Midband analysis of Days 2018_(147 & 148)
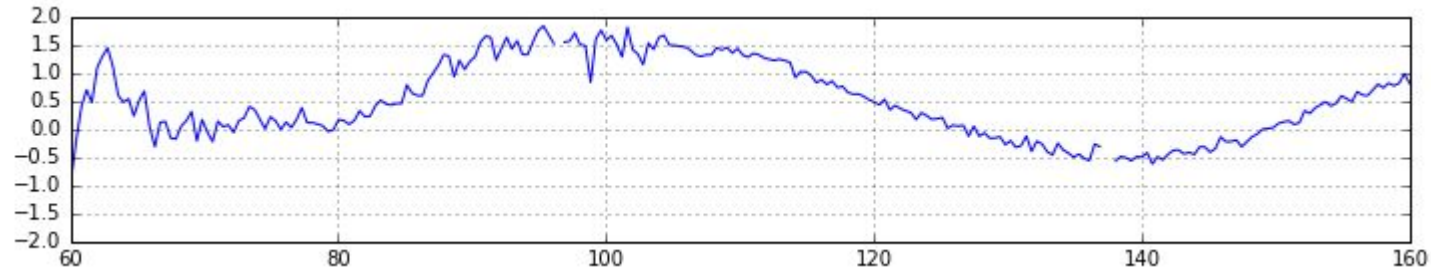
Nivedita Mahesh
ASU

Introduction

- The memo summarizes the steps I carried out on the raw mid band data
- Data shown in this report is from the days : 2018_148 & _147
- The 3 position switch correction is applied to the field data
- Then the following steps are investigated individually:
  - The data is calibrated using rcv01 coefficients obtained in report #127 and S11 of the antenna taken from the field
  - Beam correction is applied using the real ground beam model
  - Balun and connector loss correction is applied using the code obtained from Raul
- The individual steps are verified by analysing the residues to LINLOG and LOGLOG model fits

Linlog → (x/f_center)**-2.5 * (a + b* np.log(x/f_center) + c* np.log(x/f_center)**2 + d* np.log(x/f_center)**3)

Loglog → a + b*x + c*x**2 + d*x**3 + e*x**4
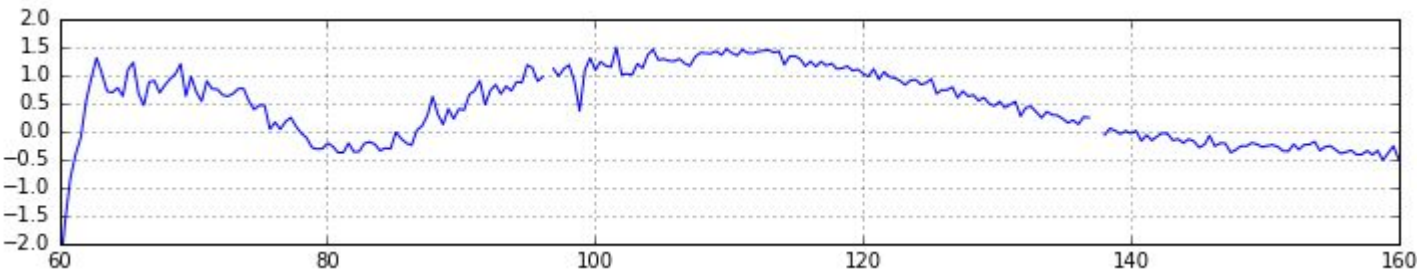
02/28/2019

Spectrum is fit to 4 term LINLOG model and the residues are obtained
Improved RFI filtering

S11:
- **File**: 2018_147_17_03_25*
- **Fit:** 13 Polynomial terms
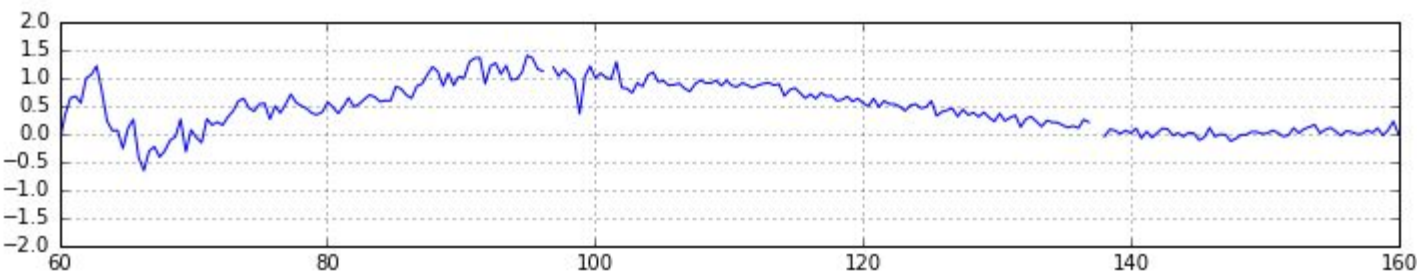- **LNA fit:** 37 Fourier terms

Cal_file: cterms - 6, wterms - 8
Beam: Not applied
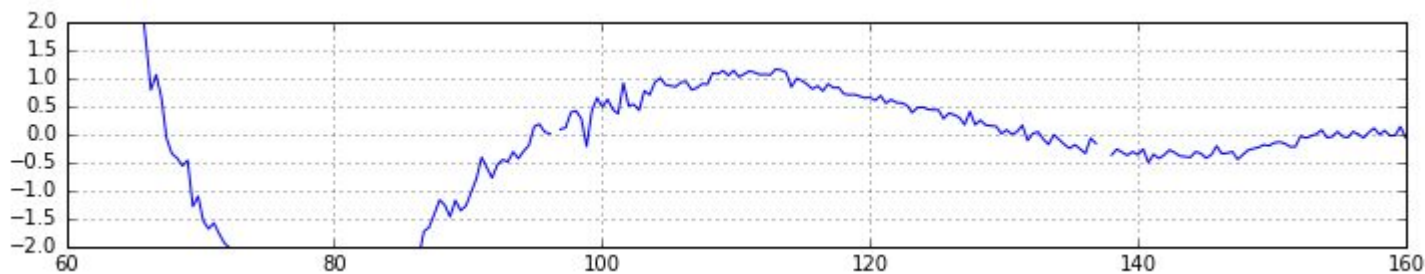**Balun Loss:** Not Applied

S11:
- **File**: 2018_147_17_03_25*
- **Fit:** 13 Polynomial terms
- **LNA fit:** 37 Fourier terms

Cal_file: cterms - 6, wterms - 8
Beam:
- **Type:** Real ground
- **Fit:** 9 polynomial terms

Balun Loss: Not applied

S11:
- **File**: 2018_147_17_03_25*
- **Fit:** 13 Polynomial terms
- **LNA fit:** 37 Fourier terms

Cal_file: cterms - 6, wterms - 8
Beam:
- **Type:** Real ground
- **Fit:** 9 polynomial terms

Balun Loss: applied

3

Spectrum is fit to 4 term LOGLOG model and the residues are obtained
Improved RFI filtering

S11:
- **File**: 2018_147_17_03_25*
- **Fit:** 13 Polynomial terms
- **LNA fit:** 37 Fourier terms

Cal_file: cterms - 6, wterms - 8
Beam: Not applied
Balun Loss: Not Applied

S11:
- **File**: 2018_147_17_03_25*
- **Fit:** 13 Polynomial terms
- **LNA fit:** 37 Fourier terms

Cal_file: cterms - 6, wterms - 8
Beam:
- **Type:** Real ground
- **Fit:** 9 polynomial terms

Balun Loss: Not applied

S11:
- **File**: 2018_147_17_03_25*
- **Fit:** 13 Polynomial terms
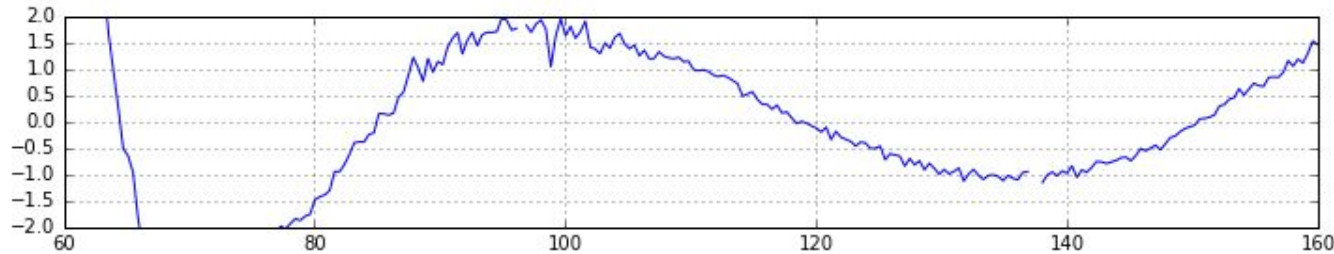- **LNA fit:** 37 Fourier terms

Cal_file: cterms - 6, wterms - 8
Beam:
- **Type:** Real ground
- **Fit:** 9 polynomial terms

Balun Loss: applied

Spectrum is fit to 5 term LINLOG model and the residues are obtained
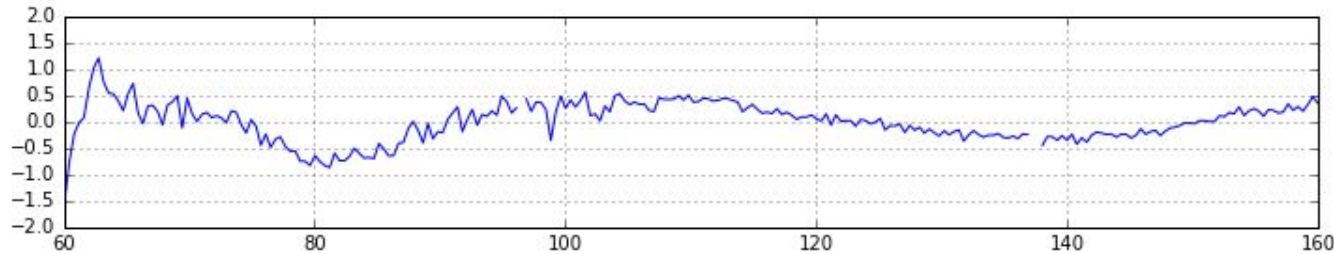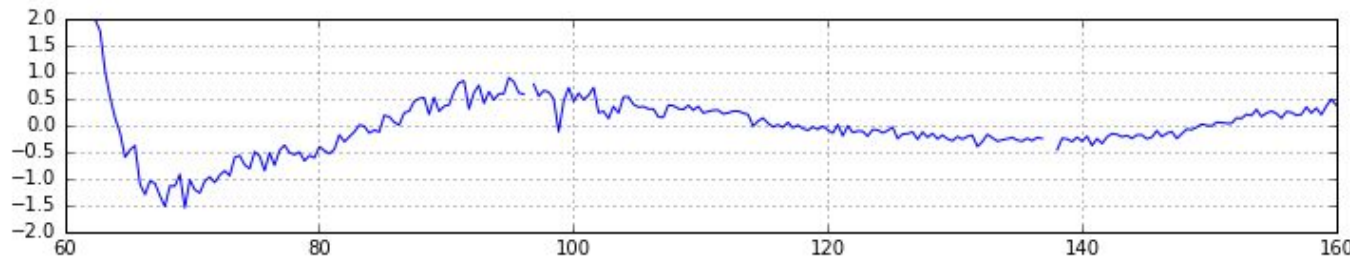## Improved RFI filtering

S11:
- **File**: 2018_147_17_03_25*
- **Fit:** 13 Polynomial terms
- **LNA fit:** 37 Fourier terms

Cal_file: cterms - 6, wterms - 8
Beam: Not applied
Balun Loss: Not Applied

S11:
- **File**: 2018_147_17_03_25*
- **Fit:** 13 Polynomial terms
- **LNA fit:** 37 Fourier terms

Cal_file: cterms - 6, wterms - 8
Beam:
- **Type:** Real ground
- **Fit:** 9 polynomial terms

Balun Loss: Not applied

S11:
- **File**: 2018_147_17_03_25*
- **Fit:** 13 Polynomial terms
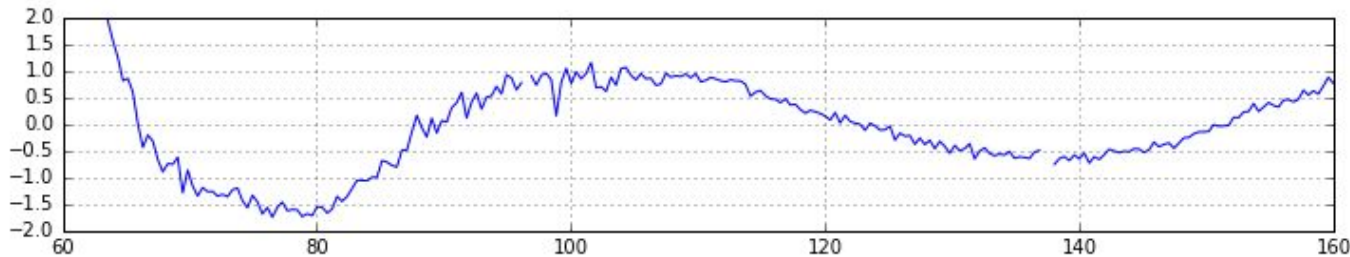- **LNA fit:** 37 Fourier terms

Cal_file: cterms - 6, wterms - 8
Beam:
- **Type:** Real ground
- **Fit:** 9 polynomial terms

Balun Loss: applied

Spectrum is fit to 5 term LOGLOG model and the residues are obtained
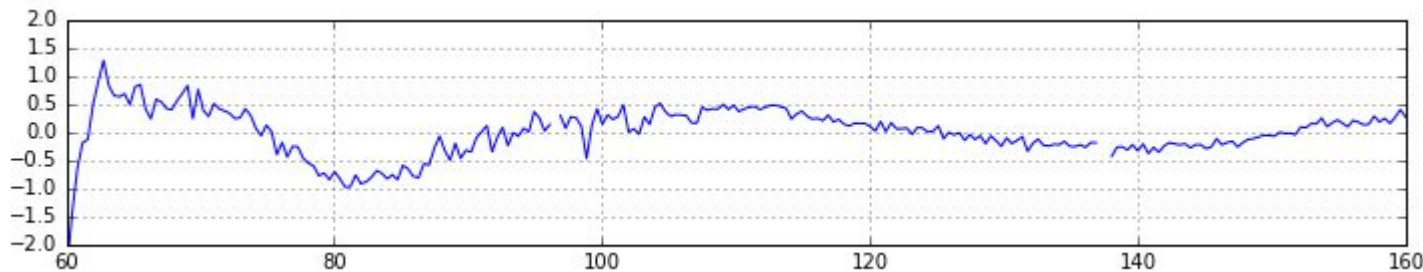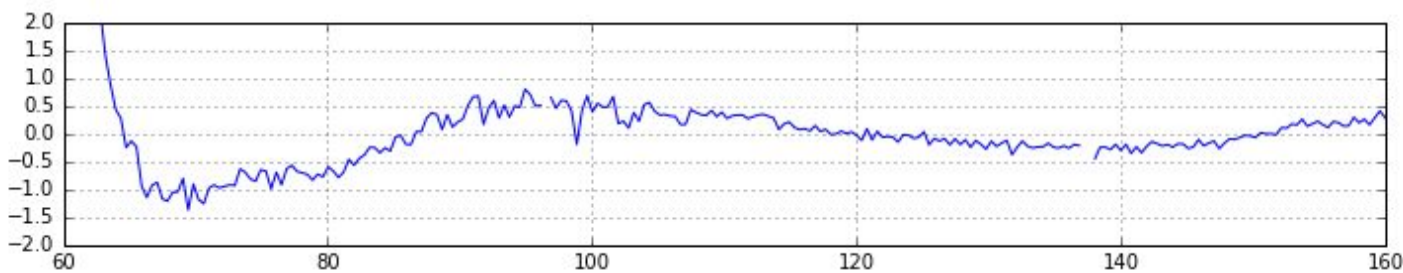## Improved RFI filtering

S11:
- **File**: 2018_147_17_03_25*
- **Fit:** 13 Polynomial terms
- **LNA fit:** 37 Fourier terms

Cal_file: cterms - 6, wterms - 8
Beam: Not applied
Balun Loss: Not Applied

S11:
- **File**: 2018_147_17_03_25*
- **Fit:** 13 Polynomial terms
- **LNA fit:** 37 Fourier terms

Cal_file: cterms - 6, wterms - 8
Beam:
- **Type:** Real ground
- **Fit:** 9 polynomial terms

Balun Loss: Not applied

S11:
- **File**: 2018_147_17_03_25*
- **Fit:** 13 Polynomial terms
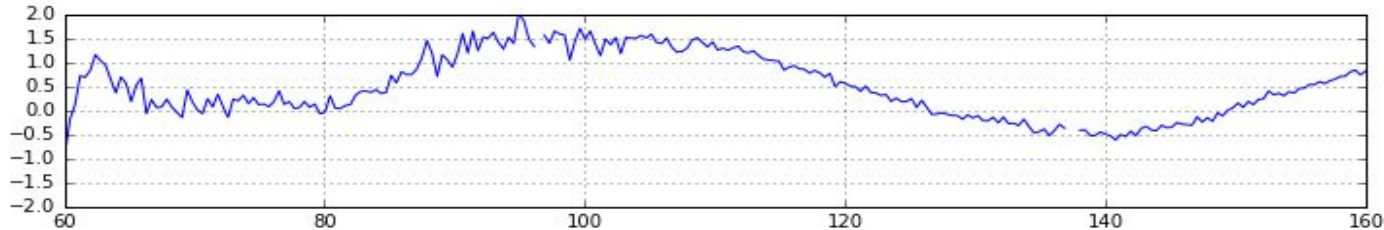- **LNA fit:** 37 Fourier terms

Cal_file: cterms - 6, wterms - 8
Beam:
- **Type:** Real ground
- **Fit:** 9 polynomial terms

Balun Loss: applied

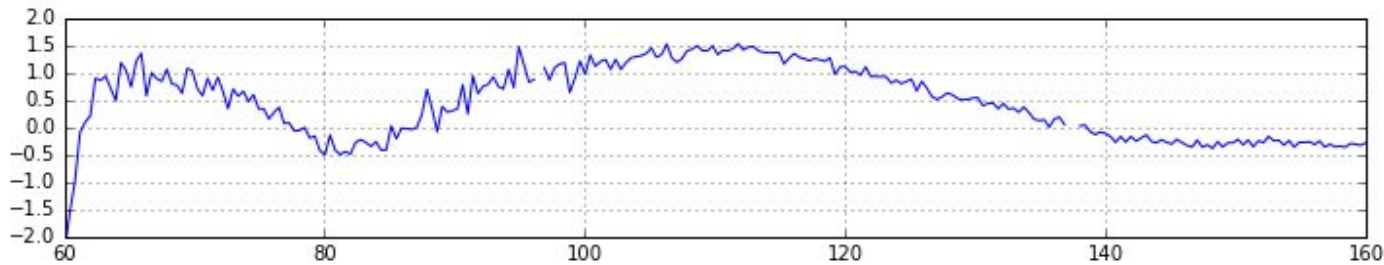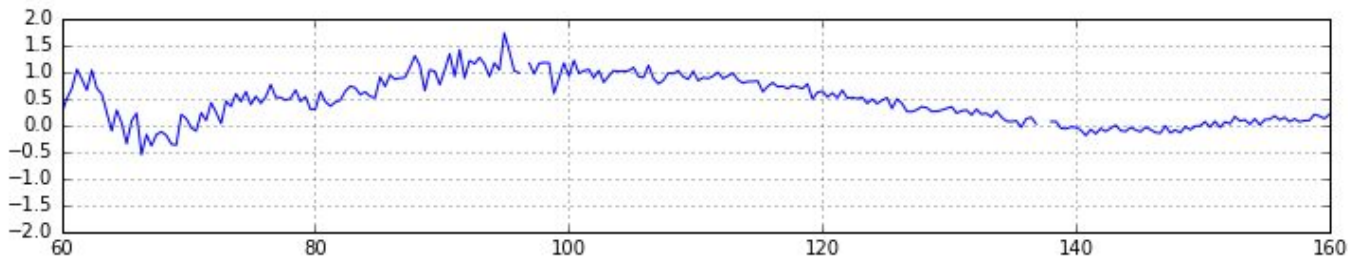Spectrum is fit to 4 term LINLOG model and the residues are obtained

S11:
- **File**: 2018_147_17_03_25*
- **Fit:** 13 Polynomial terms
- **LNA fit:** 37 fourier terms

Cal_file: cterms - 6, wterms - 8

Beam: Not applied

Balun Loss: Not applied

S11:
- **File**: 2018_147_17_03_25*
- **Fit:** 13 Polynomial terms
- **LNA fit:** 37 fourier terms

Cal_file: cterms - 6, wterms - 8

Beam:
- **Type:** Real ground
- **Fit:** 9 polynomial terms

Balun Loss: Not applied

S11:
- **File**: 2018_147_17_03_25*
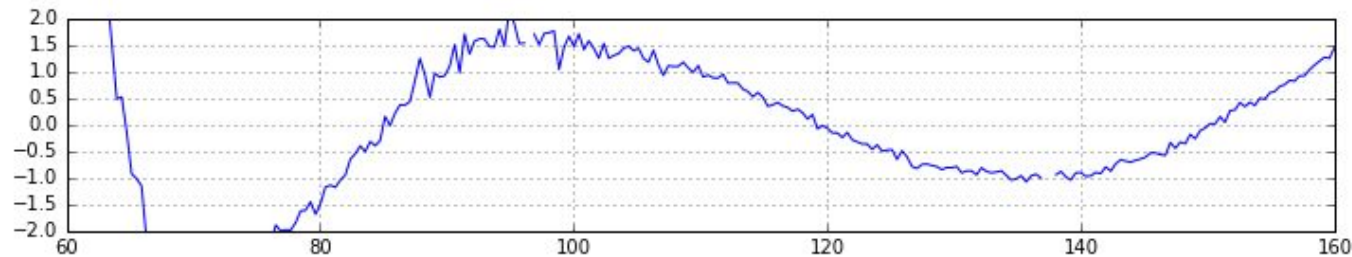- **Fit:** 13 Polynomial terms
- **LNA fit:** 37 fourier terms

Cal_file: cterms - 6, wterms - 8

Beam:
- **Type:** Real ground
- **Fit:** 9 polynomial terms

Balun Loss: applied

7

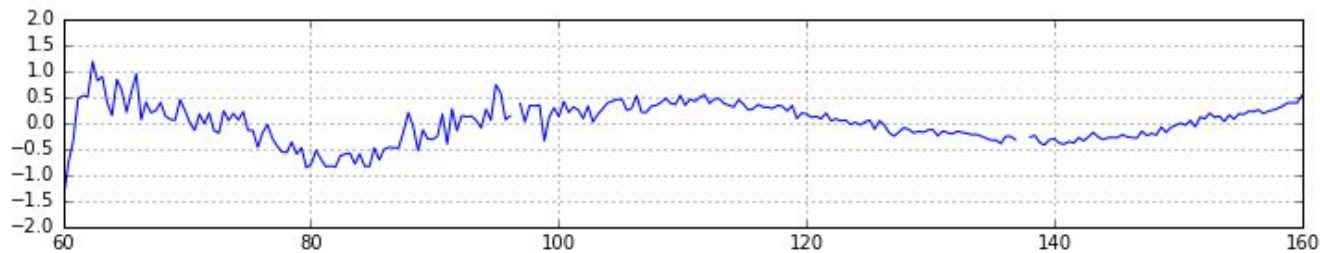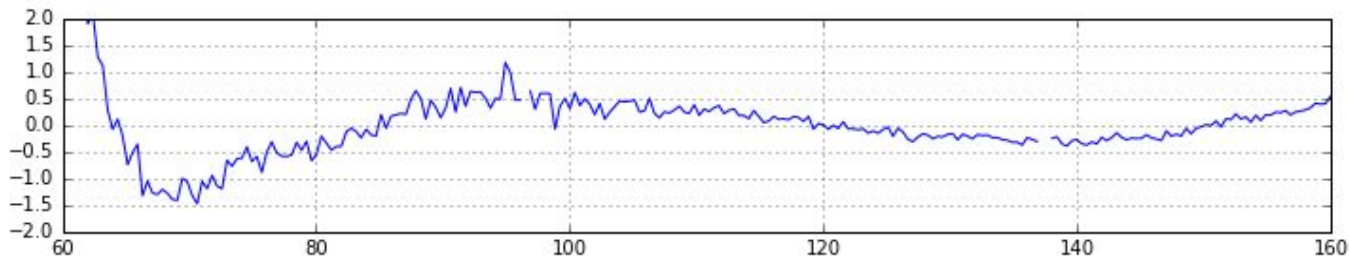# Spectrum is fit to 5 term LINLOG model and the residues are obtained

S11:
- **File**: 2018_147_17_03_25*
- **Fit:** 13 Polynomial terms
- **LNA fit:** 37 fourier terms

Cal_file: cterms - 6, wterms - 8

Beam: Not applied

Balun Loss: Not applied

S11:
- **File**: 2018_147_17_03_25*
- **Fit:** 13 Polynomial terms
- **LNA fit:** 37 fourier terms

Cal_file: cterms - 6, wterms - 8

Beam:
- **Type:** Real ground
- **Fit:** 9 polynomial terms

Balun Loss: Not applied

S11:
- **File**: 2018_147_17_03_25*
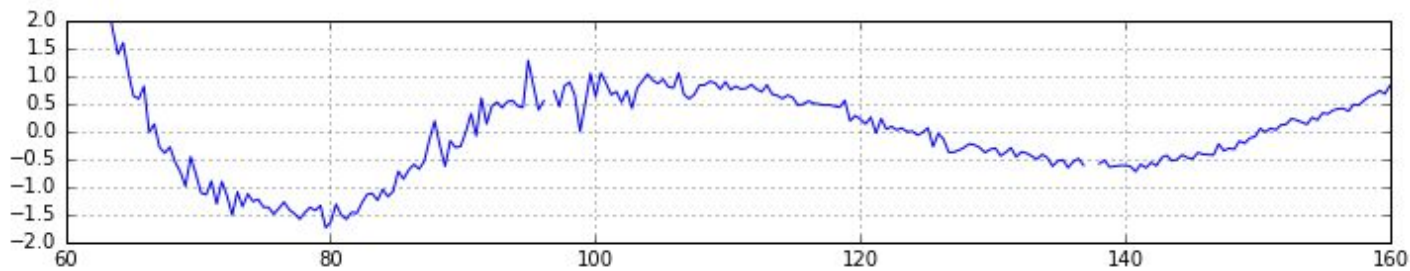- **Fit:** 13 Polynomial terms
- **LNA fit:** 37 fourier terms

Cal_file: cterms - 6, wterms - 8

Beam:
- **Type:** Real ground
- **Fit:** 9 polynomial terms

Balun Loss: applied

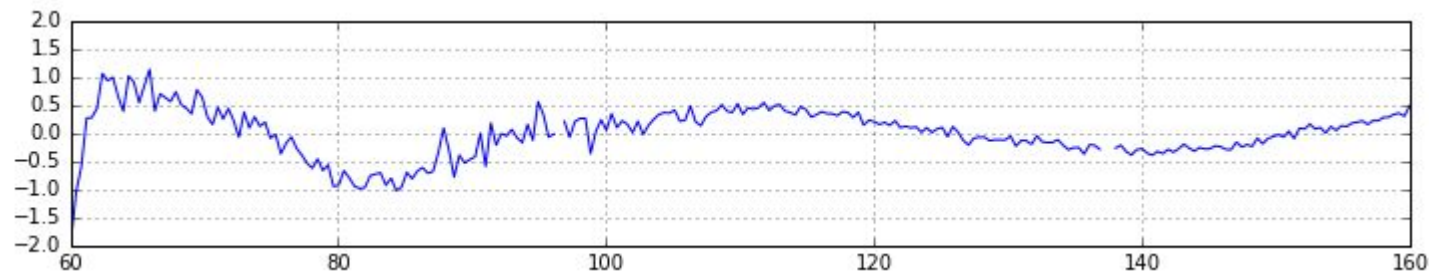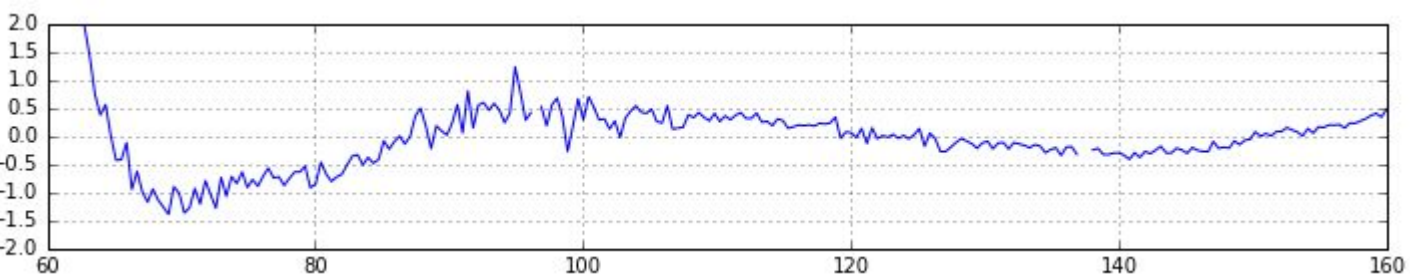# Spectrum is fit to 5 term LOGLOG model and the residues are obtained

S11:
- **File**: 2018_147_17_03_25*
- **Fit:** 13 Polynomial terms
- **LNA fit:** 37 fourier terms

Cal_file: cterms - 6, wterms - 8

Beam: Not applied

Balun Loss: Not applied

S11:
- **File**: 2018_147_17_03_25*
- **Fit:** 13 Polynomial terms
- **LNA fit:** 37 fourier terms

Cal_file: cterms - 6, wterms - 8

Beam:
- **Type:** Real ground
- **Fit:** 9 polynomial terms

Balun Loss: Not applied

S11:
- **File**: 2018_147_17_03_25*
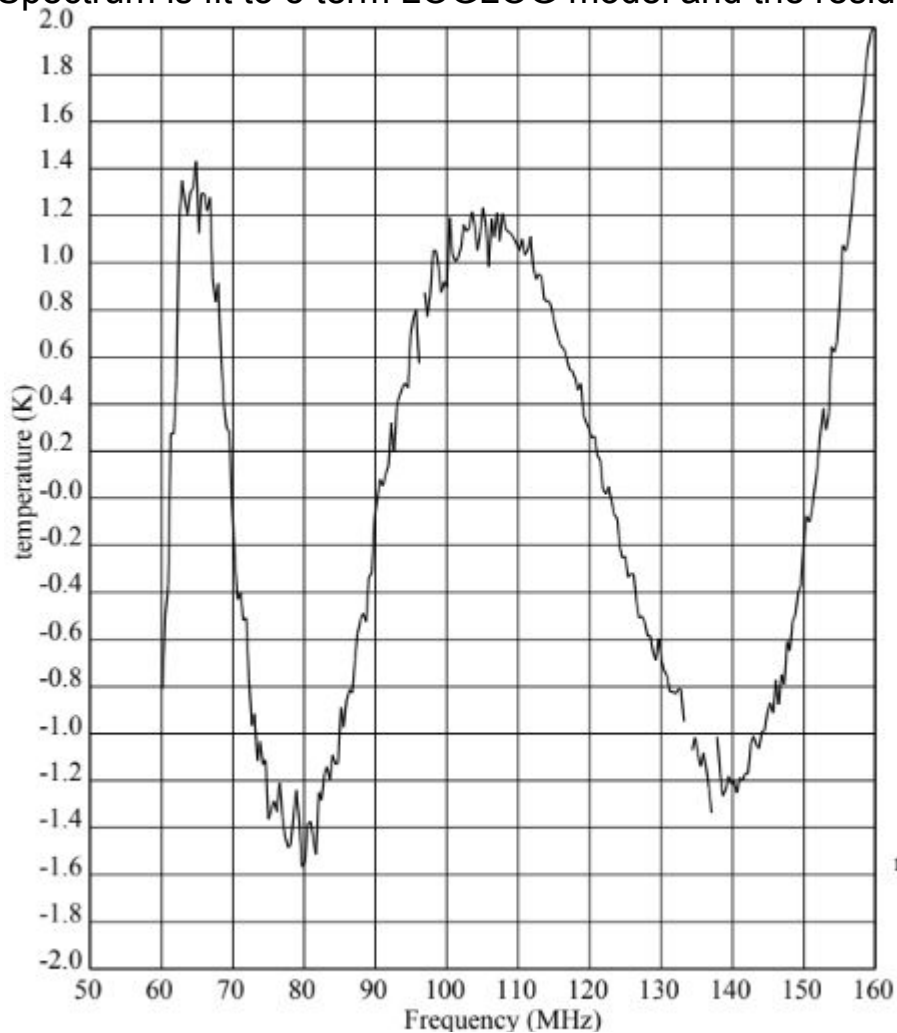- **Fit:** 13 Polynomial terms
- **LNA fit:** 37 fourier terms

Cal_file: cterms - 6, wterms - 8

Beam:
- **Type:** Real ground
- **Fit:** 9 polynomial terms

Balun Loss: applied

9

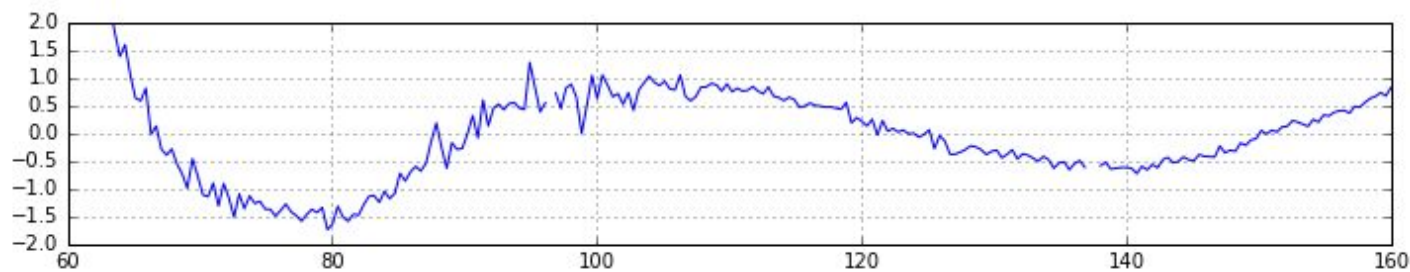## Spectrum is fit to 5 term LOGLOG model and the residues are obtained

S11:
- **File**: 2018_147_17_03_25*
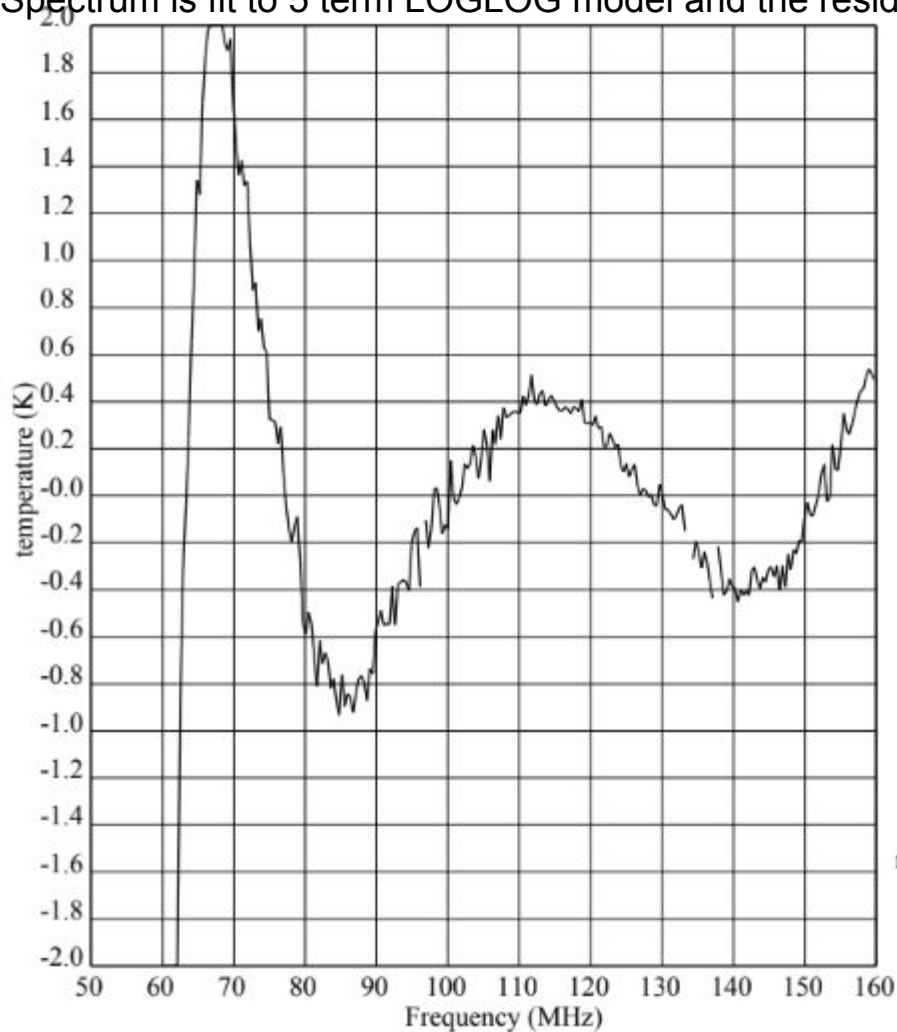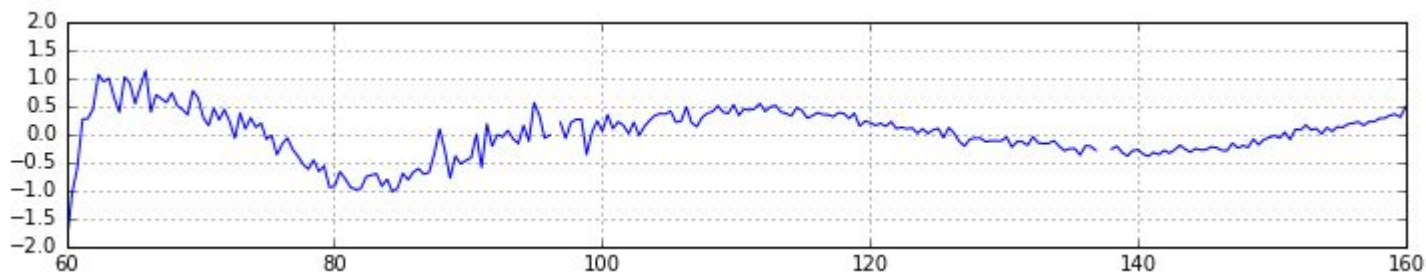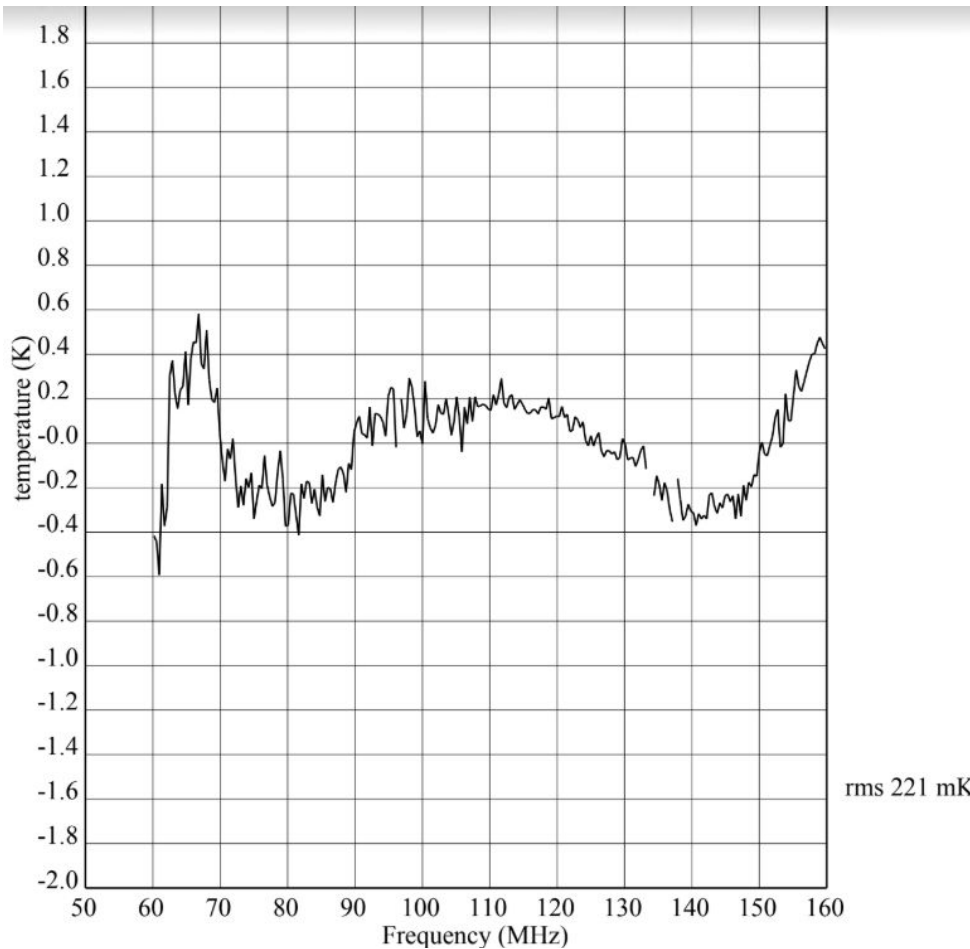- **Fit:** 13 Polynomial terms
- **LNA fit:** 37 fourier terms

Cal_file: cterms - 6, wterms - 8
Beam: Not applied
Balun Loss: Not applied

rms 942 mK

Spectrum is fit to 5 term LOGLOG model and the residues are obtained

S11:
- **File**: 2018_147_17_03_25*
- **Fit:** 13 Polynomial terms
- **LNA fit:** 37 fourier terms

Cal_file: cterms - 6, wterms - 8

Beam:
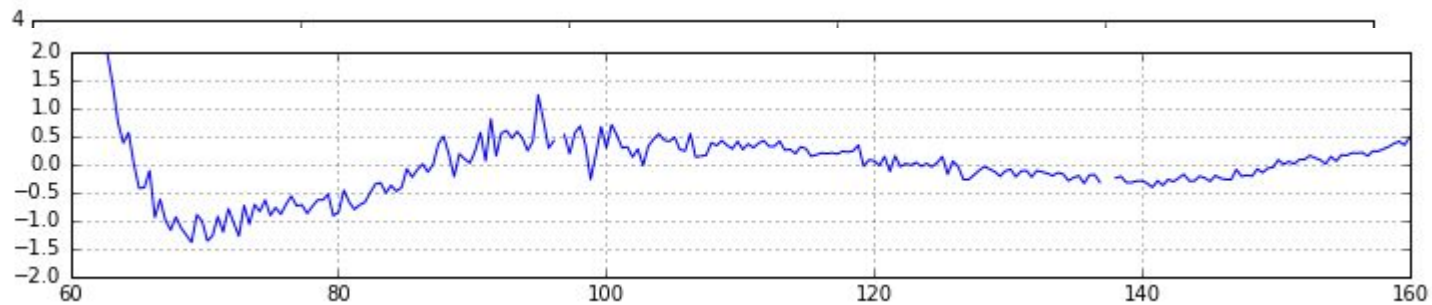- **Type:** Real ground
- **Fit:** 9 polynomial terms

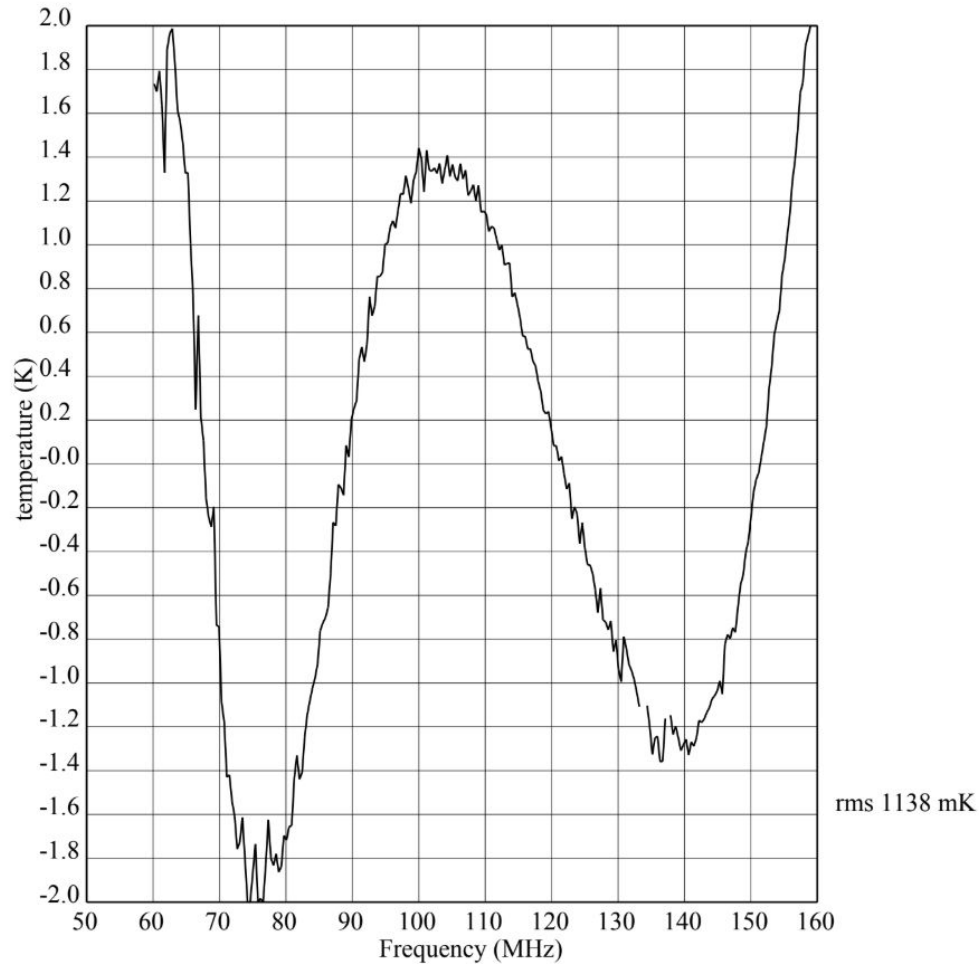**Balun Loss:** Not applied

rms 889 mK

11

02/28/2019

Spectrum is fit to 5 term LOGLOG model and the residues are obtained

S11:
- **File**: 2018_147_17_03_25*
- **Fit:** 13 Polynomial terms
- **LNA fit:** 37 fourier terms

Cal_file: cterms - 6, wterms - 8

Beam:
- **Type:** Real ground
- **Fit:** 9 polynomial terms

Balun Loss: applied

rms 221 mK

12

Spectrum is fit to 5 term LOGLOG model and the residues are obtained
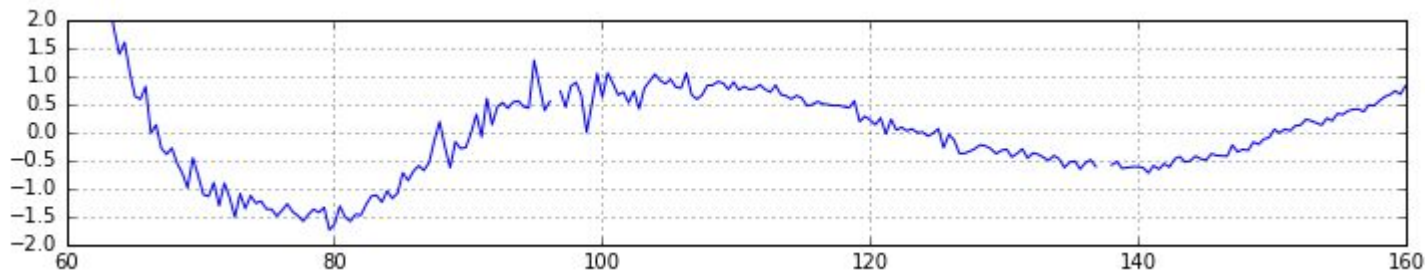

S11:
- **File**: 2018_147_17_03_25*
- **Fit:** 13 Polynomial terms
- **LNA fit:** 37 Fourier terms

Cal_file: cterms - 6, wterms - 8
Beam: Not applied
Balun Loss: Not Applied

rms 1138 mK

Spectrum is fit to 4 term LINLOG model and the residues are obtained

S11:
- **File**: 2018_147_17_03_25*
- **Fit:** 13 Polynomial terms
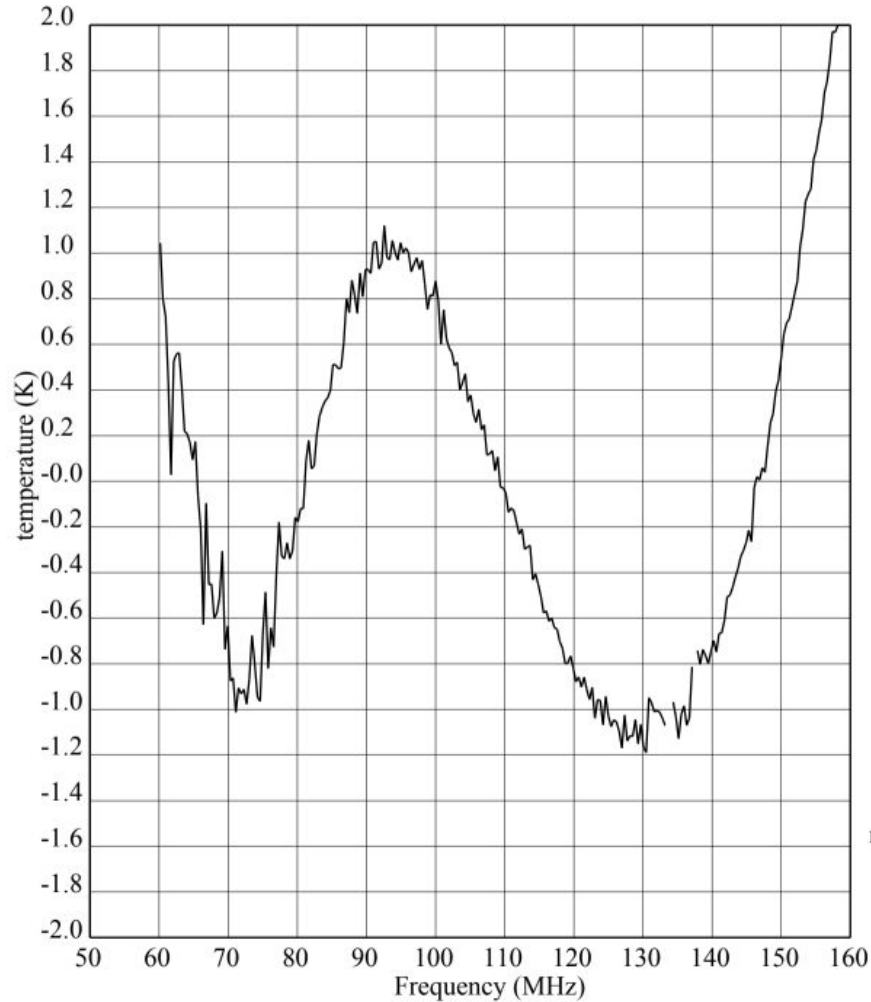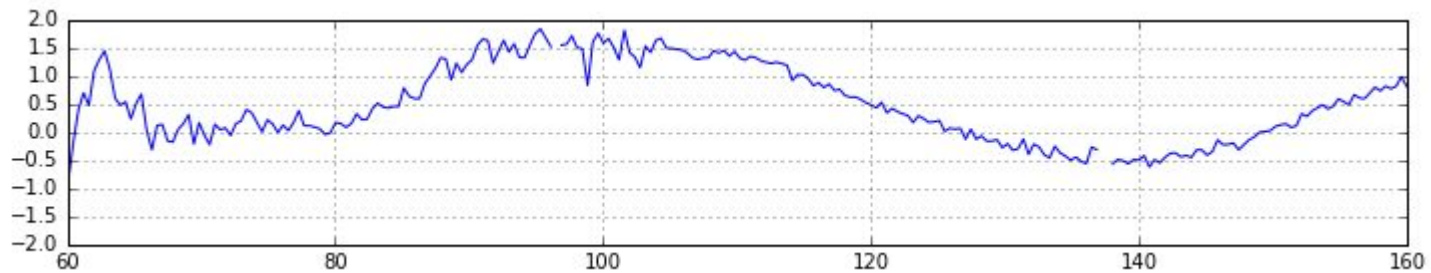- **LNA fit:** 37 Fourier terms
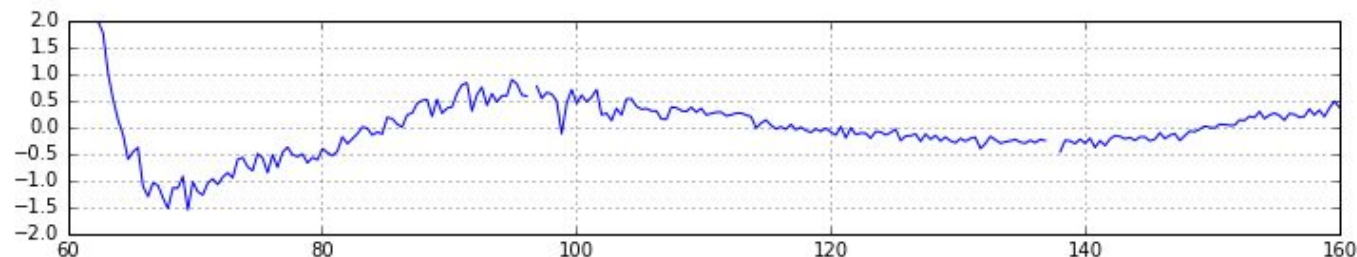
Cal_file: cterms - 6, wterms - 8
Beam: Not applied
Balun Loss: Not Applied

rms 831 mK

Spectrum is fit to 5 term LINLOG model and the residues are obtained;
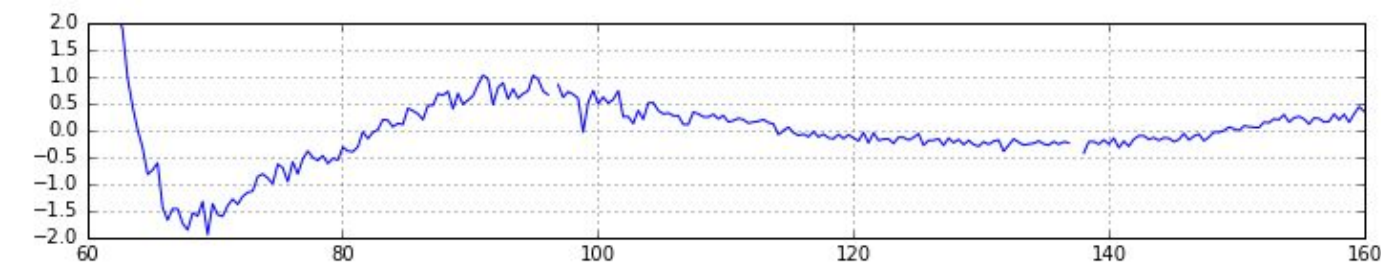Varying fitting parameters

S11:
- **File**: 2018_147_17_03_25*
- **Fit:** 13 Polynomial terms
- **LNA fit:** 37 Fourier terms

Cal_file: cterms - 6, wterms - 8
Beam:
- **Type:** Real ground
- **Fit:** 9 polynomial terms

Balun Loss: applied
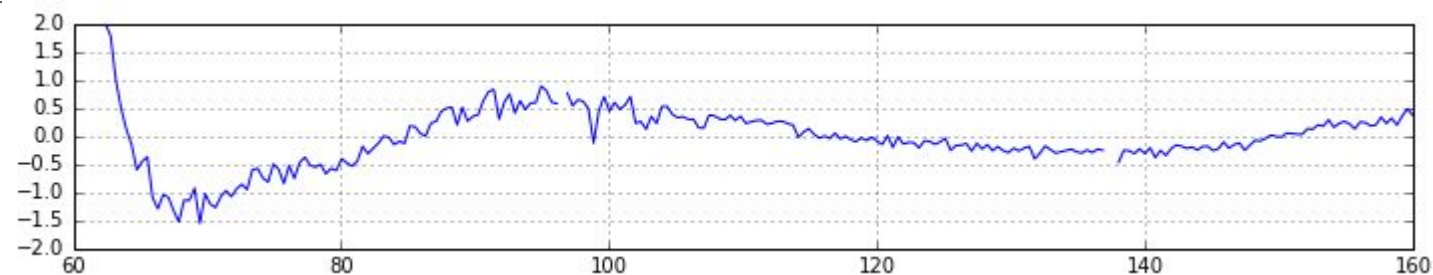

S11:
- **File**: 2018_147_17_03_25*
- **Fit:** 13 Polynomial terms
- **LNA fit:** 37 fourier terms

Cal_file: cterms - 7, wterms - 9
Beam:
- **Type:** Real ground
- **Fit:** 9 polynomial terms
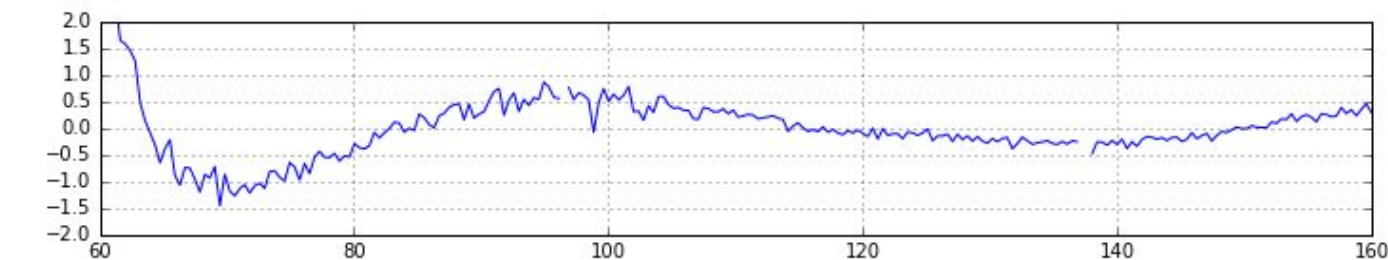
Balun Loss: applied

S11:
- **File**: 2018_147_17_03_25*
- **Fit:** 13 Polynomial terms
- **LNA fit: 47 polynomial terms**

Cal_file: cterms - 6, wterms - 8
Beam:
- **Type:** Real ground
- **Fit:** 9 polynomial terms

Balun Loss: applied

S11:
- **File**: 2018_147_17_03_25*
- **Fit: 21 Polynomial terms**
- **LNA fit:** 37 Fourier terms

Cal_file: cterms - 6, wterms - 8
Beam:
- **Type:** Real ground
- **Fit:** 9 polynomial terms

15

Balun Loss: applied