Point by Point Response to RC1

The reviews of our manuscript are thorough and well-considered. We would like to thank the reviewer for his/her careful reading and valuable comments to help us to improve this article. All the suggestions and comments from Referee 1 are addressed below point by point in bold text, followed by our responses in non-bold text. The corresponding revisions to the manuscript are marked in red. All updates to the original submission are tracked in the revised manuscript.

This article discusses a new method for correcting spectral nonlinearity of GIIRS on Fengyun-4 satellite and its preliminary evaluation，to overcome the inaccurate linear coefficient which is inevitably affected by NL response of sensor and impacted on the NL correction, an iteration algorithm is established to make both the linear and the NL coefficients to be converged to their stable values with the relative errors less than 0.5% and 1% respectively, which is universally suitable for NL correction of both infrared and microwave sensors.
The following issues need to be considered:

<u>Comment 01:</u> The proposal of innovative points needs to be further summarized.
<u>Response 01:</u> In this study, the NL correction is directly applied to the interfered broadband radiance observed by a spaceborne FTS (i.e. GIIRS). During prelaunch laboratory calibration, NL coefficients can be calculated by fitting the theoretical received radiance and the maximal DN at absolute ZPD at different temperatures by least square method. Finally, the NL parameter μ describing the relationship between the above linear and NL coefficients are determined, which is utilized to implement NL correction of such a FTS (i.e. GIIRS) together with the inaccurate enough linear coefficient by using the two-point calibration method. In addition, the NL parameter μ is almost independent of different working conditions and can be in-orbit applied directly. Moreover, to overcome the inaccurate linear coefficient which is inevitably affected by NL response of sensor and impacted on the NL correction, an iteration algorithm is established to make both the linear and the NL coefficients to be converged to their stable values respectively, which is universally suitable for NL correction of both infrared and microwave sensors.
The above contents have been supplemented in the original manuscript. Please refer to lines 522-534 in section 5 of the revised manuscript.

<u>Comment 02:</u> The conclusion needs to provide prospects for further work.
<u>Response 02:</u> In the further work, the adopted internal BB with the higher emissivity will produce the better NL correction performance in practice. The proposed NL correction method is scheduled for implementation to GIIRS onboard FY-4A satellite and its successor after modifying their possible SRF variations. Moreover, the real measurements from GIIRS after NL correction can be inter-calibrated with those of a reference sensor, i.e. IASI and CrIS to validate its calibration accuracy after NL correction.
The above contents have been supplemented in the original manuscript. Please refer to lines 541-544 in section 5 of the revised manuscript.