# Recalibration of Lowband Receiver 01 25C

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# Introduction

- Here we show the calibration results for the Low Band 1 receiver at 25◦C.
- The specific calibrations considered correspond to Low-Band 1 receiver done in 2019_04.

- The Calibration coeffecients over the 50-190MHz were calculated for different cases

- As a precaution, in order to avoid periods of instability of the calibrators, we remove ~ 5% of the data at the beginning of each period covered by the listed spectra files.

Files used:
/data5/edges/data/Receiver01_2019_04_10_040_to_200/25C

Corrected s11:
/data5/edges/data/Receiver01_2019_04_10_040_to_200/25C/S11/corrected

Note: The s11's used in this report were the first measurement in each set.

***Standards used:***

Male standard - EDGES Maury - 50.177 ohm (25 degC)

Female Standard - EDGES Keysight - 50.009 ohm (25 degC)

# Temperature of calibration loads @ 25C

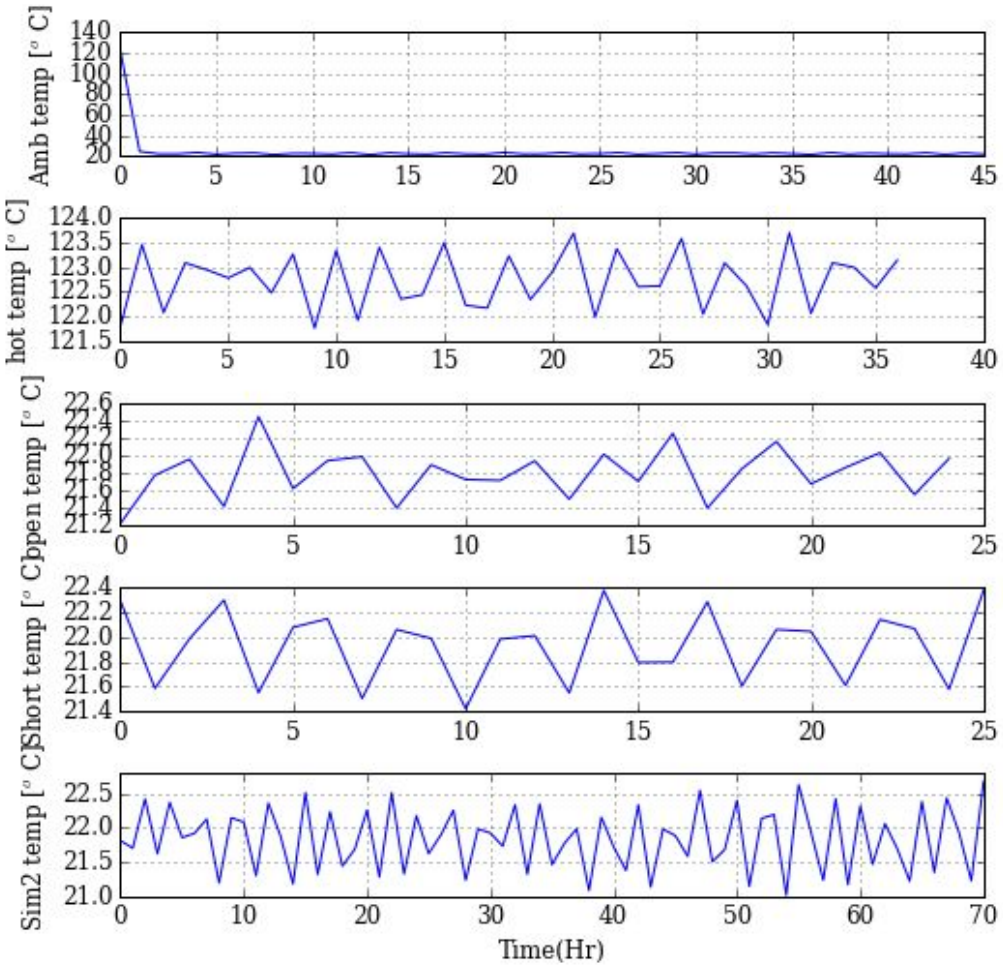



**Figure2:** Temperature of the calibration loads and antenna simulator 2

# Spectra data @ 25C for the loads

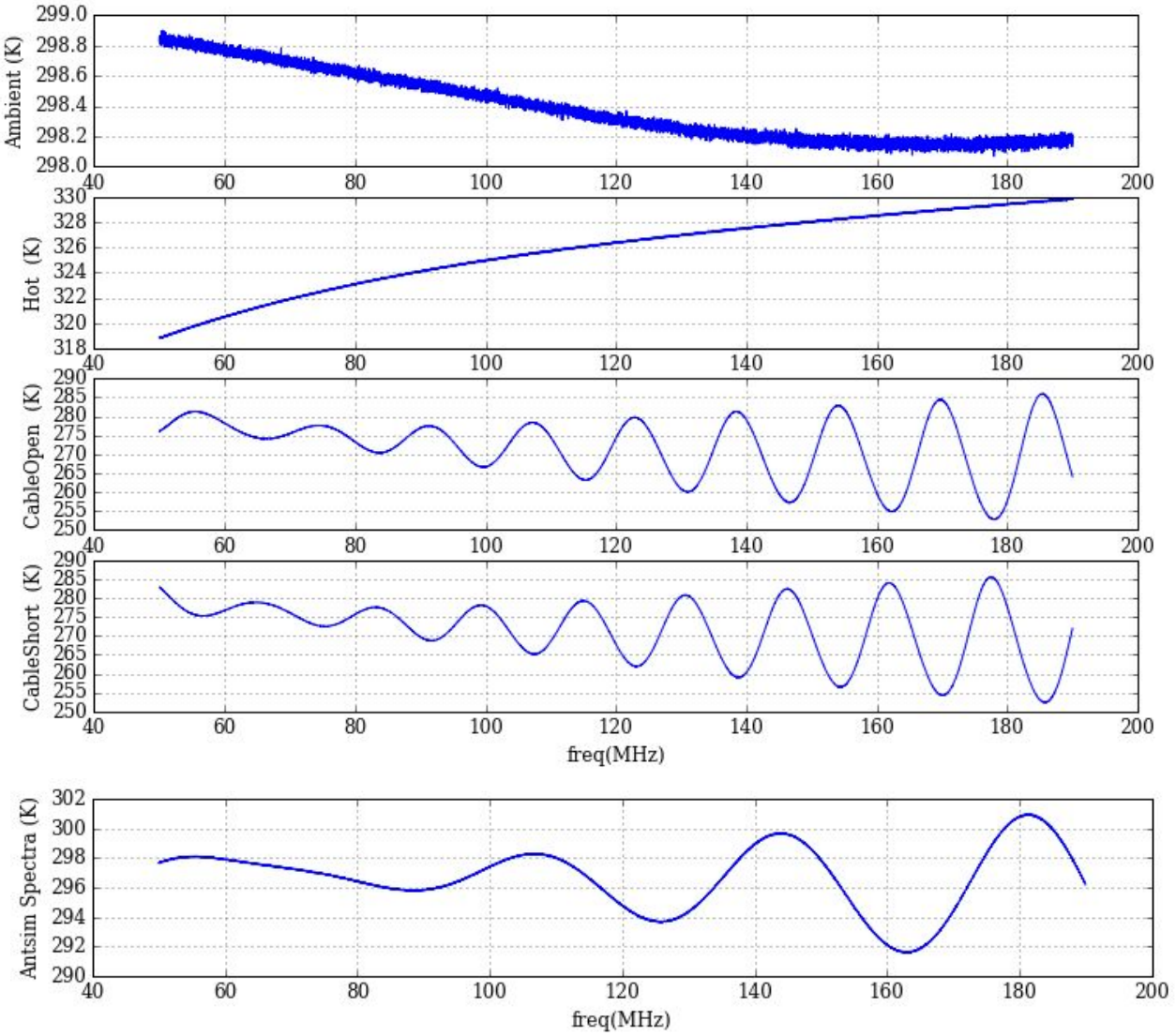
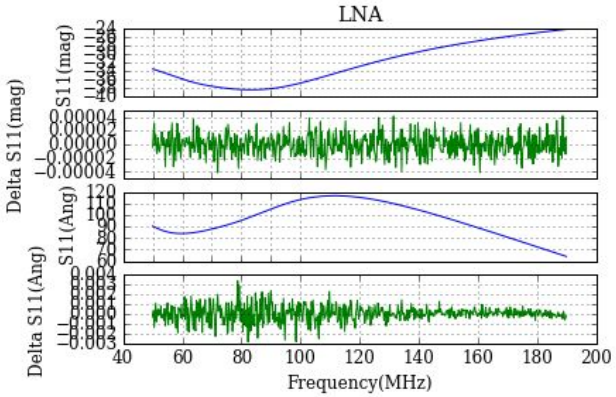


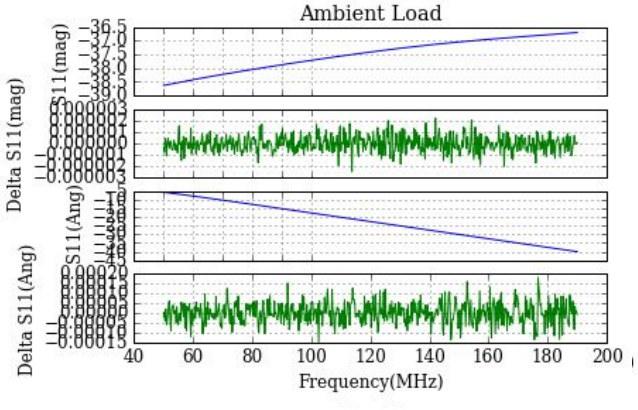

**Figure1:** Raw spectra of the calibration loads. Spectra looks clean without any RFI

# Reflection coefficients of the loads @25C; Freq: 50-190MHz

47 polynomial terms




37 fourier terms




37 fourier terms

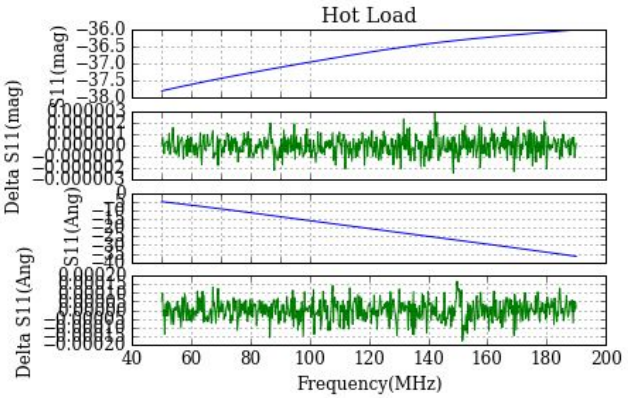
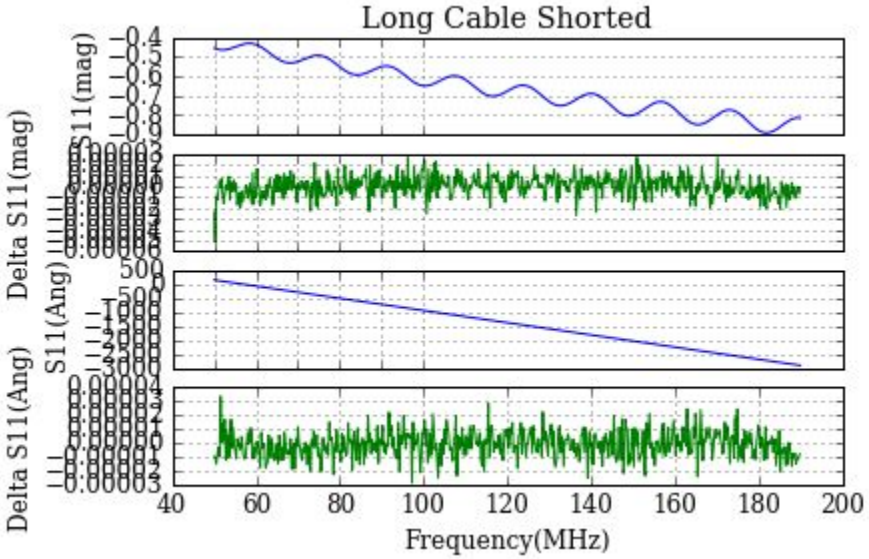



**Figure2a:** Reflection coefficients of the LNA and the calibration loads. Blue is the fit to the S11s (mag & phase). Green is the difference between the fits and the actual measurements for each respective case.

# Reflection coefficients of the loads @25C

105 fourier terms




105 fourier terms

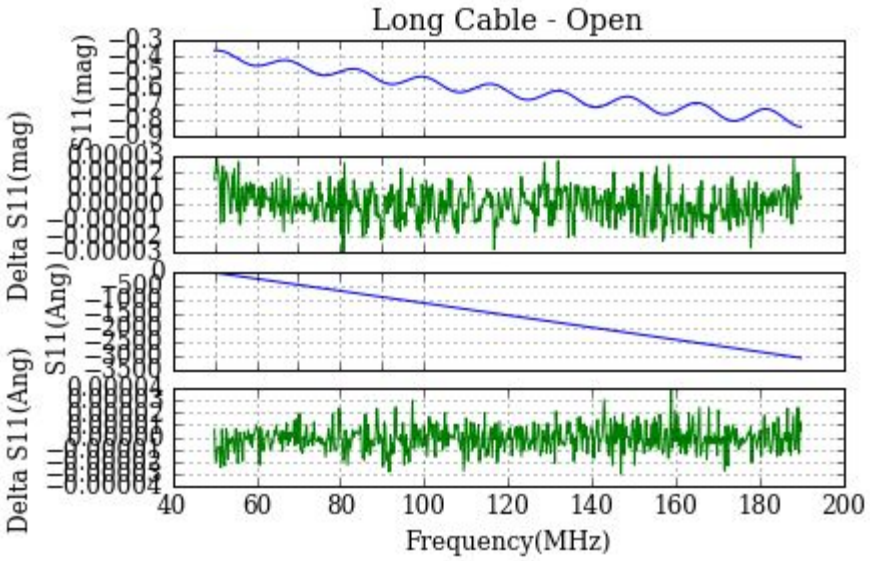
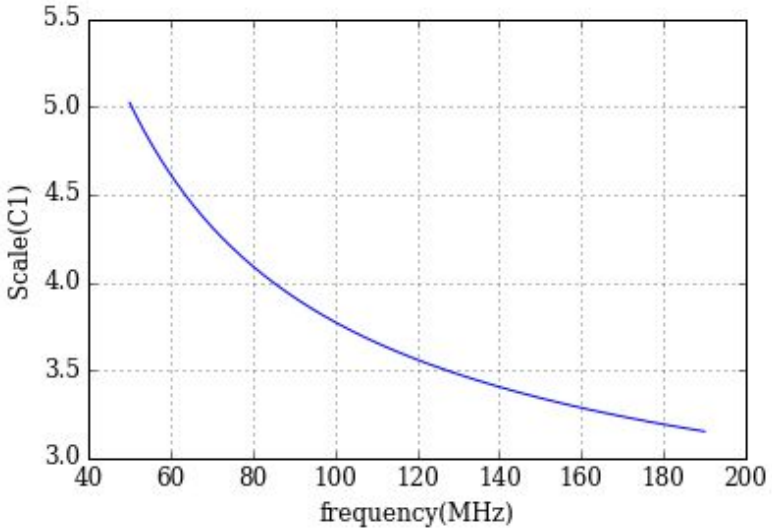
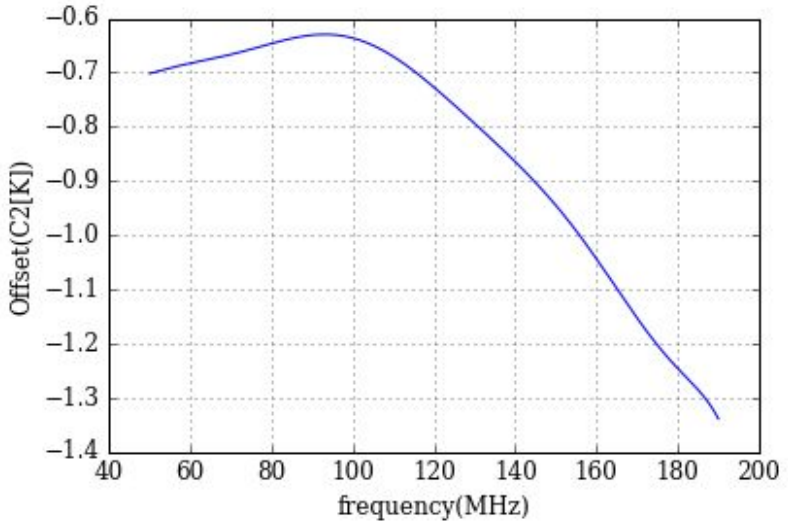
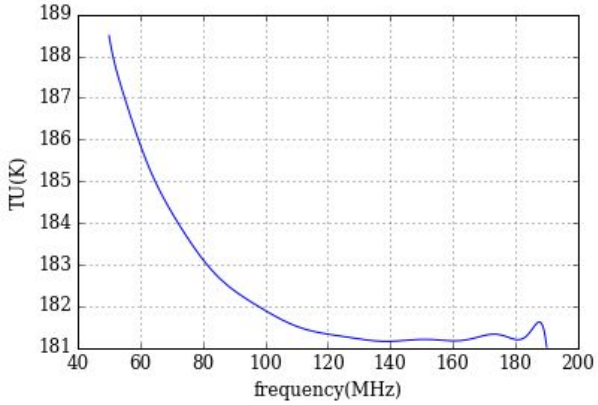


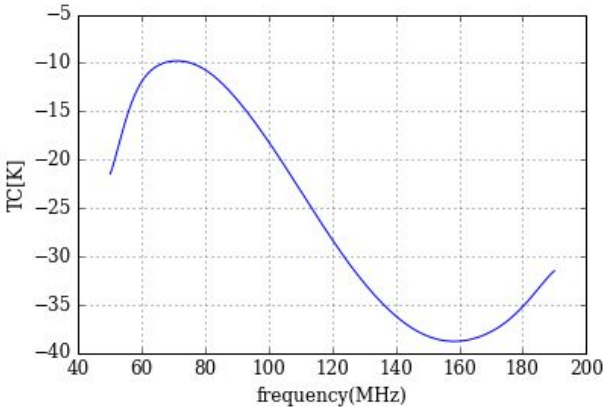

**Figure2b:** Reflection coefficients of the long cables. Blue is the fit to the S11s (mag & phase). Green is the difference between the fits and the actual measurements for each respective case.

# Cal coefficients derived from 25C; Freq: 50-190MHz



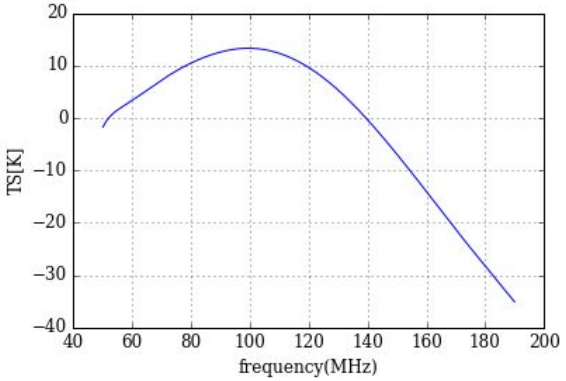
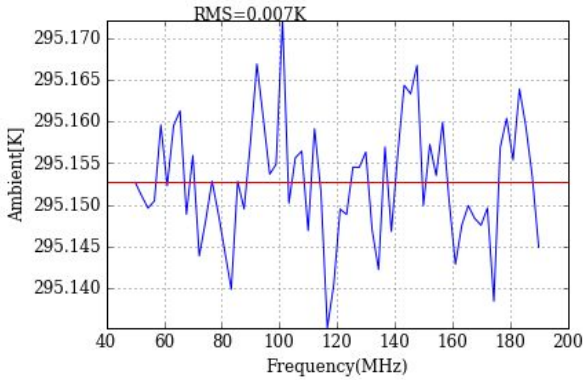
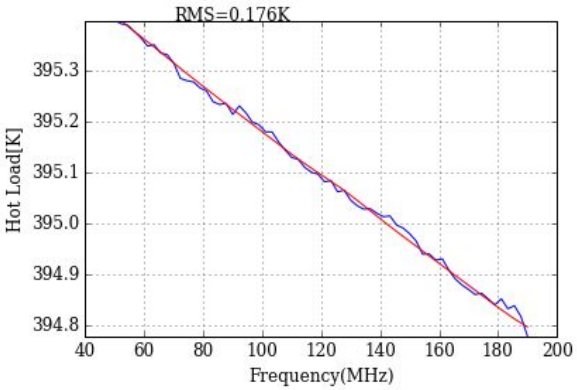
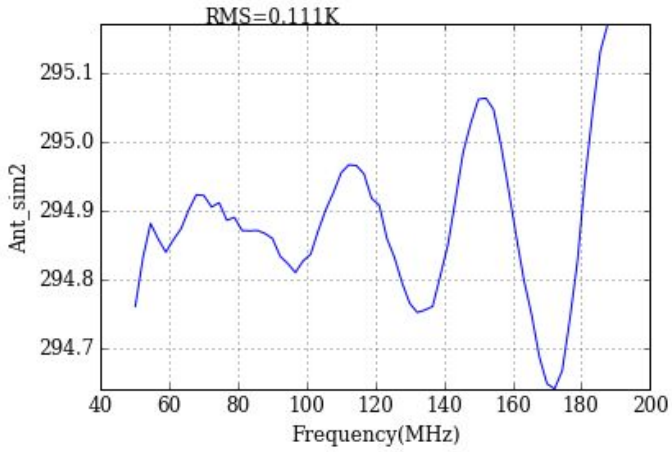



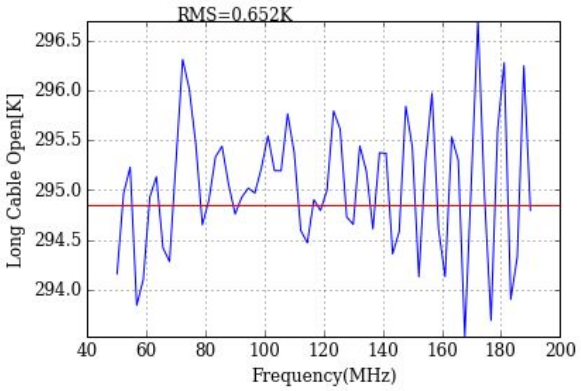

**Figure4:** Calibration parameters for the Low-Band 1 receiver. Over 50-190 MHz, we use 10 terms to model C1 & C2 and 16 terms to model Tu,Tc,Ts.

# Calibration Cross check for 25 C; Freq: 50-190 MHz
# Case1 - 8 terms for constants and 8 terms for noise wave parameters



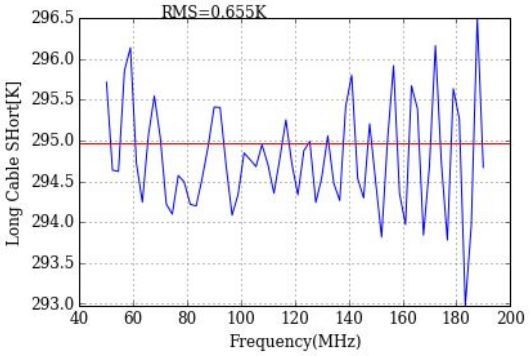
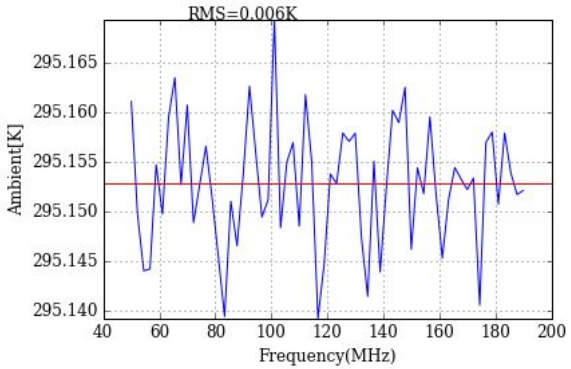
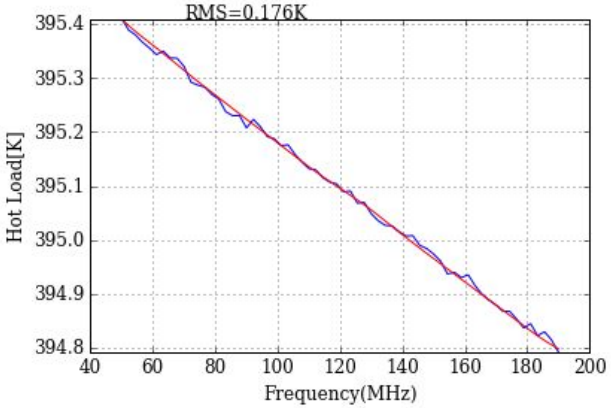
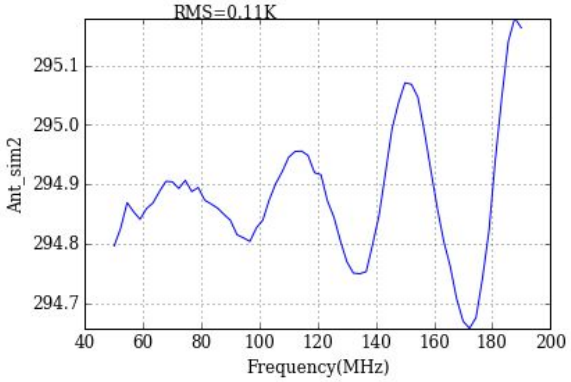



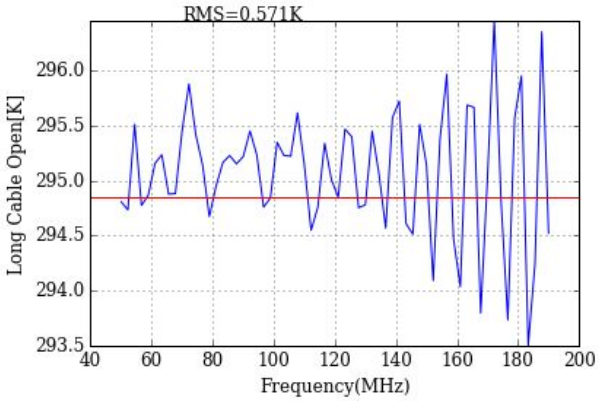

**Figure6:** Cross checks for calibration of Low-Band 1, 2019-04

# Calibration Cross check for 25 C; Freq: 50-190 MHz
# Case2 - 9 terms for constants and 10 terms for noise wave parameters



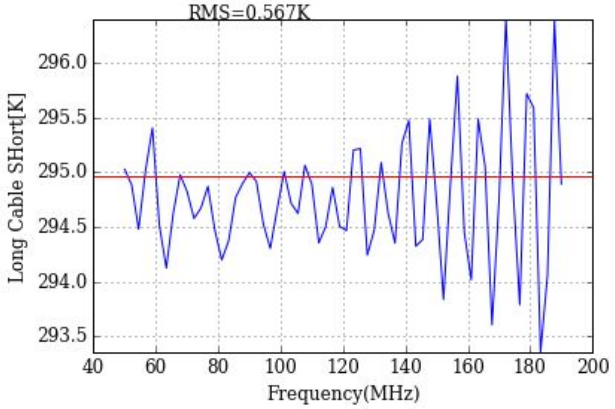
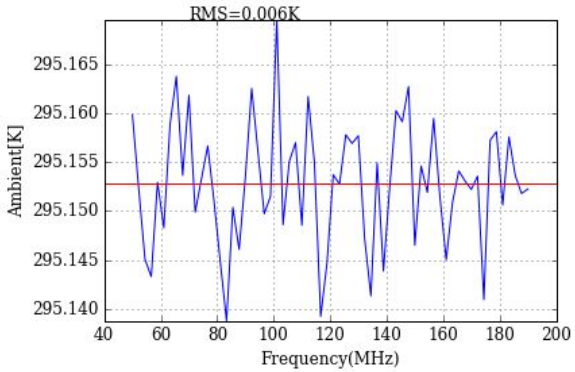
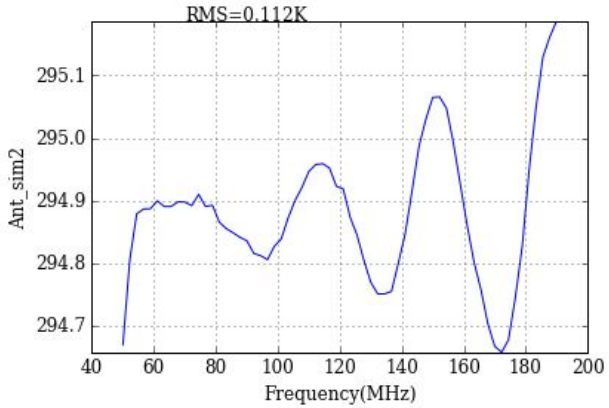
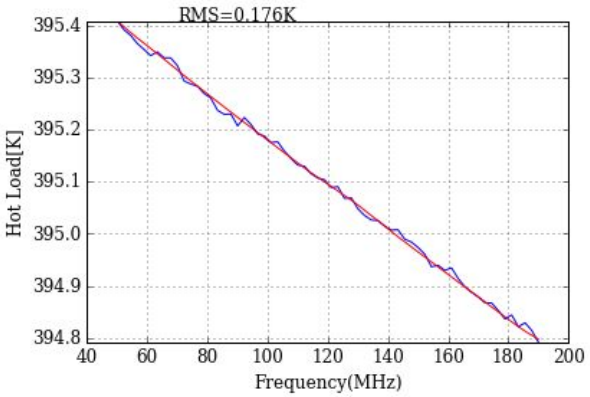



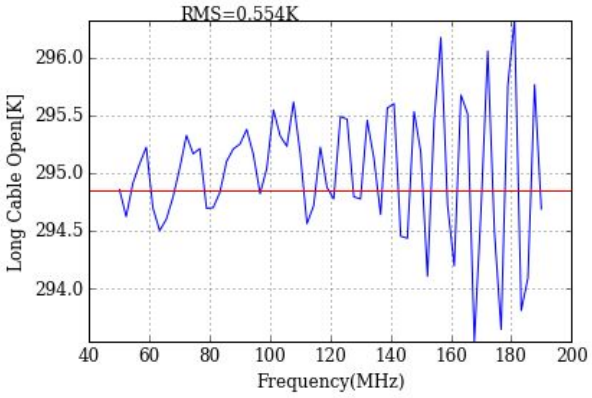

**Figure6:** Cross checks for calibration of Low-Band 1, 2019-04

# Calibration Cross check for 25 C; Freq: 50-190 MHz
# Case3 - 9 terms for constants and 15 terms for noise wave parameters



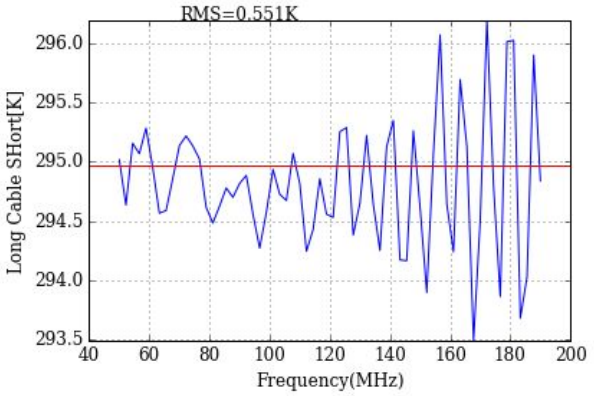
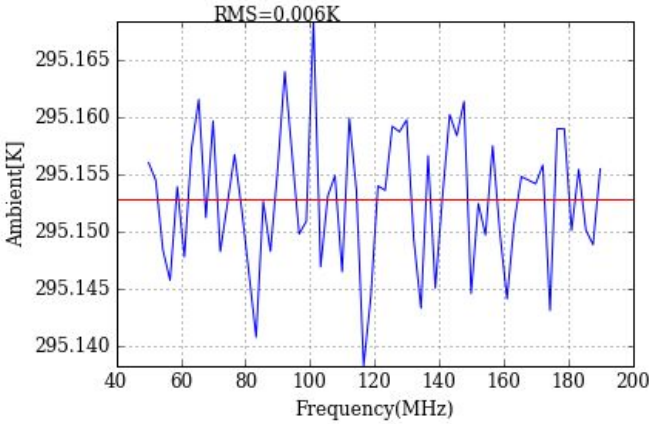
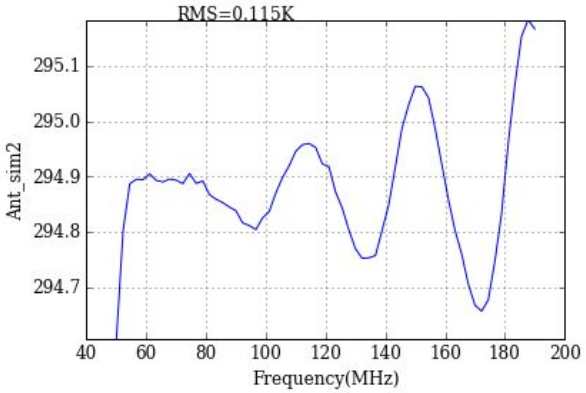
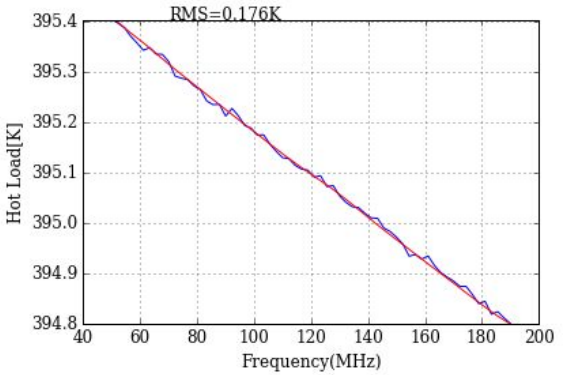



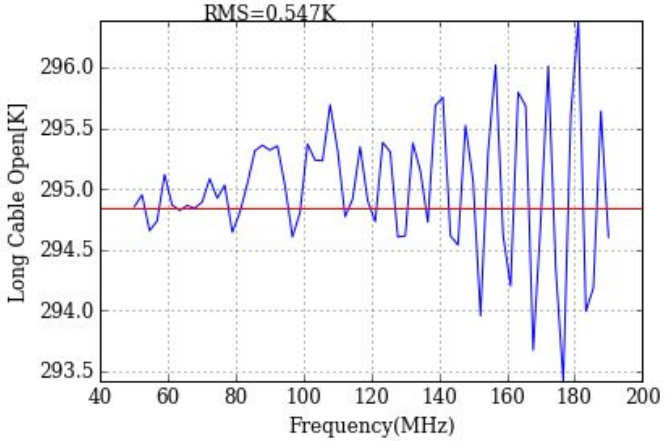

**Figure6:** Cross checks for calibration of Low-Band 1, 2019-04

# Calibration Cross check for 25 C; Freq: 50-190 MHz
# Case4 -10 terms for constants and 16 terms for noise wave parameters



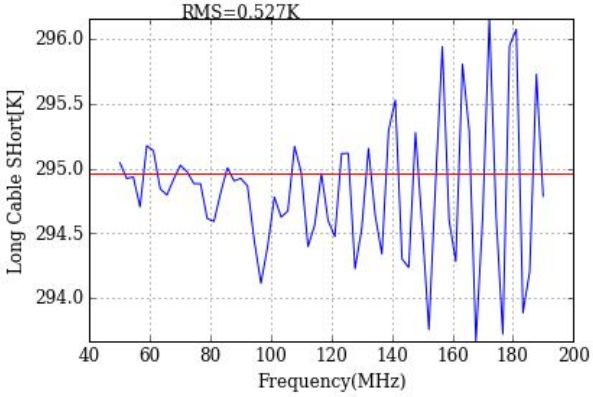
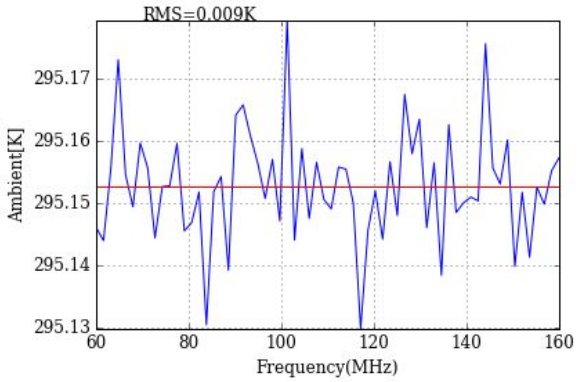
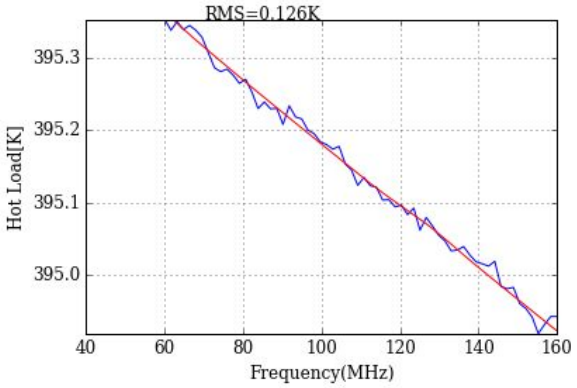



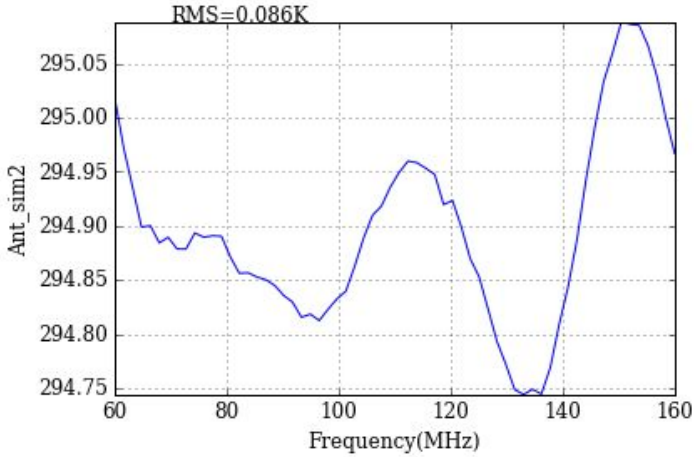

**Figure6:** Cross checks for calibration of Low-Band 1, 2019-04

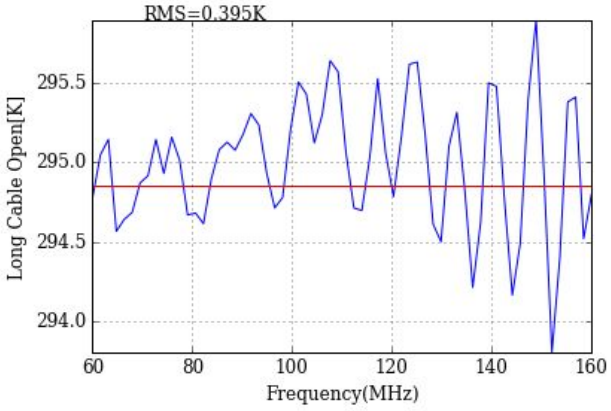
# Calibration Cross check for 25 C; Freq: 60-160 MHz
# Case1 - 8 terms for constants and 12 terms for noise wave parameters

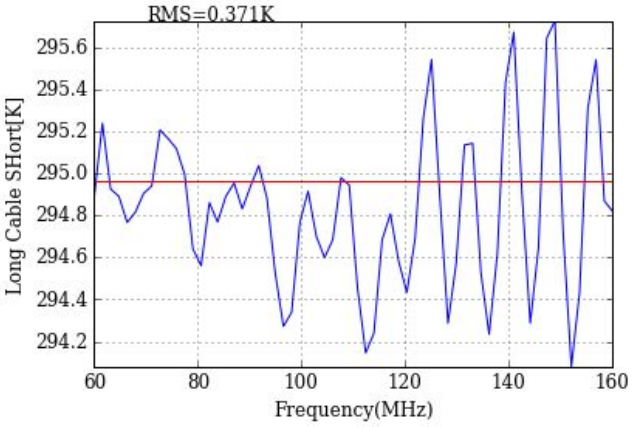
04/10/2019



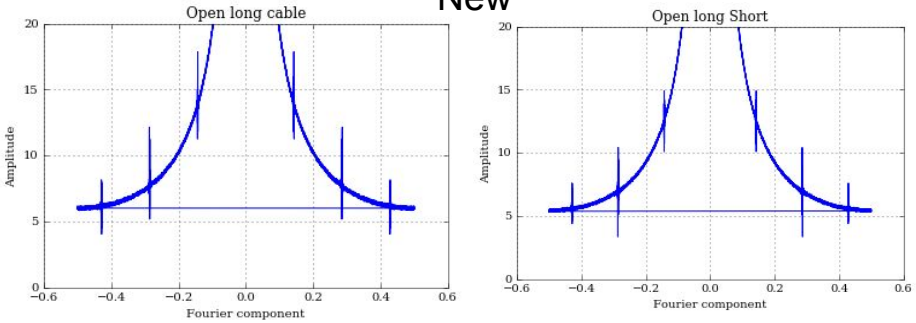



# Investigating the ripples in the long cable spectra residues

- Fourier transforming the raw long cable spectra

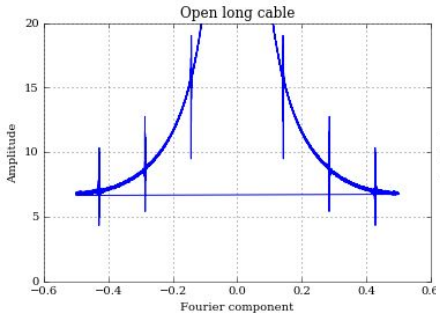
New

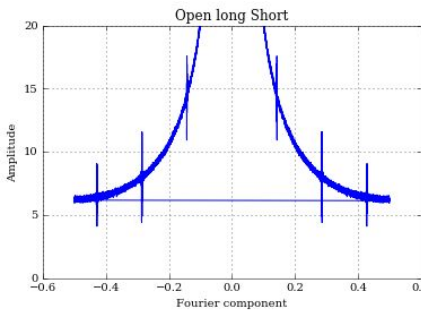




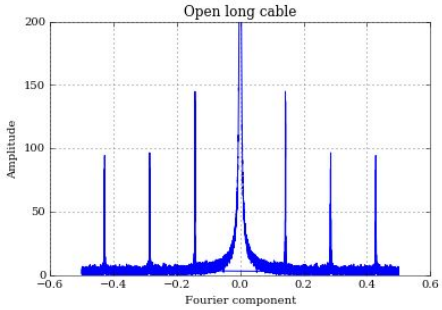


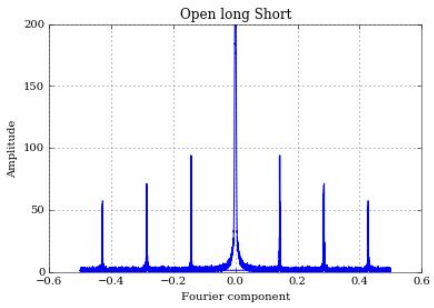
Old

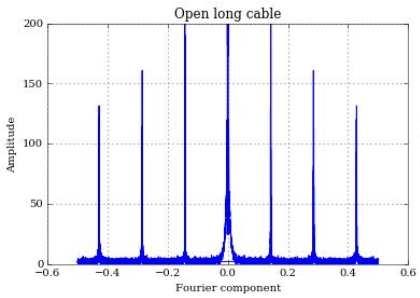


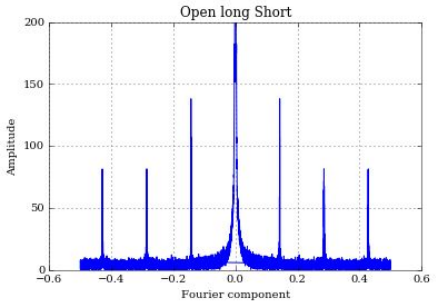



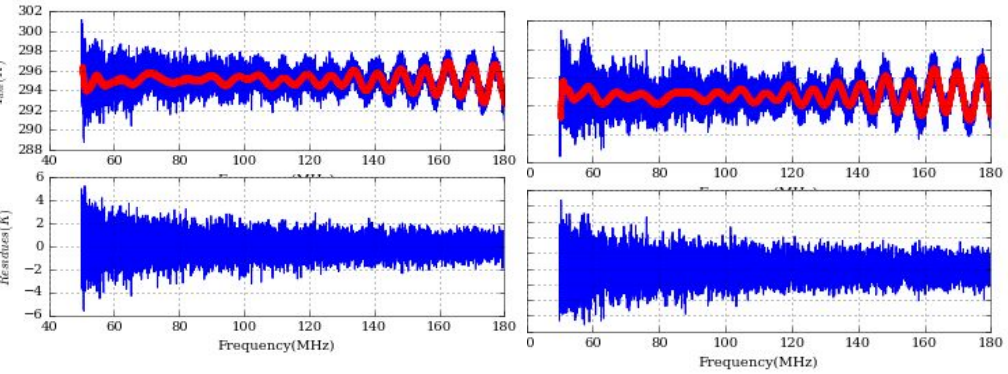

- Fourier transforming the calibrated long cable spectra

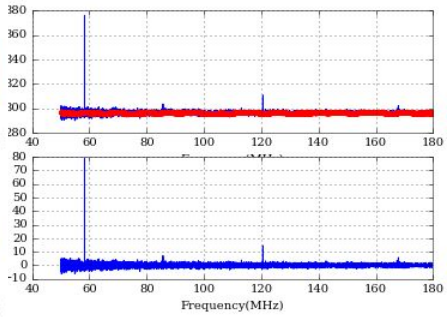


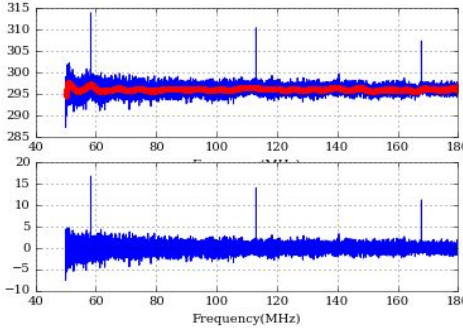



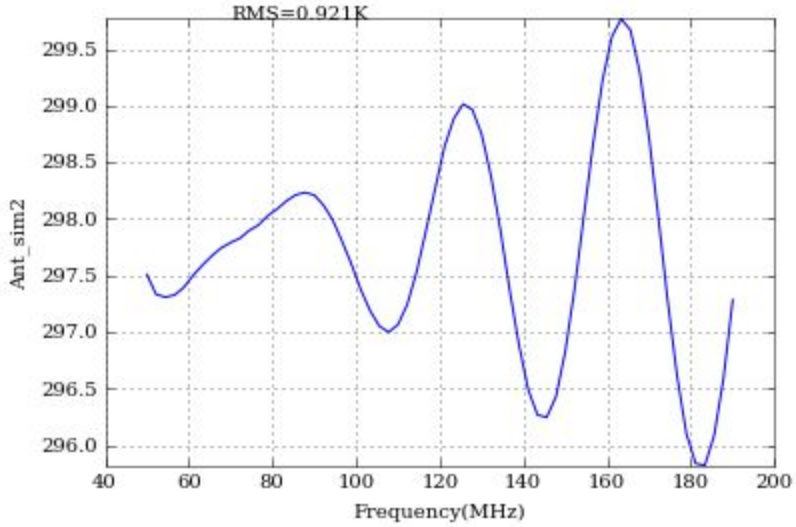



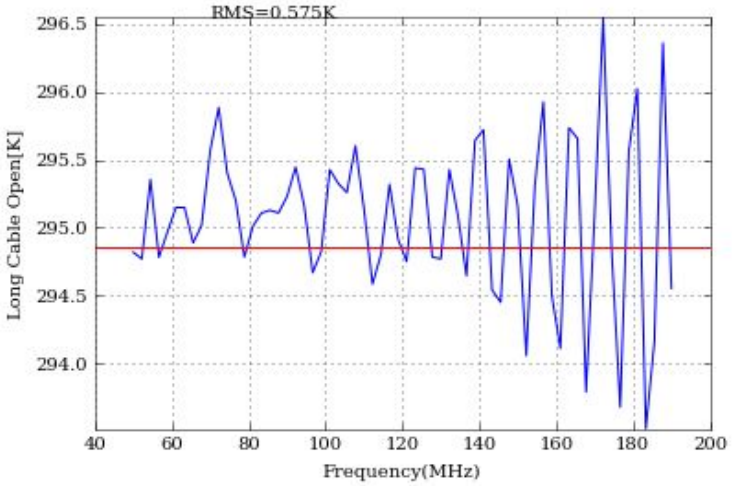



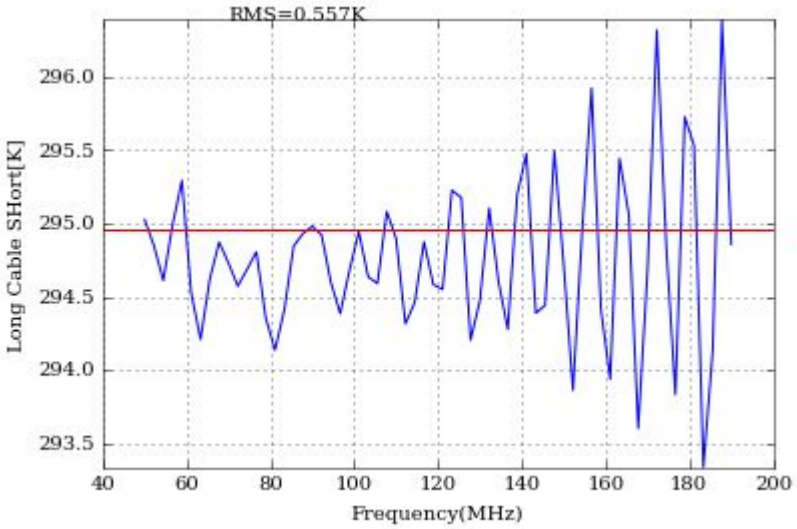
# Using the 2018_01 calibration on the Ant sim2 data from 2019_04



# Changing the Hotload temperature

Actual - 122.7 C




Modified - 126.7 C