

An Updated P802.3dj COM Parameter Value Proposal for KR and CR

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Background and Objectives

- Comments and resolutions for the COM parameters for KR/CR had been made [1], however, only some had been accepted.
- New and updated COM simulations for KR/CR had been just been conducted [2]
 - Using the latest COM V4.6B4
 - Using the latest KR/CR channels contributed to the 802.3dj (a total of 111)
 - COM configuration calibrated with the latest test chip silicon and design
- This presentation hence proposes the COM parameters based on [2] for filling-in the remaining TBDs and proposed appropriate changes for the D1.1 Spec [3]

Proposed Device/COM Parameters for KR (Table 178-12/13) (I)

Single-ended reference resistance	R_0	TBD	50 Ω
Single-ended transmitter termination resistance	$R_d^{(t)}$	TBD	46.25 Ω
Single-ended receiver termination resistance	$R_d^{(r)}$	TBD	46.25 Ω

Receiver 3 dB bandwidth	f_r	TBD $\times f_b$	0.55 GHz
Transmitter equalizer, coefficient -3 Minimum value Maximum value Step size	$c(-3)$	TBD	0 -0.06 0.02
Transmitter equalizer, coefficient -2 Minimum value Maximum value Step size	$c(-2)$	TBD	0 0.12 0.02
Transmitter equalizer, coefficient -1 Minimum value Maximum value Step size	$c(-1)$	TBD	0 -0.34 0.02
Transmitter equalizer, coefficient 0 Minimum value	$c(0)$	TBD	0.54
Transmitter equalizer, coefficient 1 Minimum value Maximum value Step size	$c(1)$	TBD	0 -0.2 0.02
Continuous time filter, gain 1 Minimum value Maximum value Step size	g_1	-20 0 1	-15 dB dB dB
Continuous time filter, gain 2 Minimum value Maximum value Step size	g_2	-6 0 1	-5 dB dB dB



TBD filling



Proposed changes

Proposed COM Parameters for KR (Table 178-13) (II)

Continuous time filter, zero 1 frequency for $g_1=0$	f_{z1}	$f_b / 2.5$	fb/4.223
Continuous time filter, zero 1 frequency for $g_2=0$	f_{z2}	$f_b / 80$	GHz
Continuous time filter, pole 1 frequency	f_{p1}	$f_b / 2.5$	fb/2.6562
Continuous time filter, pole 2 frequency	f_{p2}	f_b	fb/1.8973
Continuous time filter, pole 3 frequency	f_{p3}	$f_b / 80$	GHz
Differential peak output voltage victim transmitter	A_v	TBD	0.413 V
far-end aggressor	A_{fe}	TBD	0.413 V
near-end aggressor	A_{ne}	TBD	0.608 V
Transmitter transition time	T_r	TBD	0.004 ns
Number of signal levels	L	4	—
Receiver singled-sided input referred noise	η_0	TBD	$1e-8^2/\text{GHz}$

Parameter	Symbol	Value	Units
Transmitter signal-to-noise ratio	SNR_{TX}	TBD 33	dB
Random jitter, RMS	σ_{RJ}	TBD 0.01	UI
Dual-Dirac jitter, peak	A_{DD}	TBD 0.02	UI
Level separation mismatch ratio	R_{LM}	TBD 0.95	—
Number of samples per unit interval	M	32	—
Receiver discrete-time equalizer parameters			
Number of pre-cursor taps	d_w	TBD 6	—
Number of fixed-position taps	N_{fix}	TBD 16	—
Number of floating tap groups	N_g	TBD 2	—
Number of taps per floating tap group	N_f	TBD 5	—
Highest allowed tap index	N_{max}	TBD 80	—
Normalized upper limit on feed-forward coefficient $w(j)$	$w_{max}(j)$	TBD 0.7	—
Normalized lower limit on feed-forward coefficient $w(j)$	$w_{min}(j)$	TBD -0.7	—
Number of feedback taps /MLSD taps	N_b	1	—
Normalized upper limit on feedback /MLSD coefficient $b(i)$	$b_{max}(j)$	TBD 0.85	—
Normalized lower limit on feedback /MLSD coefficient $b(j)$	$b_{min}(j)$	TBD 0.3	—
Target detector error ratio	DER_0	2×10^{-4}	—

MLSD implementation allowance Q 0 dB

MLSD usage: Yes

Proposed Device/COM Parameters for CR (Table 179-15/16) (I)

Single-ended package capacitance at package to board interface	C_p	TBD	0
Single-ended reference resistance	R_0	TBD	50 Ω
Single-ended transmitter termination resistance	$R_d^{(t)}$	TBD	46.25 Ω
Single-ended receiver termination resistance	$R_d^{(r)}$	TBD	46.25 Ω

Receiver 3 dB bandwidth	f_r	TBD $\times f_b$	0.55 GHz
Transmitter equalizer, coefficient -3	$c(-3)$	TBD	0
Minimum value			-0.06
Maximum value			0.02
Step size			0.02
Transmitter equalizer, coefficient -2	$c(-2)$	TBD	0
Minimum value			0.12
Maximum value			0.02
Step size			0.02
Transmitter equalizer, coefficient -1	$c(-1)$	TBD	0
Minimum value			-0.34
Maximum value			0.02
Step size			0.02
Transmitter equalizer, coefficient 0	$c(0)$	TBD	0.54
Minimum value			0.54
Transmitter equalizer, coefficient 1	$c(1)$	TBD	0
Minimum value			-0.2
Maximum value			0.02
Step size			0.02
Continuous time filter, gain 1	g_1	-20	-15 dB
Minimum value		0	dB
Maximum value		1	dB
Step size			dB
Continuous time filter, gain 2	g_2	-6	-5 dB
Minimum value		0	dB
Maximum value		1	dB
Step size			dB



TBD filling



Proposed changes

Proposed COM Parameters for CR (Table 179-15/16) (II)

Continuous time filter, zero 1 frequency for $g_1=0$ Continuous time filter, zero 1 frequency for $g_2=0$	f_{z1} f_{z2}	$f_b / 2.5$ $f_b / 80$	fb/4.223 GHz
Continuous time filter, pole 1 frequency Continuous time filter, pole 2 frequency Continuous time filter, pole 3 frequency	f_{p1} f_{p2} f_{p3}	$f_b / 2.5$ f_b $f_b / 80$	fb/2.6562 fb/1.8973 GHz
Transmitter differential peak output voltage Victim Far-end aggressor Near-end aggressor	A_v A_{fe} A_{ne}	TBD TBD TBD	0.413 V 0.413 V 0.608 V
Transmitter transition time	T_r	TBD	0.004 ns
Number of signal levels	L	4	—
One-sided noise spectral density	η_0	TBD	$1e-8$ V ² /GHz
Transmitter signal-to-noise ratio	SNR_{TX}	TBD	33 dB

Parameter	Symbol	Value	Units
Random jitter, RMS	σ_{RJ}	TBD	0.01 UI
Dual-Dirac jitter, peak	A_{DD}	TBD	0.02 UI
Level separation mismatch ratio	R_{LM}	TBD	0.95 —
Number of samples per unit interval	M	TBD	32 —
Receiver discrete-time equalizer parameters			
Number of pre-cursor taps	d_w	TBD	6 —
Number of fixed-position taps	N_{fix}	TBD	16 —
Number of floating tap groups	N_g	TBD	2 —
Number of taps per floating tap group	N_f	TBD	5 —
Highest allowed tap index	N_{max}	TBD	80 —
Normalized upper limit on feed-forward coefficient $w(j)$	$w_{max}(j)$	TBD	0.7 —
Normalized lower limit on feed-forward coefficient $w(j)$			
Number of feedback /MLSD taps	$w_{min}(j)$	TBD	-0.7 —
Normalized upper limit on feed /MLSD coefficient $b(i)$			
Normalized lower limit on feed /MLSD coefficient $b(j)$			
	N_b	1	—
	$b_{max}(j)$	TBD	0.85 —
	$b_{min}(j)$	TBD	0.3 —
Target detector error ratio	DER_0	2×10^{-4}	—

MLSD implementation allowance Q 0 dB

MLSD usage: Yes

References

- [1] <https://www.ieee802.org/3/dj/comments/index.html>
- [2] TBI
- [3] <https://www.ieee802.org/3/dj/private/index.html>

Thank You!