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 2018_01.
- The calibration coefficients were estimated for two frequency ranges:
  - 50-100 MHz (This was done so that one to one comparison could be made with the results from August 2015)
  - 50-190 MHz.
- The calibration coefficients obtained were compared with the ones obtained in August 2015
- The Calibration coefficients over the 50-100MHz were calculated for two cases:
  - 7 terms for constants & 9 terms for Noise wave parameters
  - 6 terms for constants & 8 terms for Noise wave parameters
- 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_2018_01_08_040_to_200/25C

Corrected s11:
/data5/edges/data/Receiver01_2018_01_08_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 - Phil’s Kit - 50.027 ohm (25 degC)
Female Standard - EDGES Keysight - 50.009 ohm (25 degC)
Temperature of calibration loads @ 25C

Figure 2: Temperature of the calibration loads and antenna simulator 3. Also shown for comparison is the temperature of the calibration loads obtained during the calibration of Lowband1 in August 2015.
Spectra data @ 25C for the loads

Figure 1: Raw spectra of the calibration loads. Top panel- blue is the data & red is the fit. Bottom panel shows the residues of the fit to the data.
Spectra data @ 25C for the loads
Reflection coefficients of the loads @25C

**Figure 3a:** Reflection coefficients (Mag -top panel & phase- bottom panel) of the LNA and the calibration loads. Show for comparison are the reflection coefficients from the 2015 calibration run.
Reflection coefficients of the loads @25C

**Figure 3b:** Reflection coefficients (Mag - top panel & phase - bottom panel) of the LNA and the calibration loads. Show for comparison are the reflection coefficients from the 2015 calibration run.
Reflection coefficients of the loads @25°C; Freq: 50-190MHz

Figure 3a: Reflection coefficients (Mag -top panel & phase- bottom panel) of the LNA and the calibration loads.
Reflection coefficients of the loads @25C

**Figure 3b:** Reflection coefficients (Mag -top panel & phase- bottom panel) of the LNA and the calibration loads.
Cal coefficients derived from 25C

Figure 4: Calibration parameters for the Low-Band 1 receiver. Over 50-100 MHz, we use 7 terms to model C1 & C2 and 8 terms to model Tu, Tc, Ts for 2018 calibration. For the 2015 calibration, we use 7 terms to model all parameters.
Cal coefficients derived from 25C; Freq: 50-190MHz

**Figure 4:** Calibration parameters for the Low-Band 1 receiver. Over 50-190 MHz, we use 7 terms to model C1 & C2 and 9 terms to model Tu, Tc, Ts.
Cal coefficients derived from 25C; Comparing freq ranges

**Figure 4:** Calibration parameters for the Low-Band 1 receiver. Over 50-190 MHz, we use 7 terms to model C1 & C2 and 9 terms to model Tu, Tc, Ts.
Calibration Cross check for 25 C; Freq - 50-100MHz

Figure 5: Cross checks for calibration of Low-Band 1, 2018-02
Calibration Cross check for 25 C; Freq: 50-190 MHz
Case1 - 7 terms for constants and 9 terms for noise wave parameters

Figure 6: Cross checks for calibration of Low-Band 1, 2018-02
Calibration Cross check for 25 C; Freq: 50-190 MHz
Case1 - 6 terms for constants and 8 terms for noise wave parameters

Figure 6: Cross checks for calibration of Low-Band 1, 2018-02