Phase Solutions

3C295 HBA (November 2012)

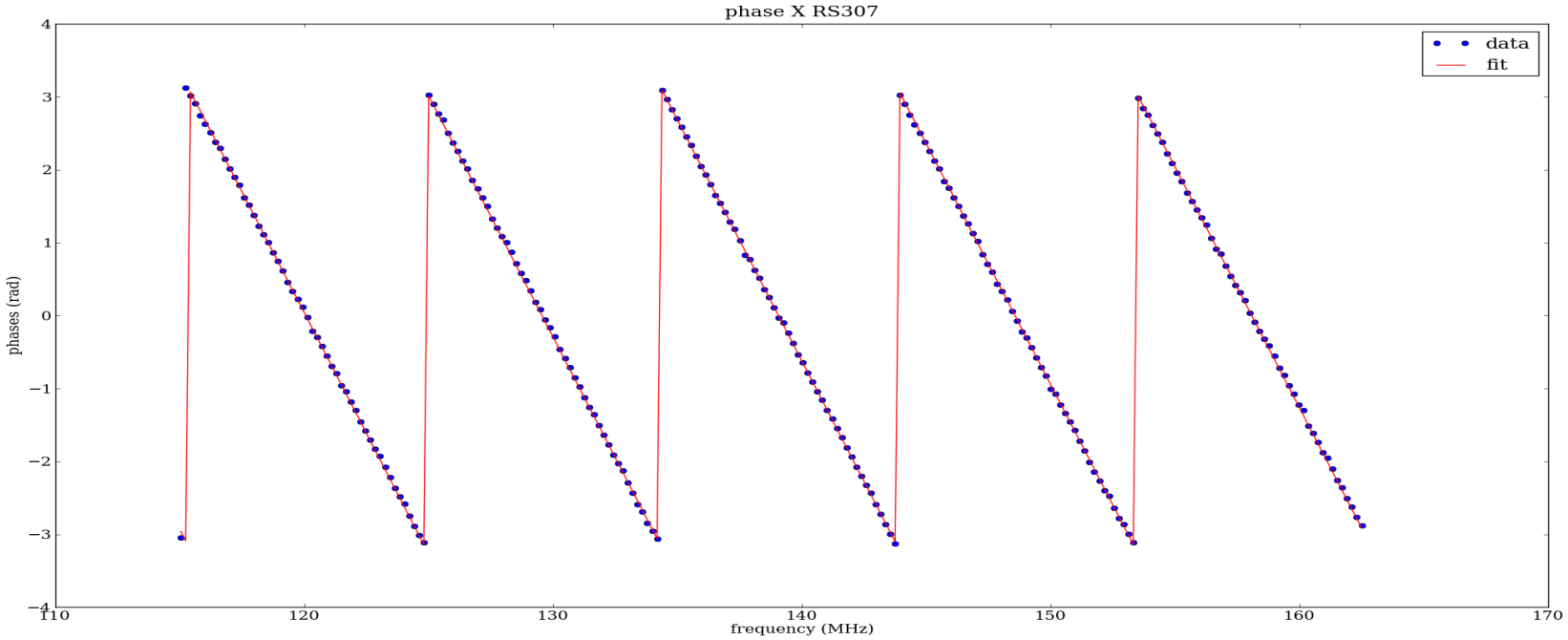
BBS: fit diagonal complex gain + 1 real rotation per SB

Clock-TEC separation on diagonal phase solutions

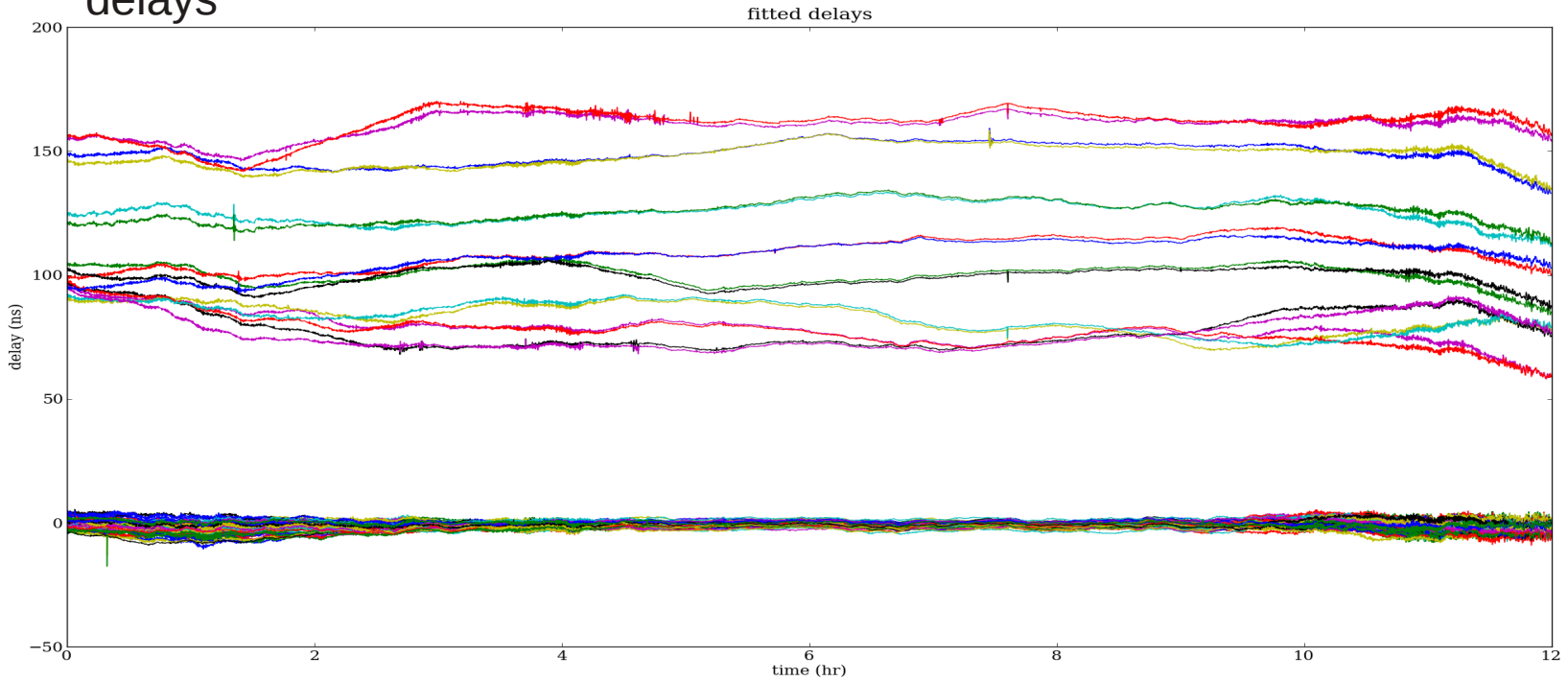
fitted function: $2\pi * \text{delay} * \text{freq} + 8.45e9 * \text{dTEC}/ \text{freq} + \text{offset}$

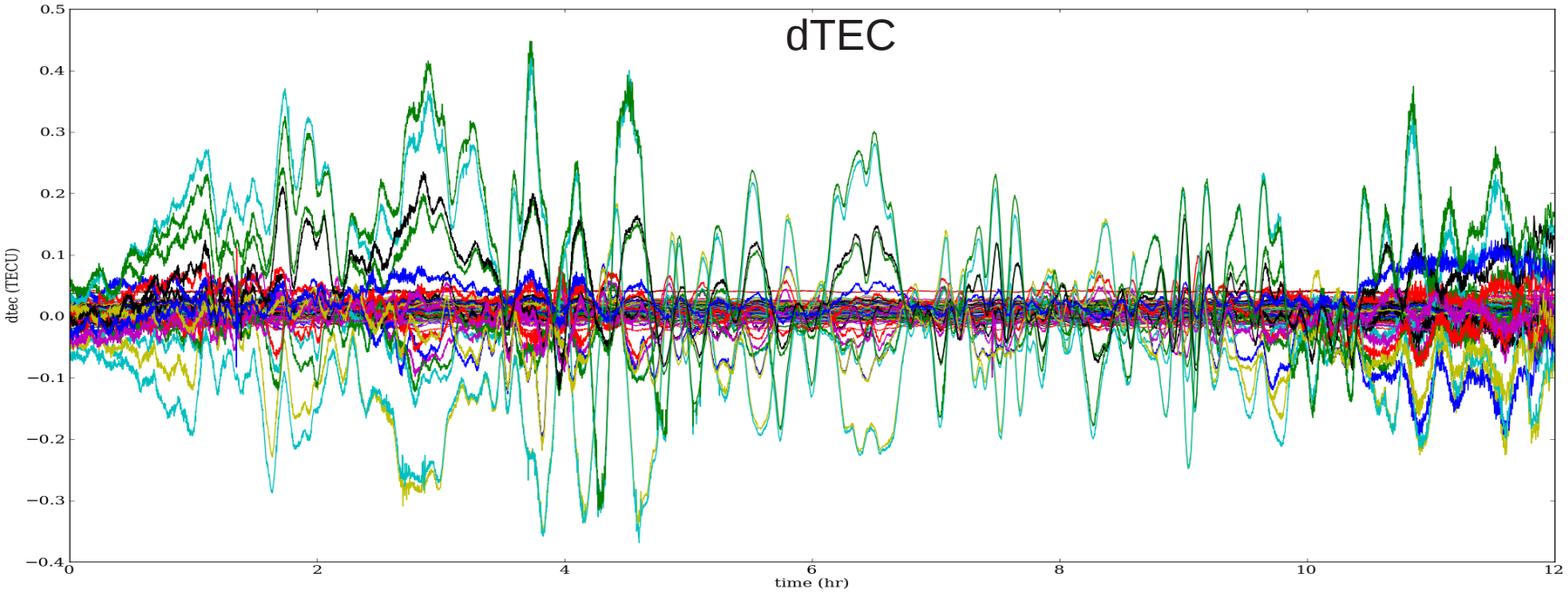
method:

- loop over all possible dtec and delay values to initialize fit parameters.
- transfer solutions in time to speed up



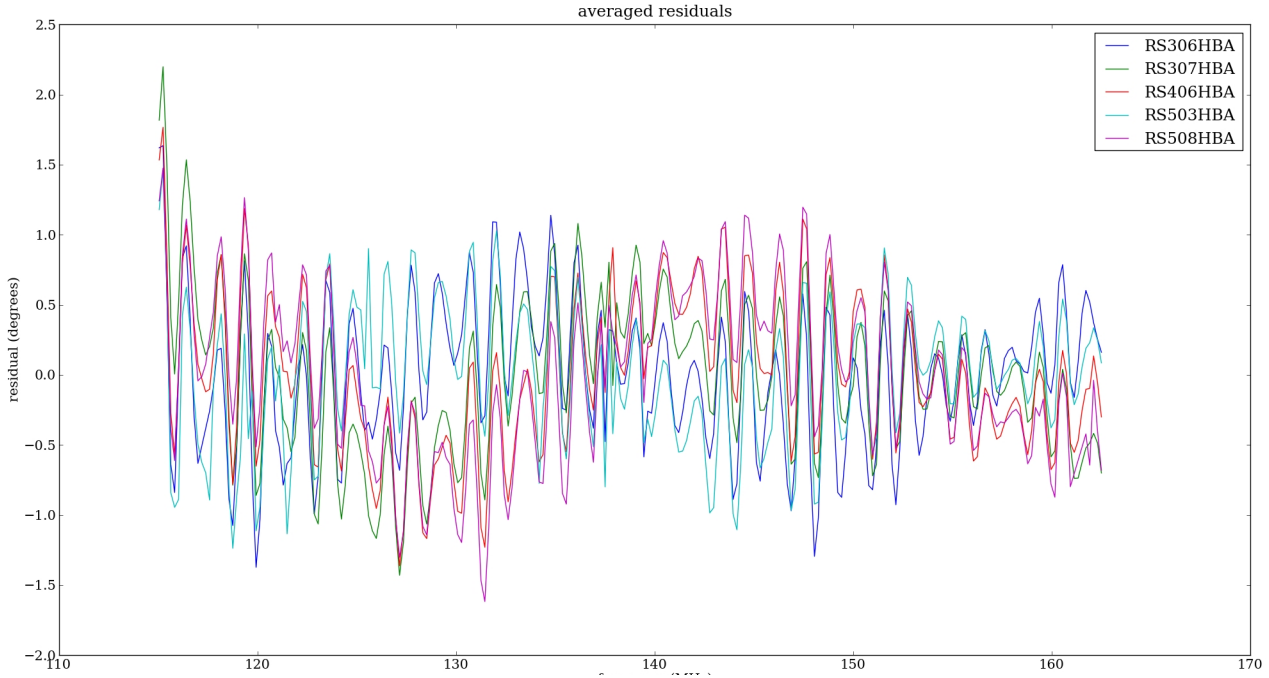
delays


fitted delays
delay (ns)
time (hr)
200
150
100
50
0
−50
0
2
4
6
8
10
12


dTEC
dtec (TECU)
time (hr)
0.5
0.4
0.3
0.2
0.1
0.0
−0.1
−0.2
−0.3
−0.4
0
2
4
6
8
10
12

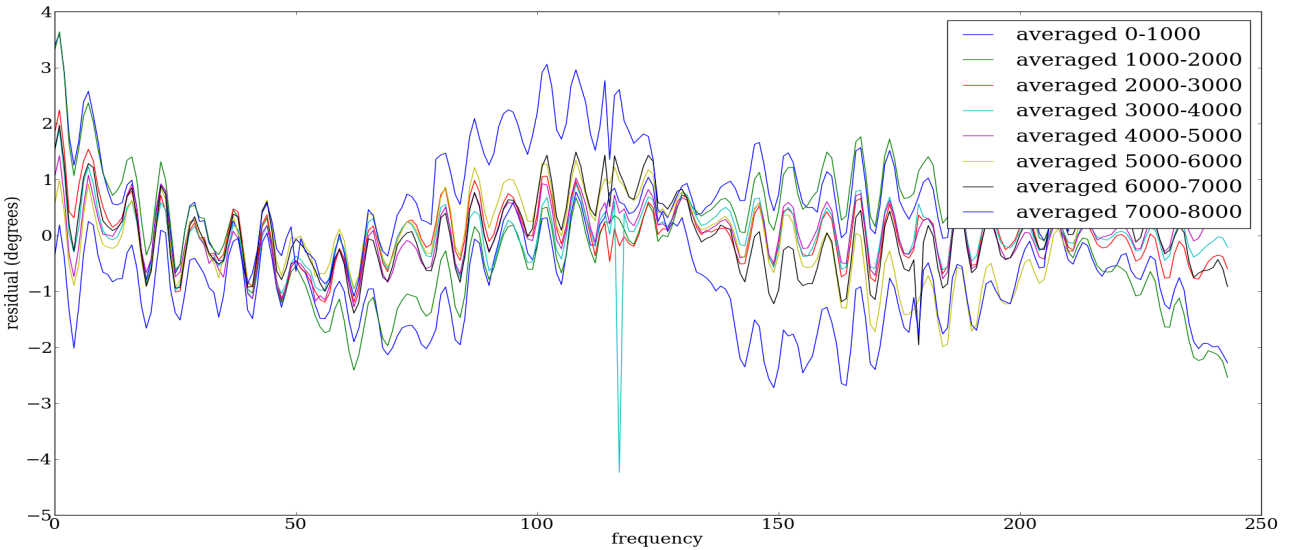
Residuals

averaged residuals (12hr)

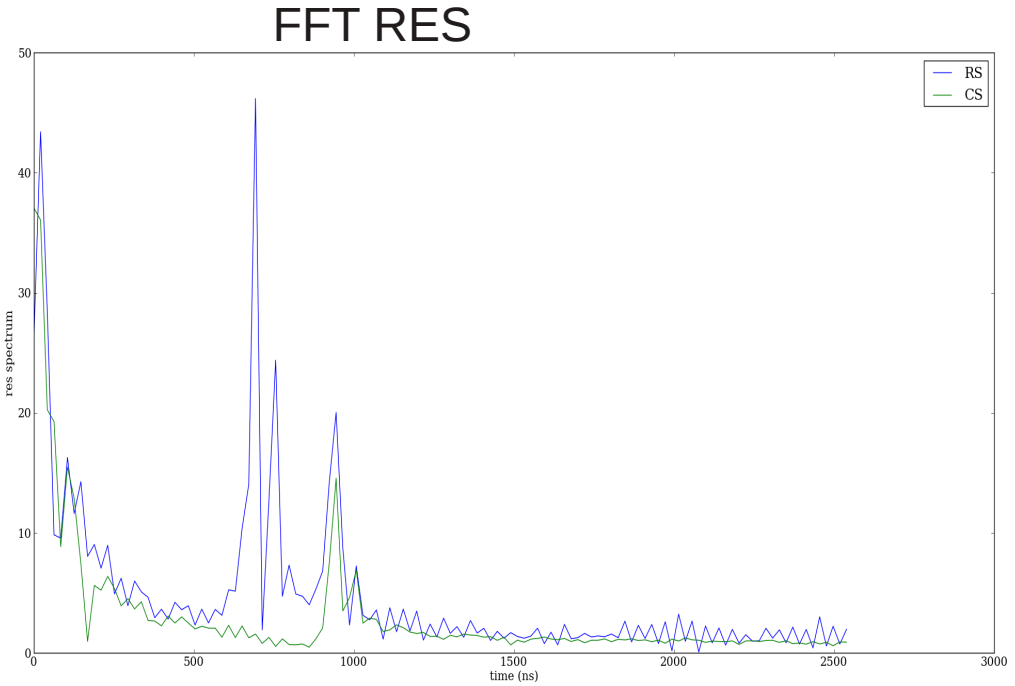


averaged residuals RS307

per 1000 timeslots



Reflections?



RS show 2 peaks (CS only 1) corresponding to delays of 700 and 920 ns

assuming signal speed in high performance cables of 0.8c: length = 166 and 222m

reflections → cable lengths:

83 m and 111 m

coax cable lengths from tiles to RCUs are 85 and 115 m (CS only 115m) !

Thanks: Fransesco de Gasperin, Bas vd Tol, Reinout van Weeren, Michiel Brentjens,...