



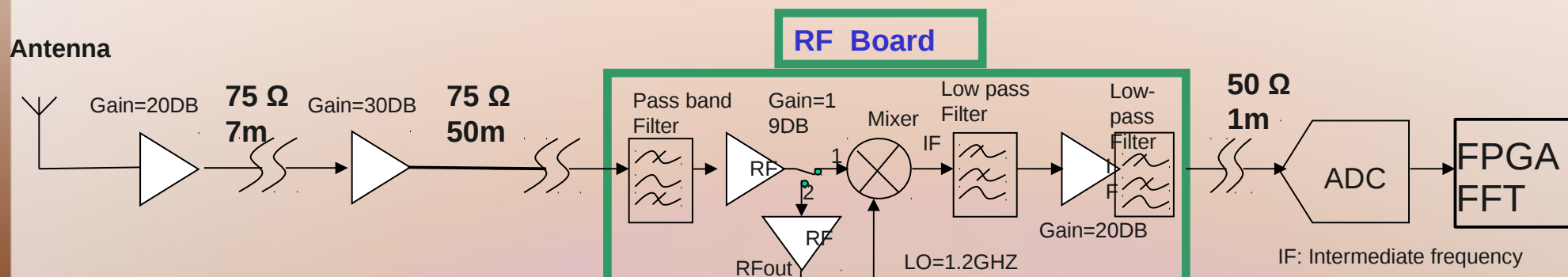
# BAO

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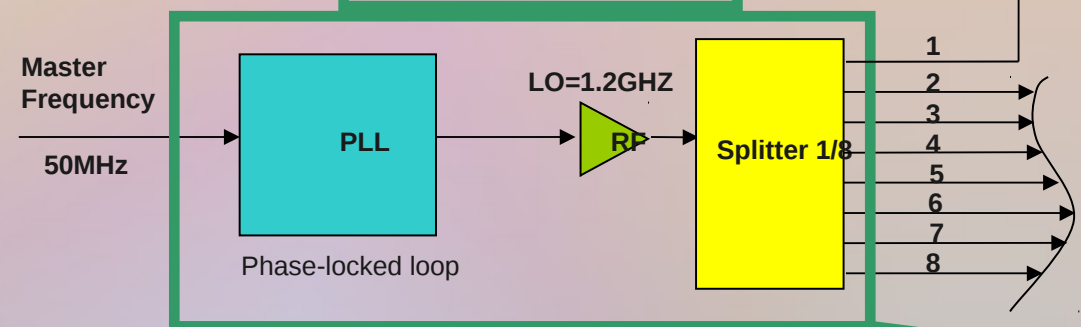
- Current Electronics
- Electronics up-grade
  - Analog
  - Digital
- Undersampling results



# Current analogue chain

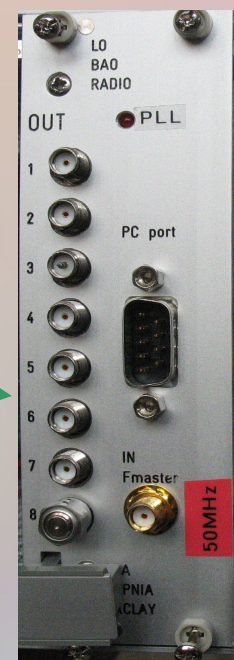


## LO Prototype Board



## Local Oscillator

## RF amplifier, mixer



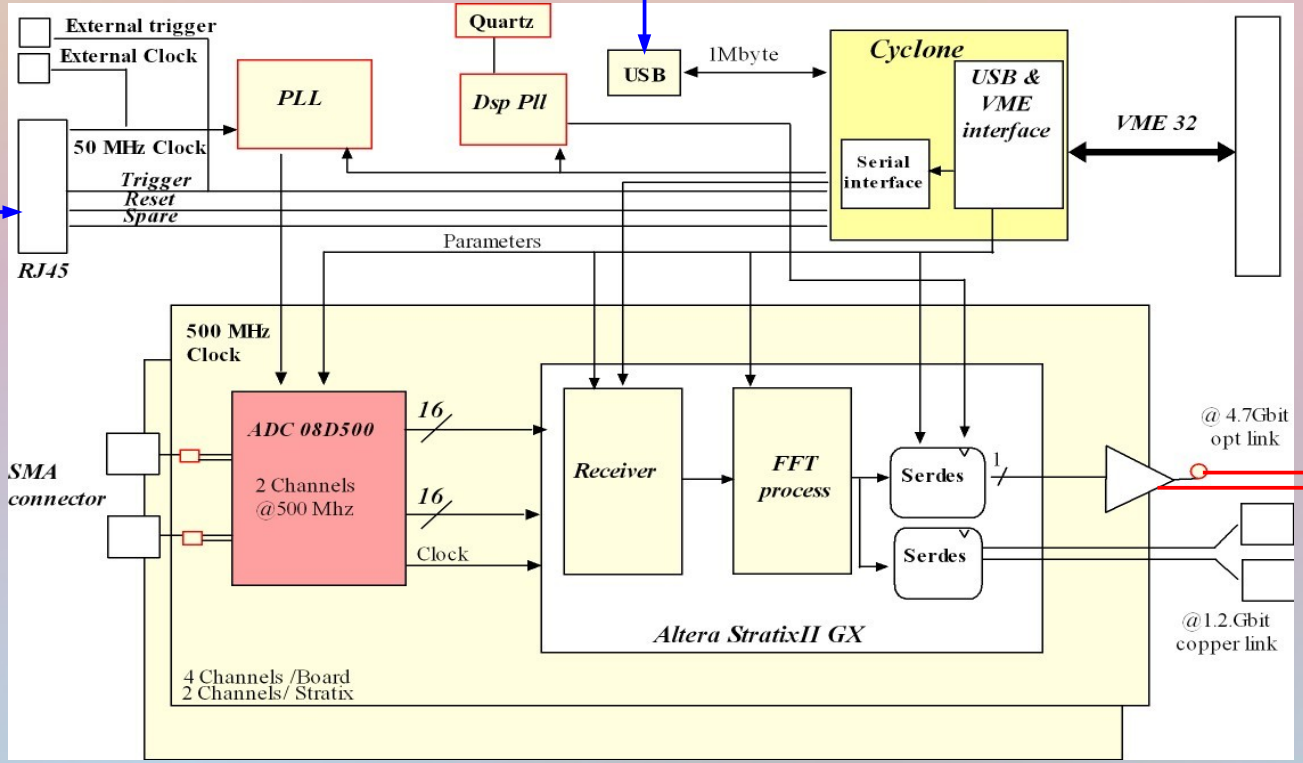
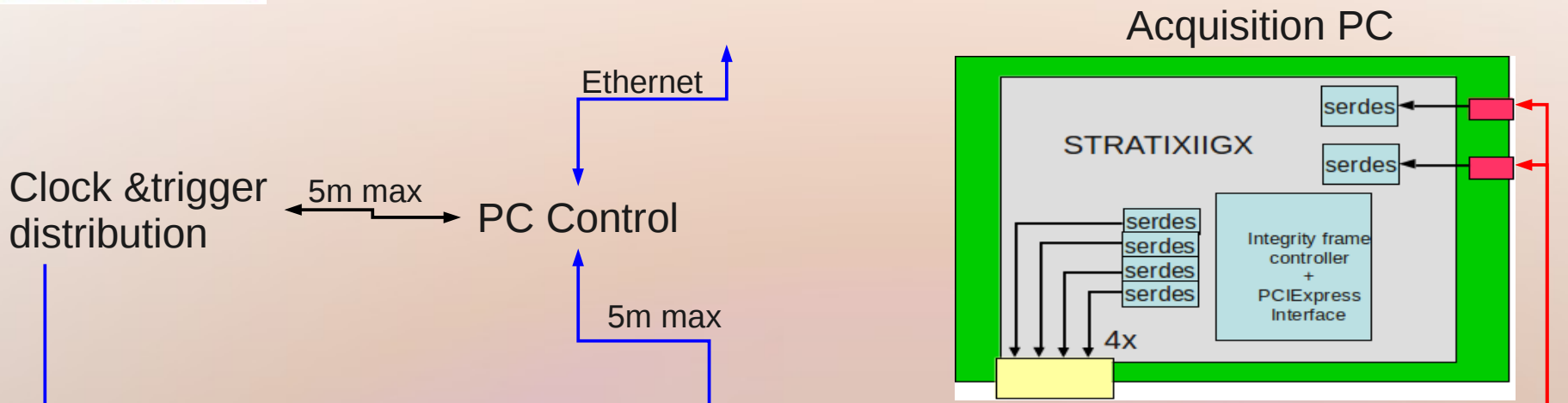
Front panel plug-in (3U EuroCard)

## RF board:

- 75Ω/50Ω inputs
- 2 channels per board
- Possibility of by-passing mixer to test the under-sampling approach.

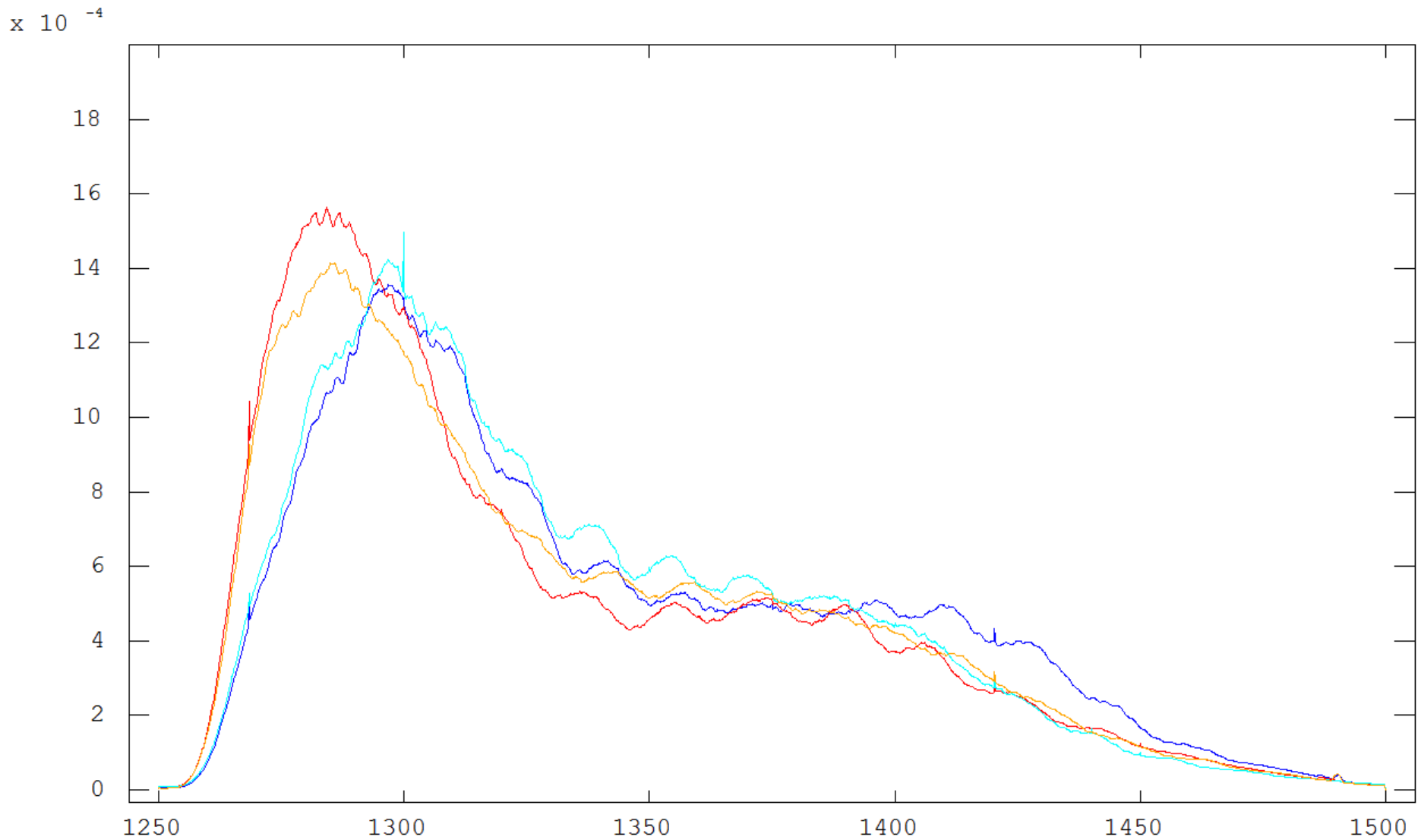


# Current numerical chain



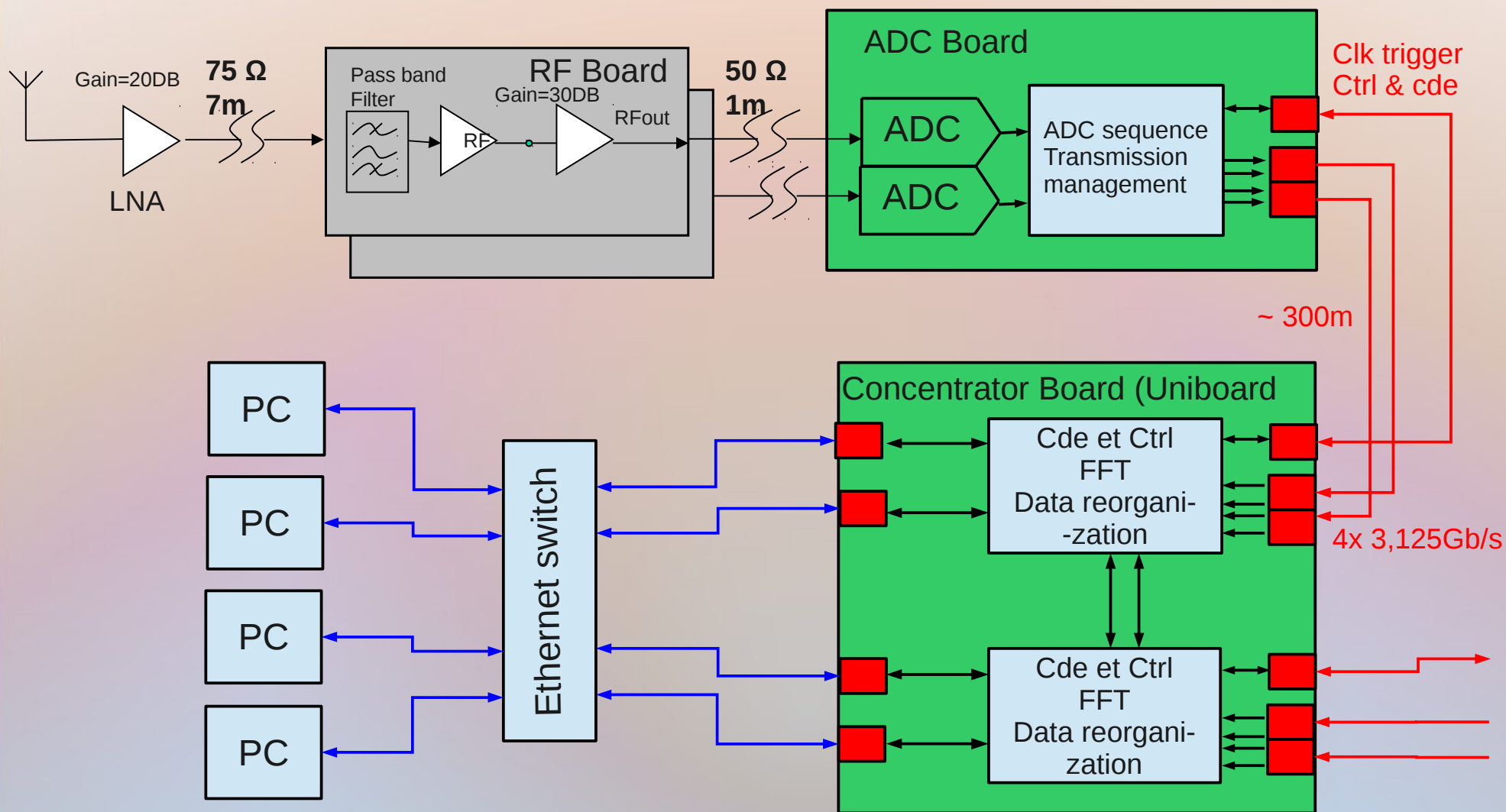


# analogue problem

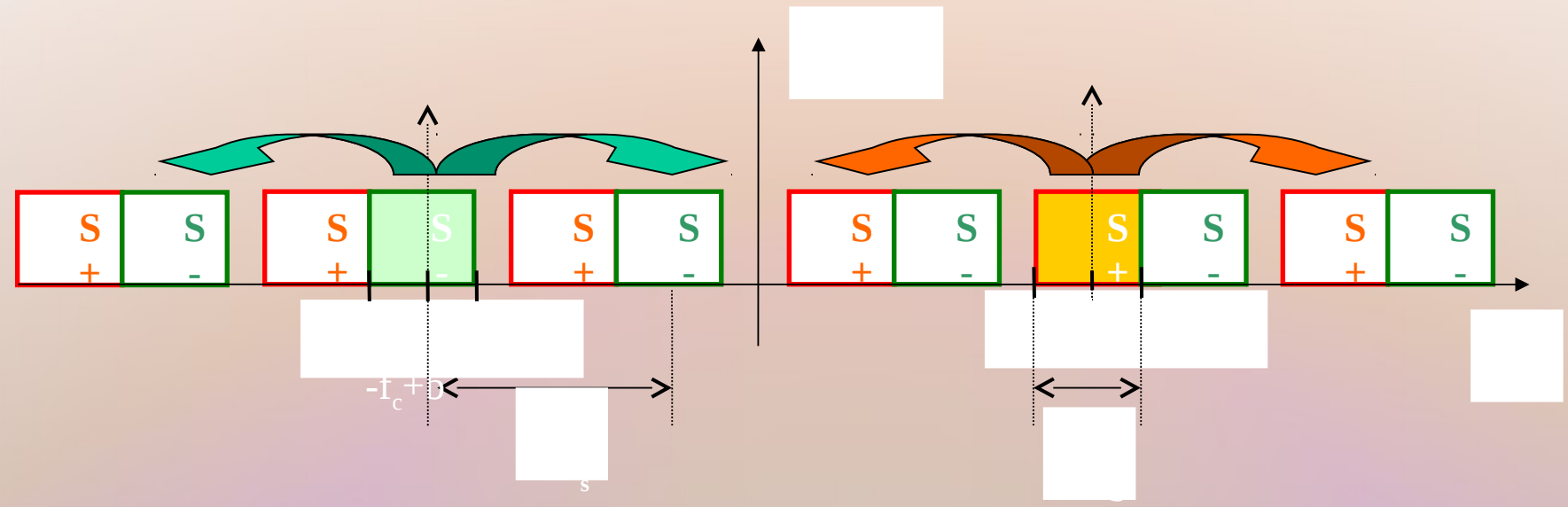




# Future BAO electronic system



# Under-sampling theory



Frequency 1250MHz-1500MHz

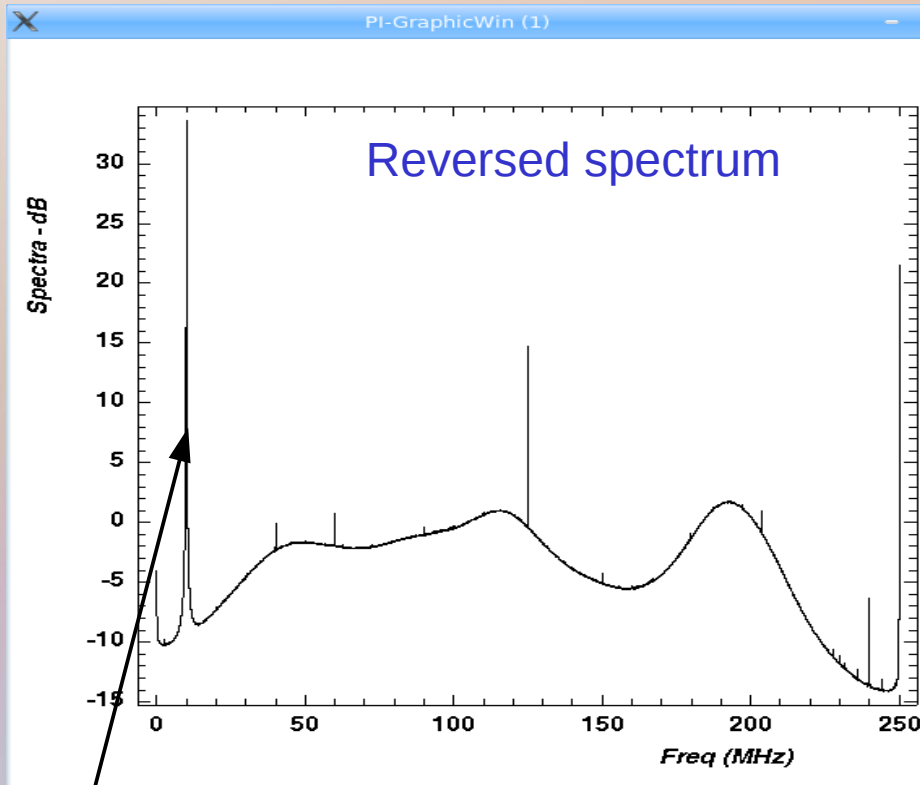
Frequence centrale (MHz)	demi-bande	freq basse	freq. Haute	Ordre du sous-echantillonnage	k	Fs Mini	Fs Maxi
vc	B	vc - B	vc + B	$(vc - B)/2B$		$2(vc + B) / (k+1)$	$2(vc - B) / k$
1375	125	1250	1500	5	5	500	500
1375	125	1250	1500		4	600	625
1375	125	1250	1500		3	750	833



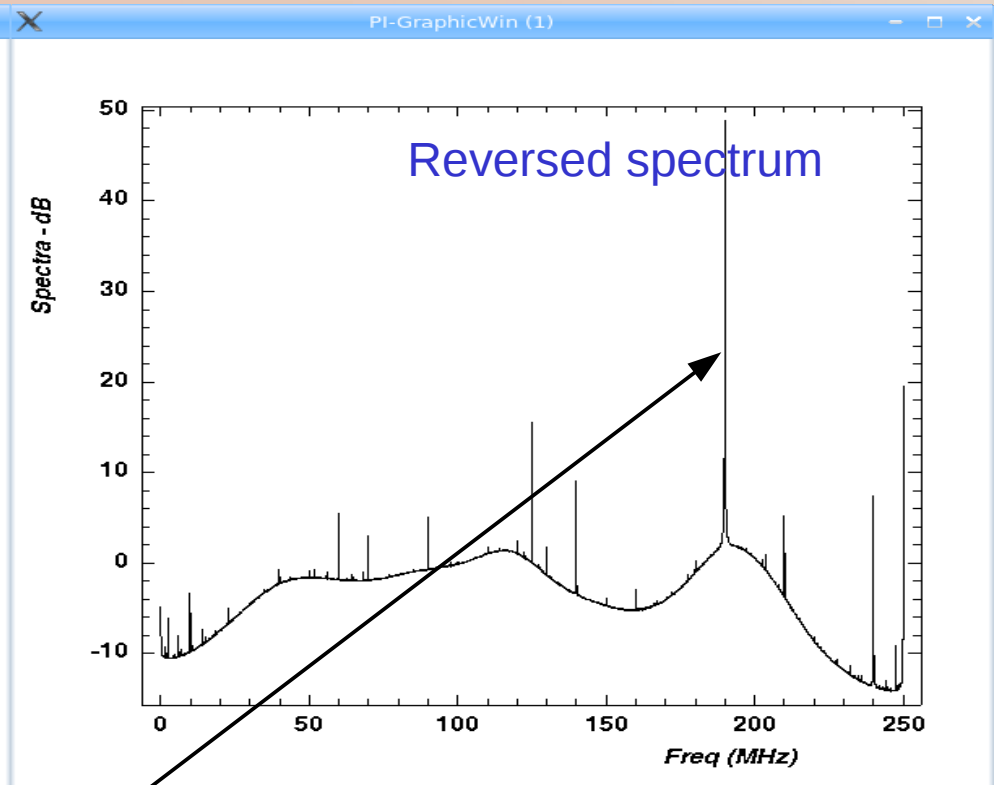
# Under-sampling result 1

Signal frequency :  $F=1490$  MHz  
(high limit)

Signal frequency :  $F=1490$  MHz



$$10 \text{ MHz} = -1490 \text{ MHz} + 3 \times 500 \text{ MHz}$$



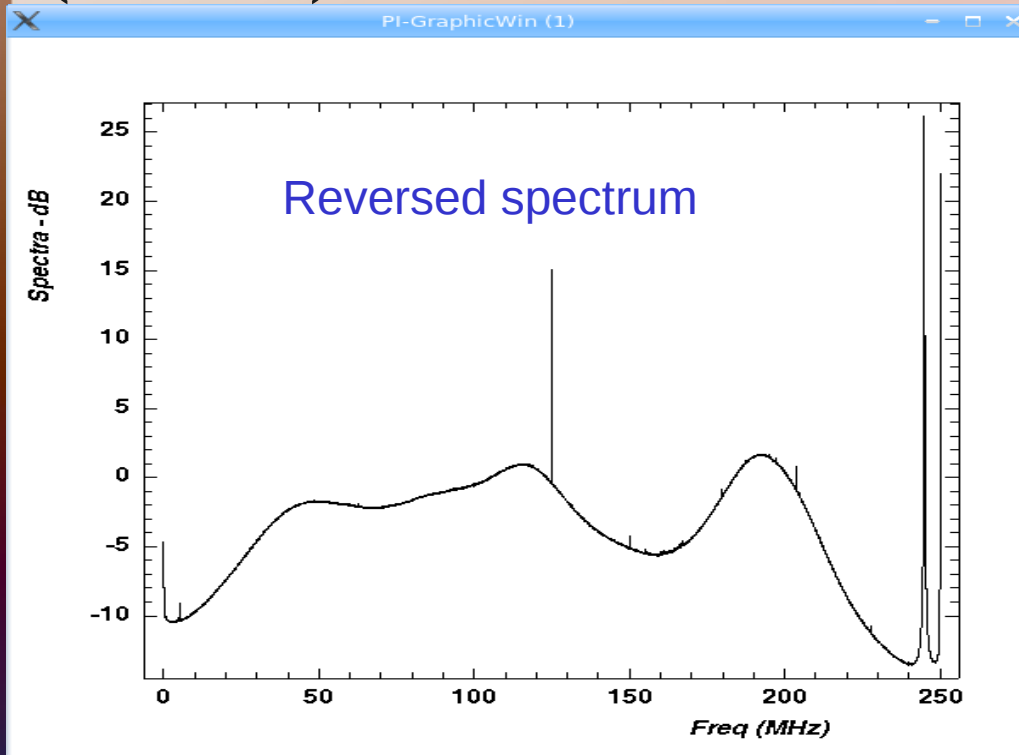
$$190 \text{ MHz} = -1310 \text{ MHz} + 3 \times 500 \text{ MHz}$$





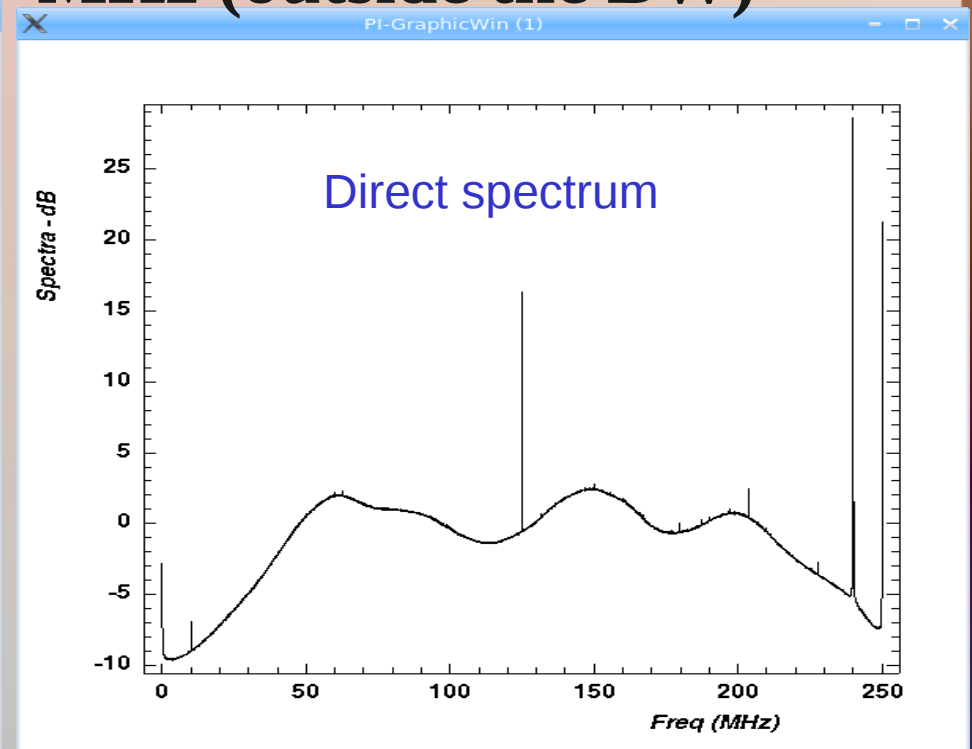
# Under-sampling result 2

Signal frequency :  $F=1255$  MHz  
(low limit)



$$245 \text{ MHz} = -1255 \text{ MHz} + 3 \times 500 \text{ MHz}$$

Signal frequency :  $F=1240$  MHz  
(outside the BW)



$$240 \text{ MHz} = 1240 \text{ MHz} - 2 \times 500 \text{ MHz}$$





# conclusion

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With a sampling rate of 500 MHz, the spectrum inside the bandwidth [1250 MHz -1500 Mhz] is translated and reversed between 0 and 250 MHz.

To avoid the spectrum overlap, it is necessary to filter the useful band.