

Out-of-Band Relative Spectral Response

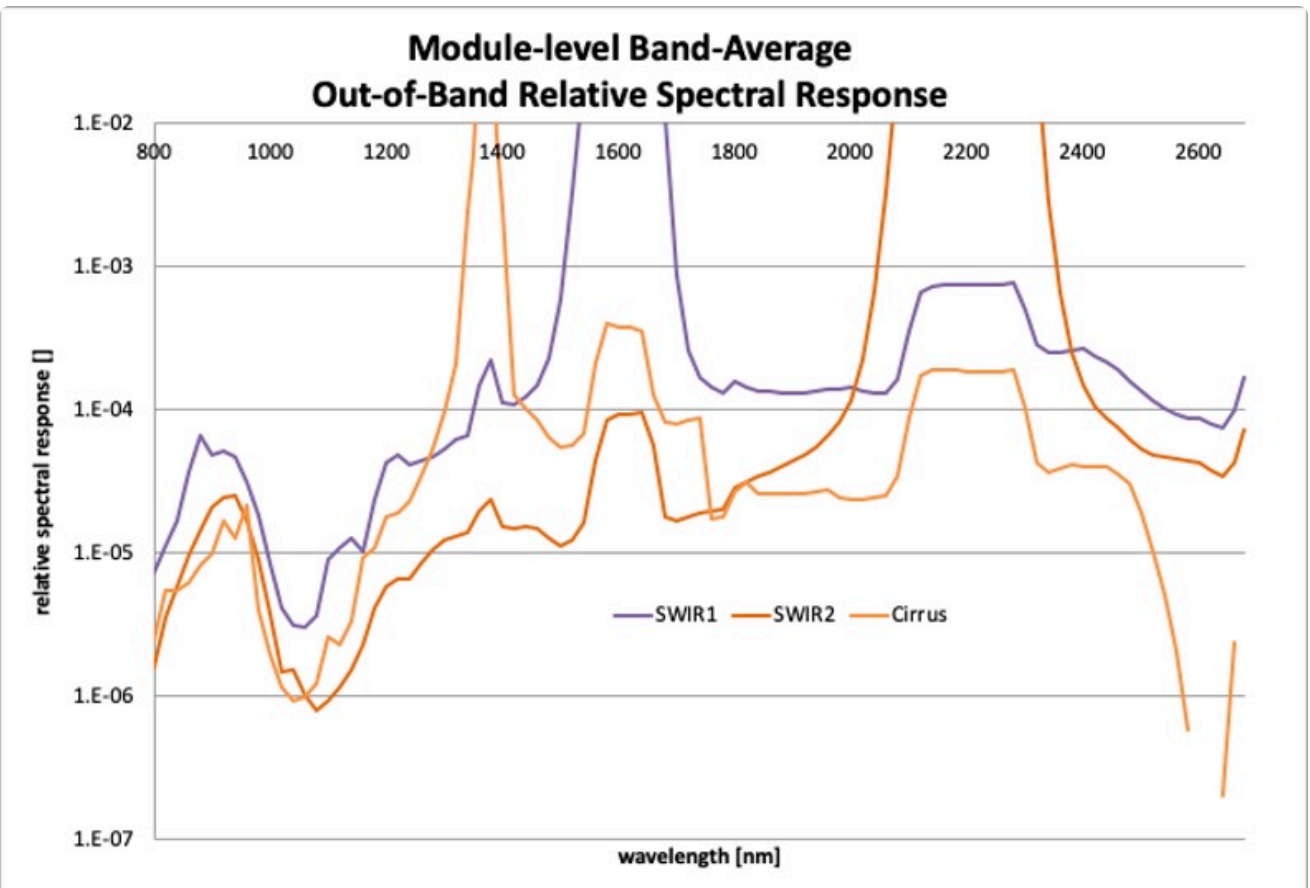
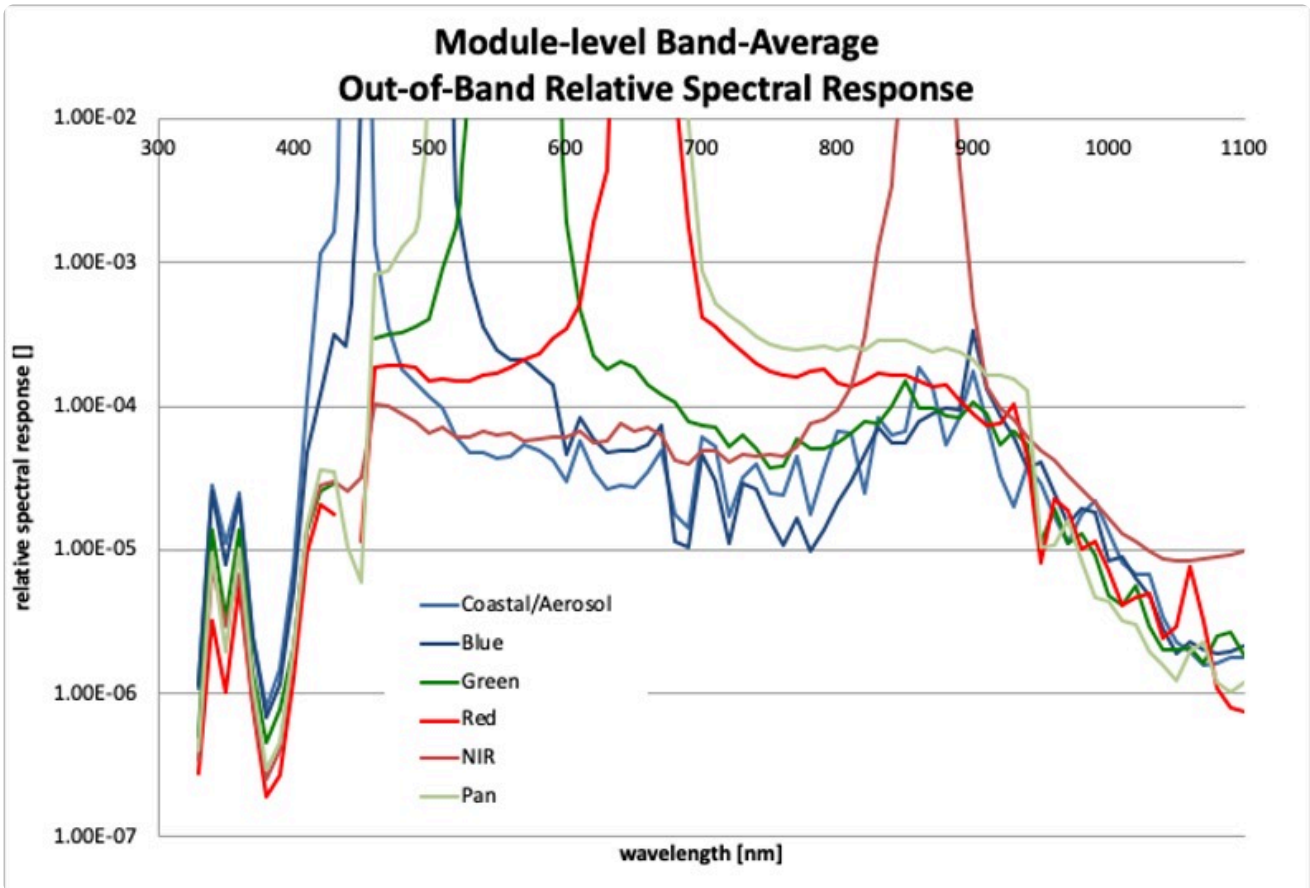


Figure 1. The OLI-2 band-average out-of-band relative spectral responses for the VNIR bands (top) and the SWIR bands (bottom).

The band-average out-of-band relative spectral radiance responses of the Operational Land Imager-2 (OLI-2) are here (Figure 1).

The focal plane modules used on OLI-2 were manufactured as spares for Landsat-8 OLI instrument. Focal plane level out-of-band spectral characterization of all the modules was performed at the same time. The test is described in Section 2.2 of Barsi, 2014 and is summarized here.

The out-of-band spectral responses were measured at the focal plane module level, when the detectors and the filters were mated but before the modules were assembled into a signal focal plane array. Individually, the modules were put in an evacuated Dewar, cooled to operational temperature and illuminated with monochromatic light. The visible and near-infrared bands were measured from 330 to 1100nm at 10nm increments and the shortwave infrared bands were measured from 800 to 2700nm at 20nm increments. The in-band regions of each band were measured at 2 or 4nm increments to allow for a normalization of the out-of-band response to the in-band spectral characterization that would eventually take place at the system level. The transmissions of the Dewar window and the variation in the monochromator output with wavelength was corrected for using calibrated reference detectors. The transmissions of the other components in the OLI-2 optical path were added to the measured transmission analytically.

There are features in the data that result from the test conditions and are not reflective of true instrument response. These features are detailed in Barsi, 2014. As such, the module-level measurements should be considered an upper bound for the true out-of-band response.

The provided spreadsheet does not contain in-band responses because the in-band spectral response was measured in finer detail in tests specifically designed to measure the in-band spectral ranges. The in-band responses can be found here.

References:

<https://landsat.gsfc.nasa.gov/satellites/landsat-9/landsat-9-instruments/oli-2-design/>

<https://landsat.gsfc.nasa.gov/satellites/landsat-9/landsat-9-instruments/oli-2-design//oli-2-relative-spectral-response>

Barsi, J.A., Lee, K., Markham, B.L., Kvaran, G., Pedelty, J.A. (2014). "The Spectral Response of the Landsat-8 Operational Land Imager.", Remote Sensing, pp. 10232-10251 DOI: 10.3390/rs61010232