Review Report

The authors have measured the effective particle density by calculating the aerosol volume and mass using SMPS and QCM, respectively. Tests were performed using lab-generated ammonium sulphate, ammonium nitrate and sodium chloride particles. The uncertainties of these measurements were also estimated. The authors then applied this method to measure the ambient aerosols in New Delhi. The method of particle density measurement using SMPS and QCM is interesting, and served as an alternative method of gravimetric, TEOM or other approaches. The paper discusses the key operational principles of the instruments, the utility of effective density measurements, and cites many relevant papers on both measurement science as well as ambient air quality monitoring. The data and method presented are scientifically well planned and focused. The work presented by authors is relevant to the the journal and scientific community. However, there are few scientific and technical corrections which are needed to be addressed to further improve the clarity of overall presentation. I have listed some specific comments before recommending for publication in AMT.

page no. 12909, the percentage range of error in density measurement of inorganic salts using SMPS-QCM setup should be mentioned in the abstract.

page no. 12909, line no. 20, a '/' is missing. The correct form is "particle concentration accuracy is ±10 % for 400 000 #/cm−3"

Page no. 12892, line no. 16, author should mention the cutoff size range with the details of impactor used.

page no. 12894, line no. 4, the flow of the CPC 3788 should be either 0.6 lpm or 1.5 lpm, unless a custom configuration was used. Authors stated the flow was only 0.24 lpm, please clarify in the manuscript.

page no. 12906, line no. 2, the version of TSI-AIM software mentioned is needed to be mentioned in correct format.

Page no. 12911, line no. 10, the section 3.2.3 is already a part of section 3.2.2, and is apparent in Table 3. Therefore section number can be omitted.

Page no. 12924, Table 3, authors should further check the relative standard uncertainty in AN column, and u4(m) row as it appears to be incorrect.