

Ant Sim residues

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Introduction:

The calibrated Antsim3 spectra taken recently (2018) with Rcv01 and Rcv02 were re plotted and analysed in figure1. From figure 1, one can see a considerable amount of RFI in the Antsim spectra that was taken with RCV02. Better RFI excision could be done to get a clean calibrated spectra. Or we could retake the measurement.

- Antsim (2&3) spectra was retaken with Rcv02 recently from May 27-31st 2019
- The reasons this was done:
 - We didn't have antsim2 spectra when Rcv02 was calibrated in 2018_09
 - The Antsim3 spectra that we had was seen to have RFI <80 MHz (ref figure1)
 - To understand the antsim calibrated spectra better
 - To test Repeatability: can we reuse the cal coefficients derived in 2018_09

- Procedure:
 - New Antsim(2,3) spectra was collected
 - New Antsim(2,3) S11 measurement was done via the LNA
 - New S11 measurement of the Internal Switch of the receiver
 - The S11 of the antsim3 were corrected for the new S11 of the Internal switch.

- Inferences:
 - The spectra from both the Antsim3 looks clean (no RFI)
 - The Corrected S11 of each of the Antsim3 is similar to what was obtained in the past (Loco Memo #128)
 - ***But, the cal coefficients from 2018_09 did not calibrate the Antsim3 spectra well. This is evident when you compare the rms in the second subplot in Figure 1 with the value in figure 4. The latter being 10X greater.***

AntSim3

06/04/2019

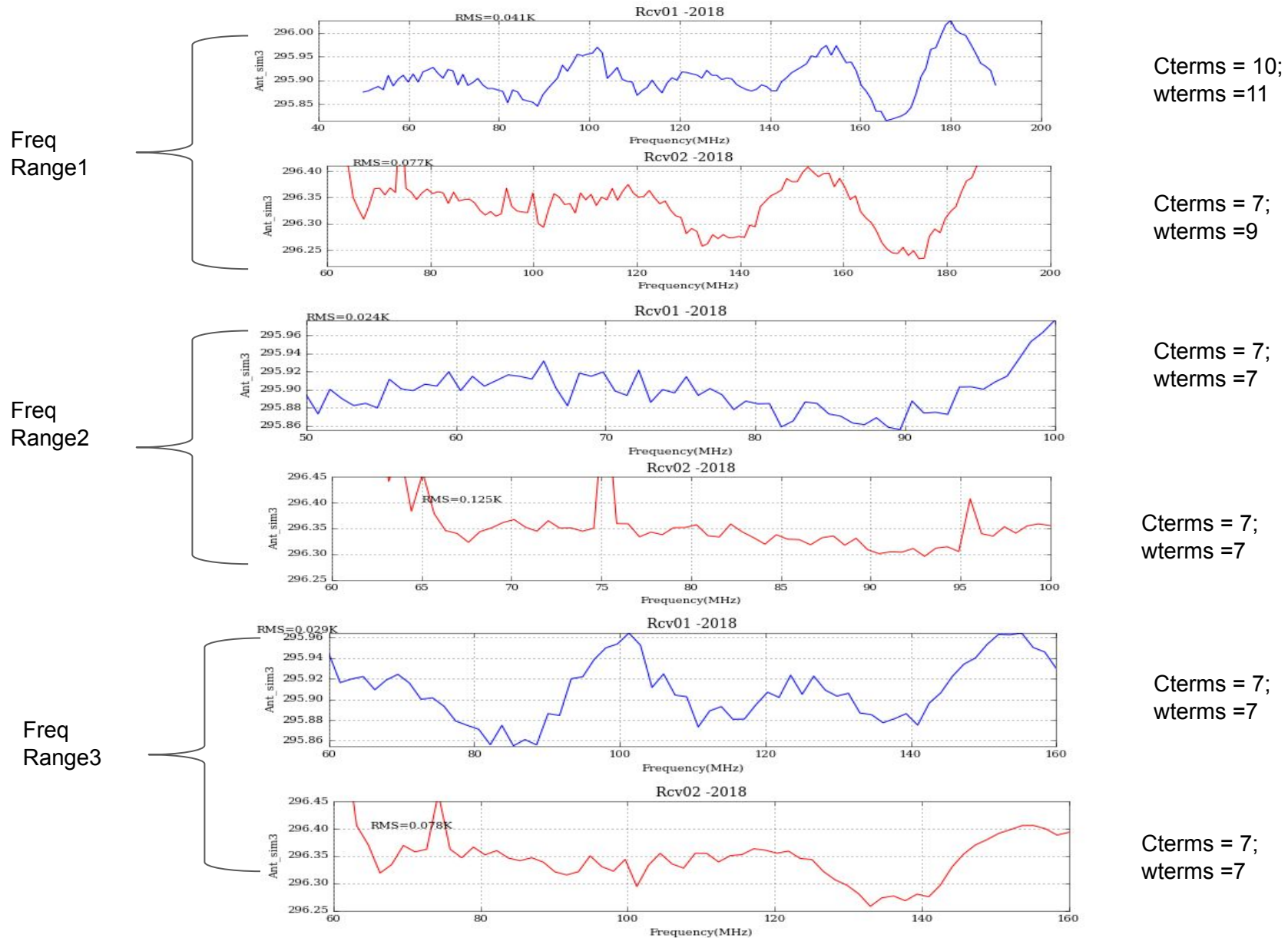


Figure1: Calibrated Antsim3 spectra taken with rcv01(blue) and rcv02(red) shown for different frequency ranges

*Note: The data < 60 MHz taken with Rcv 02 is omitted because there was RFI in the Raw spectra as explained in Memo #128

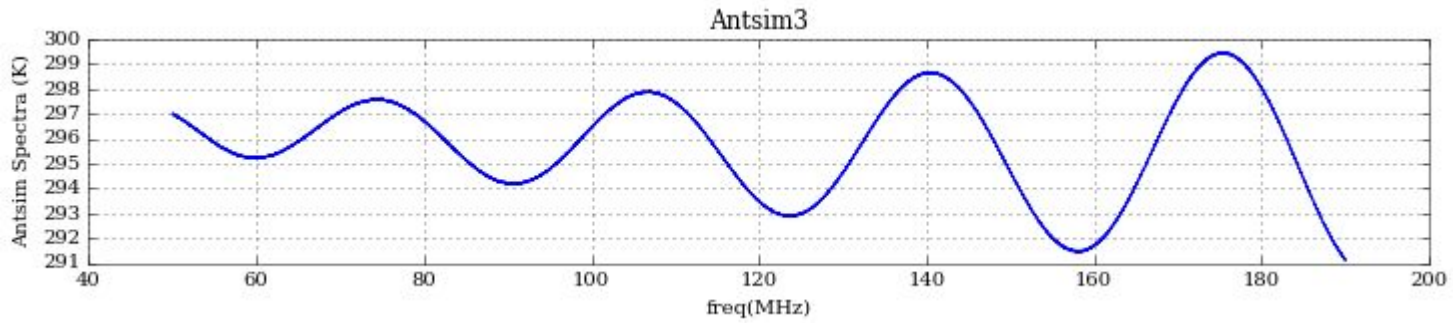


Figure2: Uncalibrated Antsim3 Spectra taken with Rcv02 in 2019_05. No strong RFI is seen

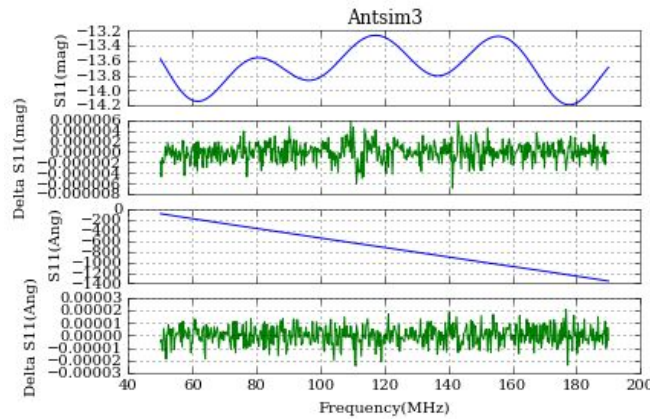


Figure3: S11 of the Antsim3 after internal switch correction applied

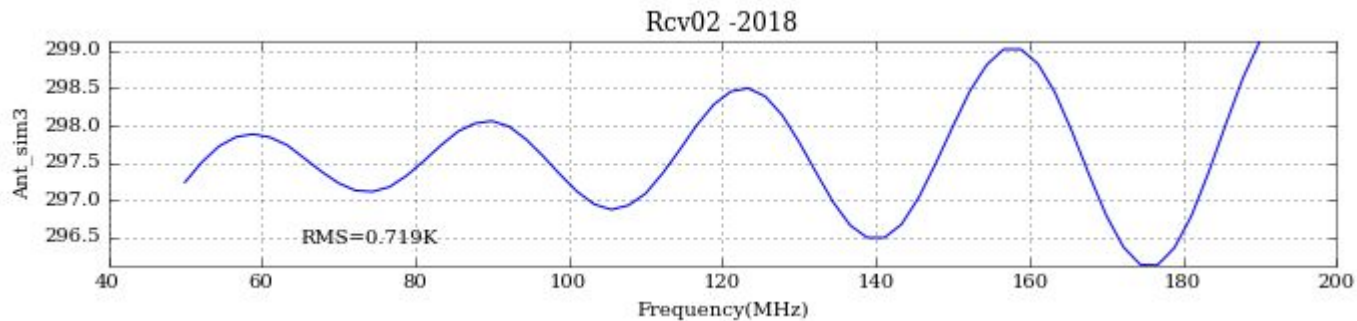


Figure4: Calibrated 2019_05 Antsim3 Spectra taken with Rcv02 using Cal coefficients and rcv S11 from 2018_09 but Antsim and switch S11 from 2019_05.

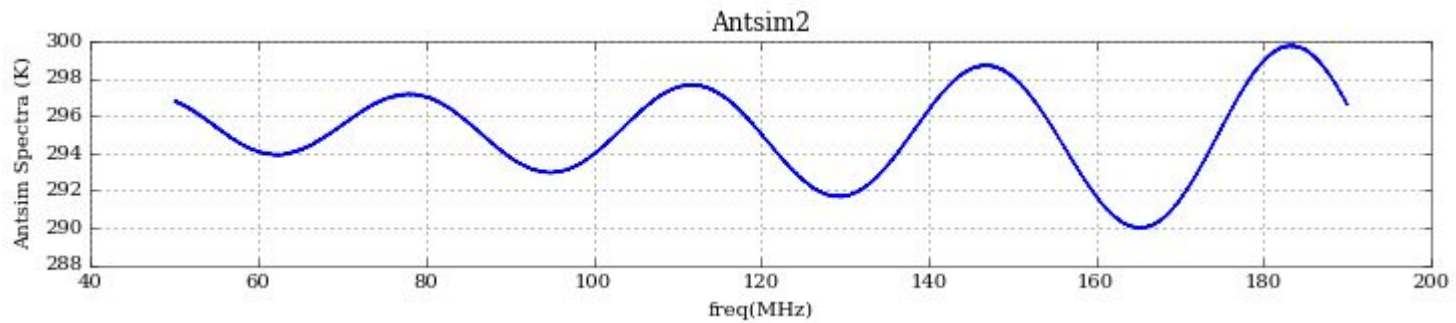


Figure5: Uncalibrated Antsim2 Spectra taken with Rcv02 in 2019_05. No strong RFI is seen

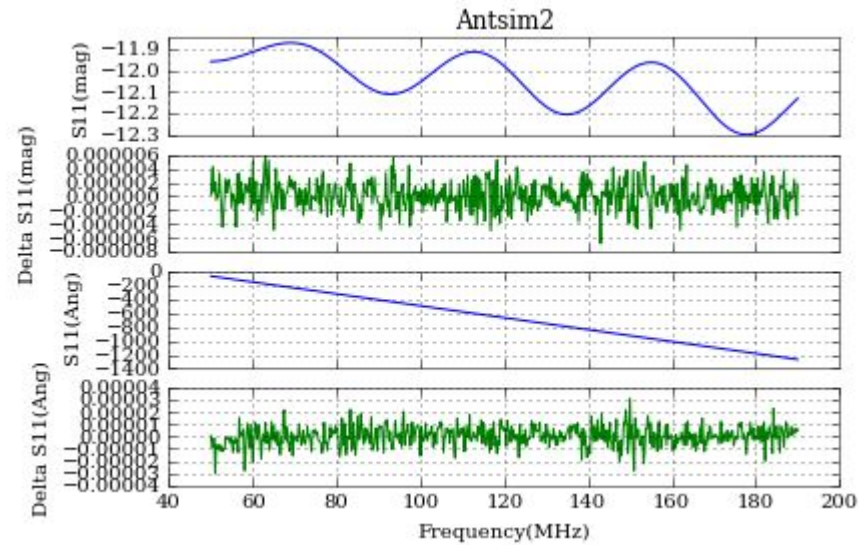


Figure6: S11 of the Antsim2 after internal switch correction applied

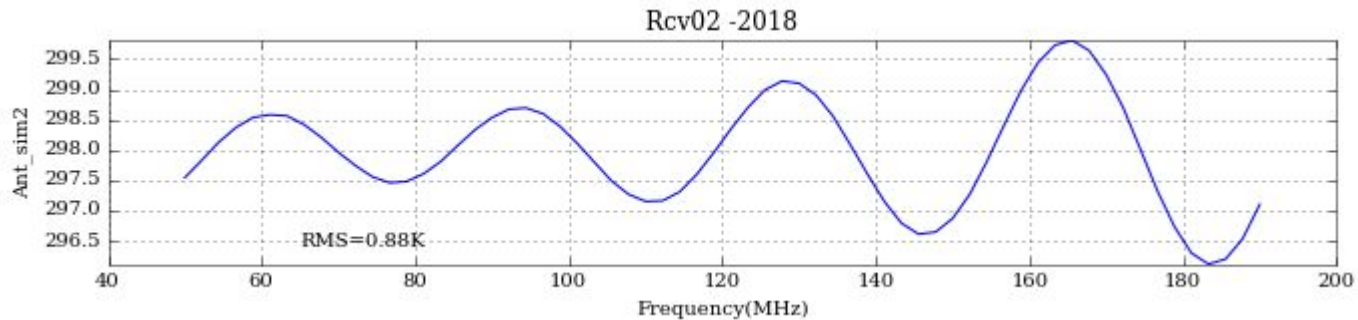


Figure7: Calibrated 2019_05 Antsim3 Spectra taken with Rcv02 using Cal coefficients and rcv S11 from 2018_09 but Antsim and switch S11 from 2019_05.

We redid the Rcv02 calibration completely by measuring all the calibration sources and the receiver S11. With the new measurements, the cal coefficients were re-calculated and the Antsim2 was recalibrated as shown below

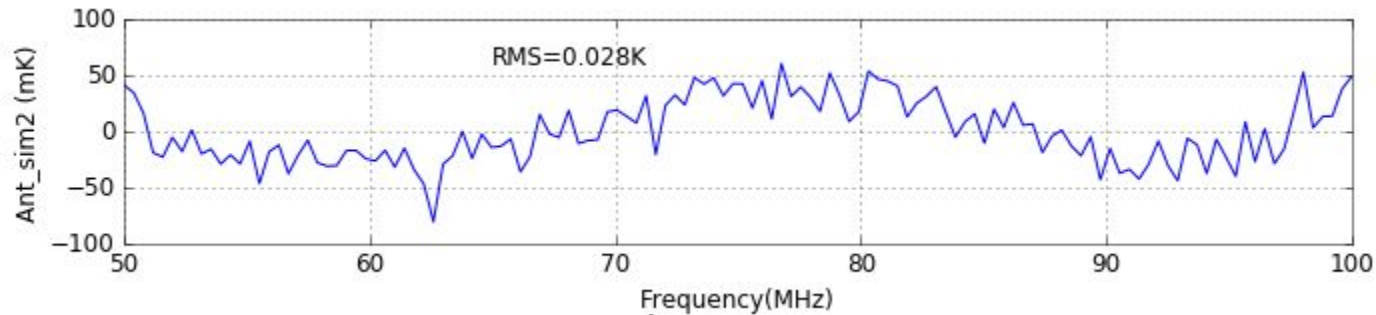


Fig: Calibrated Antsim2 spectra (2019_05) after removing a constant term. 7 terms were used for C1 & C2 and 8 terms for Tu, Tc and Ts

Comparing the obtained residues to the ones Raul calculated in 2017 for Lowband2

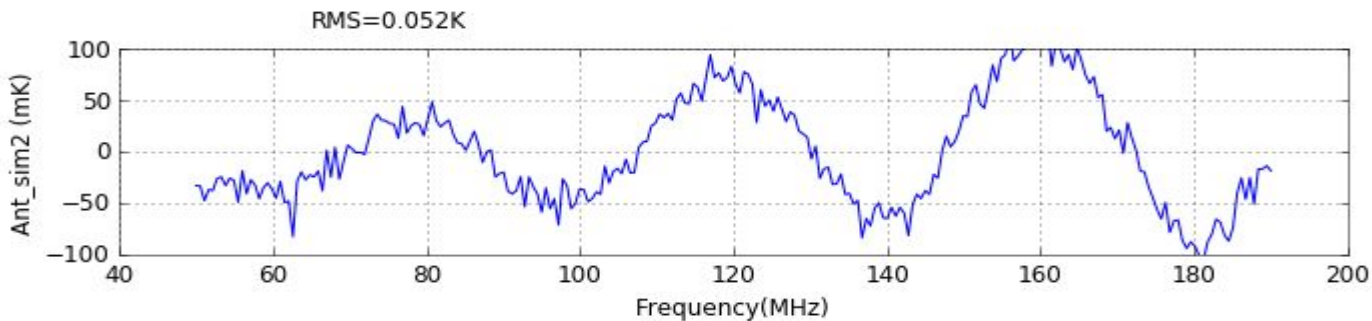
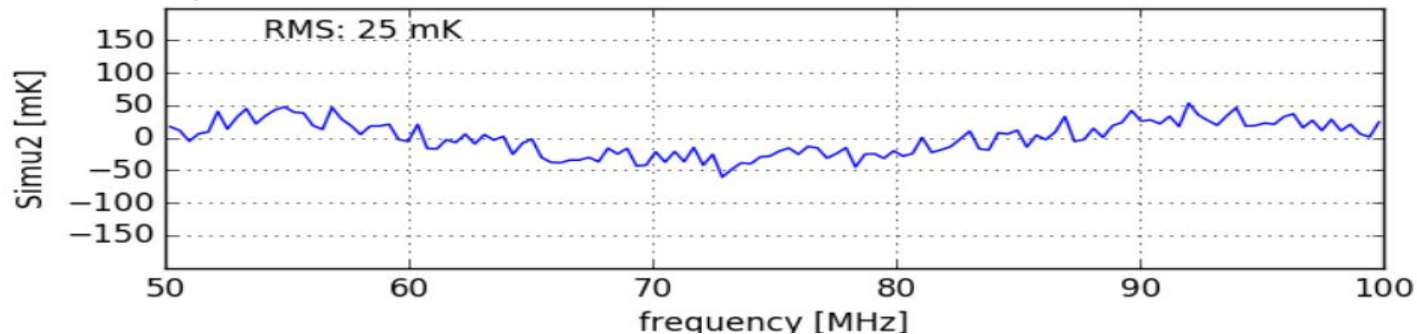


Fig: Calibrated Antsim2 spectra (2019_05) after removing a constant term. 11 terms were used for C1 & C2 and 12 terms for Tu, Tc and Ts

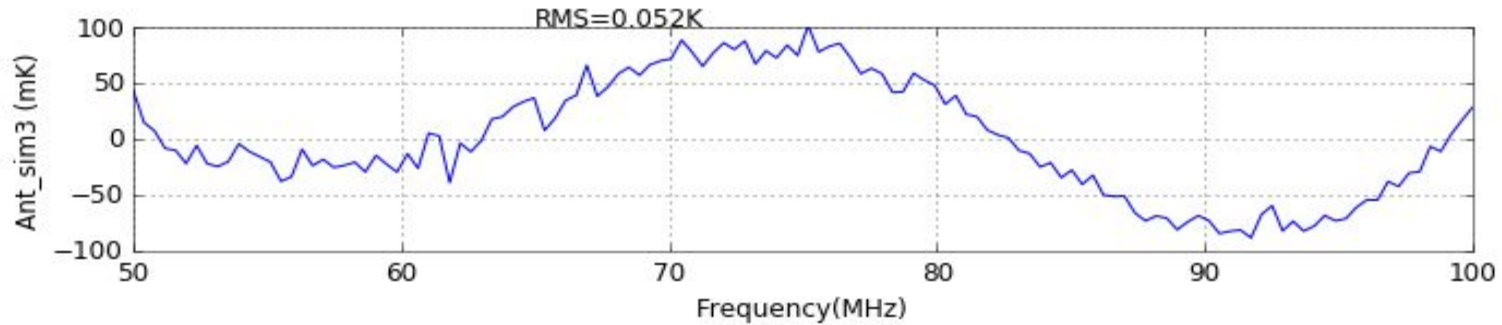


Fig: Calibrated Antsim2 spectra (2019_05) after removing a constant term.

Comparing the residues to the measurement in 2018_09 with Rcv02

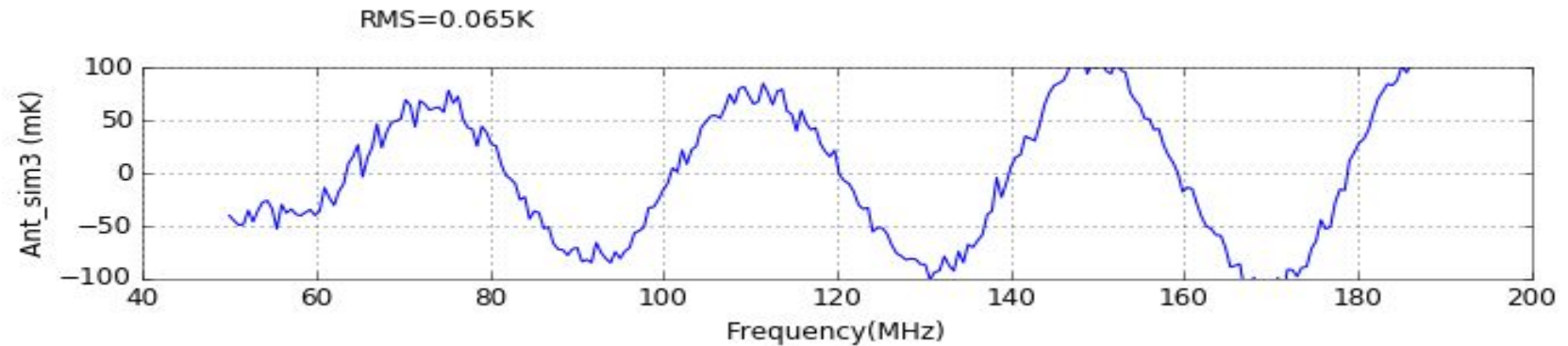
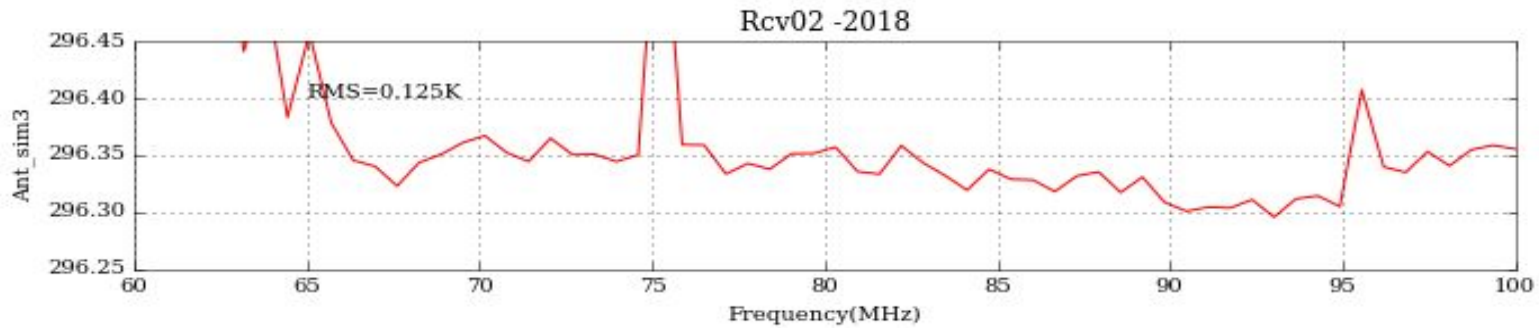


Fig: Calibrated Antsim2 spectra (2019_05) after removing a constant term.

Comparing the receiver coefficients for the two calibration cases between the frequency range 50 - 100 MHz.

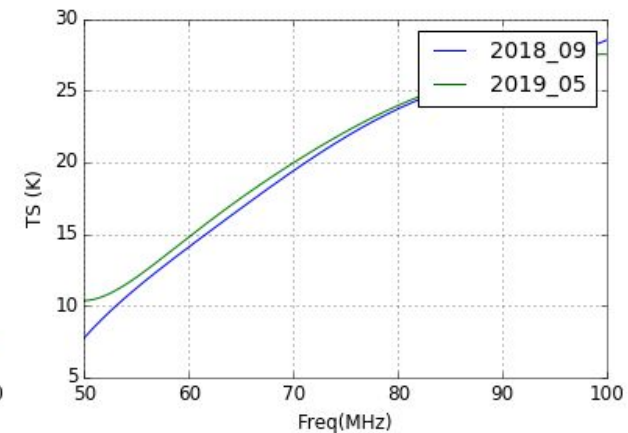
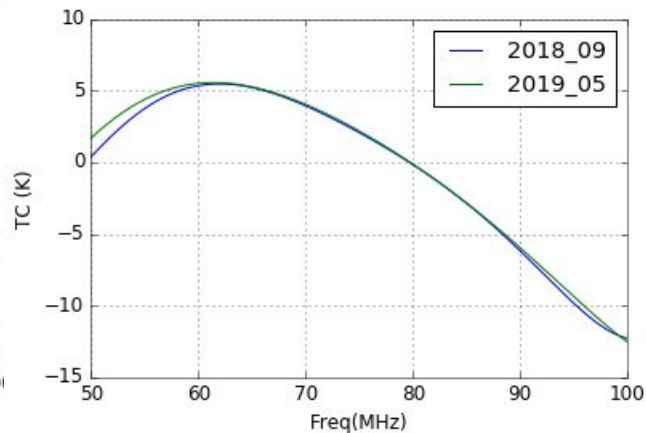
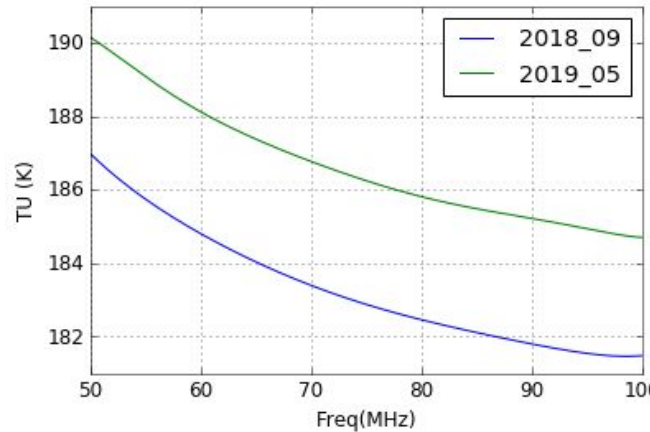
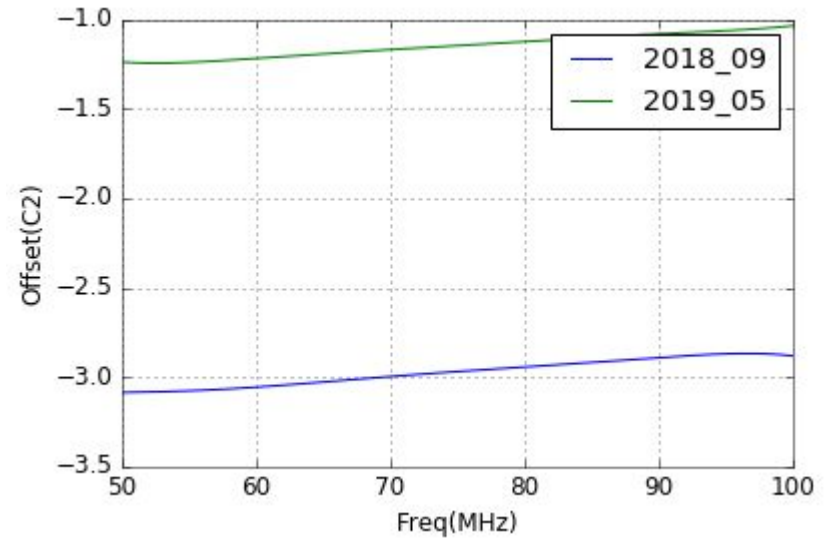
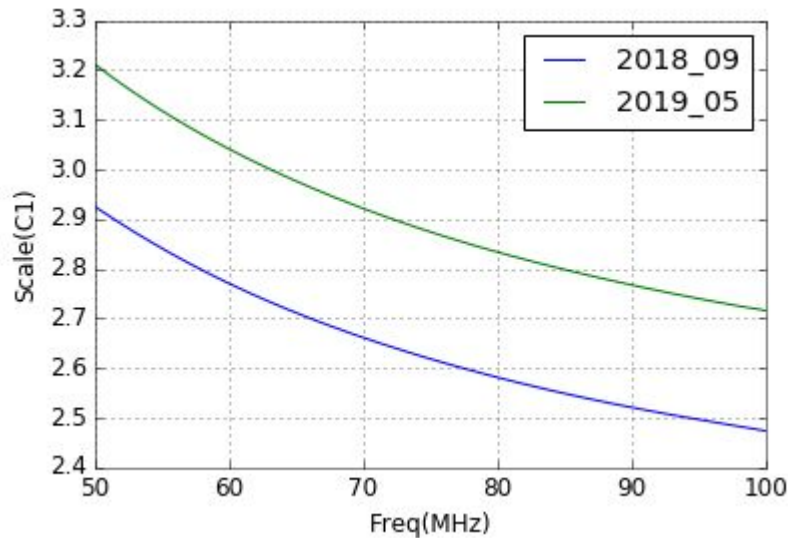


Fig: Receiver coefficients versus frequency between the range 50 -100 MHz for Rcv02. The 2018_09 used 7 terms for all coeff. The 2019_05 used 7 terms for C1,C2 and 8 for Tu, Tc,Ts.

Comparing the receiver coefficients for the two calibration cases between the frequency range 50 - 190 MHz.

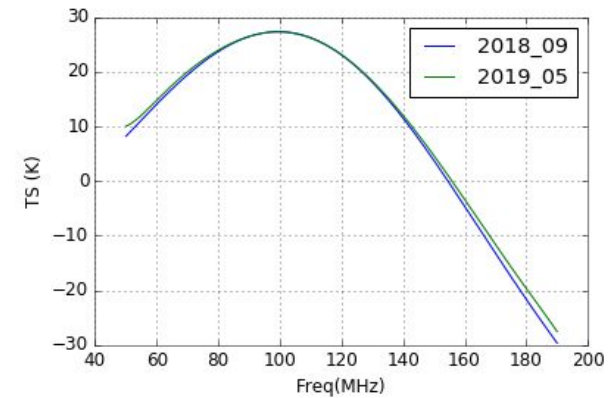
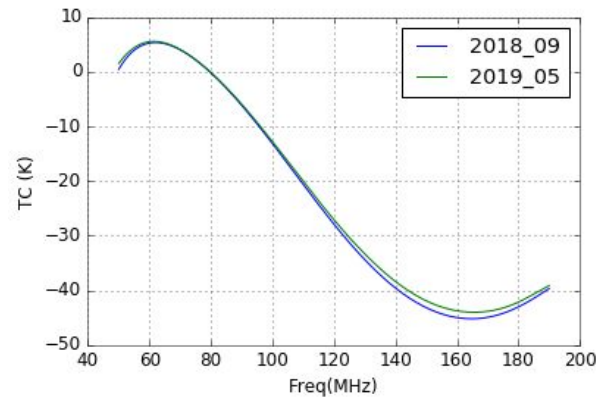
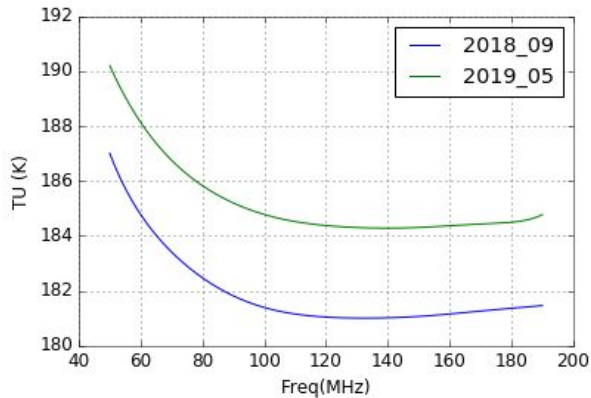
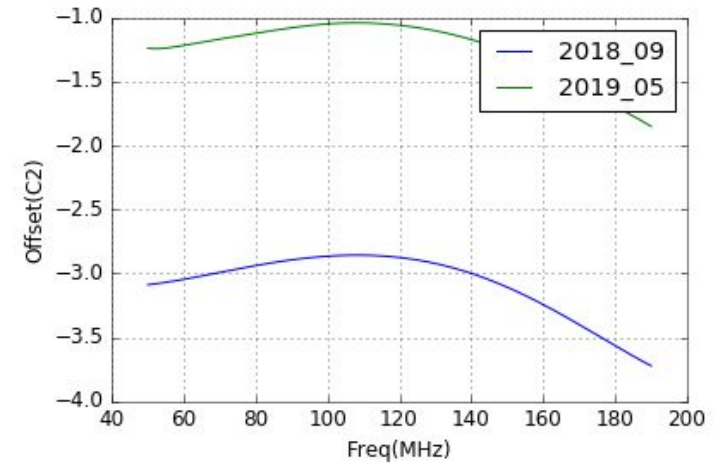
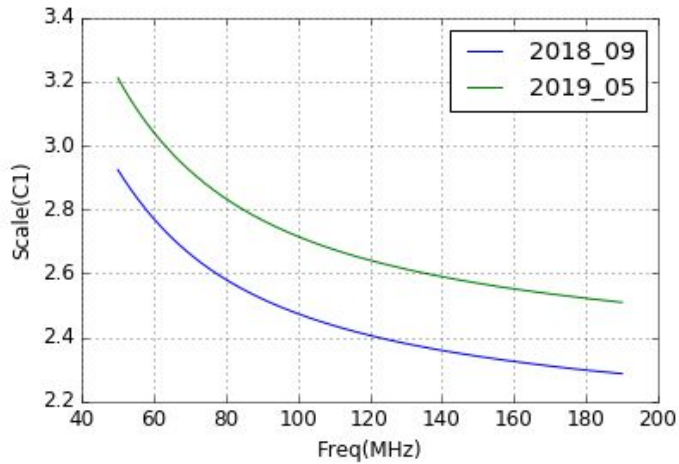


Fig: Receiver coefficients versus frequency between the range 50 -190 MHz for Rcv02. The 2018_09 used 7 terms for C1,C2 and 9 for Tu, Tc,Ts. The 2019_05 used 11 terms for C1,C2 and 12 for Tu, Tc,Ts.