EUMETSAT

Outgoing Longwave Radiation Product: Conversion Tables-Spectral Radiance

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V1A	3 April 2014		Changes to DSR and template
V2	13 March 2015		Values for MSG-4 added

Document Change Record

1 FLUX CALCULATIONS FOR OUTGOING LONGWAVE RADIATION

The tables in this document contain values to complete the two-step calculation used by the Meteosat First-Generation satellites. The two steps are as follows: First, the spectral radiances are converted into spectral fluxes; this accounts for the effect of the viewing angle using limb-darkening functions, and then the spectral fluxes are combined in an appropriate manner to get the total flux.

Regression coefficients are determined with a radiative transfer model. The model calculations provided scene-dependent regression coefficients, i.e. a special set of coefficients for clear sky, opaque clouds, and semi-transparent clouds.

1.1 Reference Documents

	Document Name	*Reference Number*
RD 1	MTG-FCI: ATBD for Outgoing Longwave Radiation Product	EUM/MTG/DOC/10/0527
RD 2	Outgoing Longwave Radiation Product: Factsheet	EUM/OPS/DOC/09/5176

These documents are available on the dedicated technical documents webpage:

http://www.eumetsat.int/website/home/Data/TechnicalDocuments/index.html

2 CONVERSION TABLES FOR SPECTRAL RADIANCE TO SPECTRAL FLUX ALGORITHM

2.1 MSG-1 (Meteosat-08)

2.1.1 For the cloud-free cases:

Channel	k_1	k_2	k_3	k_4	k_5	k_6
WV6.2	2.1818876E-03	4.2189807E-02	-6.8898560E-03	2.7342985E+00	6.4720619E-01	-9.1771312E-02
WV7.3	3.5421848E-03	1.4942988E-02	8.2747135E-03	2.7912729E+00	5.7445937E-01	-8.6563617E-02
IR8.7	4.7264099E-02	2.2022896E-01	-2.2274397E-01	2.9902406E+00	8.2201615E-02	8.3432883E-02
IR9.7	1.3946056E-02	9.0043813E-02	-5.9863243E-02	2.6985784E+00	5.9048158E-01	1.1299519E-02
IR10.8	1.1984253E-01	1.0807310E+00	-8.9997631E-01	3.0570061E+00	-6.5828197E-02	1.2086342E-01
IR12.0	1.1725616E-01	1.1511791E+00	-9.8181498E-01	3.0415304E+00	-6.7610025E-02	1.4377934E-01
IR13.4	8.0423355E-02	7.4073339E-01	-8.9805830E-01	2.8855090E+00	2.5848952E-01	1.2185365E-01

2.1.2 For the opaque cloudy cases:

Channel	k_1	k_2	k_3	k_4	k_5	k_6
WV6.2	-4.8085213E-02	2.2146262E-01	-3.3221394E-02	2.7688909E+00	5.0018281E-01	-1.3742149E-01
WV7.3	-1.1092544E-01	4.1206971E-01	-4.6491753E-02	2.8149250E+00	4.3200737E-01	-1.6264816E-01
IR8.7	-1.9287896E-01	6.0075790E-01	-1.8283587E-02	2.8837726E+00	3.6406592E-01	-1.9841656E-01
IR9.7	8.8660717E-03	3.8779008E-01	-1.8064606E-01	2.6886644E+00	4.1541991E-01	4.2487290E-02
IR10.8	-6.6010189E-01	1.8115370E+00	7.7260606E-02	2.9902997E+00	2.1387528E-01	-1.9068725E-01
IR12.0	-5.5901146E-01	1.5059979E+00	1.0857254E-01	3.0052960E+00	2.0644903E-01	-1.8994442E-01
IR13.4	-1.9344521E-01	1.4108340E+00	-2.2201268E-01	2.8926947E+00	2.5562790E-01	-9.8672152E-02

2.1.3 Semi-transparent cloudy cases:

Channel	k_1	k_2	k_3	k_4	k_5	k_6
WV6.2	-4.7762394E-03	8.2394250E-02	-8.3010159E-03	2.7625804E+00	5.6122530E-01	-1.0195383E-01
WV7.3	-8.9175701E-03	1.3546333E-01	-1.7534189E-02	2.8097122E+00	4.7513065E-01	-8.9337923E-02
IR8.7	-5.0291777E-02	2.0056941E-01	1.3289134E-02	2.9230585E+00	3.1501278E-01	-9.3635909E-02
IR9.7	3.6563396E-02	2.0543346E-01	-1.5277962E-01	2.6951170E+00	4.9447504E-01	7.8470930E-02
IR10.8	-1.9047642E-01	6.0986120E-01	1.3832542E-01	3.0273402E+00	1.6293634E-01	-9.0189345E-02
IR12.0	-1.5635872E-01	5.4339105E-01	1.1301637E-01	3.0419545E+00	1.3282190E-01	-8.0234379E-02
IR13.4	2.0473480E-02	8.2303584E-01	-3.7115273E-01	2.9100280E+00	2.2493854E-01	7.5338171E-03

2.1.4 Back-up solution, for all scene types, if no cloud information is available:

Note: The overall accuracy will be lower.

Channel	k_1	k_2	k_3	k_4	k_5	k_6
WV6.2	-2.6689053E-02	1.4722799E-01	-1.4884430E-02	2.7661772E+00	5.4088509E-01	-1.2309235E-01
WV7.3	-6.5634966E-02	2.5953186E-01	-8.5097319E-03	2.8255193E+00	4.4850725E-01	-1.3003479E-01
IR8.7	-1.6683054E-01	4.7089306E-01	-1.2079423E-02	2.9973805E+00	1.5808605E-01	-8.3870515E-02
IR9.7	1.9791842E-02	3.0707005E-01	-1.7310384E-01	2.6951926E+00	4.2847797E-01	8.5359298E-02
IR10.8	-5.1618862E-01	1.3718965E+00	7.6570027E-02	3.0740976E+00	5.0948482E-02	-8.4003650E-02
IR12.0	-4.1311264E-01	1.1819752E+00	5.6730866E-02	3.0695207E+00	5.4204028E-02	-8.0014005E-02
IR13.4	-9.0607643E-02	1.1013821E+00	-2.7518907E-01	2.9054823E+00	2.3511396E-01	-3.6981694E-02

2.2 MSG-2 (Meteosat-09)

2.2.1 Cloud-free cases:

Channel	k_1	k_2	k_3	k_4	k_5	k_6
WV6.2	1.6341209E-03	5.8909590E-02	-1.5535180E-02	2.7217035E+00	6.2156302E-01	-7.7001780E-02
WV7.3	3.4937859E-03	2.5701240E-02	-1.4010824E-03	2.8019116E+00	5.7037014E-01	-7.8707904E-02
IR8.7	4.7069550E-02	2.1530971E-01	-2.1963586E-01	2.9813170E+00	8.2254343E-02	8.3232202E-02
IR9.7	1.3493061E-02	8.2909219E-02	-5.5015039E-02	2.7111747E+00	6.0431808E-01	7.9227015E-03
IR10.8	1.2977600E-01	9.7518897E-01	-8.4711057E-01	3.0837348E+00	-4.5825019E-02	1.1014342E-01
IR12.0	1.2844086E-01	9.4624823E-01	-8.8119936E-01	3.0279391E+00	-2.5404755E-02	1.2127531E-01
IR13.4	7.5773239E-02	9.1422921E-01	-1.0141751E+00	2.8920159E+00	2.2637463E-01	1.4510758E-01

2.2.2 Opaque cloudy cases:

Channel	k_1	k_2	k_3	k_4	k_5	k_6
WV6.2	-4.7027469E-02	2.1115923E-01	-2.8049970E-02	2.7533453E+00	5.1778871E-01	-1.4778841E-01
WV7.3	-1.0899425E-01	4.0299806E-01	-4.3253865E-02	2.8254948E+00	4.4151387E-01	-1.6642518E-01
IR8.7	-1.9034886E-01	5.8795160E-01	-1.4498829E-02	2.8741581E+00	3.6944145E-01	-2.0088601E-01
IR9.7	1.0398149E-02	3.8194463E-01	-1.8028973E-01	2.7029088E+00	4.1582733E-01	4.7805697E-02
IR10.8	-6.7914963E-01	1.8657922E+00	8.0986939E-02	3.0168204E+00	2.1571256E-01	-1.9157897E-01
IR12.0	-5.8793831E-01	1.6295227E+00	8.0332696E-02	2.9968629E+00	1.8637602E-01	-1.7848389E-01
IR13.4	-1.9908333E-01	1.4404976E+00	-2.4836947E-01	2.8988128E+00	2.4412675E-01	-8.9670829E-02

2.2.3 Semi-transparent cloudy cases:

Channel	k_1	k_2	k_3	k_4	k_5	k_6
WV6.2	-5.0160885E-03	8.8738427E-02	-1.2436050E-02	2.7493129E+00	5.4759538E-01	-9.4374754E-02
WV7.3	-8.7807178E-03	1.5312643E-01	-2.8896485E-02	2.8215032E+00	4.5910117E-01	-7.7354468E-02
IR8.7	-5.1456690E-02	2.0588291E-01	9.7025605E-03	2.9153419E+00	3.0908340E-01	-9.0996467E-02
IR9.7	3.7296057E-02	1.9682646E-01	-1.4784545E-01	2.7078557E+00	5.0639361E-01	7.6556943E-02
IR10.8	-1.9733524E-01	6.6324896E-01	1.2299234E-01	3.0548277E+00	1.5804963E-01	-8.6937808E-02
IR12.0	-1.6271973E-01	5.8021349E-01	1.0737593E-01	3.0304167E+00	1.3070913E-01	-7.7829838E-02
IR13.4	1.6018867E-02	7.8204405E-01	-3.5515848E-01	2.9154973E+00	2.3422545E-01	4.4704690E-03

2.2.4 Back-up solution, for all scene types, if no cloud information is available

Note: The overall accuracy will be lower.

Channel	k_1	k_2	k_3	k_4	k_5	k_6
WV6.2	-2.6692629E-02	1.6545475E-01	-2.6140068E-02	2.7532272E+00	5.0216144E-01	-1.0068150E-01
WV7.3	-6.3755512E-02	2.7330205E-01	-1.8703738E-02	2.8347318E+00	4.3951437E-01	-1.2151906E-01
IR8.7	-1.6066980E-01	4.5690235E-01	-7.6914961E-03	2.9848087E+00	1.6417155E-01	-8.6345777E-02
IR9.7	1.9808292E-02	3.0756557E-01	-1.7361581E-01	2.7091713E+00	4.2634442E-01	9.0595007E-02
IR10.8	-5.3899288E-01	1.4168376E+00	8.0792278E-02	3.1034102E+00	5.0487243E-02	-8.4426813E-02
IR12.0	-4.2780018E-01	1.1800587E+00	8.9962341E-02	3.0568163E+00	6.8616800E-02	-8.7441728E-02
IR13.4	-9.0309143E-02	1.0034609E+00	-2.2925265E-01	2.9100571E+00	2.5846469E-01	-4.7646273E-02

2.3 MSG-3 (Meteosat-10)

2.3.1 Cloud-free cases:

Channel	k_1	k_2	k_3	k_4	k_5	k_6
WV6.2	1.5661716E-03	6.1864734E-02	-1.7299399E-02	2.7359040E+00	6.1862886E-01	-7.5809769E-02
WV7.3	4.1673183E-03	-1.6670419E-02	2.5103575E-02	2.7900460E+00	6.0240823E-01	-1.0202879E-01
IR8.7	4.9079895E-02	2.3190770E-01	-2.3367669E-01	2.9900169E+00	7.8405209E-02	8.6678520E-02
IR9.7	1.4284611E-02	8.3211064E-02	-5.5118520E-02	2.6957164E+00	6.0220760E-01	5.9445552E-03
IR10.8	1.3883018E-01	8.4112597E-01	-7.7505946E-01	3.0548916E+00	-2.3782074E-02	9.6348770E-02
IR12.0	1.1500931E-01	1.3983550E+00	-1.1350878E+00	3.0417533E+00	-1.0226658E-01	1.6502723E-01
IR13.4	7.3440552E-02	1.0361800E+00	-1.0755321E+00	2.8812160E+00	2.0899594E-01	1.5914546E-01

2.3.2 Opaque cloudy cases:

Channel	k_1	k_2	k_3	k_4	k_5	k_6
WV6.2	-4.9205899E-02	2.2716066E-01	-3.3488132E-02	2.7675517E+00	5.0450522E-01	-1.3959384E-01
WV7.3	-1.0594237E-01	3.9054859E-01	-4.1691255E-02	2.8136566E+00	4.3929741E-01	-1.6646841E-01
IR8.7	-1.9616079E-01	6.1354858E-01	-2.0069977E-02	2.8839350E+00	3.6099827E-01	-1.9656429E-01
IR9.7	1.0541916E-02	3.7759981E-01	-1.7599507E-01	2.6851532E+00	4.3967500E-01	3.1451121E-02
IR10.8	-6.8671608E-01	1.8237184E+00	1.3180822E-01	2.9871130E+00	2.3732938E-01	-2.0283872E-01
IR12.0	-5.7388496E-01	1.5769945E+00	8.6518481E-02	3.0070097E+00	1.9324915E-01	-1.8291900E-01
IR13.4	-1.7469501E-01	1.3880638E+00	-2.4097013E-01	2.8885849E+00	2.5529453E-01	-9.1562644E-02

2.3.3 Semi-transparent cloudy cases:

Channel	k_1	k_2	k_3	k_4	k_5	k_6
WV6.2	-5.0168037E-03	9.1205679E-02	-1.2207708E-02	2.7628441E+00	5.5074996E-01	-9.5717520E-02
WV7.3	-9.1052055E-03	1.3774392E-01	-2.1582440E-02	2.8102634E+00	4.6679798E-01	-8.3899736E-02
IR8.7	-5.1327705E-02	2.0202442E-01	1.4729924E-02	2.9233823E+00	3.1574747E-01	-9.4098255E-02
IR9.7	3.7295103E-02	2.0052919E-01	-1.5133211E-01	2.6930854E+00	5.0431150E-01	7.5537458E-02
IR10.8	-1.9569778E-01	6.0267615E-01	1.7016192E-01	3.0262387E+00	1.7127511E-01	-9.4782121E-02
IR12.0	-1.5197849E-01	4.5676634E-01	1.6744971E-01	3.0398538E+00	1.5448441E-01	-9.1882043E-02
IR13.4	2.7266502E-02	7.5496191E-01	-3.4680924E-01	2.9050097E+00	2.4448378E-01	2.2390166E-03

2.3.4 Back-up solution, for all scene types, e.g. if no cloud information is available

Note: The overall accuracy will be lower.

Channel	k_1	k_2	k_3	k_4	k_5	k_6
WV6.2	-2.6858091E-02	1.5505458E-01	-1.7654158E-02	2.7652225E+00	5.3296870E-01	-1.1742925E-01
WV7.3	-6.4403772E-02	2.7168903E-01	-2.0510182E-02	2.8263338E+00	4.2709681E-01	-1.1784110E-01
IR8.7	-1.6303015E-01	4.4552281E-01	5.2650571E-03	2.9922032E+00	1.8304074E-01	-9.6783854E-02
IR9.7	2.0528078E-02	2.9597506E-01	-1.6685684E-01	2.6926832E+00	4.4875297E-01	7.5218968E-02
IR10.8	-5.4812527E-01	1.4425329E+00	9.0262242E-02	3.0742958E+00	5.3758059E-02	-8.6101130E-02
IR12.0	-4.2099380E-01	1.1751881E+00	7.8851007E-02	3.0693898E+00	6.0526766E-02	-8.4727973E-02
IR13.4	-7.7867508E-02	1.0370111E+00	-2.6218915E-01	2.8995874E+00	2.5447991E-01	-4.1240633E-02

2.4 MSG-4 (Meteosat-11)

2.4.1 Cloud-free cases:

Channel	k_1	k_2	k_3	k_4	k_5	k_6
WV6.2	1.79147720E-03	5.79251270E-02	-1.49419380E-02	2.73539660E+00	6.25201340E-01	-8.00898220E-02
WV7.3	4.02736660E-03	-8.03535150E-03	2.08647980E-02	2.79025550E+00	5.94679530E-01	-9.72585010E-02
IR8.7	4.79021070E-02	2.03348040E-01	-2.12870460E-01	2.99023250E+00	8.79130070E-02	8.00940470E-02
IR9.7	1.47330760E-02	7.97741120E-02	-5.36545960E-02	2.69685890E+00	6.04986610E-01	3.37259360E-03
IR10.8	1.34660720E-01	1.03381070E+00	-8.91298230E-01	3.05545740E+00	-4.73019590E-02	1.10335920E-01
IR12.0	1.19518280E-01	1.27080700E+00	-1.06216930E+00	3.04127880E+00	-8.06539210E-02	1.52082980E-01
IR13.4	7.01084140E-02	8.08679280E-01	-9.06270440E-01	2.87777330E+00	2.53571780E-01	1.33100750E-01

2.4.2 Opaque cloudy cases:

Channel	k_1	k_2	k_3	k_4	k_5	k_6
WV6.2	-4.91558310E-02	2.23566770E-01	-3.19436040E-02	2.76800230E+00	5.08195460E-01	-1.41843630E-01
WV7.3	-1.11589190E-01	4.14781510E-01	-4.64801230E-02	2.81439140E+00	4.32301010E-01	-1.62505970E-01
IR8.7	-1.92113400E-01	6.06129170E-01	-2.32424590E-02	2.88470170E+00	3.54179860E-01	-1.92713420E-01
IR9.7	9.39750670E-03	3.97859100E-01	-1.86052200E-01	2.68767710E+00	4.20253520E-01	4.13269400E-02
IR10.8	-7.05290790E-01	1.91695360E+00	9.65876580E-02	2.98910690E+00	2.22110090E-01	-1.94583830E-01
IR12.0	-5.82952500E-01	1.61444820E+00	7.72503240E-02	3.00820540E+00	1.85936510E-01	-1.79506230E-01
IR13.4	-1.53164860E-01	1.33669170E+00	-2.59052930E-01	2.88761430E+00	2.49498860E-01	-8.28470290E-02

2.4.3 Semi-transparent cloudy cases:

Channel	k_1	k_2	k_3	k_4	k_5	k_6
WV6.2	-5.45072560E-03	9.86343100E-02	-1.64848420E-02	2.76391050E+00	5.37351130E-01	-8.82161410E-02
WV7.3	-9.74130630E-03	1.52385030E-01	-2.69962420E-02	2.81029370E+00	4.59090980E-01	-7.94256850E-02
IR8.7	-5.05595210E-02	1.98739220E-01	1.38703710E-02	2.92349890E+00	3.15905900E-01	-9.42908450E-02
IR9.7	3.77104280E-02	2.15806200E-01	-1.60086320E-01	2.69437290E+00	4.91475550E-01	8.11994970E-02
IR10.8	-1.96451190E-01	5.85568070E-01	1.84306830E-01	3.02524830E+00	1.77032890E-01	-9.72479360E-02
IR12.0	-1.59976960E-01	5.33506040E-01	1.30290250E-01	3.04148320E+00	1.38583500E-01	-8.33871660E-02
IR13.4	3.02009580E-02	7.86557440E-01	-3.90420230E-01	2.90326400E+00	2.31211720E-01	1.64483970E-02

2.4.4 Back-up solution, for all scene types, e.g. if no cloud information is available

Note: The overall accuracy will be lower.

Channel	k_1	k_2	k_3	k_4	k_5	k_6
WV6.2	-2.71195170E-02	1.62663640E-01	-2.25048920E-02	2.76561930E+00	5.21098550E-01	-1.10245510E-01
WV7.3	-6.61575790E-02	2.90220950E-01	-2.60097920E-02	2.82457800E+00	4.22202680E-01	-1.12951110E-01
IR8.7	-1.60489560E-01	4.54422440E-01	-5.79058010E-03	2.99333380E+00	1.69116020E-01	-8.88088570E-02
IR9.7	2.01094150E-02	3.11437190E-01	-1.73852790E-01	2.69491670E+00	4.34854600E-01	7.98795000E-02
IR10.8	-5.58620450E-01	1.49457610E+00	7.19307210E-02	3.07506320E+00	4.53233230E-02	-8.10943170E-02
IR12.0	-4.23820500E-01	1.26179230E+00	3.33981140E-02	3.06940630E+00	4.26353550E-02	-7.37788160E-02
IR13.4	-6.37359620E-02	1.02450610E+00	-2.91520270E-01	2.89713450E+00	2.46089030E-01	-3.05122160E-02

3 SPECTRAL FLUXES TO TOTAL FLUX

3.1 MSG-1 (Meteosat-08)

Cloud free case, offset = 31.8409

	WV6.2	*WV7.3*	*IR8.7*	*IR9.7*	*IR10.8*	*IR12.0*	*IR13.4*
i = 1	11.2335	7.8464	-12.8171	12.1768	6.73734	0.163114	6.35718
i = 2	-0.816523	-0.146295	1.26606	-1.51876	-0.141693	0.0378158	-0.0982667

Opaque cloudy case, offset = 21.6660

	WV6.2	*WV7.3*	*IR8.7*	*IR9.7*	*IR10.8*	*IR12.0*	*IR13.4*
i = 1	9.44759	2.74218	-13.7365	5.00868	7.55326	-1.99408	10.9496
i = 2	-0.653607	0.447049	0.840150	-0.562588	-0.130063	0.141134	-0.228428

Semi-transparent cloudy case, offset = 23.7684

	WV6.2	*WV7.3*	*IR8.7*	*IR9.7*	*IR10.8*	*IR12.0*	*IR13.4*
i = 1	11.5170	0.713965	-12.1882	4.73908	5.65094	1.93670	8.62458
i = 2	-1.05316	0.735824	0.919208	-0.633022	-0.0601114	-0.0306493	-0.144245

Alternative: All scene types as a backup solution, offset = 25.3623

	WV6.2	*WV7.3*	*IR8.7*	*IR9.7*	*IR10.8*	*IR12.0*	*IR13.4*
i = 1	9.408640	5.286460	-1.416630	2.780020	-1.441430	4.862840	9.357210
i = 2	-0.6854680	0.2084770	0.3455760	-0.4638810	0.0536827	-0.0749621	-0.1528680

3.2 MSG-2 (Meteosat-09)

Cloud-free case, offset = 30.4543

	WV6.2	*WV7.3*	*IR8.7*	*IR9.7*	*IR10.8*	*IR12.0*	*IR13.4*
i = 1	11.1582	8.55590	-16.9587	12.4966	9.6639	-2.1877	6.7577
i = 2	-0.795935	-0.207620	1.539760	-1.588460	-0.191826	0.081744	-0.110578

Opaque cloudy case, offset = 21. 6365

	WV6.2	*WV7.3*	*IR8.7*	*IR9.7*	*IR10.8*	*IR12.0*	*IR13.4*
i = 1	9.7708	2.1759	-11.4062	5.2862	4.7905	0.2960	10.7475
i = 2	-0.715226	0.551060	0.591452	-0.628814	-0.040600	0.053847	-0.222196

Semi-transparent cloudy case, offset = 23. 8864

	WV6.2	*WV7.3*	*IR8.7*	*IR9.7*	*IR10.8*	*IR12.0*	*IR13.4*
i = 1	11.5490	0.7584	-12.8183	4.5494	6.2001	1.1417	8.7882
i = 2	-1.043040	0.742334	0.990371	-0.607105	-0.077247	-0.006729	-0.150710

Alternative: All scene types as a backup solution, offset = 24.8098

	WV6.2	*WV7.3*	*IR8.7*	*IR9.7*	*IR10.8*	*IR12.0*	*IR13.4*
i = 1	9.4268	5.4261	-1.7748	2.5250	-0.7170	3.9052	9.6832
i = 2	-0.668429	0.201641	0.367841	-0.417539	0.034519	-0.047389	-0.167041

3.3 MSG-3 (Meteosat-10)

Cloud-free case, offset = 33.3227

	WV6.2	*WV7.3*	*IR8.7*	*IR9.7*	*IR10.8*	*IR12.0*	*IR13.4*
i = 1	10.8970	8.17052	-11.9654	12.0522	5.91921	0.701534	6.00674
i = 2	-0.757386	-0.162135	1.18656	-1.50217	-0.118998	0.0267244	-0.089937

Opaque cloudy case, offset = 21.9930

	WV6.2	*WV7.3*	*IR8.7*	*IR9.7*	*IR10.8*	*IR12.0*	*IR13.4*
i = 1	9.12343	2.87314	-14.5230	5.44882	7.14365	-0.942842	10.2372
i = 2	-0.605955	0.481378	0.930008	-0.664627	-0.115090	0.105471	-0.210558

Semi-transparent cloudy case, offset = 23.8734

	WV6.2	*WV7.3*	*IR8.7*	*IR9.7*	*IR10.8*	*IR12.0*	*IR13.4*
i = 1	11.1682	0.820681	-13.0824	4.56016	6.26441	1.63529	8.30370
i = 2	-0.969939	0.774311	0.991158	-0.600709	-0.0794879	-0.0152060	-0.139834

Alternative: All scene types as a backup solution, offset = 25.1589

	WV6.2	*WV7.3*	*IR8.7*	*IR9.7*	*IR10.8*	*IR12.0*	*IR13.4*
i = 1	9.21918	5.43984	-0.793456	2.73993	-2.18792	6.02659	8.99399
i = 2	-0.643191	0.227201	0.304978	-0.443741	0.0613286	-0.0945484	-0.150221

3.4 MSG-4 (Meteosat-11)

Cloud-free case, offset = 30.6635

	WV6.2	*WV7.3*	*IR8.7*	*IR9.7*	*IR10.8*	*IR12.0*	*IR13.4*
i = 1	10.5845	8.41203	-14.9409	11.3692	8.00568	-0.818183	6.49789
i = 2	-0.721583	-0.202434	1.42921	-1.38904	-0.158471	0.0616140	-0.106633

Opaque cloudy case, offset = 21.0246

	WV6.2	*WV7.3*	*IR8.7*	*IR9.7*	*IR10.8*	*IR12.0*	*IR13.4*
i = 1	9.14749	2.90205	-12.9849	4.32566	5.89935	0.175463	10.5010
i = 2	-0.625725	0.441348	0.758049	-0.449432	-0.0762149	0.0723019	-0.227870

Semi-transparent cloudy case, offset = 23.5771

	WV6.2	*WV7.3*	*IR8.7*	*IR9.7*	*IR10.8*	*IR12.0*	*IR13.4*
i = 1	10.9470	1.24514	-10.1945	3.91309	3.56793	3.83424	8.49464
i = 2	-0.962890	0.683247	0.754545	-0.499715	-0.0122479	-0.0755686	-0.150956

Alternative: All scene types as a backup solution, offset = 26.2830

	WV6.2	*WV7.3*	*IR8.7*	*IR9.7*	*IR10.8*	*IR12.0*	*IR13.4*
i = 1	9.01832	5.66456	0.644167	2.04768	-3.12414	6.72377	9.27712
i = 2	-0.624943	0.172579	0.196274	-0.342330	0.0795944	-0.109855	-0.164198