

Typical Radiometric Accuracy and Noise for MSG-2

Channel	Requirement Bias and long-term Drift		Estimated Calibration Uncertainty
	End of Commissioning	First Year After Commissioning	Results
HRV	10%	5%	4%
VIS 0.6	10%	5%	4%
VIS 0.8	10%	5%	4%
NIR 1.6	10%	5%	5%

Table 1 Overview of Requirements and Results of Radiometric Accuracy for MSG-2 (Warm Channels)

Channel	Requirement Bias and long-term Drift		Results					
	First Year After Commissioning (Drift only, assume zero bias)	Over Imager Design Lifetime (Including Bias)	Manufacturer Blackbody Cal. Uncertainty Estimate	This Study Blackbody Cal. Uncertainty Estimate	Bias of Vicarious (Vicarious – Standard Blackbody)	Bias of Other Blackbody (Standard - Method 1&2)	Bias of other Satellites (MSG-1 –MSG-2)	Bias of other Satellites (MET7 –MSG-2)
IR 3.9	0.76K @ 335K	1.69K @ 335K	0.90 K	0.3 K*	2.0 K**	-1.3 K	-0.02 K	N/A
IR 6.2	0.63K @ 300K	1.36K @ 300K	0.73 K	0.4 K*	9.4K**	-1.6 K	0.04 K	5.56 K
IR 7.3	0.63K @ 300K	1.36K @ 300K	0.73 K	0.4 K*	-0.9K**	-1.4 K	0.28 K	N/A
IR 8.7	0.73K @ 300K	1.41K @ 300K	0.80 K	0.5 K*	1.7K**	-1.2 K	0.16 K	N/A
IR 9.7	0.79K @ 310K	1.52K @ 310K	0.8 K	0.6 K*	Not trusted	-1.2 K	0.28 K	N/A
IR 10.8	0.82K @ 335K	1.71K @ 335K	0.94 K	0.8 K*	0.8K**	-1.0 K	0.11 K	N/A
IR 12.0	0.81K @ 335K	1.71K @ 335K	0.93 K	0.9 K*	0.9K**	-0.7 K	0.23 K	-0.77 K
IR 13.4	0.71K @ 300K	1.40K @ 300K	0.74 K	0.8 K*	1.6K**	0.7 K	1.95 K	N/A

Table 2 Overview of Requirements and Results of Radiometric Accuracy for MSG-2 (Cold Channels)

*Assuming relative accuracy of 1% as derived from window channels.

**Note that the expected accuracy of the vicarious calibration on the absorber channels is not sufficient for requirement verification. Numbers provided for information only. The result for the IR 3.9 channel is affected by a high variability of the instantaneous calibration coefficients.

Typical Radiometric Accuracy and Noise for MSG-1/2

Channel	SNR	Specification
HRV	3.09	> 1.2 (0.28% of Dyn.. Range)
Vis 0.6	372.43	> 10.1 (1 % of Dyn. Range)
Vis 0.8	70.57	> 7.28 (1 % of Dyn. Range)
NIR 1.6	10.37	> 3.0 (1% of Dyn. Range)

Table 3 – Signal to Noise Ratio for MSG-2 (Warm channels)

Channel	Range of observed noise measurements (NEAT) 95K		SY-2 Specification
	Ambient Calibrations	Heated Calibrations	
IR 3.9	0.09K-0.09K	0.07K-0.07K	0.35 K @ 300K
IR 6.2	0.05K-0.05K	0.05K-0.06K	0.75 K @ 250 K
IR 7.3	0.05K-0.05K	0.05K-0.05K	0.75 K @ 250 K
IR 8.7	0.07K-0.08K	0.06K-0.06K	0.28 K @ 300 K
IR 9.7	0.10K-0.10K	0.10K-0.10K	1.50 K @ 255 K
IR 10.8	0.07K-0.07K	0.06K-0.06K	0.25 K @ 300 K
IR 12.0	0.10K-0.10K	0.09K-0.10K	0.37 K @ 300 K
IR 13.4	0.20K-0.21K	0.17K-0.18K	1.80 K @ 270 K

Table 4 – Level 1.0 Radiometric Noise at 95 K for MSG-2 (Cold Channels)

Typical Radiometric Accuracy and Noise for MSG-1

Channel	Requirement Bias and long-term Drift		Estimated Calibration Uncertainty Results
	End of Commissioning	First Year After Commissioning	
HRV	10%	5%	4.3%
VIS 0.6	10%	5%	4.5%
VIS 0.8	10%	5%	4.4%
NIR 1.6	10%	5%	5.0%

Table 5 Overview of Requirements and Results of Radiometric Accuracy for MSG-1 (Warm Channels)

Channel	Requirement Bias and long-term Drift		Results				
	First Year After Commissioning (Drift only, assume zero bias)	Over Imager Design Lifetime (Including Bias)	Manufacturer Blackbody Cal. Uncertainty Estimate	This Study Blackbody Cal. Uncertainty Estimate	Bias of Vicarious (Vicarious – Standard Blackbody)	Bias of Other Blackbody (Standard -Method 1&2) (After optimisation)	Bias of other Other Satellites (HIRS –MSG)
IR 3.9	0.76K @ 335K	1.69K @ 335K	0.90 K	0.5 K*	2.1 K**	-0.5 K	0.19 K
IR 6.2	0.63K @ 300K	1.36K @ 300K	0.73 K	0.7 K*	9.1 K**	-0.6 K	0.39 K
IR 7.3	0.63K @ 300K	1.36K @ 300K	0.73 K	0.8 K*	-3.0 K**	-0.3 K	0.33 K
IR 8.7	0.73K @ 300K	1.41K @ 300K	0.80 K	0.9 K*	2.9 K**	-0.5 K	not available on HIRS
IR 9.7	0.79K @ 310K	1.52K @ 310K	0.8 K	1.1 K*	not trusted	-0.2 K	1.47 K
IR 10.8	0.82K @ 335K	1.71K @ 335K	0.94 K	1.4 K	1.4 K	-0.2 K	-0.25 K
IR 12.0	0.81K @ 335K	1.71K @ 335K	0.93 K	1.3 K	1.3 K	0.1 K	-0.74 K
IR 13.4	0.71K @ 300K	1.40K @ 300K	0.74 K	1.4 K*	0.6 K**	0.2 K	0.85 K

Table 6 Overview of Requirements and Results of Radiometric Accuracy for MSG-1 (Cold Channels)

*Assuming relative accuracy of 1.7% as derived from window channels.

**Note, that the expected accuracy of the vicarious calibration on the absorber channels is not sufficient for requirement verification. Numbers provided for information only. The result for the IR 3.9 channel is affected by a high variability of the instantaneous calibration coefficients.

Typical Radiometric Accuracy and Noise for MSG-1/2

Channel	SNR	Specification
HRV	2.86	> 1.2 (0.28% of Dyn.. Range)
VIS 0.6	361.55	> 10.1 (1 % of Dyn. Range)
VIS 0.8	73.97	> 7.28 (1 % of Dyn. Range)
NIR 1.6	11.71	> 3.0 (1% of Dyn. Range)

Table 7 – Signal to Noise Ratio for MSG-1 (Warm channels)

Channel	Range of observed noise measurements (NEAT) 95K		SY-2 Specification
	Ambient Calibrations	Heated Calibrations	
IR 3.9	0.13K-0.13K	0.08K-0.08K	0.35 K @ 300K
IR 6.2	0.04K-0.05K	0.04K-0.04K	0.75 K @ 250 K
IR 7.3	0.06K-0.07K	0.05K-0.05K	0.75 K @ 250 K
IR 8.7	0.07K-0.07K	0.06K-0.06K	0.28 K @ 300 K
IR 9.7	0.11K-0.12K	0.09K-0.10K	1.50 K @ 255 K
IR 10.8	0.06K-0.07K	0.06K-0.06K	0.25 K @ 300 K
IR 12.0	0.12K-0.12K	0.10K-0.10K	0.37 K @ 300 K
IR 13.4	0.18K-0.19K	0.17K-0.17K	1.80 K @ 270 K

Table 8 – Level 1.0 Radiometric Noise at 95 K for MSG-1 (Cold Channels)