Reply to the comments by Reviewer2

Thank for your kind comments

1. Some of my conceptual concerns are, however, only partly addressed. The added k/Ze analysis is useful, but the manuscript should more consistently acknowledge that the DSD information provided by k is limited and that the method reduces, rather than generally removes, DSO-related effects. Similarly, the treatment of k still does not include the complete operational chain from PLA to range-resolved k profile. In my understanding, the retrieval is strongly dependent on the estimate of k, while Zm must also be corrected for attenuation using information derived from the same attenuation retrieval to provide Ze estimate. The Doppler velocity provides only an initial estimate of 0m and a constraint on the iterative solution. I do not request an additional experiment at this stage, but these limitations should be stated consistently when interpreting the results, and the manuscript should present a clear methodology for estimating k et W-band.

Re: We removed the word 'remove' and revised as 'reduced' and explain the DSD information from k/Ze more in detail in new section 7. We have also modified the Abstract and Summary.

Accurate estimation of the attenuation is needed for the retrieval of Dm which may be possible for the GPM (10-20%). For W-band, it is currently unknown whether accurate attenuation-corrected measurements can be obtained or not, in my understanding. As the reviewer pointed out, its practical viability remains uncertain. A technique to estimate k is important but is beyond the scope of the present manuscript. I hope that the present paper will encourage the study on this issue.

Although the effects of DSD variations on the estimated Dm are not so significant for W-band, the effects cannot be ignored and should be reduced for more accurate estimation., In the revised version, we have added a new section (7) to examine whether k/Ze is useful to reduce the effect of DSD to make clear the DSD information provided from k/Ze. We adopted the (k/Ze) as a DSD indicator and determine the effects of the DSD variations. Results show that k/Ze cannot improve the estimated Dm significantly but can improve to some degree. The cumulative percentage of occurrence of the absolute error less than 0.5 m/s is improved by 5%.

2. The Z-k power-law relationship used in Section 6 was derived from disdrometer data that appear to contain relatively few cases with low Dm. It therefore seems to be applied mainly in the region where k/Ze changes monotonically with Dm in the second panel of Fig. 7. If the retrieval is restricted to this domain, it is not clear to me whether the multiple-solution region remains relevant, and the W-band methodology may become essentially similar to that used at Ku-band. The authors should clarify this point and explain precisely under which conditions multiple solutions occur.

Re:

When Z (Rayleigh reflectivity factor) is converted from the observed Ze, Z-Ze relationship at specified Doppler speed Vp (modified values as $V_p \pm \Delta V_p$) is applied. The value of the converted Z varies with the Vp. Degree to which the Vp modified depends on the air motion: in the presence of large air motion, the Vp should be modified significantly which results in the double solution.

The percentage of the occurrence of the double solution is less than 10 % for modified Vp ranging from -1 to1 m/s from the measured V.

