



Clause 83E Module Stressed input signal generation (Comment i-101)

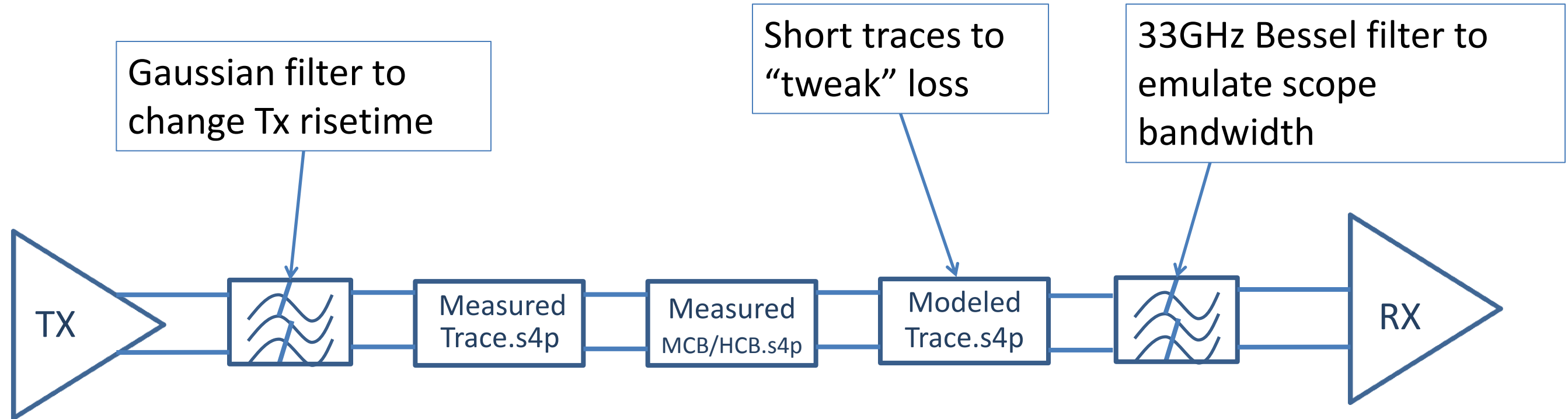
Mike Dudek QLogic

Barrett Bartell QLogic

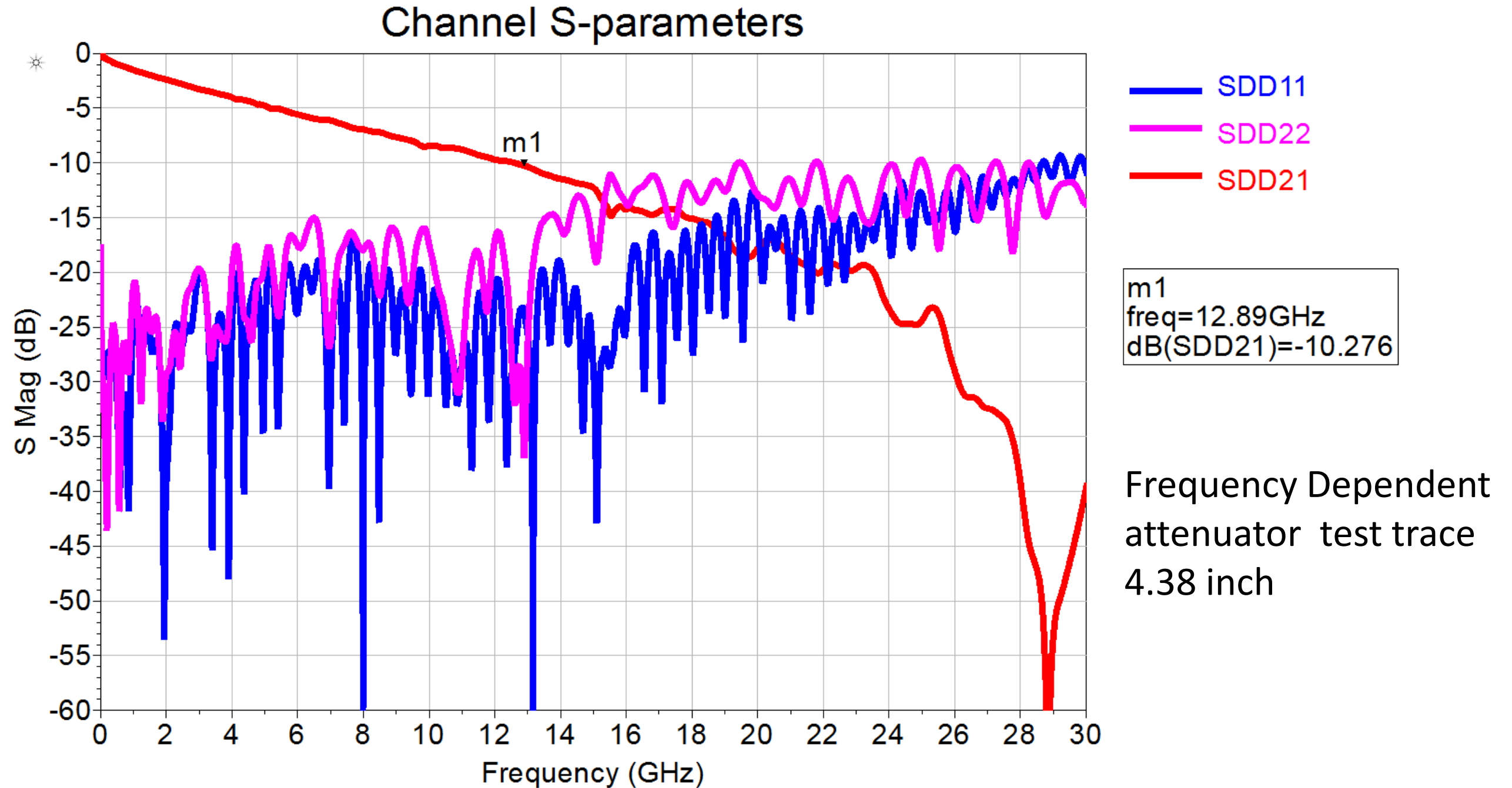
7/13/2014

- **This presentation investigates the Clause 83E Module stressed input signal generation and resulting CTLE recommendation. It is in support of comment i-101**
- **The process is as follows.**
 1. A signal is generated in simulation following the “recipe” of 83E.3.4.2.
 2. The software CTLE is swept to obtain what the “optimum” CTLE setting is.
 3. As specified the R_j is changed to obtain the required 0.46UI eye width.
 4. Steps 2 and 3 are iterated until the eye width is 0.46UI at the “optimum” CTLE setting.

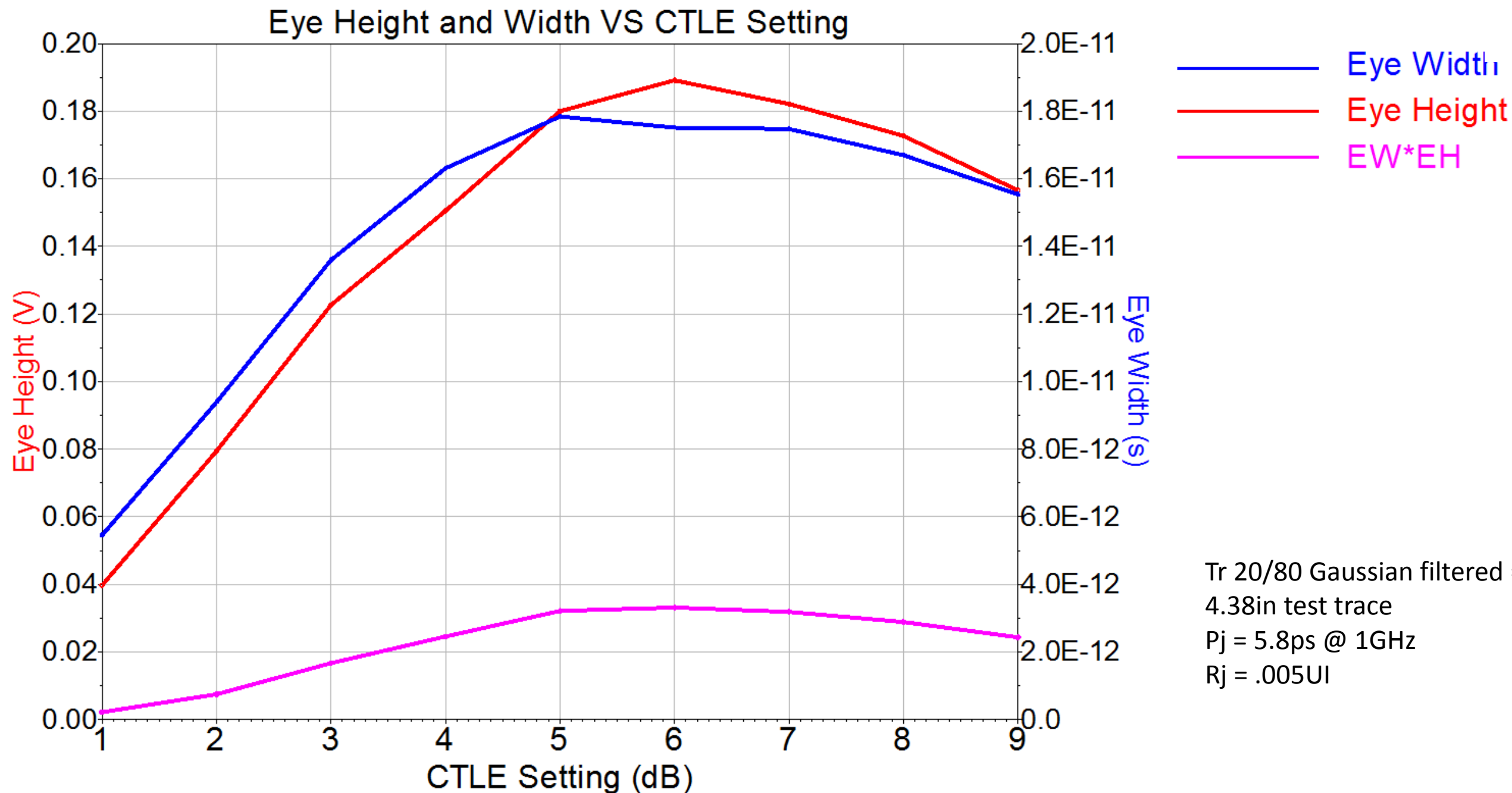
Stressed Module Channel



Total Channel S-parameters set to match high loss case in draft 3.0.

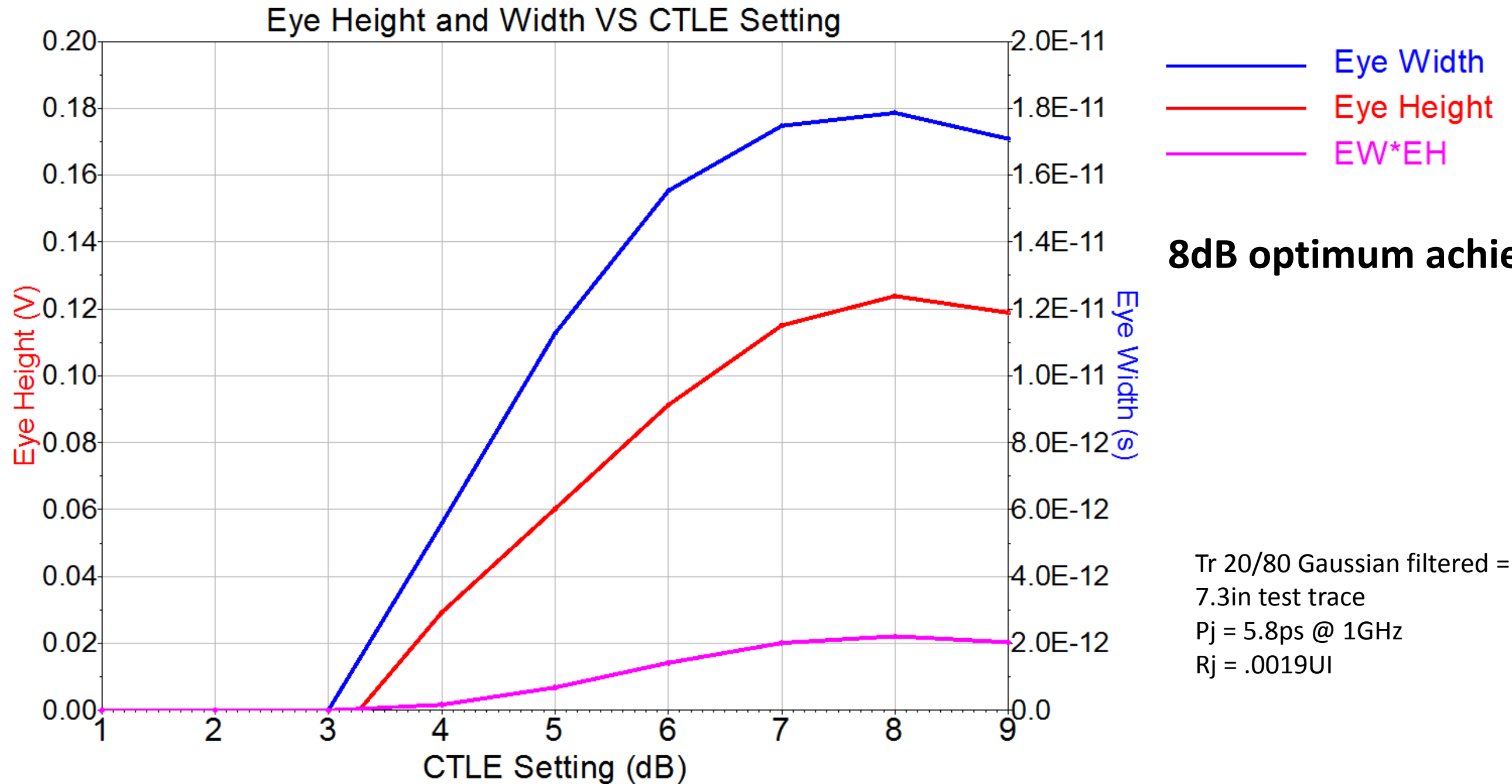


Eye Height and Eye Width for high loss channel in draft 3.0



- **The “optimum” CTLE setting is only 6dB. This will not fully stress the module CTLE.**
- **We should create a stressed input that has an “optimum” CTLE setting of 8dB so that the module is tested with “recommended” settings of 7,8 and 9dB. Potential methods to increase the optimum CTLE are**
 - **Increase the test trace loss**
 - **Increase the transmitter risetime by reducing the bandwidth of the Gaussian filter.**
- **Secondary conclusion**
 - **The Eye width and Eye height are not a strong function of the CTLE setting provided it is large enough. This is relevant for other comments.**

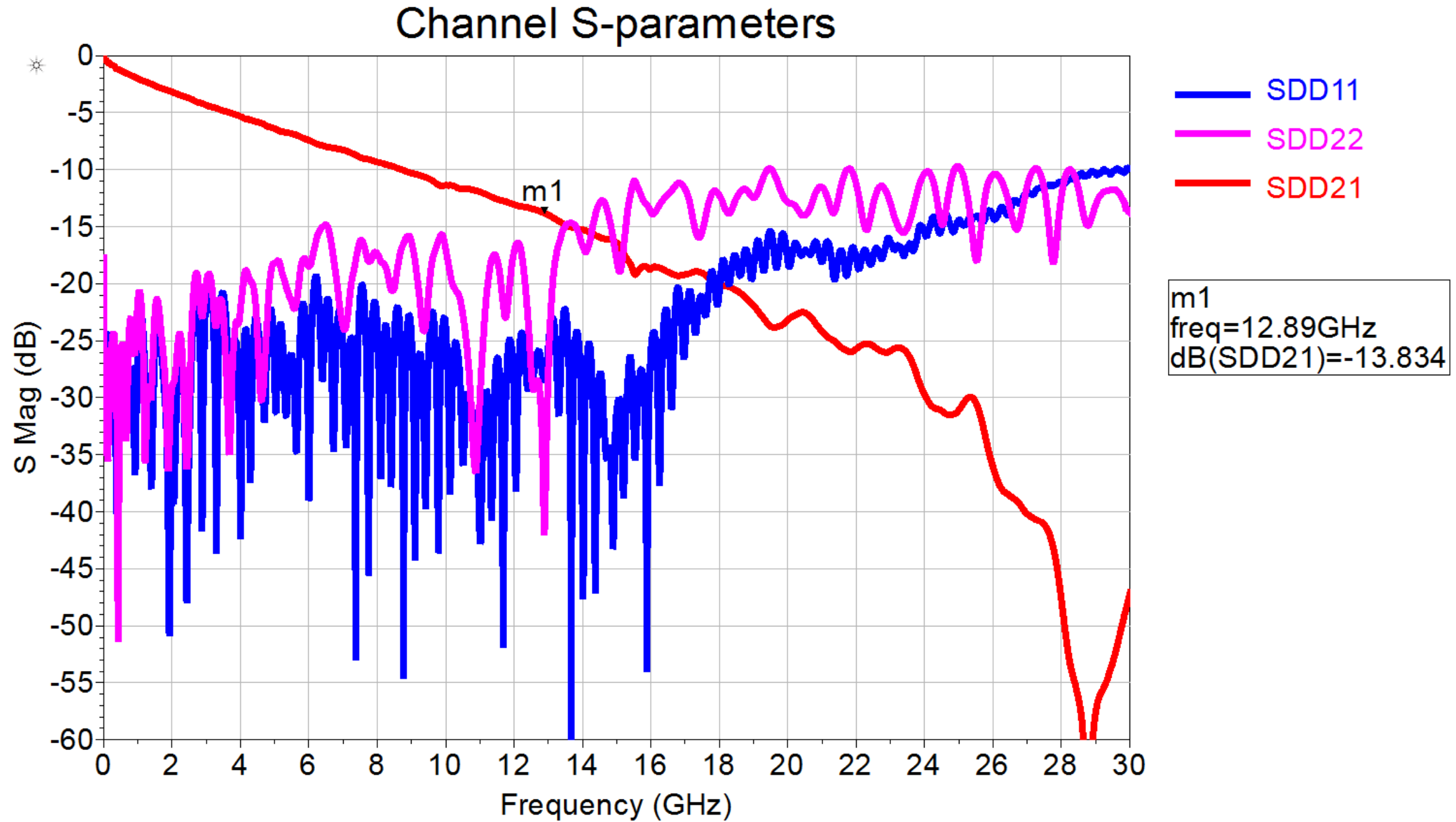
With higher trace loss (13.8dB total channel loss).



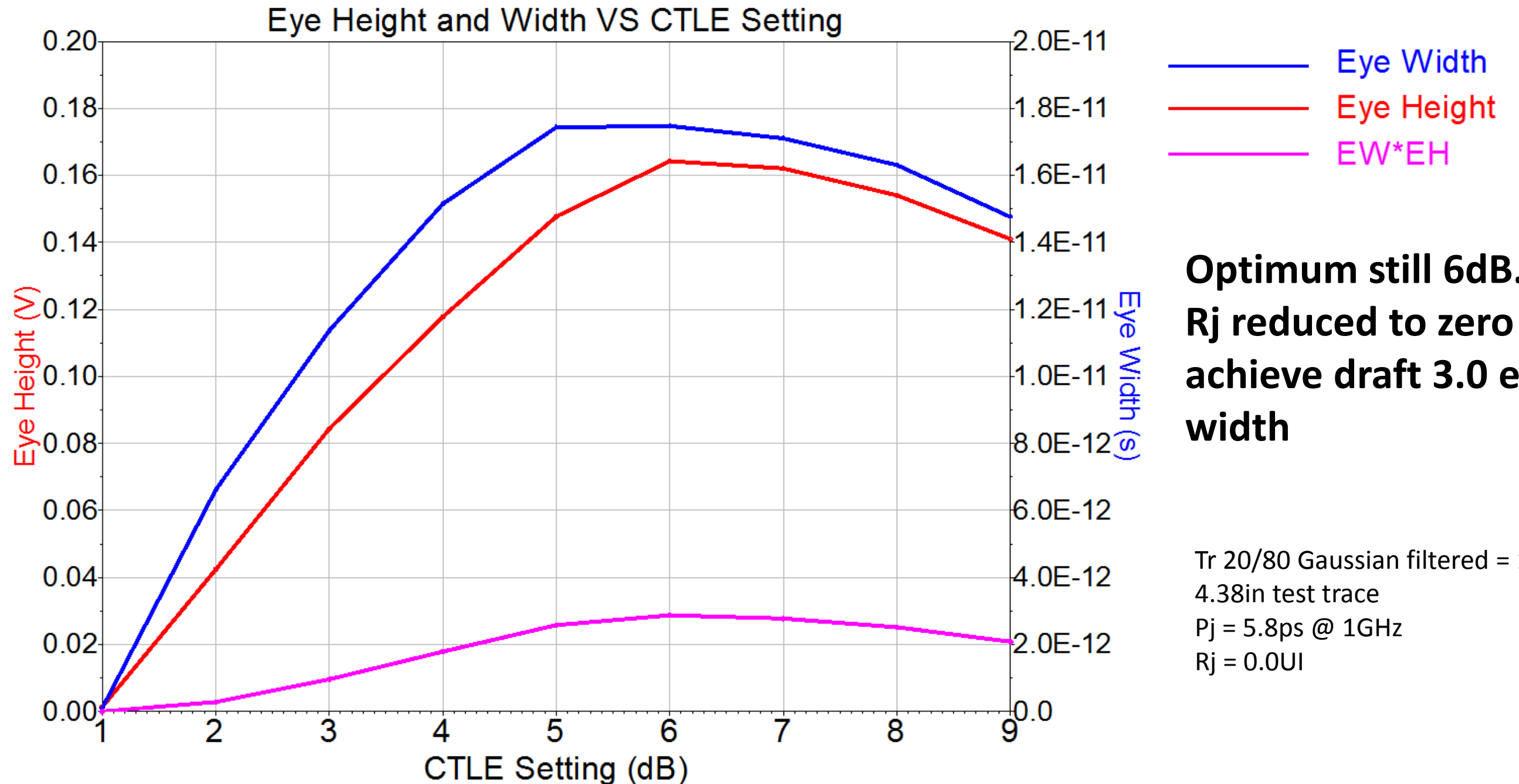
8dB optimum achieved

Tr 20/80 Gaussian filtered = 9.5ps
7.3in test trace
Pj = 5.8ps @ 1GHz
Rj = .0019UI

Total Channel S-parameters with higher loss



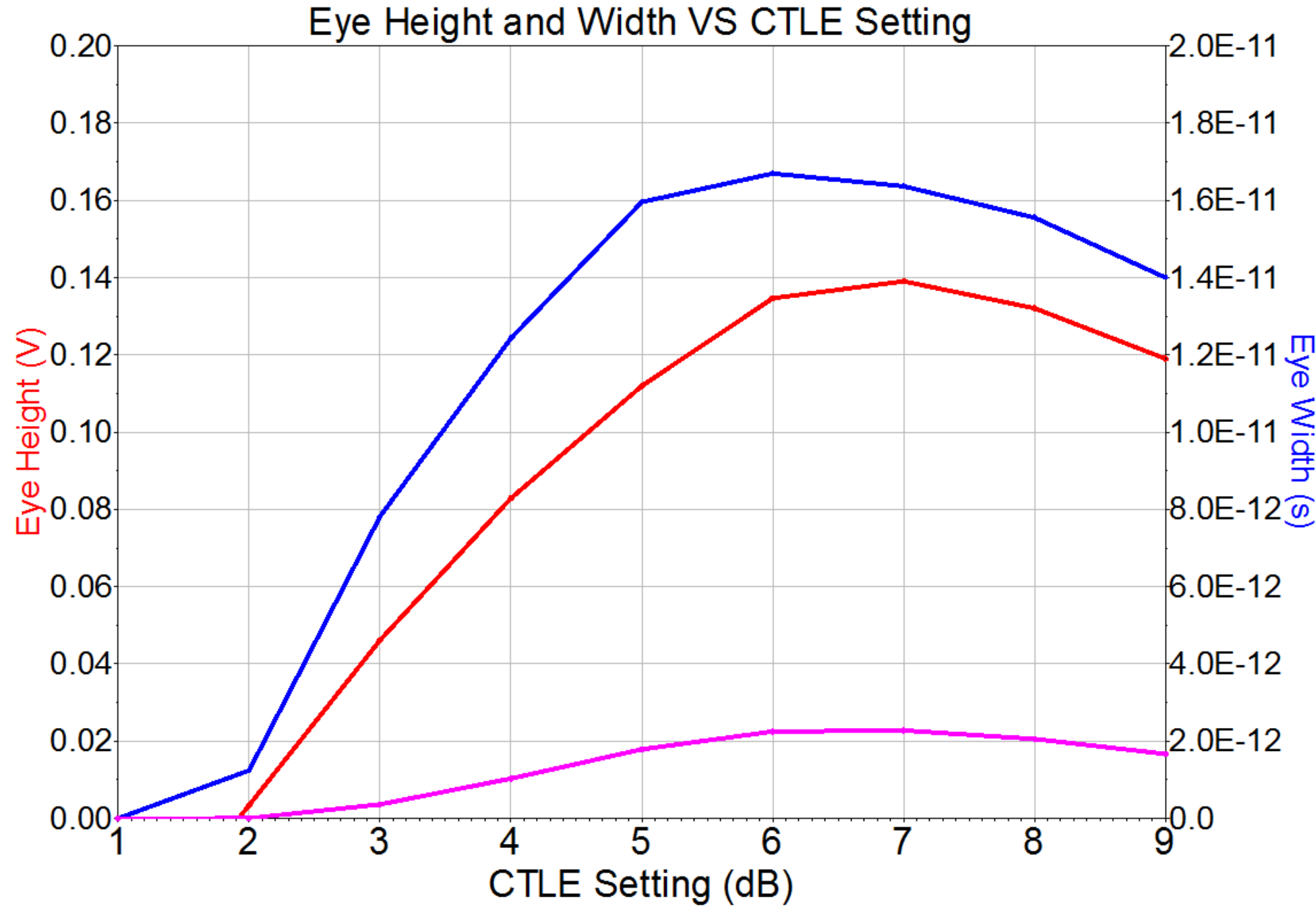
With slower Gaussian filtered risetime (14ps) draft 3.0 channel



**Optimum still 6dB.
Rj reduced to zero to
achieve draft 3.0 eye
width**

Tr 20/80 Gaussian filtered = 14ps
4.38in test trace
Pj = 5.8ps @ 1GHz
Rj = 0.0UI

With slower Gaussian filtered risetime (20ps) draft 3.0 channel



— Eye Width
— Eye Height
— EW*EH

**Optimum only 7dB.
Eye width too narrow
with zero Rj**

Tr 20/80 Gaussian filtered = 20ps
4.38in test trace
Pj = 5.8ps @ 1GHz
Rj = 0.0UI

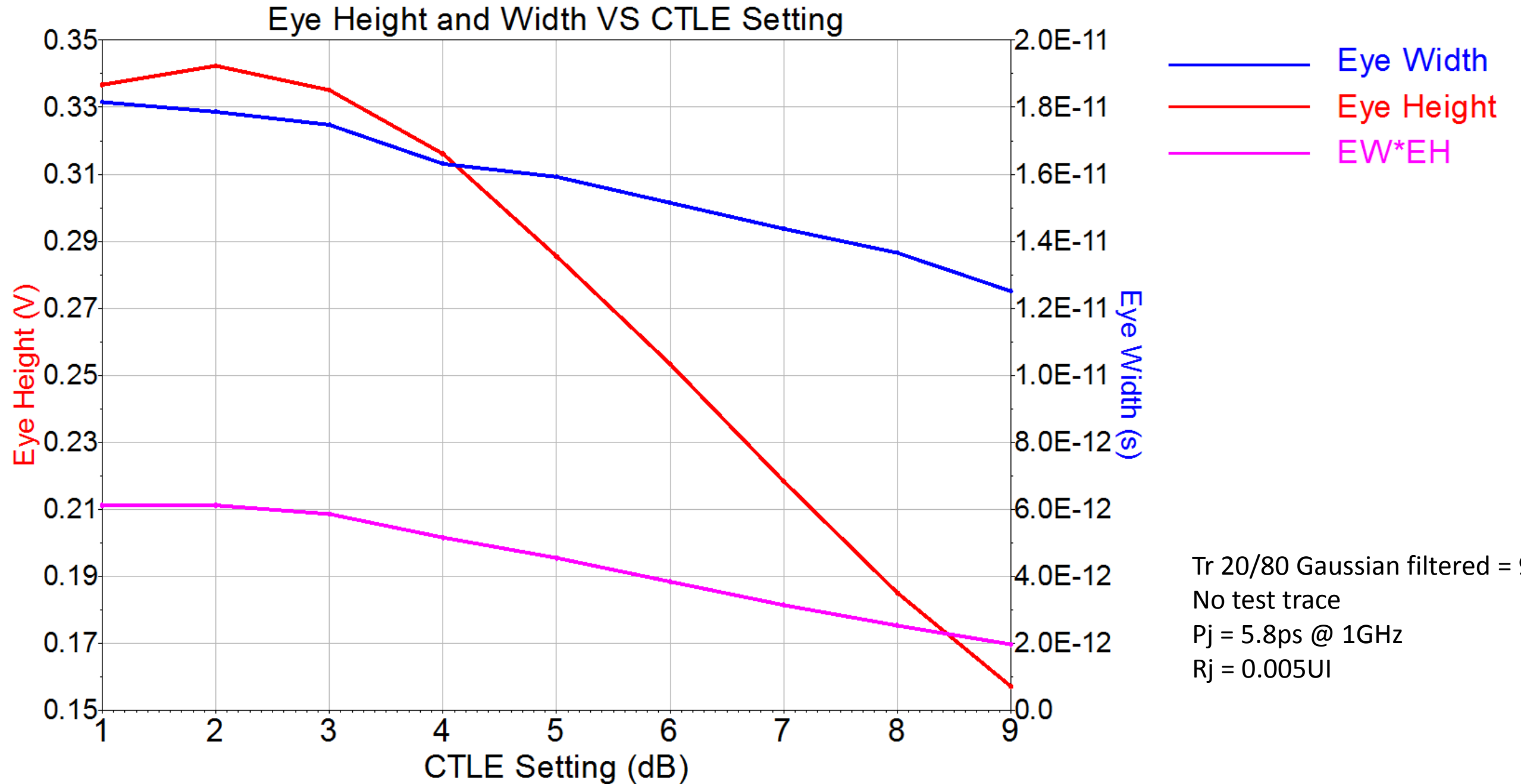
Final conclusions and Recommendation.

- **Increasing the risetime by reducing the bandwidth of the Gaussian filter does not have the desired effect (8dB for the optimum CTLE setting)**
- **We should increase the loss of the frequency dependent attenuator for the high loss case to achieve a channel loss of 13.8dB instead of 10.2dB. This will be equivalent to higher loss traces in the host ASIC package than present with the 9.5ps risetime pattern generator.**



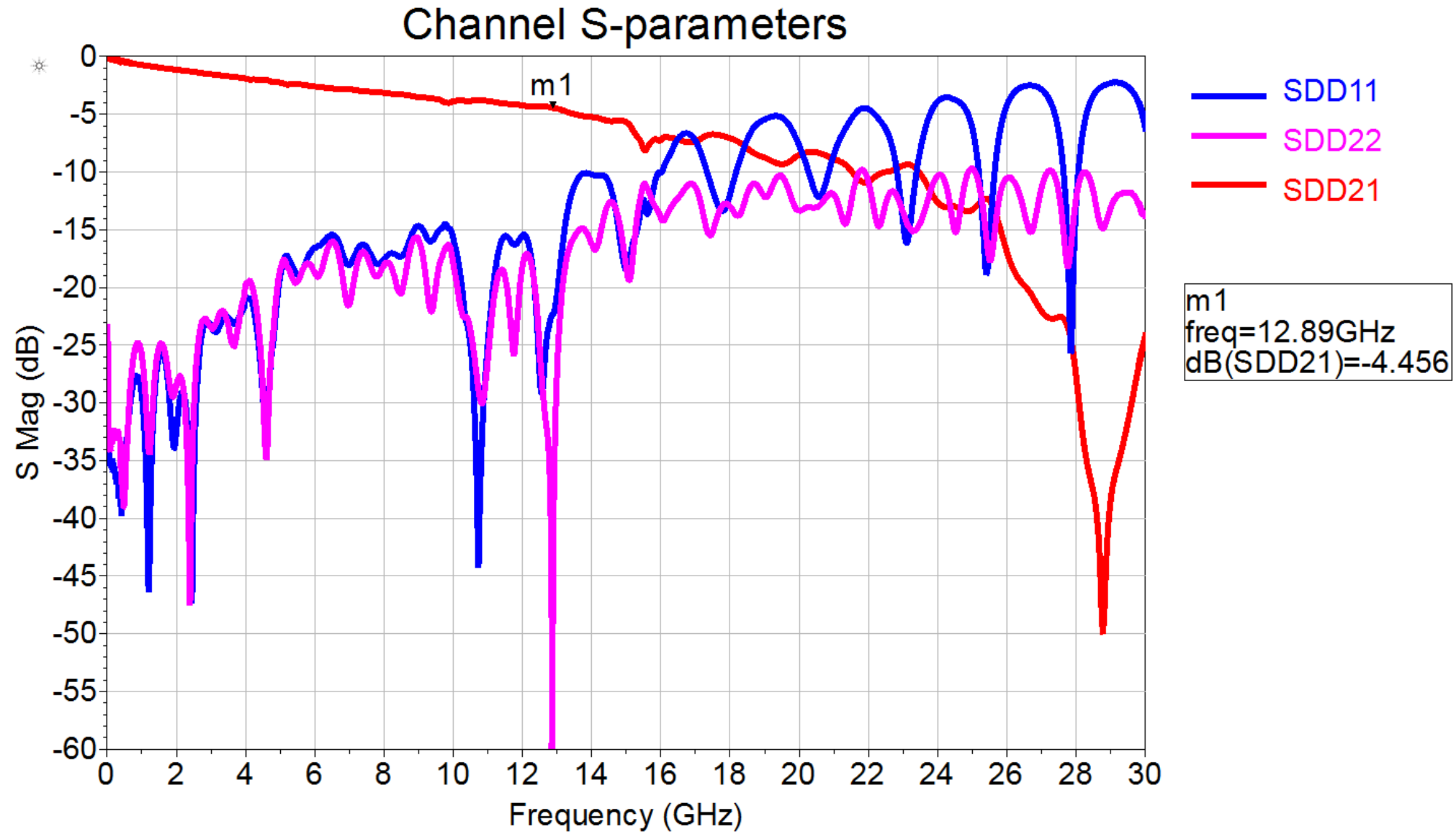
Backup

Low loss condition. No Frequency Dependent attenuator

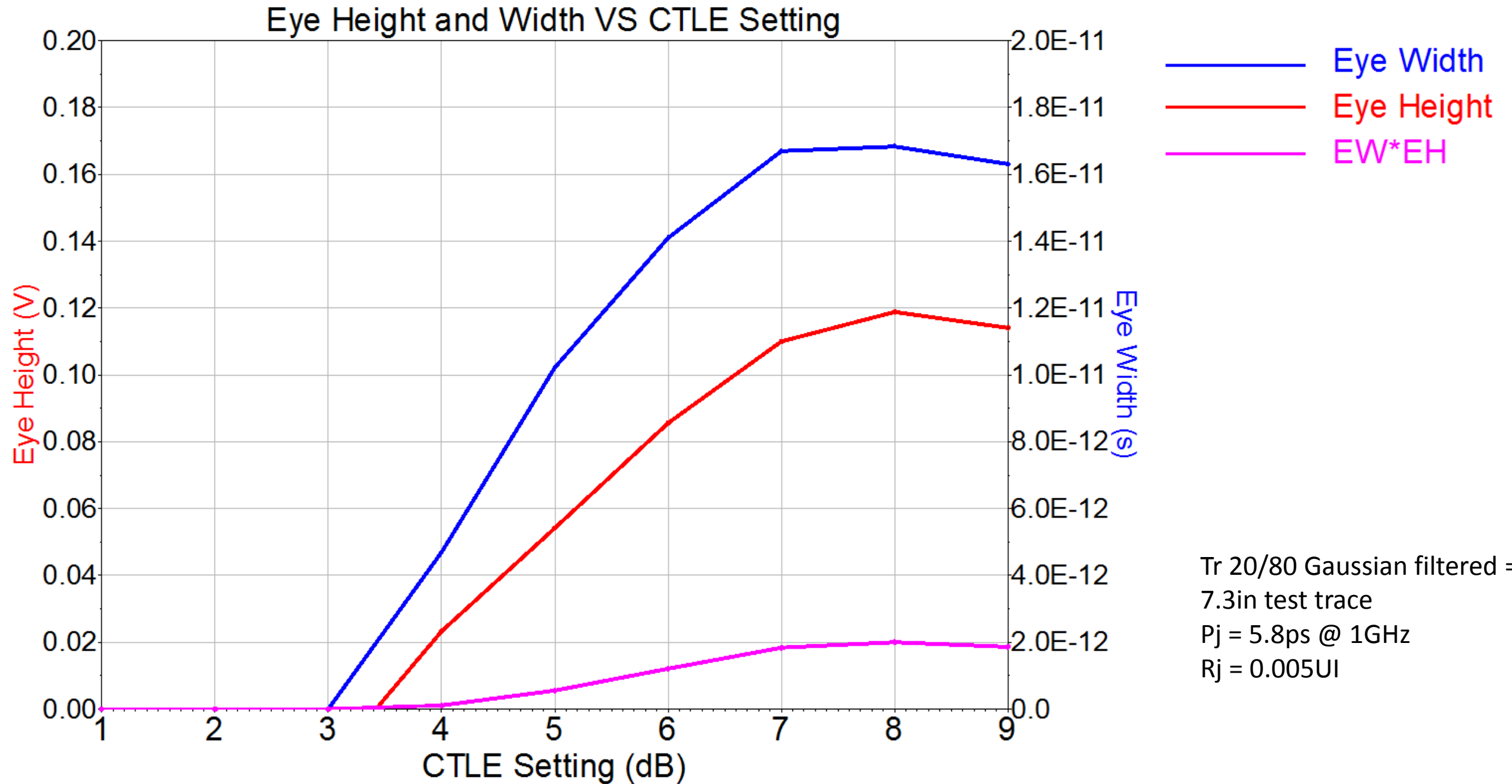


Tr 20/80 Gaussian filtered = 9.5ps
No test trace
Pj = 5.8ps @ 1GHz
Rj = 0.005UI

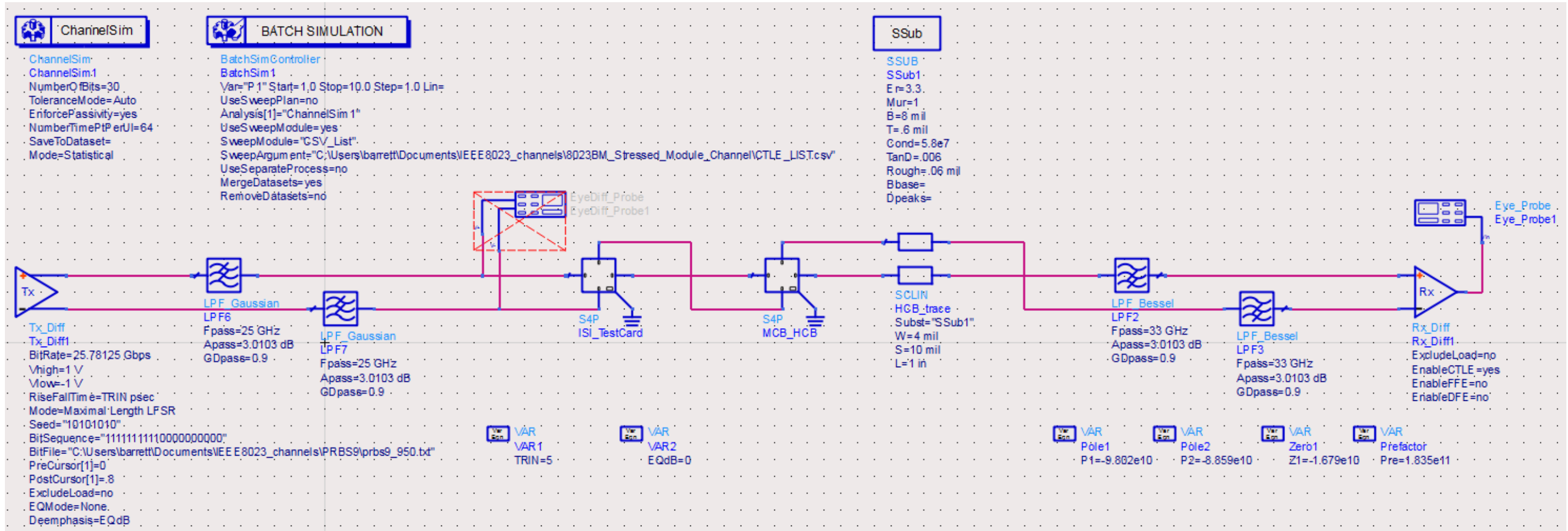
Channel S-parameters for Low Loss (no frequency dependent attenuator)



Higher trace loss with nominal Rj



ADS Channel Model



ADS S-parameters

