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Interactive comment on “Broadband cavity enhanced spectroscopy in the ultraviolet spectral region for measurements of nitrogen dioxide and formaldehyde” by R. A. Washenfelder et al.

Anonymous Referee #3

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This paper reports the application of a new and particularly intensive light source to BBCEAS which extends towards the short wavelength UV region. As the author argues, this region is of great importance in terms of measuring a few atmospheric trace gases that has strong absorption feature only in the UV. The sensitivity achieved is sufficient and the potential promising, for making it a field instrument which can measure HCHO at its ambient level. I therefore recommend publication of this paper on AMT, subject to a few minor corrections/suggestions as below.

Page 9929, line 8, I see no point of reiterating the value of $(1-R)$ as R is mentioned one word away. Actually this confuses me somewhat because I was trying to under-

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stand “loss” as mirror absorption + scattering rather than absorption + scattering + transmission. Similarly in page 9933, line 23.

Page 9932, line 3, as far as I know, bandpass filters are not always needed in BBCEAS (depending on the emission profile of the light source). I would suggest the author to add something like that in the parenthesis to reflect this.

Page 9933, line 27, can the authors please state how much of intensity gain they managed to achieve with two lens rather than 1.

Page 9939, line 2, the authors rule out the role of “dirty” mirror surfaces (by particles for example) in lowering mirror R. How?

Page 9942, line 1 onwards, I agree that D_{lmin} at 330 nm may be $\sim 1E-4$, but the light intensity actually changes at all wavelength, which makes its effect in determining the detection limit of trace gases different from that of broadly extictive species such as aerosol particles (because we use “differential” absorption structures rather than a polynomial fit). If this is factored in, the discussion of “detection limit” based on ΔI_{lmin} at a single wavelength is somewhat irrelevant, and the estimated value may be conservative in fact unless the shape of the emission profile of the light source also distorts significantly with temperature.

Interactive comment on *Atmos. Meas. Tech. Discuss.*, 8, 9927, 2015.

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