797E18	78,11
450,0	1,5550	3,523E+18	107,56	1,284E00	2,909E18	79,37
451,0	1,6126	3,661E+18	109,15	1,334E00	3,028E18	80,68
452,0	1,5437	3,513E+18	110,73	1,278E00	2,909E18	81,99
453,0	1,4256	3,251E+18	112,21	1,182E00	2,695E18	83,22
454,0	1,5291	3,495E+18	113,69	1,269E00	2,901E18	84,44
455,0	1,5180	3,477E+18	115,21	1,262E00	2,890E18	85,71
456,0	1,5678	3,599E+18	116,75	1,305E00	2,996E18	86,99
457,0	1,5808	3,637E+18	118,33	1,317E00	3,031E18	88,30
458,0	1,5469	3,567E+18	119,89	1,291E00	2,976E18	89,61
459,0	1,5346	3,546E+18	121,43	1,282E00	2,963E18	90,90
460,0	1,5247	3,531E+18	122,96	1,275E00	2,953E18	92,17
461,0	1,5781	3,662E+18	124,51	1,322E00	3,067E18	93,47
462,0	1,5929	3,705E+18	126,10	1,335E00	3,106E18	94,80
463,0	1,5985	3,726E+18	127,70	1,341E00	3,126E18	96,14
464,0	1,5499	3,620E+18	129,27	1,302E00	3,041E18	97,46
465,0	1,5305	3,583E+18	130,81	1,287E00	3,012E18	98,76
466,0	1,5628	3,666E+18	132,36	1,315E00	3,085E18	100,06
467,0	1,4930	3,510E+18	133,88	1,258E00	2,957E18	101,34
468,0	1,5574	3,669E+18	135,41	1,314E00	3,096E18	102,63
469,0	1,5637	3,692E+18	136,97	1,321E00	3,119E18	103,95
470,0	1,5033	3,557E+18	138,50	1,271E00	3,008E18	105,24
471,0	1,5287	3,624E+18	140,02	1,294E00	3,067E18	106,52
472,0	1,6079	3,821E+18	141,59	1,362E00	3,237E18	107,85
473,0	1,5454	3,680E+18	143,16	1,311E00	3,121E18	109,19
474,0	1,5626	3,728E+18	144,72	1,327E00	3,165E18	110,51
475,0	1,6138	3,859E+18	146,31	1,372E00	3,280E18	111,86
476,0	1,5586	3,735E+18	147,89	1,326E00	3,177E18	113,21
477,0	1,5678	3,765E+18	149,46	1,335E00	3,206E18	114,54
478,0	1,6183	3,894E+18	151,05	1,380E00	3,320E18	115,89
479,0	1,5870	3,827E+18	152,65	1,355E00	3,267E18	117,26
480,0	1,6134	3,899E+18	154,25	1,378E00	3,331E18	118,63
481,0	1,6130	3,906E+18	155,87	1,380E00	3,340E18	120,01
482,0	1,6189	3,928E+18	157,48	1,386E00	3,363E18	121,39
483,0	1,5991	3,888E+18	159,09	1,370E00	3,332E18	122,77
484,0	1,5688	3,822E+18	160,67	1,345E00	3,278E18	124,13
485,0	1,5638	3,818E+18	162,24	1,342E00	3,276E18	125,47
486,0	1,2679	3,102E+18	163,66	1,089E00	2,663E18	126,68

Wave-length nm	Global spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Global photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative global integrated irradiance $W \cdot m^{-2}$	Direct spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Direct photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative direct integrated irradiance $W \cdot m^{-2}$
487,0	1,4200	3,481E+18	165,00	1,220E00	2,991E18	127,84
488,0	1,5368	3,775E+18	166,48	1,321E00	3,246E18	129,11
489,0	1,4477	3,564E+18	167,97	1,246E00	3,066E18	130,39
490,0	1,6177	3,990E+18	169,50	1,393E00	3,435E18	131,71
491,0	1,5550	3,843E+18	171,09	1,340E00	3,311E18	133,08
492,0	1,4826	3,672E+18	172,61	1,278E00	3,165E18	134,39
493,0	1,5857	3,935E+18	174,14	1,368E00	3,395E18	135,71
494,0	1,5480	3,850E+18	175,71	1,336E00	3,323E18	137,06
495,0	1,6437	4,096E+18	177,31	1,420E00	3,538E18	138,44
496,0	1,5631	3,903E+18	178,91	1,351E00	3,373E18	139,82
497,0	1,5898	3,977E+18	180,49	1,375E00	3,440E18	141,19
498,0	1,5464	3,877E+18	182,05	1,338E00	3,355E18	142,54
499,0	1,5462	3,884E+18	183,60	1,339E00	3,364E18	143,88
500,0	1,5406	3,878E+18	185,14	1,335E00	3,361E18	145,22
501,0	1,4935	3,767E+18	186,66	1,295E00	3,267E18	146,54
502,0	1,4923	3,771E+18	188,15	1,295E00	3,273E18	147,83
503,0	1,5608	3,952E+18	189,68	1,356E00	3,433E18	149,16
504,0	1,4545	3,690E+18	191,19	1,265E00	3,208E18	150,47
505,0	1,5590	3,963E+18	192,69	1,356E00	3,447E18	151,78
506,0	1,6217	4,131E+18	194,28	1,411E00	3,595E18	153,16
507,0	1,5515	3,960E+18	195,87	1,351E00	3,448E18	154,54
508,0	1,5121	3,867E+18	197,40	1,317E00	3,368E18	155,87
509,0	1,5847	4,060E+18	198,95	1,381E00	3,539E18	157,22
510,0	1,5436	3,963E+18	200,52	1,346E00	3,455E18	158,59
511,0	1,5723	4,045E+18	202,07	1,371E00	3,528E18	159,95
512,0	1,6139	4,160E+18	203,67	1,408E00	3,630E18	161,34
513,0	1,5162	3,916E+18	205,23	1,324E00	3,419E18	162,70
514,0	1,4842	3,840E+18	206,73	1,297E00	3,355E18	164,01
515,0	1,5270	3,959E+18	208,24	1,335E00	3,460E18	165,33
516,0	1,5410	4,003E+18	209,77	1,347E00	3,500E18	166,67
517,0	1,2557	3,268E+18	211,17	1,099E00	2,859E18	167,89
518,0	1,4361	3,745E+18	212,52	1,257E00	3,277E18	169,07
519,0	1,3917	3,636E+18	213,93	1,219E00	3,184E18	170,31
520,0	1,5192	3,977E+18	215,38	1,331E00	3,484E18	171,58
521,0	1,5301	4,013E+18	216,91	1,341E00	3,518E18	172,92
522,0	1,5644	4,111E+18	218,46	1,372E00	3,605E18	174,27
523,0	1,4746	3,882E+18	219,98	1,294E00	3,406E18	175,61
524,0	1,5859	4,183E+18	221,51	1,392E00	3,672E18	176,95
525,0	1,5735	4,159E+18	223,09	1,382E00	3,652E18	178,34
526,0	1,5297	4,050E+18	224,64	1,344E00	3,559E18	179,70
527,0	1,3378	3,549E+18	226,07	1,176E00	3,120E18	180,96

Wave-length nm	Global spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Global photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative global integrated irradiance $W \cdot m^{-2}$	Direct spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Direct photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative direct integrated irradiance $W \cdot m^{-2}$
528,0	1,5312	4,070E+18	227,51	1,347E00	3,580E18	182,22
529,0	1,6024	4,267E+18	229,07	1,410E00	3,755E18	183,60
530,0	1,5401	4,109E+18	230,64	1,356E00	3,617E18	184,98
531,0	1,6245	4,342E+18	232,23	1,431E00	3,824E18	186,38
532,0	1,5952	4,272E+18	233,84	1,405E00	3,764E18	187,79
533,0	1,4245	3,822E+18	235,35	1,255E00	3,368E18	189,13
534,0	1,5258	4,102E+18	236,82	1,345E00	3,616E18	190,43
535,0	1,5490	4,172E+18	238,36	1,366E00	3,679E18	191,78
536,0	1,6152	4,358E+18	239,94	1,425E00	3,845E18	193,18
537,0	1,4946	4,040E+18	241,50	1,319E00	3,566E18	194,55
538,0	1,5692	4,250E+18	243,03	1,386E00	3,753E18	195,90
539,0	1,5307	4,153E+18	244,58	1,352E00	3,668E18	197,27
540,0	1,4782	4,018E+18	246,08	1,306E00	3,550E18	198,60
541,0	1,4210	3,870E+18	247,53	1,256E00	3,420E18	199,88
542,0	1,5466	4,220E+18	249,02	1,367E00	3,731E18	201,19
543,0	1,5212	4,158E+18	250,55	1,345E00	3,678E18	202,55
544,0	1,5746	4,312E+18	252,10	1,393E00	3,815E18	203,92
545,0	1,5390	4,222E+18	253,65	1,362E00	3,736E18	205,29
546,0	1,5247	4,191E+18	255,19	1,350E00	3,710E18	206,65
547,0	1,5445	4,253E+18	256,72	1,368E00	3,766E18	208,01
548,0	1,5005	4,139E+18	258,24	1,329E00	3,667E18	209,36
549,0	1,5475	4,277E+18	259,77	1,371E00	3,790E18	210,71
550,0	1,5354	4,251E+18	261,31	1,361E00	3,768E18	212,07
551,0	1,5337	4,254E+18	262,84	1,360E00	3,772E18	213,43
552,0	1,5651	4,349E+18	264,39	1,388E00	3,858E18	214,81
553,0	1,5206	4,233E+18	265,94	1,349E00	3,756E18	216,18
554,0	1,5504	4,324E+18	267,47	1,376E00	3,838E18	217,54
555,0	1,5589	4,355E+18	269,03	1,384E00	3,868E18	218,92
556,0	1,5321	4,288E+18	270,57	1,361E00	3,810E18	220,29
557,0	1,4945	4,190E+18	272,08	1,328E00	3,724E18	221,64
558,0	1,5266	4,288E+18	273,59	1,357E00	3,813E18	222,98
559,0	1,4441	4,064E+18	275,08	1,285E00	3,615E18	224,30
560,0	1,4697	4,143E+18	276,54	1,308E00	3,687E18	225,60
561,0	1,5550	4,391E+18	278,05	1,384E00	3,910E18	226,94
562,0	1,4804	4,188E+18	279,57	1,319E00	3,731E18	228,29
563,0	1,5363	4,354E+18	281,08	1,369E00	3,880E18	229,64
564,0	1,5062	4,276E+18	282,60	1,343E00	3,812E18	230,99
565,0	1,5157	4,311E+18	284,11	1,352E00	3,844E18	232,34
566,0	1,4332	4,084E+18	285,58	1,279E00	3,643E18	233,66
567,0	1,5276	4,360E+18	287,06	1,363E00	3,891E18	234,98
568,0	1,5136	4,328E+18	288,58	1,351E00	3,864E18	236,34

Wave-length nm	Global spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Global photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative global integrated irradiance $W \cdot m^{-2}$	Direct spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Direct photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative direct integrated irradiance $W \cdot m^{-2}$
569,0	1,4764	4,229E+18	290,08	1,319E00	3,778E18	237,67
570,0	1,4773	4,239E+18	291,55	1,320E00	3,788E18	238,99
571,0	1,4289	4,107E+18	293,01	1,277E00	3,671E18	240,29
572,0	1,5090	4,345E+18	294,48	1,349E00	3,886E18	241,60
573,0	1,5154	4,371E+18	295,99	1,356E00	3,910E18	242,95
574,0	1,5075	4,356E+18	297,50	1,349E00	3,897E18	244,31
575,0	1,4734	4,265E+18	298,99	1,319E00	3,817E18	245,64
576,0	1,4612	4,237E+18	300,46	1,308E00	3,793E18	246,95
577,0	1,4979	4,351E+18	301,94	1,341E00	3,896E18	248,28
578,0	1,4518	4,224E+18	303,41	1,300E00	3,783E18	249,60
579,0	1,4727	4,293E+18	304,87	1,319E00	3,845E18	250,91
580,0	1,4976	4,373E+18	306,36	1,342E00	3,917E18	252,24
581,0	1,5045	4,400E+18	307,86	1,348E00	3,942E18	253,58
582,0	1,5276	4,475E+18	309,38	1,369E00	4,011E18	254,94
583,0	1,5434	4,530E+18	310,91	1,383E00	4,059E18	256,32
584,0	1,5403	4,528E+18	312,45	1,380E00	4,058E18	257,70
585,0	1,5280	4,500E+18	313,99	1,370E00	4,034E18	259,08
586,0	1,4910	4,398E+18	315,50	1,337E00	3,944E18	260,43
587,0	1,5237	4,502E+18	317,01	1,367E00	4,039E18	261,78
588,0	1,4891	4,408E+18	318,51	1,336E00	3,956E18	263,13
589,0	1,2857	3,812E+18	319,90	1,155E00	3,424E18	264,38
590,0	1,3669	4,060E+18	321,23	1,228E00	3,647E18	265,57
591,0	1,4619	4,349E+18	322,64	1,313E00	3,907E18	266,84
592,0	1,4312	4,265E+18	324,09	1,286E00	3,833E18	268,14
593,0	1,4519	4,334E+18	325,53	1,305E00	3,895E18	269,44
594,0	1,4449	4,321E+18	326,98	1,299E00	3,885E18	270,74
595,0	1,4267	4,273E+18	328,41	1,283E00	3,844E18	272,03
596,0	1,4702	4,411E+18	329,86	1,322E00	3,967E18	273,33
597,0	1,4745	4,431E+18	331,33	1,326E00	3,986E18	274,66
598,0	1,4565	4,384E+18	332,80	1,310E00	3,945E18	275,97
599,0	1,4564	4,392E+18	334,25	1,311E00	3,952E18	277,28
600,0	1,4710	4,443E+18	335,72	1,324E00	3,999E18	278,60
601,0	1,4537	4,398E+18	337,18	1,308E00	3,959E18	279,92
602,0	1,4318	4,339E+18	338,62	1,289E00	3,906E18	281,22
603,0	1,4621	4,438E+18	340,07	1,317E00	3,997E18	282,52
604,0	1,4878	4,524E+18	341,55	1,340E00	4,074E18	283,85
605,0	1,4852	4,523E+18	343,03	1,338E00	4,075E18	285,19
606,0	1,4779	4,509E+18	344,51	1,331E00	4,062E18	286,52
607,0	1,4868	4,543E+18	346,00	1,340E00	4,093E18	287,86
608,0	1,4819	4,536E+18	347,48	1,335E00	4,087E18	289,19
609,0	1,4706	4,509E+18	348,96	1,325E00	4,063E18	290,52

Wave-length nm	Global spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Global photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative global integrated irradiance $W \cdot m^{-2}$	Direct spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Direct photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative direct integrated irradiance $W \cdot m^{-2}$
610,0	1,4643	4,497E+18	350,42	1,320E00	4,053E18	291,85
611,0	1,4569	4,481E+18	351,88	1,313E00	4,039E18	293,16
612,0	1,4788	4,556E+18	353,35	1,333E00	4,107E18	294,49
613,0	1,4579	4,499E+18	354,82	1,314E00	4,056E18	295,81
614,0	1,4135	4,369E+18	356,26	1,275E00	3,940E18	297,11
615,0	1,4654	4,537E+18	357,70	1,322E00	4,091E18	298,40
616,0	1,4269	4,425E+18	359,14	1,287E00	3,991E18	299,71
617,0	1,4087	4,375E+18	360,56	1,271E00	3,947E18	300,99
618,0	1,4621	4,549E+18	362,00	1,319E00	4,103E18	302,28
619,0	1,4690	4,578E+18	363,46	1,325E00	4,130E18	303,60
620,0	1,4696	4,587E+18	364,93	1,326E00	4,139E18	304,93
621,0	1,4759	4,614E+18	366,40	1,332E00	4,164E18	306,26
622,0	1,4228	4,455E+18	367,85	1,284E00	4,022E18	307,57
623,0	1,4124	4,430E+18	369,27	1,276E00	4,001E18	308,85
624,0	1,4077	4,422E+18	370,68	1,271E00	3,994E18	310,12
625,0	1,3985	4,400E+18	372,08	1,263E00	3,974E18	311,39
626,0	1,3971	4,403E+18	373,48	1,262E00	3,976E18	312,65
627,0	1,4375	4,537E+18	374,90	1,298E00	4,098E18	313,93
628,0	1,3591	4,297E+18	376,30	1,229E00	3,886E18	315,19
629,0	1,4073	4,456E+18	377,68	1,272E00	4,028E18	316,44
630,0	1,3884	4,403E+18	379,08	1,255E00	3,981E18	317,71
631,0	1,4120	4,485E+18	380,48	1,276E00	4,054E18	318,97
632,0	1,3598	4,326E+18	381,86	1,229E00	3,910E18	320,23
633,0	1,4466	4,610E+18	383,27	1,307E00	4,165E18	321,49
634,0	1,4243	4,546E+18	384,70	1,287E00	4,107E18	322,79
635,0	1,4416	4,608E+18	386,14	1,303E00	4,164E18	324,09
636,0	1,4087	4,510E+18	387,56	1,273E00	4,076E18	325,37
637,0	1,4568	4,671E+18	388,99	1,317E00	4,222E18	326,67
638,0	1,4664	4,710E+18	390,45	1,325E00	4,257E18	327,99
639,0	1,4604	4,698E+18	391,92	1,320E00	4,246E18	329,31
640,0	1,4298	4,607E+18	393,36	1,292E00	4,164E18	330,62
641,0	1,4306	4,616E+18	394,79	1,293E00	4,173E18	331,91
642,0	1,4334	4,633E+18	396,23	1,296E00	4,188E18	333,21
643,0	1,4483	4,688E+18	397,67	1,309E00	4,238E18	334,51
644,0	1,4420	4,675E+18	399,11	1,304E00	4,226E18	335,82
645,0	1,4525	4,716E+18	400,56	1,313E00	4,264E18	337,12
646,0	1,4109	4,588E+18	401,99	1,276E00	4,150E18	338,42
647,0	1,4045	4,575E+18	403,40	1,271E00	4,139E18	339,69
648,0	1,3912	4,538E+18	404,80	1,259E00	4,106E18	340,96
649,0	1,3480	4,404E+18	406,17	1,220E00	3,985E18	342,20
650,0	1,3555	4,435E+18	407,52	1,226E00	4,013E18	343,42

Wave-length nm	Global spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Global photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative global integrated irradiance $W \cdot m^{-2}$	Direct spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Direct photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative direct integrated irradiance $W \cdot m^{-2}$
651,0	1,4405	4,721E+18	408,92	1,303E00	4,271E18	344,68
652,0	1,3831	4,540E+18	410,33	1,252E00	4,110E18	345,96
653,0	1,4269	4,691E+18	411,73	1,291E00	4,245E18	347,23
654,0	1,4112	4,646E+18	413,15	1,277E00	4,204E18	348,52
655,0	1,3460	4,438E+18	414,53	1,218E00	4,018E18	349,76
656,0	1,1817	3,902E+18	415,79	1,070E00	3,532E18	350,91
657,0	1,2357	4,087E+18	417,00	1,119E00	3,699E18	352,00
658,0	1,3815	4,576E+18	418,31	1,250E00	4,142E18	353,19
659,0	1,3865	4,600E+18	419,69	1,255E00	4,163E18	354,44
660,0	1,3951	4,635E+18	421,09	1,263E00	4,197E18	355,70
661,0	1,3893	4,623E+18	422,48	1,258E00	4,186E18	356,96
662,0	1,3779	4,592E+18	423,86	1,248E00	4,160E18	358,21
663,0	1,3804	4,607E+18	425,24	1,250E00	4,173E18	359,46
664,0	1,3926	4,655E+18	426,63	1,261E00	4,215E18	360,72
665,0	1,4173	4,745E+18	428,03	1,283E00	4,296E18	361,99
666,0	1,4162	4,748E+18	429,45	1,282E00	4,299E18	363,27
667,0	1,4061	4,721E+18	430,86	1,273E00	4,274E18	364,55
668,0	1,4109	4,744E+18	432,27	1,277E00	4,295E18	365,83
669,0	1,4352	4,834E+18	433,69	1,299E00	4,376E18	367,11
670,0	1,4155	4,774E+18	435,12	1,282E00	4,322E18	368,40
671,0	1,4128	4,772E+18	436,53	1,279E00	4,321E18	369,68
672,0	1,3931	4,713E+18	437,93	1,261E00	4,267E18	370,95
673,0	1,4053	4,761E+18	439,33	1,272E00	4,310E18	372,22
674,0	1,4033	4,761E+18	440,74	1,271E00	4,311E18	373,49
675,0	1,3918	4,729E+18	442,14	1,260E00	4,282E18	374,76
676,0	1,4079	4,791E+18	443,53	1,275E00	4,338E18	376,03
677,0	1,3950	4,754E+18	444,94	1,263E00	4,305E18	377,30
678,0	1,4025	4,787E+18	446,34	1,270E00	4,335E18	378,56
679,0	1,3907	4,753E+18	447,73	1,259E00	4,304E18	379,83
680,0	1,3928	4,768E+18	449,12	1,261E00	4,318E18	381,09
681,0	1,3875	4,756E+18	450,51	1,256E00	4,307E18	382,35
682,0	1,3940	4,786E+18	451,90	1,263E00	4,335E18	383,61
683,0	1,3790	4,741E+18	453,29	1,249E00	4,294E18	384,86
684,0	1,3699	4,717E+18	454,67	1,241E00	4,273E18	386,11
685,0	1,3708	4,727E+18	456,04	1,242E00	4,282E18	387,35
686,0	1,3399	4,627E+18	457,39	1,214E00	4,192E18	388,57
687,0	0,9654	3,339E+18	458,54	8,803E-01	3,044E18	389,62
688,0	1,1174	3,870E+18	459,59	1,017E00	3,521E18	390,57
689,0	1,1245	3,900E+18	460,71	1,023E00	3,548E18	391,59
690,0	1,1787	4,094E+18	461,86	1,071E00	3,722E18	392,64
691,0	1,2297	4,278E+18	463,06	1,117E00	3,885E18	393,73

Wave-length nm	Global spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Global photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative global integrated irradiance $W \cdot m^{-2}$	Direct spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Direct photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative direct integrated irradiance $W \cdot m^{-2}$
692,0	1,2652	4,407E+18	464,31	1,148E00	4,000E18	394,86
693,0	1,2572	4,386E+18	465,57	1,141E00	3,981E18	396,01
694,0	1,2428	4,342E+18	466,82	1,129E00	3,943E18	397,14
695,0	1,2677	4,435E+18	468,08	1,150E00	4,025E18	398,28
696,0	1,2647	4,431E+18	469,34	1,148E00	4,022E18	399,43
697,0	1,3364	4,689E+18	470,64	1,212E00	4,251E18	400,61
698,0	1,3154	4,622E+18	471,97	1,193E00	4,191E18	401,81
699,0	1,2881	4,532E+18	473,27	1,169E00	4,112E18	403,00
700,0	1,2786	4,506E+18	474,55	1,160E00	4,088E18	404,16
701,0	1,2622	4,454E+18	475,82	1,146E00	4,043E18	405,31
702,0	1,2637	4,466E+18	477,09	1,147E00	4,052E18	406,46
703,0	1,2710	4,498E+18	478,35	1,153E00	4,082E18	407,61
704,0	1,3040	4,621E+18	479,64	1,183E00	4,192E18	408,78
705,0	1,3176	4,676E+18	480,95	1,195E00	4,243E18	409,97
706,0	1,3106	4,658E+18	482,27	1,189E00	4,226E18	411,16
707,0	1,3052	4,645E+18	483,57	1,184E00	4,214E18	412,34
708,0	1,3010	4,637E+18	484,88	1,180E00	4,207E18	413,53
709,0	1,3057	4,660E+18	486,18	1,185E00	4,228E18	414,71
710,0	1,3137	4,695E+18	487,49	1,192E00	4,260E18	415,90
711,0	1,3117	4,695E+18	488,80	1,190E00	4,259E18	417,09
712,0	1,3033	4,671E+18	490,11	1,182E00	4,237E18	418,27
713,0	1,2881	4,623E+18	491,41	1,169E00	4,194E18	419,45
714,0	1,2991	4,669E+18	492,70	1,179E00	4,237E18	420,62
715,0	1,2550	4,517E+18	493,98	1,139E00	4,101E18	421,78
716,0	1,2679	4,570E+18	495,24	1,151E00	4,150E18	422,93
717,0	1,1039	3,984E+18	496,42	1,005E00	3,628E18	424,01
718,0	1,0266	3,711E+18	497,49	9,360E-01	3,383E18	424,98
719,0	0,9205	3,332E+18	498,46	8,403E-01	3,041E18	425,87
720,0	0,9826	3,562E+18	499,42	8,968E-01	3,250E18	426,73
721,0	1,0830	3,931E+18	500,45	9,868E-01	3,582E18	427,68
722,0	1,2371	4,496E+18	501,61	1,125E00	4,088E18	428,73
723,0	1,1411	4,153E+18	502,80	1,039E00	3,783E18	429,81
724,0	1,0524	3,836E+18	503,89	9,603E-01	3,500E18	430,81
725,0	1,0350	3,777E+18	504,94	9,447E-01	3,448E18	431,77
726,0	1,0782	3,940E+18	505,99	9,835E-01	3,594E18	432,73
727,0	1,0819	3,959E+18	507,07	9,870E-01	3,612E18	433,72
728,0	1,0370	3,800E+18	508,13	9,469E-01	3,470E18	434,68
729,0	1,0436	3,830E+18	509,17	9,523E-01	3,495E18	435,63
730,0	1,1252	4,135E+18	510,26	1,026E00	3,772E18	436,62
731,0	1,0672	3,927E+18	511,35	9,742E-01	3,585E18	437,62
732,0	1,1501	4,238E+18	512,46	1,049E00	3,865E18	438,63

Wave-length nm	Global spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Global photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative global integrated irradiance $W \cdot m^{-2}$	Direct spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Direct photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative direct integrated irradiance $W \cdot m^{-2}$
733,0	1,1927	4,401E+18	513,63	1,087E00	4,011E18	439,70
734,0	1,2321	4,553E+18	514,85	1,123E00	4,149E18	440,81
735,0	1,2143	4,493E+18	516,07	1,107E00	4,095E18	441,92
736,0	1,2024	4,455E+18	517,28	1,096E00	4,062E18	443,02
737,0	1,2004	4,454E+18	518,48	1,095E00	4,061E18	444,12
738,0	1,2233	4,545E+18	519,69	1,115E00	4,143E18	445,22
739,0	1,1870	4,416E+18	520,90	1,082E00	4,027E18	446,32
740,0	1,2160	4,530E+18	522,10	1,109E00	4,130E18	447,42
741,0	1,2113	4,518E+18	523,31	1,105E00	4,120E18	448,52
742,0	1,2118	4,526E+18	524,52	1,105E00	4,128E18	449,63
743,0	1,2369	4,626E+18	525,75	1,128E00	4,220E18	450,75
744,0	1,2467	4,669E+18	526,99	1,137E00	4,260E18	451,88
745,0	1,2461	4,673E+18	528,24	1,137E00	4,265E18	453,02
746,0	1,2434	4,669E+18	529,48	1,135E00	4,262E18	454,15
747,0	1,2441	4,678E+18	530,72	1,136E00	4,270E18	455,29
748,0	1,2365	4,656E+18	531,96	1,129E00	4,251E18	456,42
749,0	1,2321	4,646E+18	533,20	1,125E00	4,243E18	457,55
750,0	1,2305	4,646E+18	534,43	1,124E00	4,244E18	458,67
751,0	1,2250	4,631E+18	535,66	1,119E00	4,231E18	459,79
752,0	1,2294	4,654E+18	536,89	1,123E00	4,252E18	460,91
753,0	1,2230	4,636E+18	538,11	1,118E00	4,237E18	462,03
754,0	1,2384	4,701E+18	539,34	1,132E00	4,297E18	463,16
755,0	1,2347	4,693E+18	540,58	1,129E00	4,290E18	464,29
756,0	1,2197	4,642E+18	541,81	1,115E00	4,244E18	465,41
757,0	1,2186	4,644E+18	543,03	1,114E00	4,247E18	466,53
758,0	1,2259	4,678E+18	544,25	1,121E00	4,279E18	467,64
759,0	1,1910	4,551E+18	545,46	1,090E00	4,165E18	468,75
760,0	0,2653	1,015E+18	546,18	2,464E-01	9,429E17	469,42
761,0	0,1535	5,881E+17	546,39	1,429E-01	5,473E17	469,61
762,0	0,6857	2,630E+18	546,81	6,331E-01	2,428E18	470,00
763,0	0,3784	1,453E+18	547,35	3,511E-01	1,349E18	470,49
764,0	0,5372	2,066E+18	547,80	4,974E-01	1,913E18	470,92
765,0	0,6840	2,634E+18	548,41	6,319E-01	2,434E18	471,48
766,0	0,8122	3,132E+18	549,16	7,486E-01	2,887E18	472,17
767,0	0,9713	3,750E+18	550,05	8,931E-01	3,449E18	472,99
768,0	1,1106	4,294E+18	551,09	1,019E00	3,941E18	473,95
769,0	1,1245	4,353E+18	552,21	1,032E00	3,994E18	474,97
770,0	1,1574	4,486E+18	553,35	1,062E00	4,115E18	476,02
771,0	1,1652	4,522E+18	554,51	1,068E00	4,147E18	477,09
772,0	1,1744	4,564E+18	555,68	1,077E00	4,186E18	478,16
773,0	1,1737	4,567E+18	556,86	1,077E00	4,189E18	479,24

Wave-length nm	Global spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Global photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative global integrated irradiance $W \cdot m^{-2}$	Direct spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Direct photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative direct integrated irradiance $W \cdot m^{-2}$
774,0	1,1737	4,573E+18	558,03	1,077E00	4,196E18	480,31
775,0	1,1737	4,579E+18	559,21	1,077E00	4,202E18	481,39
776,0	1,1764	4,595E+18	560,38	1,080E00	4,217E18	482,47
777,0	1,1693	4,574E+18	561,55	1,073E00	4,198E18	483,54
778,0	1,1679	4,574E+18	562,72	1,072E00	4,200E18	484,62
779,0	1,1731	4,600E+18	563,89	1,077E00	4,224E18	485,69
780,0	1,1602	4,556E+18	565,06	1,066E00	4,184E18	486,76
781,0	1,1573	4,550E+18	566,22	1,063E00	4,180E18	487,83
782,0	1,1628	4,578E+18	567,38	1,068E00	4,205E18	488,89
783,0	1,1580	4,565E+18	568,54	1,064E00	4,194E18	489,96
784,0	1,1503	4,540E+18	569,69	1,057E00	4,172E18	491,02
785,0	1,1552	4,565E+18	570,85	1,062E00	4,196E18	492,08
786,0	1,1558	4,573E+18	572,00	1,063E00	4,204E18	493,14
787,0	1,1417	4,523E+18	573,15	1,050E00	4,160E18	494,20
788,0	1,1272	4,471E+18	574,28	1,037E00	4,113E18	495,24
789,0	1,1224	4,458E+18	575,41	1,033E00	4,103E18	496,28
790,0	1,0878	4,326E+18	576,51	1,002E00	3,983E18	497,29
791,0	1,1026	4,390E+18	577,61	1,015E00	4,041E18	498,30
792,0	1,0921	4,354E+18	578,71	1,005E00	4,009E18	499,31
793,0	1,0843	4,329E+18	579,79	9,986E-01	3,986E18	500,31
794,0	1,0940	4,373E+18	580,88	1,007E00	4,026E18	501,32
795,0	1,0900	4,362E+18	581,98	1,004E00	4,017E18	502,32
796,0	1,0711	4,292E+18	583,06	9,870E-01	3,955E18	503,32
797,0	1,0881	4,366E+18	584,14	1,003E00	4,023E18	504,31
798,0	1,1089	4,455E+18	585,23	1,022E00	4,104E18	505,32
799,0	1,0873	4,373E+18	586,33	1,002E00	4,030E18	506,34
800,0	1,0694	4,307E+18	587,41	9,857E-01	3,970E18	507,33
801,0	1,0812	4,360E+18	588,49	9,969E-01	4,020E18	508,32
802,0	1,0825	4,370E+18	589,57	9,982E-01	4,030E18	509,32
803,0	1,0626	4,295E+18	590,64	9,800E-01	3,962E18	510,31
804,0	1,0751	4,351E+18	591,71	9,916E-01	4,014E18	511,29
805,0	1,0514	4,261E+18	592,77	9,699E-01	3,930E18	512,27
806,0	1,0942	4,440E+18	593,85	1,009E00	4,095E18	513,26
807,0	1,0828	4,399E+18	594,93	9,989E-01	4,058E18	514,27
808,0	1,0790	4,389E+18	596,01	9,955E-01	4,049E18	515,27
809,0	1,0517	4,283E+18	597,08	9,707E-01	3,953E18	516,25
810,0	1,0528	4,293E+18	598,13	9,721E-01	3,964E18	517,22
811,0	1,0502	4,288E+18	599,18	9,699E-01	3,960E18	518,19
812,0	1,0238	4,185E+18	600,22	9,461E-01	3,867E18	519,15
813,0	1,0057	4,116E+18	601,24	9,297E-01	3,805E18	520,09
814,0	0,9009	3,692E+18	602,19	8,344E-01	3,419E18	520,97

Wave-length nm	Global spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Global photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative global integrated irradiance $W \cdot m^{-2}$	Direct spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Direct photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative direct integrated irradiance $W \cdot m^{-2}$
815,0	0,8926	3,662E+18	603,09	8,269E-01	3,392E18	521,80
816,0	0,8297	3,408E+18	603,95	7,695E-01	3,161E18	522,60
817,0	0,8494	3,493E+18	604,79	7,875E-01	3,239E18	523,38
818,0	0,8202	3,377E+18	605,62	7,608E-01	3,133E18	524,15
819,0	0,9026	3,721E+18	606,48	8,360E-01	3,447E18	524,95
820,0	0,8594	3,547E+18	607,36	7,967E-01	3,289E18	525,76
821,0	0,9947	4,111E+18	608,29	9,202E-01	3,803E18	526,62
822,0	0,9488	3,926E+18	609,26	8,783E-01	3,634E18	527,52
823,0	0,6708	2,779E+18	610,07	6,239E-01	2,585E18	528,27
824,0	0,9323	3,867E+18	610,87	8,637E-01	3,583E18	529,02
825,0	0,9665	4,014E+18	611,82	8,949E-01	3,717E18	529,90
826,0	0,9311	3,872E+18	612,77	8,628E-01	3,588E18	530,78
827,0	0,9818	4,087E+18	613,73	9,091E-01	3,785E18	531,66
828,0	0,8473	3,532E+18	614,64	7,864E-01	3,278E18	532,51
829,0	0,9266	3,867E+18	615,53	8,589E-01	3,584E18	533,33
830,0	0,9134	3,816E+18	616,45	8,468E-01	3,538E18	534,18
831,0	0,9212	3,854E+18	617,37	8,542E-01	3,573E18	535,04
832,0	0,8917	3,735E+18	618,27	8,272E-01	3,465E18	535,88
833,0	0,9537	3,999E+18	619,20	8,836E-01	3,705E18	536,73
834,0	0,9314	3,910E+18	620,14	8,636E-01	3,626E18	537,60
835,0	1,0003	4,205E+18	621,11	9,265E-01	3,894E18	538,50
836,0	0,9695	4,080E+18	622,09	8,987E-01	3,782E18	539,41
837,0	1,0063	4,240E+18	623,08	9,322E-01	3,928E18	540,33
838,0	0,9961	4,202E+18	624,08	9,232E-01	3,894E18	541,26
839,0	0,9984	4,217E+18	625,08	9,251E-01	3,907E18	542,18
840,0	1,0128	4,283E+18	626,08	9,385E-01	3,969E18	543,11
841,0	1,0072	4,264E+18	627,09	9,335E-01	3,952E18	544,05
842,0	0,9941	4,214E+18	628,09	9,214E-01	3,906E18	544,98
843,0	1,0024	4,254E+18	629,09	9,290E-01	3,942E18	545,90
844,0	0,9834	4,178E+18	630,08	9,117E-01	3,874E18	546,82
845,0	1,0136	4,311E+18	631,08	9,395E-01	3,997E18	547,75
846,0	1,0157	4,326E+18	632,10	9,417E-01	4,011E18	548,69
847,0	0,9888	4,216E+18	633,10	9,168E-01	3,909E18	549,62
848,0	0,9893	4,223E+18	634,09	9,174E-01	3,916E18	550,53
849,0	0,9831	4,202E+18	635,07	9,118E-01	3,897E18	551,45
850,0	0,8911	3,813E+18	636,01	8,266E-01	3,537E18	552,32
851,0	0,9721	4,164E+18	636,94	9,019E-01	3,864E18	553,18
852,0	0,9665	4,145E+18	637,91	8,968E-01	3,846E18	554,08
853,0	0,9621	4,131E+18	638,88	8,928E-01	3,834E18	554,98
854,0	0,8487	3,648E+18	639,78	7,877E-01	3,386E18	555,82
855,0	0,9104	3,918E+18	640,66	8,450E-01	3,637E18	556,63

Wave-length nm	Global spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Global photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative global integrated irradiance $W \cdot m^{-2}$	Direct spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Direct photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative direct integrated irradiance $W \cdot m^{-2}$
856,0	0,9703	4,181E+18	641,60	9,008E-01	3,882E18	557,51
857,0	0,9888	4,266E+18	642,58	9,179E-01	3,960E18	558,41
858,0	0,9891	4,272E+18	643,57	9,183E-01	3,966E18	559,33
859,0	0,9888	4,276E+18	644,56	9,181E-01	3,970E18	560,25
860,0	0,9853	4,266E+18	645,55	9,150E-01	3,961E18	561,17
861,0	0,9839	4,265E+18	646,53	9,138E-01	3,961E18	562,08
862,0	0,9916	4,303E+18	647,52	9,210E-01	3,996E18	563,00
863,0	0,9976	4,334E+18	648,51	9,266E-01	4,026E18	563,92
864,0	0,9763	4,246E+18	649,50	9,069E-01	3,945E18	564,84
865,0	0,9604	4,182E+18	650,47	8,923E-01	3,885E18	565,74
866,0	0,8465	3,690E+18	651,37	7,865E-01	3,429E18	566,58
867,0	0,9128	3,984E+18	652,25	8,482E-01	3,702E18	567,40
868,0	0,9564	4,179E+18	653,19	8,888E-01	3,884E18	568,26
869,0	0,9468	4,142E+18	654,14	8,800E-01	3,849E18	569,15
870,0	0,9647	4,225E+18	655,09	8,967E-01	3,927E18	570,04
871,0	0,9511	4,170E+18	656,05	8,841E-01	3,877E18	570,93
872,0	0,9641	4,232E+18	657,01	8,963E-01	3,934E18	571,82
873,0	0,9544	4,194E+18	657,97	8,874E-01	3,900E18	572,71
874,0	0,9377	4,126E+18	658,91	8,720E-01	3,836E18	573,59
875,0	0,9242	4,071E+18	659,85	8,595E-01	3,786E18	574,46
876,0	0,9500	4,189E+18	660,78	8,837E-01	3,897E18	575,33
877,0	0,9534	4,209E+18	661,73	8,869E-01	3,916E18	576,21
878,0	0,9496	4,197E+18	662,69	8,835E-01	3,905E18	577,10
879,0	0,9338	4,132E+18	663,63	8,689E-01	3,845E18	577,97
880,0	0,9368	4,150E+18	664,56	8,718E-01	3,862E18	578,84
881,0	0,9060	4,018E+18	665,48	8,432E-01	3,739E18	579,70
882,0	0,9297	4,128E+18	666,40	8,654E-01	3,842E18	580,56
883,0	0,9266	4,119E+18	667,33	8,624E-01	3,834E18	581,42
884,0	0,9303	4,140E+18	668,26	8,661E-01	3,854E18	582,28
885,0	0,9415	4,194E+18	669,19	8,766E-01	3,905E18	583,16
886,0	0,9049	4,036E+18	670,12	8,427E-01	3,759E18	584,01
887,0	0,9080	4,054E+18	671,02	8,455E-01	3,775E18	584,86
888,0	0,9196	4,111E+18	671,94	8,565E-01	3,829E18	585,71
889,0	0,9318	4,170E+18	672,86	8,679E-01	3,884E18	586,57
890,0	0,9213	4,127E+18	673,79	8,583E-01	3,845E18	587,44
891,0	0,9232	4,141E+18	674,71	8,600E-01	3,858E18	588,29
892,0	0,9062	4,069E+18	675,63	8,444E-01	3,792E18	589,15
893,0	0,8707	3,914E+18	676,52	8,118E-01	3,649E18	589,97
894,0	0,8488	3,820E+18	677,38	7,918E-01	3,564E18	590,78
895,0	0,8112	3,655E+18	678,21	7,574E-01	3,412E18	591,55
896,0	0,7603	3,429E+18	678,99	7,106E-01	3,205E18	592,28

Wave-length nm	Global spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Global photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative global integrated irradiance $W \cdot m^{-2}$	Direct spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Direct photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative direct integrated irradiance $W \cdot m^{-2}$
897,0	0,6637	2,997E+18	679,70	6,213E-01	2,805E18	592,95
898,0	0,7157	3,235E+18	680,39	6,694E-01	3,026E18	593,60
899,0	0,5471	2,476E+18	681,02	5,131E-01	2,322E18	594,19
900,0	0,7404	3,355E+18	681,67	6,923E-01	3,136E18	594,79
901,0	0,5976	2,710E+18	682,34	5,600E-01	2,540E18	595,42
902,0	0,6660	3,024E+18	682,97	6,232E-01	2,830E18	596,01
903,0	0,6869	3,122E+18	683,65	6,430E-01	2,923E18	596,64
904,0	0,8421	3,832E+18	684,41	7,863E-01	3,578E18	597,36
905,0	0,8147	3,712E+18	685,24	7,612E-01	3,468E18	598,13
906,0	0,7733	3,527E+18	686,03	7,229E-01	3,297E18	598,87
907,0	0,6367	2,907E+18	686,74	5,966E-01	2,724E18	599,53
908,0	0,6503	2,972E+18	687,38	6,091E-01	2,784E18	600,13
909,0	0,7023	3,214E+18	688,06	6,572E-01	3,007E18	600,77
910,0	0,6229	2,853E+18	688,72	5,838E-01	2,675E18	601,39
911,0	0,6661	3,055E+18	689,36	6,240E-01	2,862E18	601,99
912,0	0,6869	3,154E+18	690,04	6,432E-01	2,953E18	602,63
913,0	0,6265	2,880E+18	690,70	5,874E-01	2,700E18	603,24
914,0	0,6247	2,874E+18	691,32	5,857E-01	2,695E18	603,83
915,0	0,6764	3,116E+18	691,97	6,337E-01	2,919E18	604,44
916,0	0,5748	2,650E+18	692,60	5,394E-01	2,487E18	605,02
917,0	0,7281	3,361E+18	693,25	6,815E-01	3,146E18	605,63
918,0	0,5910	2,731E+18	693,91	5,545E-01	2,563E18	606,25
919,0	0,7366	3,408E+18	694,57	6,896E-01	3,190E18	606,87
920,0	0,7420	3,436E+18	695,31	6,945E-01	3,217E18	607,57
921,0	0,7782	3,608E+18	696,07	7,279E-01	3,375E18	608,28
922,0	0,6982	3,241E+18	696,81	6,539E-01	3,035E18	608,97
923,0	0,7429	3,452E+18	697,53	6,950E-01	3,229E18	609,64
924,0	0,7194	3,346E+18	698,26	6,738E-01	3,134E18	610,33
925,0	0,7090	3,302E+18	698,98	6,643E-01	3,093E18	611,00
926,0	0,7013	3,269E+18	699,68	6,568E-01	3,062E18	611,66
927,0	0,7851	3,664E+18	700,43	7,347E-01	3,429E18	612,35
928,0	0,5880	2,747E+18	701,11	5,520E-01	2,579E18	613,00
929,0	0,5497	2,571E+18	701,68	5,164E-01	2,415E18	613,53
930,0	0,4308	2,017E+18	702,17	4,056E-01	1,899E18	613,99
931,0	0,4080	1,912E+18	702,59	3,843E-01	1,801E18	614,39
932,0	0,3000	1,407E+18	702,95	2,830E-01	1,328E18	614,72
933,0	0,2477	1,163E+18	703,22	2,339E-01	1,099E18	614,98
934,0	0,1434	6,742E+17	703,41	1,356E-01	6,378E17	615,16
935,0	0,2501	1,177E+18	703,61	2,362E-01	1,112E18	615,35
936,0	0,1610	7,584E+17	703,82	1,522E-01	7,173E17	615,54
937,0	0,1629	7,684E+17	703,98	1,541E-01	7,268E17	615,70

Wave-length nm	Global spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Global photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative global integrated irradiance $W \cdot m^{-2}$	Direct spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Direct photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative direct integrated irradiance $W \cdot m^{-2}$
938,0	0,2000	9,444E+17	704,16	1,891E-01	8,928E17	615,87
939,0	0,3977	1,880E+18	704,46	3,748E-01	1,772E18	616,15
940,0	0,4704	2,226E+18	704,89	4,428E-01	2,095E18	616,56
941,0	0,3709	1,757E+18	705,31	3,497E-01	1,657E18	616,95
942,0	0,4041	1,916E+18	705,70	3,808E-01	1,806E18	617,32
943,0	0,2775	1,317E+18	706,04	2,621E-01	1,244E18	617,64
944,0	0,2850	1,354E+18	706,32	2,691E-01	1,279E18	617,91
945,0	0,3671	1,747E+18	706,65	3,463E-01	1,647E18	618,21
946,0	0,1940	9,241E+17	706,93	1,836E-01	8,741E17	618,48
947,0	0,3700	1,764E+18	707,21	3,491E-01	1,664E18	618,75
948,0	0,2734	1,305E+18	707,53	2,584E-01	1,233E18	619,05
949,0	0,4925	2,353E+18	707,92	4,638E-01	2,216E18	619,41
950,0	0,1468	7,022E+17	708,24	1,390E-01	6,649E17	619,71
951,0	0,4824	2,309E+18	708,55	4,543E-01	2,175E18	620,01
952,0	0,2681	1,285E+18	708,93	2,534E-01	1,215E18	620,36
953,0	0,3426	1,644E+18	709,23	3,235E-01	1,552E18	620,65
954,0	0,4229	2,031E+18	709,61	3,987E-01	1,915E18	621,01
955,0	0,3402	1,635E+18	710,00	3,211E-01	1,544E18	621,37
956,0	0,3273	1,575E+18	710,33	3,091E-01	1,487E18	621,69
957,0	0,2699	1,300E+18	710,63	2,552E-01	1,229E18	621,97
958,0	0,4597	2,217E+18	710,99	4,333E-01	2,089E18	622,31
959,0	0,3728	1,800E+18	711,41	3,519E-01	1,699E18	622,71
960,0	0,4194	2,027E+18	711,81	3,957E-01	1,912E18	623,08
961,0	0,4599	2,225E+18	712,25	4,335E-01	2,097E18	623,49
962,0	0,4405	2,133E+18	712,70	4,154E-01	2,012E18	623,92
963,0	0,5036	2,441E+18	713,17	4,745E-01	2,300E18	624,36
964,0	0,4573	2,219E+18	713,65	4,312E-01	2,092E18	624,82
965,0	0,5023	2,440E+18	714,13	4,733E-01	2,299E18	625,27
966,0	0,5013	2,438E+18	714,63	4,724E-01	2,297E18	625,74
967,0	0,5009	2,439E+18	715,13	4,722E-01	2,298E18	626,21
968,0	0,6502	3,168E+18	715,71	6,112E-01	2,979E18	626,76
969,0	0,6842	3,338E+18	716,37	6,429E-01	3,136E18	627,38
970,0	0,6328	3,090E+18	717,03	5,952E-01	2,906E18	628,00
971,0	0,7119	3,480E+18	717,70	6,686E-01	3,268E18	628,63
972,0	0,6857	3,355E+18	718,40	6,444E-01	3,153E18	629,29
973,0	0,6047	2,962E+18	719,05	5,692E-01	2,788E18	629,90
974,0	0,5736	2,813E+18	719,64	5,401E-01	2,648E18	630,45
975,0	0,5882	2,887E+18	720,22	5,537E-01	2,718E18	631,00
976,0	0,5703	2,802E+18	720,80	5,372E-01	2,639E18	631,54
977,0	0,6368	3,132E+18	721,40	5,991E-01	2,947E18	632,11
978,0	0,6133	3,019E+18	722,03	5,774E-01	2,842E18	632,70

Wave-length nm	Global spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Global photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative global integrated irradiance $W \cdot m^{-2}$	Direct spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Direct photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative direct integrated irradiance $W \cdot m^{-2}$
979,0	0,6363	3,136E+18	722,65	5,987E-01	2,951E18	633,29
980,0	0,6029	2,974E+18	723,27	5,678E-01	2,801E18	633,87
981,0	0,7113	3,513E+18	723,93	6,686E-01	3,302E18	634,49
982,0	0,6902	3,412E+18	724,63	6,491E-01	3,209E18	635,15
983,0	0,6667	3,299E+18	725,31	6,273E-01	3,104E18	635,79
984,0	0,7352	3,642E+18	726,01	6,909E-01	3,422E18	636,45
985,0	0,6862	3,402E+18	726,72	6,455E-01	3,201E18	637,11
986,0	0,7487	3,716E+18	727,44	7,035E-01	3,492E18	637,79
987,0	0,7371	3,663E+18	728,18	6,929E-01	3,443E18	638,49
988,0	0,7325	3,643E+18	728,91	6,886E-01	3,425E18	639,18
989,0	0,7469	3,719E+18	729,65	7,019E-01	3,494E18	639,87
990,0	0,7301	3,639E+18	730,39	6,864E-01	3,421E18	640,57
991,0	0,7514	3,749E+18	731,13	7,063E-01	3,523E18	641,26
992,0	0,7488	3,740E+18	731,88	7,039E-01	3,515E18	641,97
993,0	0,7351	3,675E+18	732,62	6,912E-01	3,455E18	642,67
994,0	0,7519	3,762E+18	733,37	7,069E-01	3,537E18	643,37
995,0	0,7496	3,755E+18	734,12	7,047E-01	3,530E18	644,07
996,0	0,7467	3,744E+18	734,87	7,020E-01	3,520E18	644,77
997,0	0,7376	3,702E+18	735,61	6,935E-01	3,481E18	645,47
998,0	0,7367	3,701E+18	736,35	6,928E-01	3,481E18	646,17
999,0	0,7364	3,704E+18	737,08	6,925E-01	3,483E18	646,86
1000,0	0,7332	3,691E+18	737,82	6,896E-01	3,471E18	647,55
1001,0	0,7423	3,740E+18	738,56	6,981E-01	3,518E18	648,24
1002,0	0,7259	3,662E+18	739,29	6,830E-01	3,445E18	648,93
1003,0	0,7323	3,697E+18	740,02	6,889E-01	3,478E18	649,62
1004,0	0,7213	3,645E+18	740,75	6,786E-01	3,430E18	650,30
1005,0	0,6798	3,439E+18	741,45	6,395E-01	3,236E18	650,96
1006,0	0,7105	3,598E+18	742,14	6,685E-01	3,386E18	651,62
1007,0	0,7254	3,677E+18	742,86	6,826E-01	3,461E18	652,29
1008,0	0,7247	3,678E+18	743,58	6,821E-01	3,461E18	652,97
1009,0	0,7176	3,645E+18	744,30	6,755E-01	3,431E18	653,65
1010,0	0,7171	3,646E+18	745,02	6,750E-01	3,432E18	654,33
1011,0	0,7207	3,668E+18	745,74	6,784E-01	3,452E18	655,00
1012,0	0,7167	3,651E+18	746,46	6,747E-01	3,437E18	655,68
1013,0	0,7155	3,649E+18	747,18	6,736E-01	3,435E18	656,36
1014,0	0,7186	3,668E+18	747,89	6,765E-01	3,453E18	657,03
1015,0	0,7061	3,608E+18	748,61	6,648E-01	3,397E18	657,70
1016,0	0,7092	3,627E+18	749,31	6,678E-01	3,416E18	658,37
1017,0	0,7013	3,591E+18	750,02	6,604E-01	3,381E18	659,03
1018,0	0,7121	3,650E+18	750,72	6,707E-01	3,437E18	659,70
1019,0	0,6868	3,523E+18	751,42	6,469E-01	3,318E18	660,36

Wave-length nm	Global spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Global photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative global integrated irradiance $W \cdot m^{-2}$	Direct spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Direct photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative direct integrated irradiance $W \cdot m^{-2}$
1020,0	0,6969	3,579E+18	752,12	6,565E-01	3,371E18	661,01
1021,0	0,6997	3,596E+18	752,81	6,592E-01	3,388E18	661,67
1022,0	0,6877	3,538E+18	753,51	6,479E-01	3,333E18	662,32
1023,0	0,6931	3,569E+18	754,20	6,530E-01	3,363E18	662,97
1024,0	0,6886	3,550E+18	754,89	6,489E-01	3,345E18	663,62
1025,0	0,6955	3,589E+18	755,58	6,554E-01	3,382E18	664,27
1026,0	0,6943	3,586E+18	756,28	6,543E-01	3,380E18	664,93
1027,0	0,6910	3,573E+18	756,97	6,513E-01	3,367E18	665,58
1028,0	0,6918	3,580E+18	757,66	6,521E-01	3,375E18	666,23
1029,0	0,6843	3,545E+18	758,35	6,450E-01	3,341E18	666,88
1030,0	0,6885	3,570E+18	759,04	6,490E-01	3,365E18	667,53
1031,0	0,6854	3,557E+18	759,72	6,461E-01	3,353E18	668,18
1032,0	0,6859	3,563E+18	760,41	6,466E-01	3,359E18	668,82
1033,0	0,6742	3,506E+18	761,09	6,357E-01	3,306E18	669,46
1034,0	0,6782	3,530E+18	761,76	6,395E-01	3,329E18	670,10
1035,0	0,6804	3,545E+18	762,44	6,416E-01	3,343E18	670,74
1036,0	0,6800	3,547E+18	763,12	6,414E-01	3,345E18	671,38
1037,0	0,6730	3,513E+18	763,80	6,348E-01	3,314E18	672,02
1038,0	0,6698	3,500E+18	764,47	6,318E-01	3,301E18	672,65
1039,0	0,6744	3,527E+18	765,14	6,362E-01	3,327E18	673,29
1040,0	0,6698	3,506E+18	765,82	6,318E-01	3,308E18	673,92
1041,0	0,6698	3,510E+18	766,49	6,320E-01	3,312E18	674,55
1042,0	0,6701	3,515E+18	767,16	6,322E-01	3,316E18	675,19
1043,0	0,6633	3,483E+18	767,82	6,259E-01	3,286E18	675,81
1044,0	0,6664	3,502E+18	768,49	6,288E-01	3,305E18	676,44
1045,0	0,6626	3,486E+18	769,15	6,253E-01	3,289E18	677,07
1046,0	0,6453	3,398E+18	769,81	6,090E-01	3,207E18	677,69
1047,0	0,6550	3,452E+18	770,46	6,183E-01	3,259E18	678,30
1048,0	0,6608	3,486E+18	771,11	6,238E-01	3,291E18	678,92
1049,0	0,6570	3,470E+18	771,77	6,203E-01	3,275E18	679,54
1050,0	0,6527	3,450E+18	772,43	6,162E-01	3,257E18	680,16
1051,0	0,6533	3,457E+18	773,08	6,168E-01	3,263E18	680,78
1052,0	0,6493	3,439E+18	773,73	6,131E-01	3,247E18	681,39
1053,0	0,6473	3,431E+18	774,38	6,112E-01	3,240E18	682,00
1054,0	0,6446	3,420E+18	775,03	6,087E-01	3,230E18	682,61
1055,0	0,6466	3,434E+18	775,67	6,106E-01	3,243E18	683,22
1056,0	0,6445	3,426E+18	776,32	6,088E-01	3,236E18	683,83
1057,0	0,6430	3,421E+18	776,96	6,073E-01	3,232E18	684,44
1058,0	0,6363	3,389E+18	777,60	6,011E-01	3,202E18	685,05
1059,0	0,6170	3,289E+18	778,23	5,828E-01	3,107E18	685,64
1060,0	0,6340	3,383E+18	778,85	5,990E-01	3,196E18	686,23

Wave-length nm	Global spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Global photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative global integrated irradiance $W \cdot m^{-2}$	Direct spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Direct photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative direct integrated irradiance $W \cdot m^{-2}$
1061,0	0,6194	3,308E+18	779,48	5,852E-01	3,126E18	686,82
1062,0	0,6308	3,372E+18	780,10	5,961E-01	3,187E18	687,41
1063,0	0,6206	3,321E+18	780,73	5,864E-01	3,138E18	688,00
1064,0	0,6301	3,375E+18	781,36	5,955E-01	3,190E18	688,59
1065,0	0,6273	3,363E+18	781,98	5,929E-01	3,179E18	689,19
1066,0	0,6153	3,302E+18	782,61	5,816E-01	3,121E18	689,78
1067,0	0,6185	3,322E+18	783,22	5,847E-01	3,140E18	690,36
1068,0	0,6176	3,321E+18	783,84	5,839E-01	3,139E18	690,94
1069,0	0,5846	3,146E+18	784,44	5,527E-01	2,974E18	691,51
1070,0	0,6029	3,248E+18	785,03	5,701E-01	3,071E18	692,07
1071,0	0,6148	3,315E+18	785,64	5,813E-01	3,134E18	692,65
1072,0	0,6136	3,311E+18	786,26	5,803E-01	3,131E18	693,23
1073,0	0,6019	3,251E+18	786,87	5,692E-01	3,075E18	693,80
1074,0	0,6198	3,351E+18	787,48	5,861E-01	3,169E18	694,38
1075,0	0,5908	3,197E+18	788,08	5,589E-01	3,025E18	694,95
1076,0	0,6129	3,320E+18	788,68	5,797E-01	3,140E18	695,52
1077,0	0,6026	3,267E+18	789,29	5,701E-01	3,091E18	696,10
1078,0	0,6015	3,264E+18	789,89	5,691E-01	3,088E18	696,67
1079,0	0,6030	3,275E+18	790,50	5,704E-01	3,098E18	697,24
1080,0	0,5955	3,238E+18	791,10	5,636E-01	3,064E18	697,80
1081,0	0,5791	3,152E+18	791,68	5,481E-01	2,983E18	698,36
1082,0	0,5877	3,201E+18	792,27	5,561E-01	3,029E18	698,91
1083,0	0,5964	3,252E+18	792,86	5,644E-01	3,077E18	699,47
1084,0	0,5768	3,148E+18	793,44	5,462E-01	2,980E18	700,03
1085,0	0,5916	3,231E+18	794,03	5,600E-01	3,059E18	700,58
1086,0	0,5525	3,020E+18	794,60	5,234E-01	2,862E18	701,12
1087,0	0,5653	3,093E+18	795,16	5,353E-01	2,929E18	701,65
1088,0	0,5914	3,239E+18	795,74	5,600E-01	3,067E18	702,20
1089,0	0,5775	3,166E+18	796,32	5,470E-01	2,999E18	702,75
1090,0	0,5541	3,041E+18	796,89	5,250E-01	2,881E18	703,29
1091,0	0,5866	3,222E+18	797,46	5,556E-01	3,051E18	703,83
1092,0	0,5796	3,186E+18	798,04	5,489E-01	3,017E18	704,38
1093,0	0,5091	2,801E+18	798,59	4,828E-01	2,656E18	704,90
1094,0	0,5381	2,963E+18	799,11	5,097E-01	2,807E18	705,39
1095,0	0,5192	2,862E+18	799,64	4,922E-01	2,713E18	705,90
1096,0	0,5018	2,768E+18	800,15	4,759E-01	2,626E18	706,38
1097,0	0,5768	3,186E+18	800,69	5,465E-01	3,018E18	706,89
1098,0	0,5015	2,772E+18	801,23	4,757E-01	2,629E18	707,40
1099,0	0,5062	2,801E+18	801,73	4,802E-01	2,657E18	707,88
1100,0	0,4844	2,682E+18	802,23	4,598E-01	2,546E18	708,35
1101,0	0,4955	2,746E+18	802,72	4,703E-01	2,607E18	708,81

Wave-length nm	Global spectral irradiance $\text{W} \cdot \text{m}^{-2} \cdot \text{nm}^{-1}$	Global photon flux $\text{m}^{-2} \cdot \text{s}^{-1} \cdot \text{nm}^{-1}$	Cumulative global integrated irradiance $\text{W} \cdot \text{m}^{-2}$	Direct spectral irradiance $\text{W} \cdot \text{m}^{-2} \cdot \text{nm}^{-1}$	Direct photon flux $\text{m}^{-2} \cdot \text{s}^{-1} \cdot \text{nm}^{-1}$	Cumulative direct integrated irradiance $\text{W} \cdot \text{m}^{-2}$
1102,0	0,4675	2,593E+18	803,20	4,438E-01	2,462E18	709,27
1103,0	0,4650	2,582E+18	803,66	4,416E-01	2,452E18	709,71
1104,0	0,4663	2,591E+18	804,13	4,428E-01	2,461E18	710,16
1105,0	0,5050	2,809E+18	804,62	4,793E-01	2,666E18	710,62
1106,0	0,3968	2,209E+18	805,07	3,773E-01	2,101E18	711,05
1107,0	0,4816	2,684E+18	805,51	4,573E-01	2,549E18	711,46
1108,0	0,4144	2,312E+18	805,95	3,940E-01	2,198E18	711,89
1109,0	0,4116	2,298E+18	806,37	3,914E-01	2,185E18	712,28
1110,0	0,4776	2,669E+18	806,81	4,536E-01	2,535E18	712,70
1111,0	0,3306	1,849E+18	807,22	3,148E-01	1,761E18	713,09
1112,0	0,4124	2,308E+18	807,59	3,922E-01	2,195E18	713,44
1113,0	0,2677	1,500E+18	807,93	2,552E-01	1,430E18	713,77
1114,0	0,2990	1,677E+18	808,21	2,849E-01	1,598E18	714,04
1115,0	0,2491	1,398E+18	808,48	2,376E-01	1,334E18	714,30
1116,0	0,2008	1,128E+18	808,71	1,917E-01	1,077E18	714,51
1117,0	0,0794	4,464E+17	808,85	7,594E-02	4,270E17	714,65
1118,0	0,2169	1,221E+18	809,00	2,070E-01	1,165E18	714,79
1119,0	0,1128	6,356E+17	809,16	1,079E-01	6,078E17	714,94
1120,0	0,1415	7,977E+17	809,29	1,352E-01	7,624E17	715,07
1121,0	0,1853	1,046E+18	809,45	1,770E-01	9,989E17	715,22
1122,0	0,0814	4,600E+17	809,59	7,793E-02	4,402E17	715,35
1123,0	0,1278	7,225E+17	809,69	1,222E-01	6,908E17	715,45
1124,0	0,1084	6,133E+17	809,81	1,037E-01	5,866E17	715,56
1125,0	0,1439	8,147E+17	809,93	1,375E-01	7,789E17	715,68
1126,0	0,0514	2,916E+17	810,03	4,925E-02	2,792E17	715,78
1127,0	0,1568	8,895E+17	810,14	1,499E-01	8,503E17	715,88
1128,0	0,0989	5,618E+17	810,26	9,467E-02	5,376E17	716,00
1129,0	0,1056	6,002E+17	810,37	1,010E-01	5,742E17	716,10
1130,0	0,0704	4,003E+17	810,45	6,737E-02	3,832E17	716,18
1131,0	0,2947	1,678E+18	810,64	2,812E-01	1,601E18	716,35
1132,0	0,2334	1,330E+18	810,90	2,229E-01	1,270E18	716,61
1133,0	0,1529	8,719E+17	811,09	1,462E-01	8,338E17	716,79
1134,0	0,0416	2,376E+17	811,19	3,987E-02	2,276E17	716,88
1135,0	0,0154	8,809E+16	811,22	1,478E-02	8,442E16	716,91
1136,0	0,1284	7,342E+17	811,29	1,228E-01	7,025E17	716,98
1137,0	0,2870	1,643E+18	811,50	2,739E-01	1,568E18	717,18
1138,0	0,2027	1,161E+18	811,74	1,937E-01	1,110E18	717,41
1139,0	0,2976	1,707E+18	811,99	2,840E-01	1,628E18	717,65
1140,0	0,2552	1,465E+18	812,27	2,438E-01	1,399E18	717,92
1141,0	0,1928	1,107E+18	812,50	1,843E-01	1,059E18	718,13
1142,0	0,2241	1,289E+18	812,70	2,142E-01	1,231E18	718,33

Wave-length nm	Global spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Global photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative global integrated irradiance $W \cdot m^{-2}$	Direct spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Direct photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative direct integrated irradiance $W \cdot m^{-2}$
1143,0	0,3109	1,789E+18	812,97	2,967E-01	1,707E18	718,58
1144,0	0,1129	6,504E+17	813,18	1,081E-01	6,226E17	718,79
1145,0	0,1456	8,393E+17	813,31	1,394E-01	8,032E17	718,91
1146,0	0,1572	9,068E+17	813,46	1,504E-01	8,677E17	719,06
1147,0	0,0590	3,407E+17	813,57	5,655E-02	3,265E17	719,16
1148,0	0,2703	1,562E+18	813,74	2,582E-01	1,492E18	719,32
1149,0	0,2179	1,260E+18	813,98	2,083E-01	1,205E18	719,55
1150,0	0,1213	7,022E+17	814,15	1,161E-01	6,724E17	719,71
1151,0	0,2028	1,175E+18	814,31	1,940E-01	1,124E18	719,87
1152,0	0,2469	1,432E+18	814,54	2,360E-01	1,368E18	720,08
1153,0	0,2374	1,378E+18	814,78	2,270E-01	1,317E18	720,31
1154,0	0,1421	8,253E+17	814,97	1,360E-01	7,903E17	720,49
1155,0	0,3123	1,816E+18	815,20	2,982E-01	1,734E18	720,71
1156,0	0,2801	1,630E+18	815,49	2,676E-01	1,557E18	720,99
1157,0	0,3137	1,827E+18	815,79	2,995E-01	1,745E18	721,28
1158,0	0,3108	1,812E+18	816,10	2,968E-01	1,730E18	721,58
1159,0	0,3360	1,960E+18	816,43	3,207E-01	1,871E18	721,89
1160,0	0,2856	1,668E+18	816,74	2,729E-01	1,594E18	722,18
1161,0	0,3465	2,025E+18	817,05	3,307E-01	1,933E18	722,48
1162,0	0,3490	2,042E+18	817,40	3,332E-01	1,949E18	722,82
1163,0	0,4672	2,735E+18	817,81	4,451E-01	2,606E18	723,20
1164,0	0,4007	2,348E+18	818,24	3,822E-01	2,240E18	723,62
1165,0	0,3875	2,272E+18	818,64	3,697E-01	2,168E18	723,99
1166,0	0,3739	2,194E+18	819,02	3,568E-01	2,094E18	724,36
1167,0	0,4088	2,401E+18	819,41	3,899E-01	2,291E18	724,73
1168,0	0,4183	2,460E+18	819,82	3,990E-01	2,346E18	725,13
1169,0	0,4219	2,483E+18	820,24	4,023E-01	2,368E18	725,53
1170,0	0,4574	2,694E+18	820,68	4,360E-01	2,568E18	725,95
1171,0	0,4470	2,635E+18	821,13	4,263E-01	2,513E18	726,38
1172,0	0,4535	2,676E+18	821,58	4,324E-01	2,551E18	726,81
1173,0	0,4551	2,687E+18	822,04	4,340E-01	2,562E18	727,24
1174,0	0,3359	1,985E+18	822,43	3,210E-01	1,897E18	727,62
1175,0	0,4511	2,668E+18	822,83	4,302E-01	2,544E18	727,99
1176,0	0,4754	2,814E+18	823,29	4,532E-01	2,683E18	728,43
1177,0	0,4710	2,791E+18	823,76	4,491E-01	2,661E18	728,88
1178,0	0,3590	2,129E+18	824,18	3,429E-01	2,034E18	729,28
1179,0	0,4823	2,863E+18	824,60	4,598E-01	2,729E18	729,68
1180,0	0,4394	2,610E+18	825,06	4,193E-01	2,491E18	730,12
1181,0	0,4538	2,698E+18	825,51	4,330E-01	2,574E18	730,55
1182,0	0,3222	1,917E+18	825,89	3,081E-01	1,833E18	730,92
1183,0	0,4374	2,605E+18	826,27	4,173E-01	2,485E18	731,28

Wave-length nm	Global spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Global photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative global integrated irradiance $W \cdot m^{-2}$	Direct spectral irradiance $W \cdot m^{-2} \cdot nm^{-1}$	Direct photon flux $m^{-2} \cdot s^{-1} \cdot nm^{-1}$	Cumulative direct integrated irradiance $W \cdot m^{-2}$
1184,0	0,4186	2,495E+18	826,70	3,997E-01	2,382E18	731,69
1185,0	0,4062	2,423E+18	827,11	3,880E-01	2,314E18	732,08
1186,0	0,4758	2,841E+18	827,56	4,539E-01	2,710E18	732,50
1187,0	0,4544	2,715E+18	828,02	4,337E-01	2,591E18	732,95
1188,0	0,3341	1,998E+18	828,42	3,195E-01	1,911E18	733,32
1189,0	0,4145	2,481E+18	828,79	3,957E-01	2,368E18	733,68
1190,0	0,4610	2,762E+18	829,23	4,400E-01	2,636E18	734,10
1191,0	0,4453	2,670E+18	829,68	4,251E-01	2,549E18	734,53
1192,0	0,4720	2,832E+18	830,14	4,504E-01	2,703E18	734,97
1193,0	0,4530	2,721E+18	830,60	4,324E-01	2,597E18	735,41
1194,0	0,4675	2,810E+18	831,06	4,462E-01	2,682E18	735,85
1195,0	0,4457	2,681E+18	831,52	4,255E-01	2,560E18	736,29
1196,0	0,4301	2,589E+18	831,96	4,107E-01	2,473E18	736,71
1197,0	0,4758	2,867E+18	832,41	4,539E-01	2,735E18	737,14
1198,0	0,4327	2,609E+18	832,86	4,131E-01	2,491E18	737,57
1199,0	0,3638	2,196E+18	833,26	3,477E-01	2,099E18	737,95
1200,0	0,4470	2,700E+18	833,67	4,266E-01	2,577E18	738,34
1201,0	0,4358	2,635E+18	834,11	4,161E-01	2,516E18	738,76
1202,0	0,4359	2,638E+18	834,54	4,162E-01	2,519E18	739,18
1203,0	0,4328	2,621E+18	834,98	4,132E-01	2,502E18	739,59
1204,0	0,3614	2,191E+18	835,38	3,454E-01	2,094E18	739,97
1205,0	0,4357	2,643E+18	835,77	4,159E-01	2,523E18	740,35
1206,0	0,4795	2,911E+18	836,23	4,574E-01	2,777E18	740,79
1207,0	0,4286	2,604E+18	836,69	4,092E-01	2,487E18	741,22
1208,0	0,4322	2,628E+18	837,12	4,126E-01	2,509E18	741,63
1209,0	0,4131	2,514E+18	837,54	3,943E-01	2,400E18	742,04
1210,0	0,4520	2,753E+18	837,97	4,314E-01	2,628E18	742,45
1211,0	0,4211	2,567E+18	838,41	4,020E-01	2,451E18	742,86
1212,0	0,4237	2,585E+18	838,83	4,045E-01	2,468E18	743,27
1213,0	0,4682	2,859E+18	839,28	4,467E-01	2,728E18	743,69
1214,0	0,4328	2,645E+18	839,73	4,132E-01	2,525E18	744,12
1215,0	0,4266	2,609E+18	840,16	4,073E-01	2,491E18	744,53
1216,0	0,4650	2,847E+18	840,60	4,438E-01	2,717E18	744,96
1217,0	0,4540	2,781E+18	841,06	4,333E-01	2,655E18	745,40
1218,0	0,4580	2,808E+18	841,52	4,371E-01	2,680E18	745,83
1219,0	0,4453	2,733E+18	841,97	4,252E-01	2,609E18	746,26
1220,0	0,4567	2,805E+18	842,42	4,360E-01	2,678E18	746,70
1221,0	0,4640	2,852E+18	842,88	4,428E-01	2,722E18	747,13
1222,0	0,4501	2,769E+18	843,34	4,297E-01	2,643E18	747,57
1223,0	0,4428	2,726E+18	843,78	4,228E-01	2,603E18	748,00
1224,0	0,4468	2,753E+18	844,23	4,266E-01	2,629E18	748,42