The detailed examination of the external quantum efficiencies (EQEs) for the perovskite top solar cell and the silicon bottom solar cell used for Figure 9 will be published by L. Brockmann (ISFH) in the near future. The evaluation of the spectral intensity for different air masses was conducted with SMARTS 2.9.2 (https://www.nrel.gov/grid/solar-resource/smarts.html) with the following input parameters:

Card 2	1 (Enter site pressure, altitude, and height (recommended))
Card 2a	1013.25 0 0 (Site pressure (mB), Altitude (km), Height above ground (km))
Card 3	1 (Reference atmosphere)
Card 3a	'USSA' (U.S. Standard Atmosphere 1976)
Card 4	1 (Water vapor: calculate from reference atmosphere and altitude)
Card 4a	
Card 5	1 (Columnar Ozone Abundance: use default from reference atmosphere)
Card 5a	
Card 6	1 (Gaseous Absorption: default from selected atmosphere)
Card 6a	
Card 6b	
Card 7	370 (Carbon Dioxide Concentration (ppmv))
Card 7a	0 (Extraterrestrial Spectrum: Gueymard 2004)
Card 8	'S&F_RURAL' (Aerosol model: Rural)
Card 8a	
Card 9	0 (Aerosol Optical Depth at 500 nm)
Card 9a	0.084 (Atmospheric Turbidity)
Card 10	41 (Albedo: Red construction brick)
Card 10a	
Card 10b	1
Card 10c	51 37 180. (Fixed Tilt, 37 °, 180 ° Azimuth)
Card 10d	
Card 11	280 4000 1.0 1366.1 (Spectral range 280 – 4000 nm, Solar constant distance correction 1.0, solar constant (1366.1 W/m²))
	2
Card 12	280 4000 0.5 (Spectral range 280 - 4000 nm in 0.5 nm steps)
Card 12a	3
Card 12b	8 12 43 (Global tilted irradiance, global tilted photon flux, global tilted photon
Card 12c	flux per eV)
	1 (Calculate Circumsolar Irradiance for specified Radiometer below)
Card 13	0 2.9 0 (Slope, Aperature/Opening, Limit)
Card 13a	0 (Smoothing Filter: Bypass)
Card 14	
Card 14a	0 (Illuminance: Bypass)
Card 15	0 (UV: Bypass)
Card 16	2 (Input relative Air Mass)
Card 17	1.0
Card 17a	1.1
Card 17a	1.2
Card 17a	1.3
Card 17a	1.4
Card 17a	1.5
Card 17a	1.6
Card 17a	1.7
Card 17a	1.8
Card 17a	1.9
Card 17a	2
Card 17a	3
Card 17a	4
Card 17a	5
Card 17a	7

Card 17a Card 17a	10

The evaluation of the short current density ratios is the integration of the EQEs with the spectral intensities conducted with python.