

# TX FIR range of C2C

Junqing (Phil) Sun, Credo  
Yasuo Hidaka, Credo

IEEE P802.3ck Task Force  
July, 2020

# Introduction

- ❖ This contribution is to optimize C2C TX FIR range
- ❖ COM tool is used to evaluate TX FIR range.
  - ❖ Real SERDES and channel may have other causes for wider TX FIR range. Tr is used as a proxy of these causes in this work.
- ❖ 2.5% step size is used in this TX FIR range study as it is the maximum allowed TX step size.

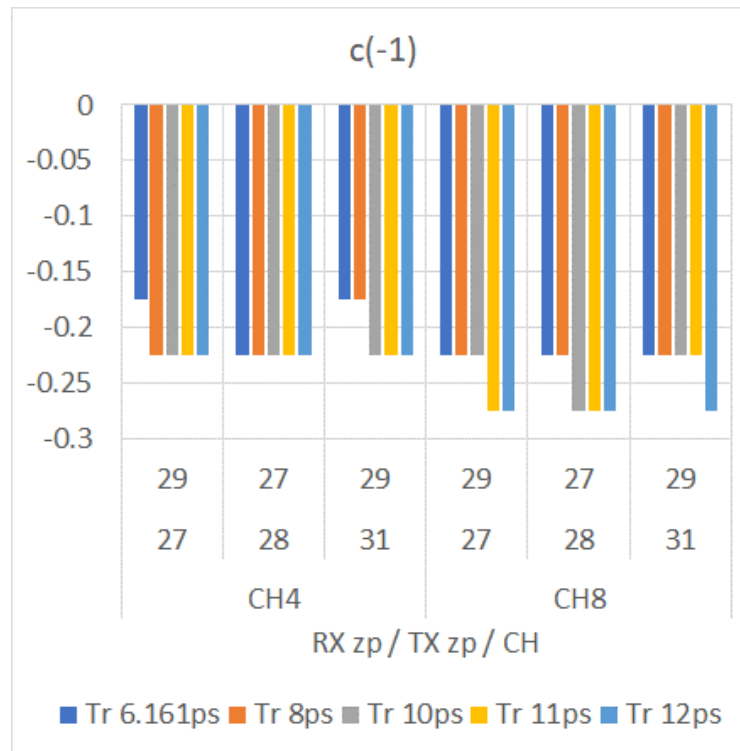
# Simulation Conditions

- ❖ Channels: Two representative C2C channels
  - ❖ CH4 lim\_3ck\_04\_0719\Asic\_Deep\_Mezz\_Retimer\_L23\_Thru.s4p
  - ❖ CH8 rabinovich\_3ck\_adhoc\_01a\_071019\Impaired\_C2C\_20dB\_P1\_to\_P2\_THRU\_ExtPEC.s4p
  - ❖ These are CH4 and CH8 in sun\_3ck\_01\_0320.pdf slide 9
  
- ❖ COM parameters (parameters not shown below are same as D1.2)
  - ❖ COM tool version 2.93

Parameter	Simulated values	Values in D1.2	Unit
Tr	[6.161 8.0 10.0 11.0 12.0]	TBD	ps
TX zp RX zp	[27 29; 28 27; 31 29]	[13 11; 31 29]	mm
C(-1)	[-0.35 : 0.025 : 0.00]	[-0.34 : 0.02 : 0.00]	
C(-2)	[0.00 : 0.025 : 0.125]	[0.00 : 0.02 : 0.12]	
C(-3)	[-0.075 : 0.025 : 0.0]	[-0.06 : 0.02 : 0.00]	
C(+1)	[-0.10 : 0.05 : 0.00]	[-0.10 : 0.05 : 0.00]	
C(0)	min 0.54	min 0.54	
fLF	fb / 40	fb / 80	

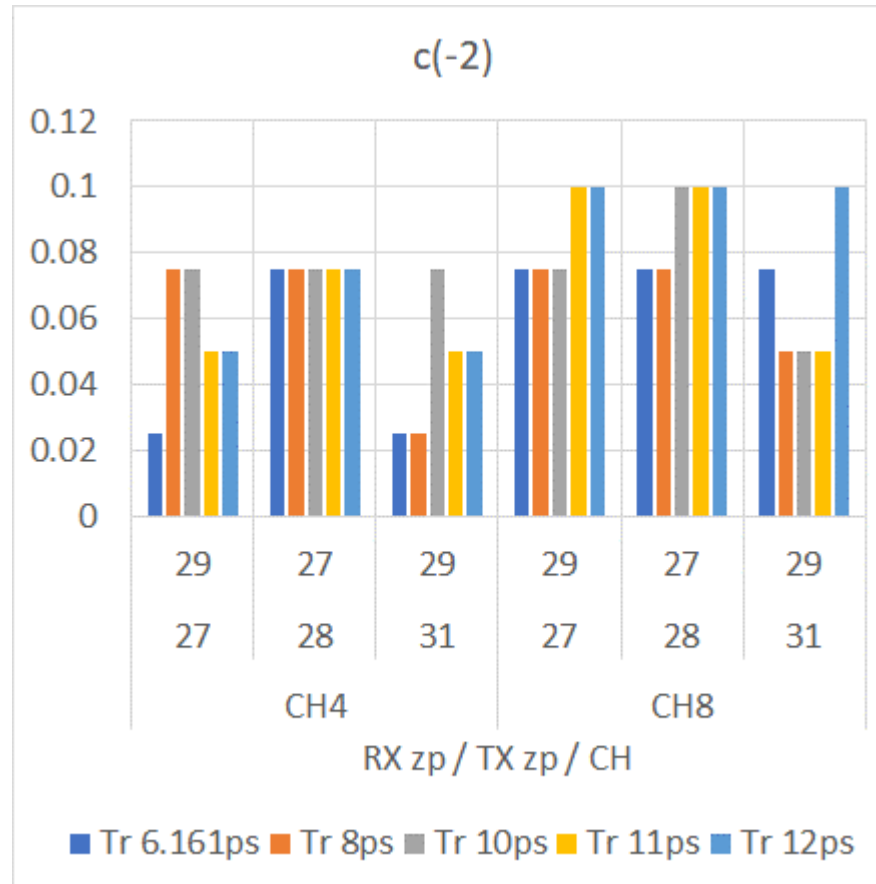
# Results of TX FIR c(-1)

- ❖ 27.5% C(-1) is observed in this simulation.
- ❖ c(-1) min in D1.2 is -0.34.
- ❖ Slower Tr requires wider range of c(-1).



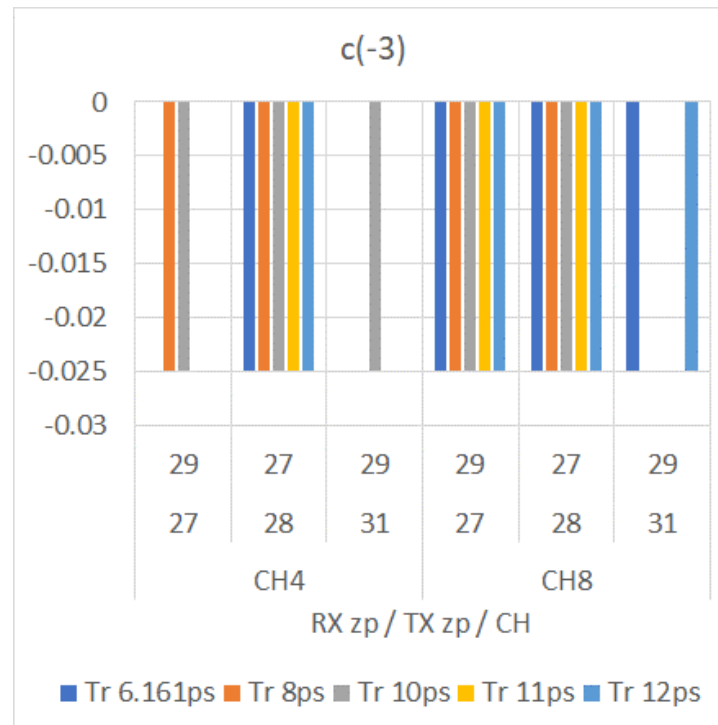
# Results of TX FIR c(-2)

- ❖ c(-2) goes up to 10% in this simulation.
- ❖ c(-2) max in D1.2 is 0.12.



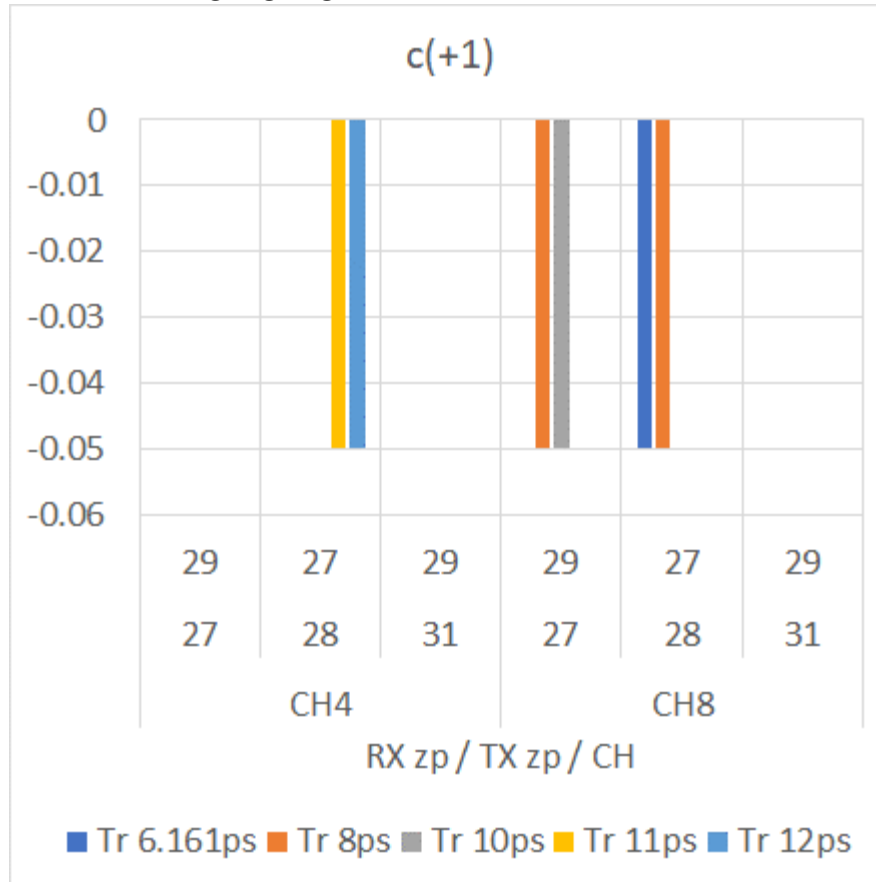
# Results of TX FIR c(-3)

- ❖ 2.5% c(-3) is observed in this simulation
- ❖ Real implementations may need heavier C(-3).
- ❖ C(-3) min in D1.2 is -0.06.



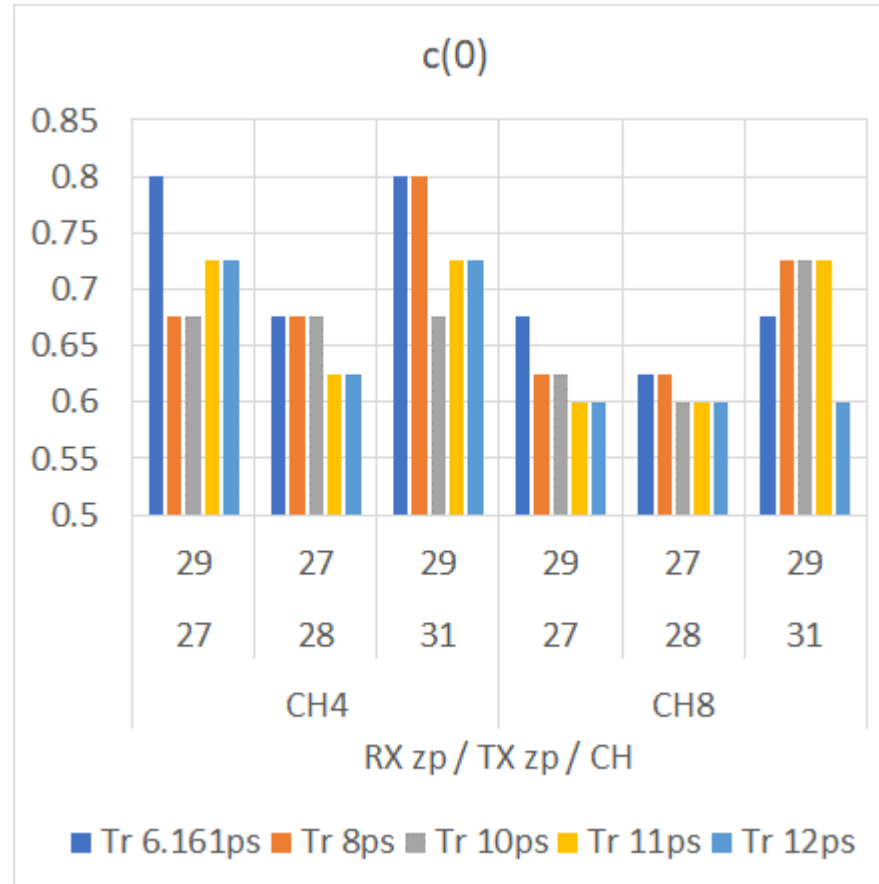
# Results of TX FIR c(+1)

- ❖ DFE based COM model does not need much C(+1).
- ❖ Some implementations may need C(1) for dynamic range.
- ❖ c(+1) min in D1.2 is -0.10.



# Results of TX FIR c(0)

- ❖ C(0) can go down to 0.6 in this simulation.
- ❖ c(0) min in D1.2 is 0.54.





# Summary

- ❖ Propose the following C2C TX FIR range:

	D1.2 COM Table	Proposal for Table 120F-1 TX Characteristics	Proposal for Table 120F-6 COM Parameters
C(-1)	[-0.34 : 0.02 : 0.00]	[-0.28 : 0.025 : 0.00]	[-0.28 : 0.02 : 0.00]
C(-2)	[0.00 : 0.02 : 0.12]	[0.00 : 0.025 : 0.10]	[0.00 : 0.02 : 0.10]
C(-3)	[-0.06 : 0.02 : 0.00]	[-0.05 : 0.025 : 0.0]	[-0.04 : 0.02 : 0.00]
C(+1)	[-0.10 : 0.05 : 0.00]	[-0.1 : 0.025 : 0.00]	[-0.1 : 0.05 : 0.00]
C(0)	min 0.54	min 0.6	min 0.6

# Backup Slides

# COM Values

- ❖ COM are checked for multiple Tr values.

