TDECQ Improvements with New MMSE Optimization Points

Norman Swenson

Affiliated with Nokia, Point2

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This study is still in progress. These results are preliminary and will undergo further validation.

Addresses Comment: R2-194

Can TDECQ Optimization Be Improved?

- Some commenters have expressed concern that the changes introduced in TDECQ may substantially change results because a global optimization is no longer required
- This study investigated other convergence criteria to investigate improvements achievable
- Optimization criteria investigated included minimizing MSE where the SER is estimated
- Waveforms were simulated and included the following effects
  - Bandwidth limitation in the electrical domain
  - MZM modulation including nonlinear E-to-O conversion
  - Imbalance in the MZM arms
  - Different modulation depths and extinction ratios to explore eye compression
- Thus far, with 36 waveforms run, TDECQ measured did not improve by more than .05 dB
  - In some cases, the results were worse by .03 dB
- Results thus far do not justify changing the algorithm

Preliminary Results

Run #	BW GHz	Mod Depth	ER Target (dB)	ER Meas (dB)	OMA Square Wv (mW)	OMA Outer (mW)	TDECQ Standard (dB)	TDECQ New Algo (dB)	TDECQ Delta (dB)
1	45	0.9	3.00	3.00	0.33	0.33	2.29	2.32	-0.03
2	45	0.9	9.36	9.36	0.79	0.79	2.29	2.32	-0.03
3	45	0.9	15.72	15.72	0.95	0.95	2.29	2.32	-0.03
4	45	0.9	22.08	22.07	0.99	0.99	2.29	2.32	-0.03
5	45	0.7	3.00	3.00	0.33	0.33	1.32	1.33	-0.01
6	45	0.7	6.13	6.13	0.61	0.61	1.32	1.33	-0.01
7	45	0.7	9.26	9.26	0.79	0.79	1.32	1.33	-0.01
8	45	0.7	12.39	12.39	0.89	0.89	1.32	1.33	-0.01
9	45	0.5	3.00	3.00	0.33	0.33	1.11	1.12	0.00
10	45	0.5	4.55	4.55	0.48	0.48	1.11	1.12	0.00
11	45	0.5	6.10	6.10	0.61	0.61	1.11	1.12	0.00
12	45	0.5	7.66	7.65	0.71	0.71	1.11	1.12	0.00
13	53	0.9	3.00	3.00	0.33	0.33	1.23	1.20	0.03
14	53	0.9	9.36	9.36	0.79	0.79	1.23	1.20	0.03
15	53	0.9	15.72	15.72	0.95	0.95	1.23	1.20	0.03
16	53	0.9	22.08	22.08	0.99	0.99	1.23	1.20	0.03
17	53	0.7	3.00	3.00	0.33	0.33	0.77	0.76	0.01
18	53	0.7	6.13	6.13	0.61	0.61	0.77	0.76	0.01
19	53	0.7	9.26	9.26	0.79	0.79	0.77	0.76	0.01
20	53	0.7	12.39	12.39	0.89	0.89	0.77	0.76	0.01
21	53	0.5	3.00	3.00	0.33	0.33	0.60	0.57	0.02
22	53	0.5	4.55	4.55	0.48	0.48	0.60	0.57	0.02
23	53	0.5	6.10	6.10	0.61	0.61	0.60	0.57	0.02
24	53	0.5	7.66	7.66	0.71	0.71	0.60	0.57	0.02
25	60	0.9	3.00	3.00	0.33	0.33	1.36	1.31	0.05
26	60	0.9	9.36	9.36	0.79	0.79	1.36	1.31	0.05
27	60	0.9	15.72	15.72	0.95	0.95	1.36	1.31	0.05
28	60	0.9	22.08	22.08	0.99	0.99	1.36	1.31	0.05
29	60	0.7	3.00	3.00	0.33	0.33	0.65	0.64	0.01
30	60	0.7	6.13	6.13	0.61	0.61	0.65	0.64	0.01
31	60	0.7	9.26	9.26	0.79	0.79	0.65	0.64	0.01
32	60	0.7	12.39	12.39	0.89	0.89	0.65	0.64	0.01
33	60	0.5	3.00	3.00	0.33	0.33	0.29	0.28	0.01
34	60	0.5	4.55	4.55	0.48	0.48	0.29	0.28	0.01
35	60	0.5	6.10	6.10	0.61	0.61	0.29	0.28	0.01
36	60	0.5	7.66	7.66	0.71	0.71	0.29	0.28	0.01

Thank you