

100GBASE-CR1 FEC Performance

IEEE P802.3ck

Ad Hoc October 2nd, 2019

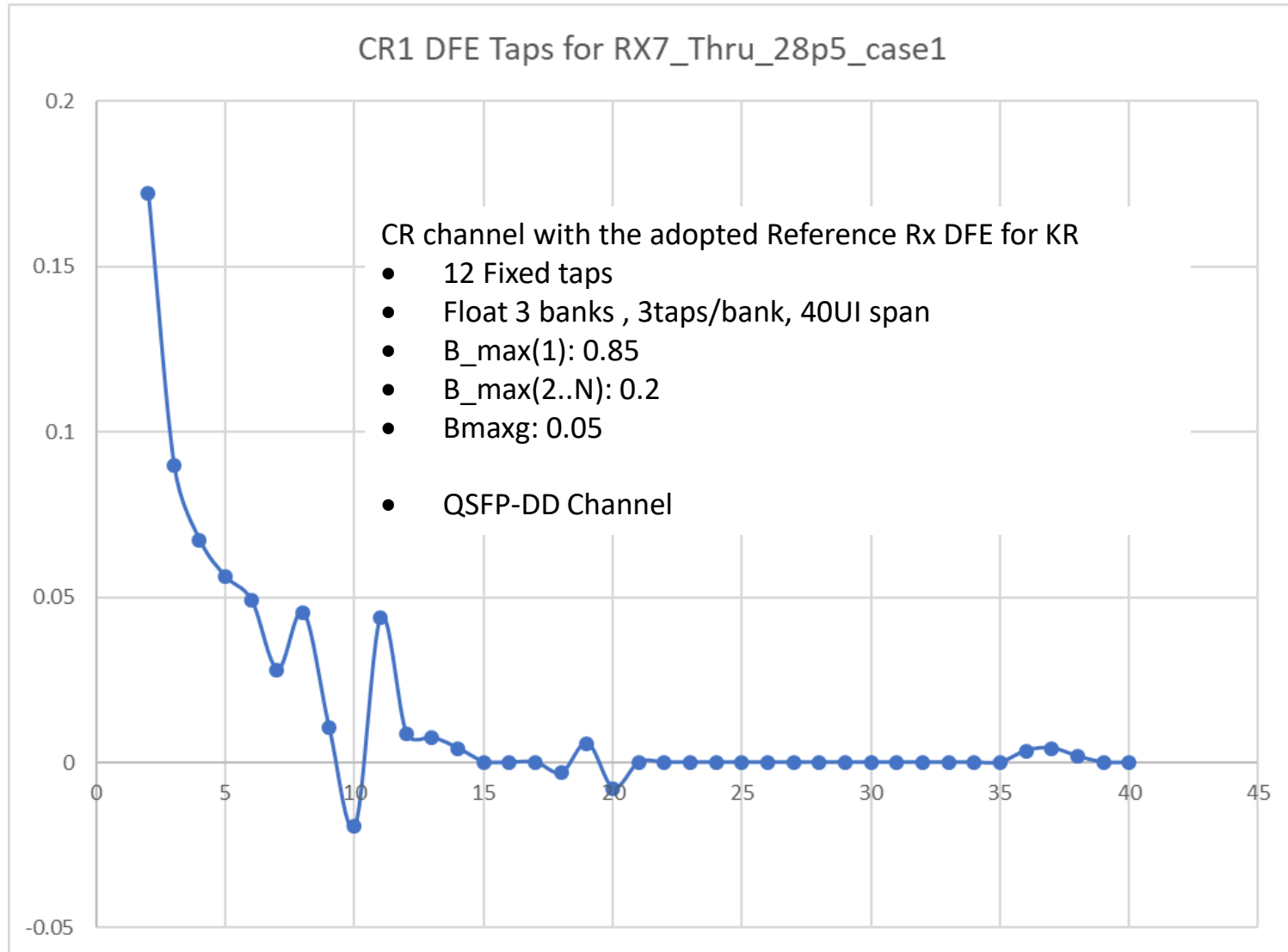
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Introduction

- There has been a significant amount of data presented on DFE tap weights for 100GBASE-KR1 channels and their FEC performance
 - heck_3ck_01_0919.pdf: showed the details of tap weights for the KR1 channels
 - anslow_3ck_adhoc_01_041019.pdf: showed FEC performance for a number of DFE tap weight scenarios
- Not as much analysis has been done for CR1 channels
- This deck looks at the DFE taps and FEC performance for a CR1 channel (from lim_3ck_01_0919)
 - Channel 3a for QSFPDD new pair with end to end loss of ~28.5dB
 - Case 1 (with 12mm package trace)
 - Case 2 (with 29mm package trace)
 - Case 1 seemed to be the worst channel of the two for FEC analysis, based on the DFE tap weight response

DFE Tap Weights for a 100GBASE-CR1 Channel

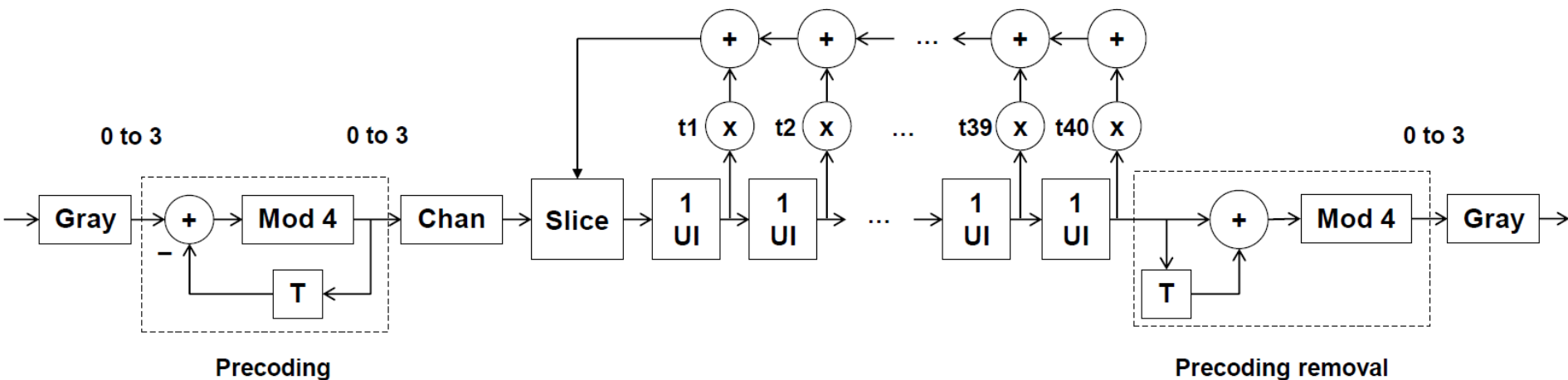
Tap #	Tap Weight
1	0.66490066
2	0.172188658
3	0.089677577
4	0.067069003
5	0.056084081
6	0.04891859
7	0.028116865
8	0.045354548
9	0.010586048
10	-0.019334181
11	0.043954979
12	0.00850518
13	0.00754548
14	0.004249263
15	0.000170087
16	0
17	0
18	-0.00312484
19	0.005843128
20	-0.007752828
21-35	0
36	0.003577557
37	0.004280772
38	0.001790581



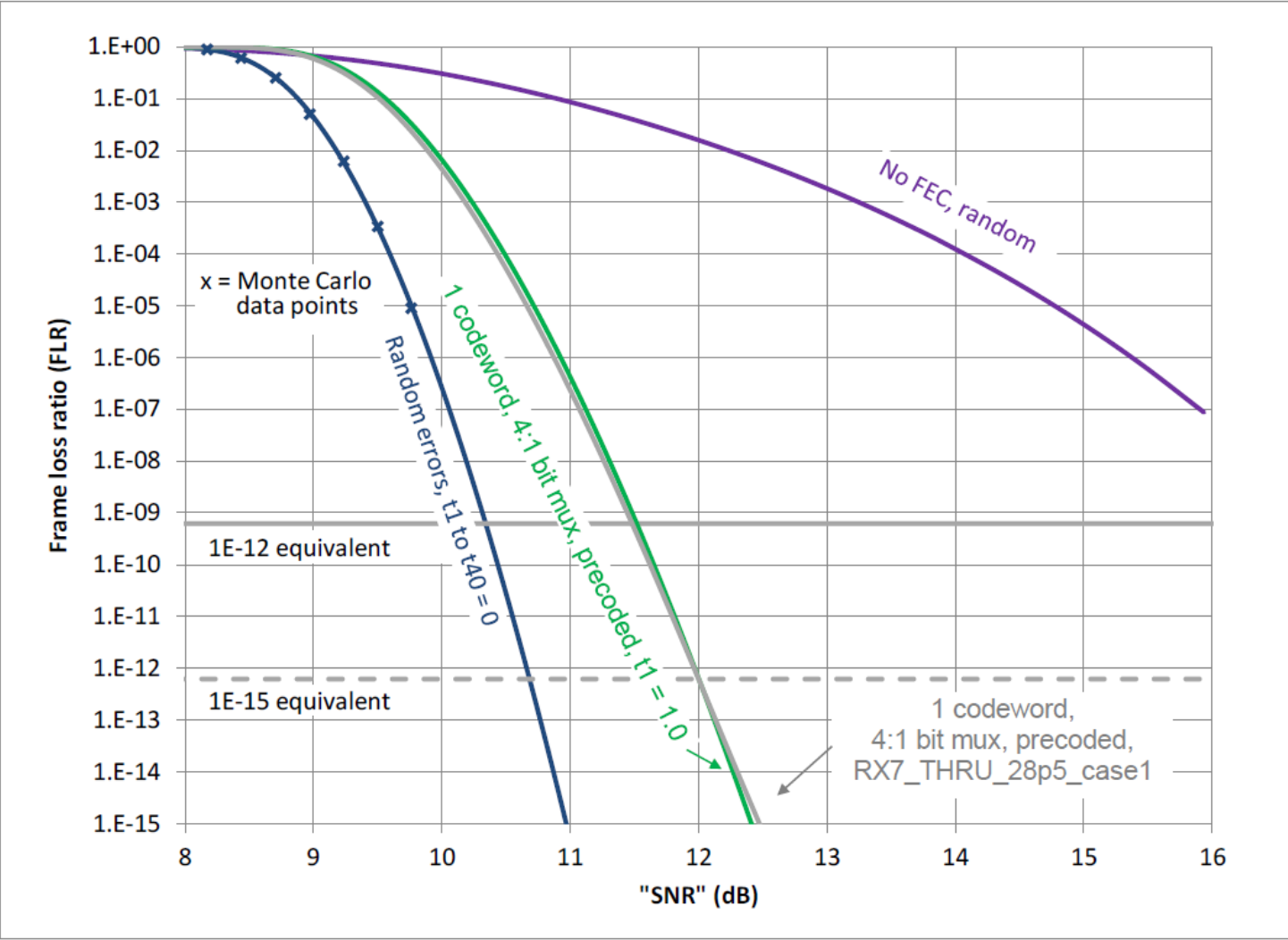
Channel 3a from lim_3ck_01_0919, Case 1 (12mm package)

Precoding and 40-tap DFE model

The multi-tap DFE results with precoding in [anslow 3ck adhoc 01 041019](#) were for a 24-tap DFE. To investigate the effect of the later taps, this model has been extended to a 40-tap DFE as below.

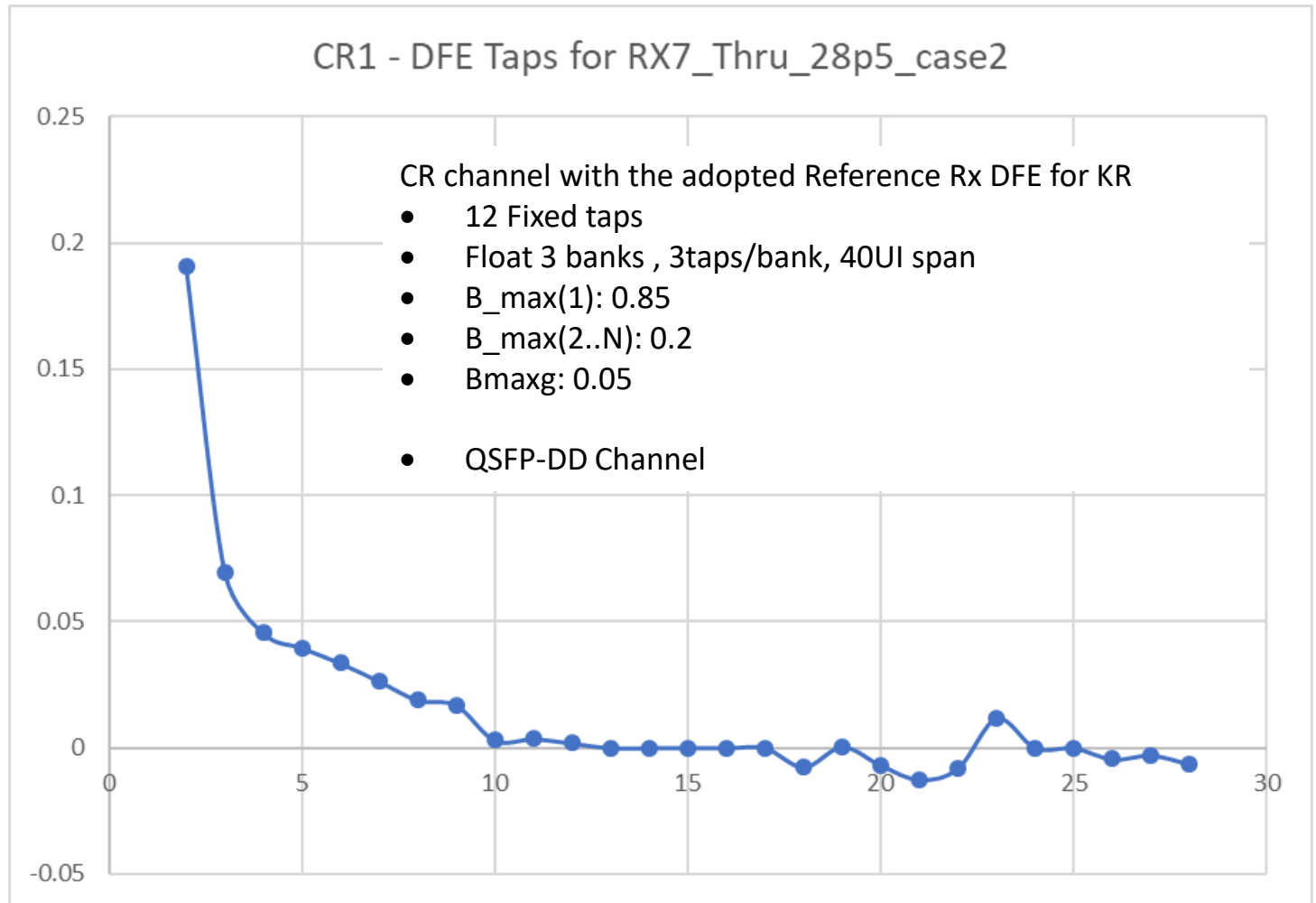


100G with 40-tap DFE RX7_THRU_28p5_case1with precoding



DFE Tap Weights for a 2nd 100GBASE-CR1 Channel

Tap #	Tap Weight
1	0.751217234
2	0.190805059
3	0.069688578
4	0.045424916
5	0.03954811
6	0.033483158
7	0.02636389
8	0.018934968
9	0.016860183
10	0.002988026
11	0.003555807
12	0.001865955
13	0
14	0
15	0
16	0
17	0
18	-0.007570704
19	0.000438567
20	-0.006868048
21	-0.012561627
22	-0.007973085
23	0.011687164
24	0
25	0
26	-0.004461022
27	-0.002919
28	-0.006409819



Channel 3a from lim_3ck_01_0919, Case 2 (31/29 mm package)

Another Channel (not simulated)

- At least for this channel and setup, non-interleaved FEC is sufficient
 - For the DFE induced errors, with precoding on

Thanks!