

Baseline Proposal for
100GAUI-1/200GAUI-2/400GAUI-4 C2M
Reference Receiver

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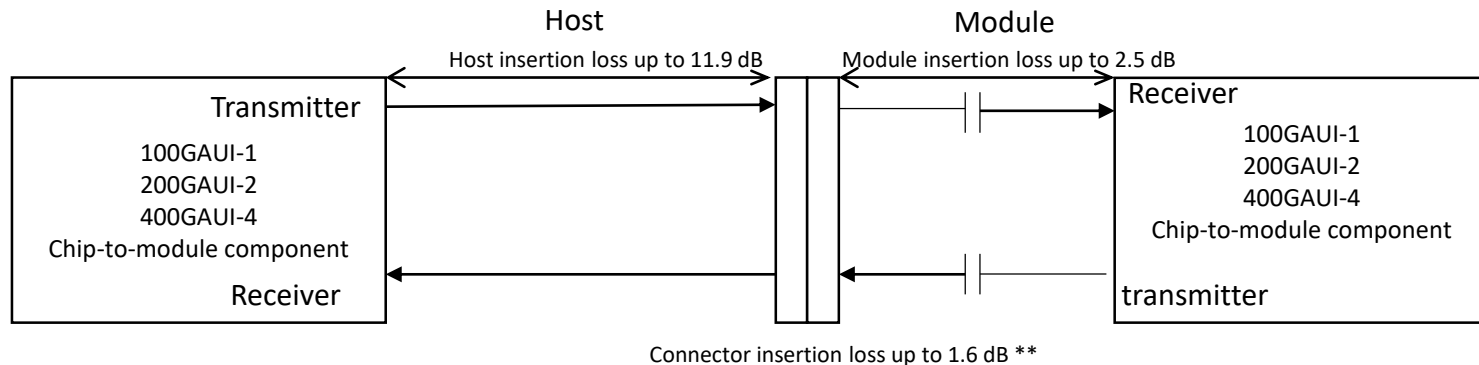
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Introduction

- ❖ This baseline proposal is to complete open items of the adopted C2M baseline [sun 3ck 04b 0319](#), including the following items:
 - ❖ Channel loss allocation
 - ❖ Reference receiver and its optimization algorithm
 - ❖ EH, ESMW, and VEC thresholds
 - ❖ HCB/MCB characteristics
 - ❖ Return loss (ERL) parameters for host/module input and output

Channel Insertion Loss Allocation

- ❖ C2M channel and insertion loss allocation:



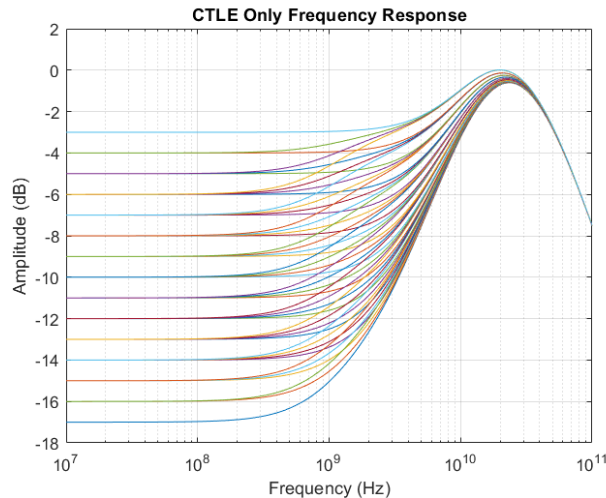
** The host connector mating interface is allocated 0.3 dB variation allowance, not including via.

Reference Receiver

- ❖ Reference receiver for both host and module output is CTLE + a 4-tap DFE with
 - $b_{\max}(1)$ limited to 0.5 or lower, and
 - $b_{\max}(2,3,4)$ limited to 0.2.
- ❖ Reference equalizer adaptation algorithm is **explicitly specified to achieve measurement consistency** (among vendors).
 - Leverage Clause 85.8.3.3.5 linear fit methodology to extract pulse response. Parameter M is no less than 32, Dp is 3, and N is 200.
 - Leverage Annex 93A for optimal phase and DFE tap weight.
 - Apply phase and DFE weight on measured waveforms. Noise and distortion are all kept. Reuse Annex 120E for test point measurement.

* Parameters in magenta throughout this presentation need to be confirmed.

CTLE and Noise Filter



CTLE		
g_{DC}	[-14:1:-3]	dB
f_z	12.58	GHz
f_{p1}	20	GHz
f_{p2}	28	GHz
g_{DC2}	[-3:1:0]	dB
f_{LF}	1.328125	GHz

- CTLE equation is the same as in Clause 93A:

$$H_{ctf}(f) = \frac{\left(10^{\frac{g_{DC}}{20}} + j\frac{f}{f_z}\right)\left(10^{\frac{g_{DC2}}{20}} + j\frac{f}{f_{LF}}\right)}{\left(1 + j\frac{f}{f_{p1}}\right)\left(1 + j\frac{f}{f_{p2}}\right)\left(1 + j\frac{f}{f_{LF}}\right)}$$

- An additional noise filter is a fourth-order Butter Worth filter with 3dB bandwidth $f_r=39.8438$ GHz:

$$H_r(f) = \frac{1}{1 - 3.414214(f/f_r)^2 + (f/f_r)^4 + j2.613126(f/f_r - (f/f_r)^3)}$$

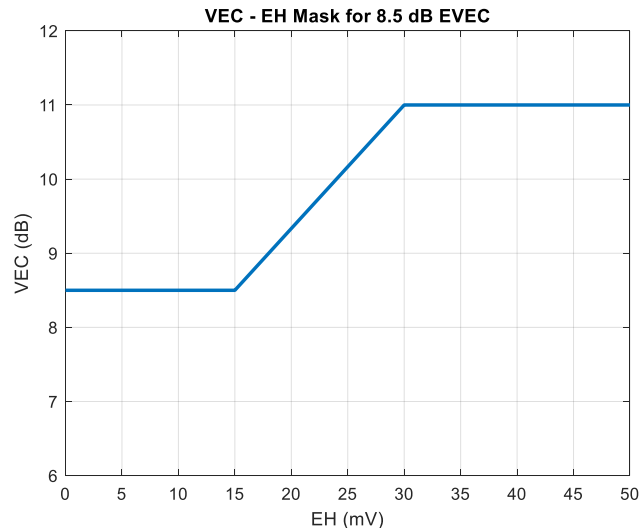
- * CTLE is the same as in [sun 3ck 03 0319](#).

Host Output Characteristics (at TP1a)

Parameter	400GAUI-8	100GAUI-1, 200GAUI-2, 400GAUI-4
ESMW (Eye symmetry mask width)	0.22 UI	TBD
Eye height, differential (min)	32 mV	15 mV
Vertical Eye Closure (max)	12 dB	8.5 dB EVEC (Effective Vertical Eye Closure)

EVEC definition:

$$EVEC = \begin{cases} VEC, & \text{if } EH < 15 \text{ mV} \\ VEC - 0.1667 * (EH - 15) \text{ dB}, & \text{if } EH \text{ is between } 15 \text{ and } 30 \text{ mV} \\ VEC - 2.5 \text{ dB}, & \text{if } EH > 30 \text{ mV} \end{cases}$$

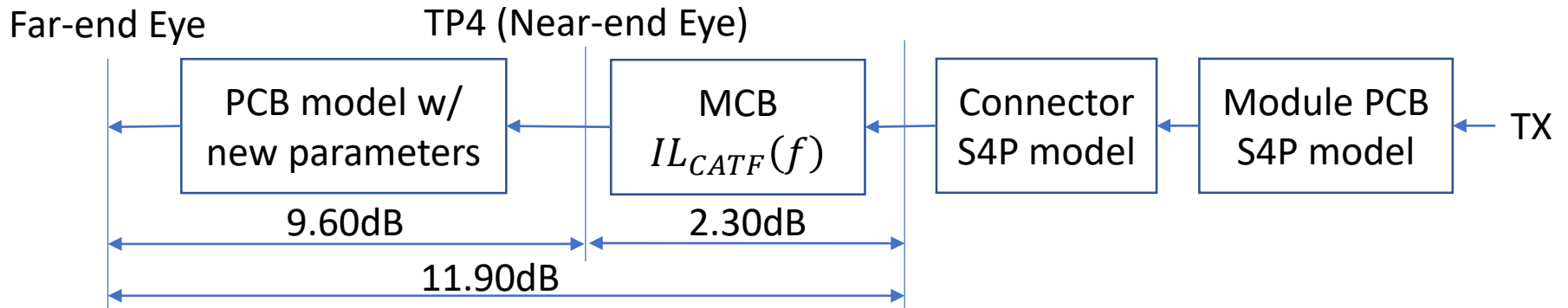


Module Output Characteristics (at TP4)

Parameter	400GAUI-8	100GAUI-1, 200GAUI-2, 400GAUI-4
Near-end Vertical Eye Closure (max)	-	6.5 dB
Near-end Eye height, differential (min)	70 mV	50 mV
Near-end ESMW (Eye symmetry mask width)	0.265 UI	TBD
Far-end Vertical Eye Closure (max)	-	7 dB
Far-end Eye height, differential (min)	30 mV	20 mV
Far-end ESMW (Eye symmetry mask width)	0.2 UI	TBD

Module Output Far-End Reference Channel model

- Host IL (11.9dB) – MCB IL (2.3dB) = PCB model IL budget (9.6dB)
 - 243.84mm PCB model has 9.60dB at 26.56GHz using Table 92-12 parameters shown in config_example_ieee8023_93a=3ck_CR_mellitz_01_100219
 - $\gamma_0 = 0$, $a_1 = 3.8206 \times 10^{-4}$, $a_2 = 9.5909 \times 10^{-5}$, $\tau = 5.790 \times 10^{-3}$



HCB/MCB Characteristics

- HCB characteristics are described in 162B.1.1 where the HCB performs the same equivalent function as the TP2 or TP3 test fixture.
- MCB characteristics are described in 162B.1.2 where the MCB performs the equivalent functionality as the cable assembly test fixture.
- The mated compliance board characteristics are described in 162B.1.3 where the MCB and HCB perform the equivalent functionality as the cable assembly test fixtures.

Host/Module Input / Output Effective Return Loss

Parameter	50GBASE-CR, 100GBASE-CR2, 200GBASE-CR4	100GAUI-1, 200GAUI-2, 400GAUI-4
Transition time associated with a pulse	0.0189 ns	0.010 ns
Incremental available signal loss factor	1.7 GHz	1.7 GHz
Permitted reflection from a transmission line external to the device under test	0.3	0.3
Length of the reflection signal	300 UI	600 UI
Transmitter steady-state voltage, v_f (min.)	0.354 V	0.35 V
Transmitter steady-state voltage, v_f (max.)	0.6 V	0.7 V
Linear fit pulse peak (min.)	0.49 x v_f V	0.4 x v_f V
Transmitter (Host/Module output) ERL	EQ 136-6 at TP2	EQ below at TP1a and TP4
Receiver (Host/Module input) ERL	≥ 10 dB at TP3	≥ 9 dB at TP1 and TP4a

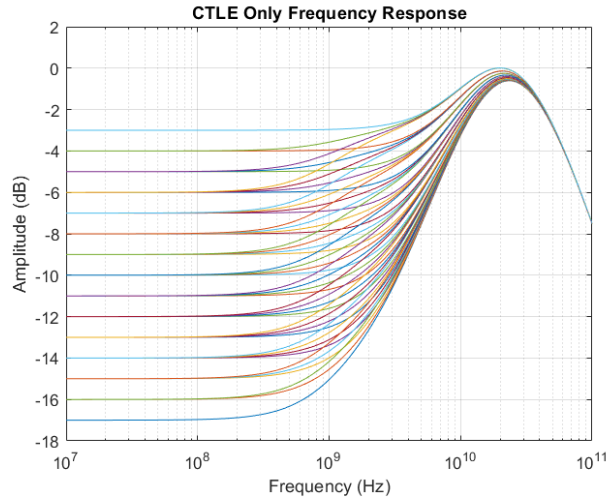
- ❖ See 93A.5 for definition of parameters
- ❖ 100GAUI-1, 200GAUI-2, 400GAUI-4 Host/Module output ERL
 - ❖
$$ERL \geq 40 \log_{10} \left(\frac{v_f}{\max_k(p(k))} \right) \quad (dB)$$

Summary

- ❖ Propose 802.3ck task force to adopt these baseline proposals on slides 4-11.

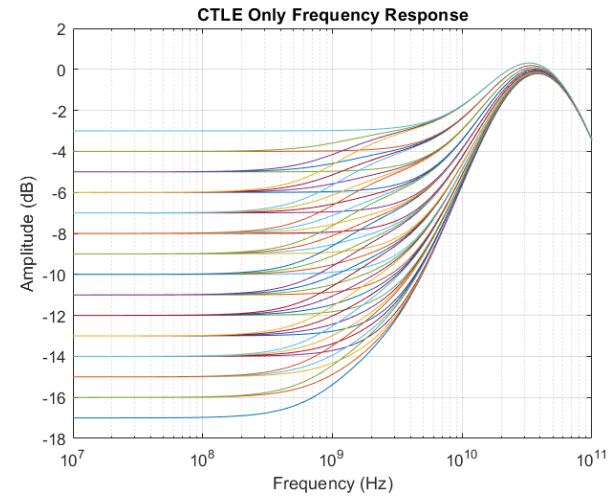
Backup Slides

CTLE



CTLE and Noise Filter for Receivers A, A2, and B		
g_{DC}	[-14:1:-3]	dB
f_z	12.58	GHz
f_{p1}	20	GHz
f_{p2}	28	GHz
g_{DC2}	[-3:1:0]	dB
f_{LF}	1.328125	GHz

CTLE for $b_{max}(1) > 0$



CTLE and Noise Filter for Receivers C and D		
g_{DC}	[-14:1:-3]	dB
f_z	18.88	GHz
f_{p1}	28	GHz
f_{p2}	53.125	GHz
g_{DC2}	[-3:1:0]	dB
f_{LF}	1.328125	GHz

CTLE for $b_{max}(1) = 0$