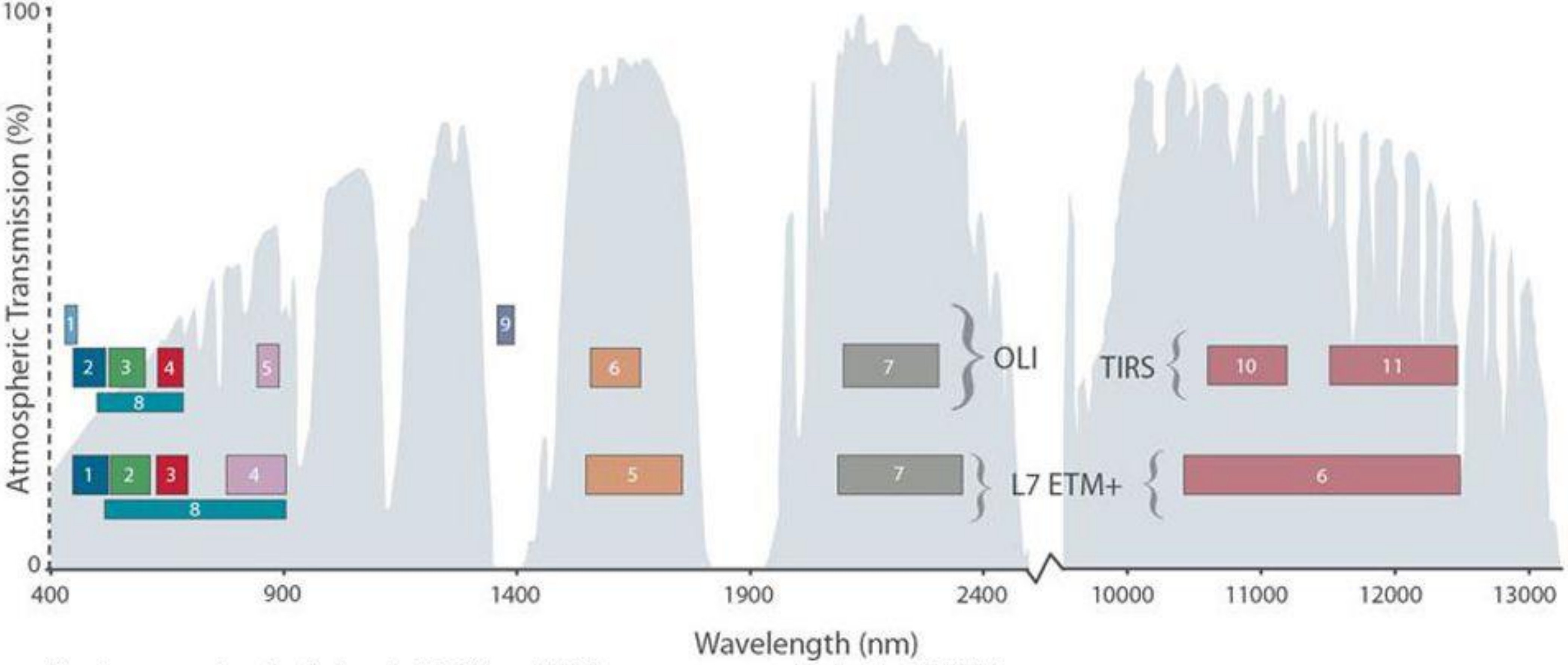

Bandpass wavelengths for Landsat 8 OLI and TIRS sensor, compared to Landsat 7 ETM+ sensor

Note: atmospheric transmission values for this graphic were calculated using MODTRAN for a summertime mid-latitude hazy atmosphere (circa 5 km visibility).

Landsat-7 ETM+ Bands (µm)			Landsat-8 OLI and *TIRS* Bands (µm)		
			30 m Coastal/Aerosol	0.435 - 0.451	Band 1
Band 1	30 m Blue	0.441 - 0.514	30 m Blue	0.452 - 0.512	Band 2
Band 2	30 m Green	0.519 - 0.601	30 m Green	0.533 - 0.590	Band 3
Band 3	30 m Red	0.631 - 0.692	30 m Red	0.636 - 0.673	Band 4
Band 4	30 m NIR	0.772 - 0.898	30 m NIR	0.851 - 0.879	Band 5
Band 5	30 m SWIR-1	1.547 - 1.749	30 m SWIR-1	1.566 - 1.651	Band 6
Band 6	60 m TIR	10.31 - 12.36	*100 m TIR-1*	*10.60 – 11.19*	Band 10
			100 m TIR-2	*11.50 – 12.51*	Band 11
Band 7	30 m SWIR-2	2.064 - 2.345	30 m SWIR-2	2.107 - 2.294	Band 7
Band 8	15 m Pan	0.515 - 0.896	15 m Pan	0.503 - 0.676	Band 8
			30 m Cirrus	1.363 - 1.384	Band 9

Table 2-1. OLI and TIRS Spectral Bands Compared to ETM+ Spectral Bands

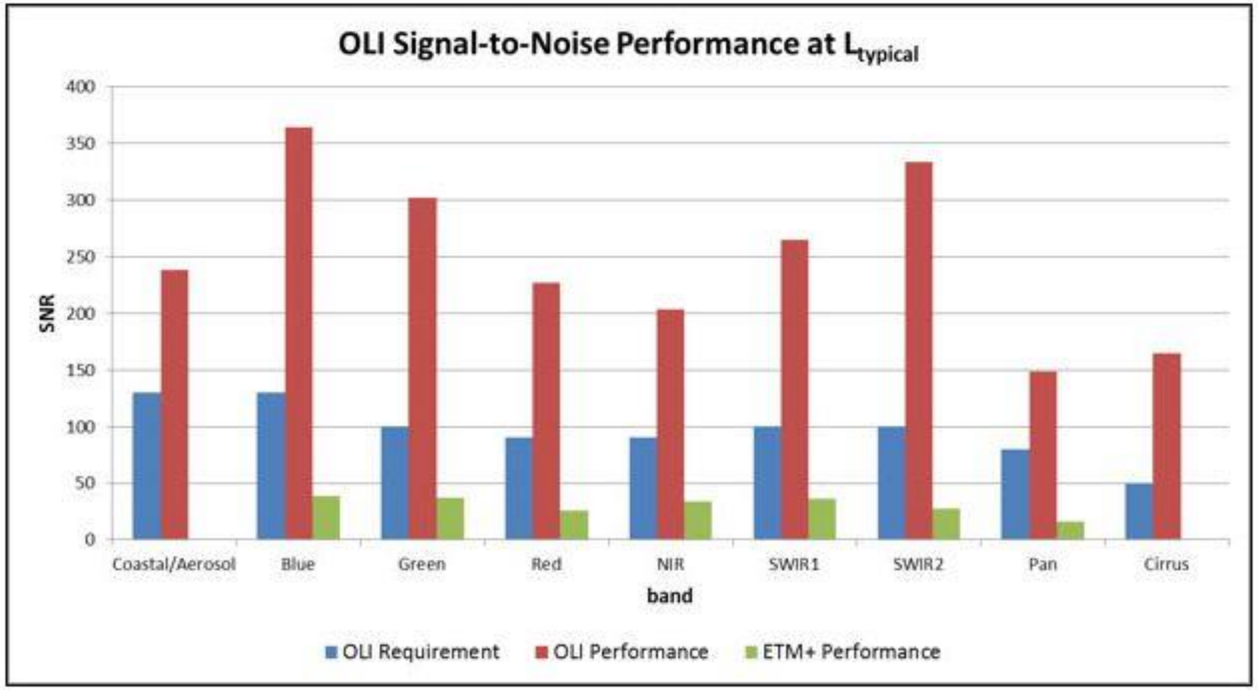

Figure 2-3. OLI Signal-To-Noise (SNR) Performance at Ltypical

5.2 OLI Top of Atmosphere Reflectance

Similar to the conversion to radiance, the 16-bit integer values in the level 1 product can also be converted to Top of Atmosphere (TOA) reflectance. The following equation is used to convert level 1 DN values to TOA reflectance:

$$\rho\lambda' = M_\rho * Q_{cal} + A_\rho$$

where:

ρ_λ' = Top-of-Atmosphere Planetary Spectral Reflectance, without correction for solar angle. (Unitless)
M_ρ = Reflectance multiplicative scaling factor for the band (REFLECTANCEW_MULT_BAND_n from the metadata).
A_ρ = Reflectance additive scaling factor for the band (REFLECTANCE_ADD_BAND_N from the metadata).
Q_{cal} = Level 1 pixel value in DN

Note that $\rho\lambda'$ is not true TOA Reflectance, because it does not contain a correction for the solar elevation angle. This correction factor is left out of the level 1 scaling at the users' request; some users are content with the scene-center solar elevation angle in the metadata, while others prefer to calculate their own per-pixel solar elevation angle across the entire scene. Once a solar elevation angle is chosen, the conversion to true TOA Reflectance is:

$$\rho_\lambda = \frac{\rho_\lambda'}{\sin(\theta)}$$

$$\rho_\lambda = \frac{\rho_\lambda'}{\sin(\theta)}$$

where:

ρ_λ = Top-of-Atmosphere Planetary Reflectance. (Unitless)
θ = Solar Elevation Angle (from the metadata, or calculated).