mipi alliance

IF IT'S NOT MIPI, IT'S NOT MOBILE

System Modelling Considerations for a Successful A-PHY Implementation

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A-PHY Profile 1 Architecture

Profile 1 ADS model

4.1.1 End-To-End Validation Model

Figure 1 shows a complete end-to-end model used to validate the operation of Profile 1 solutions.

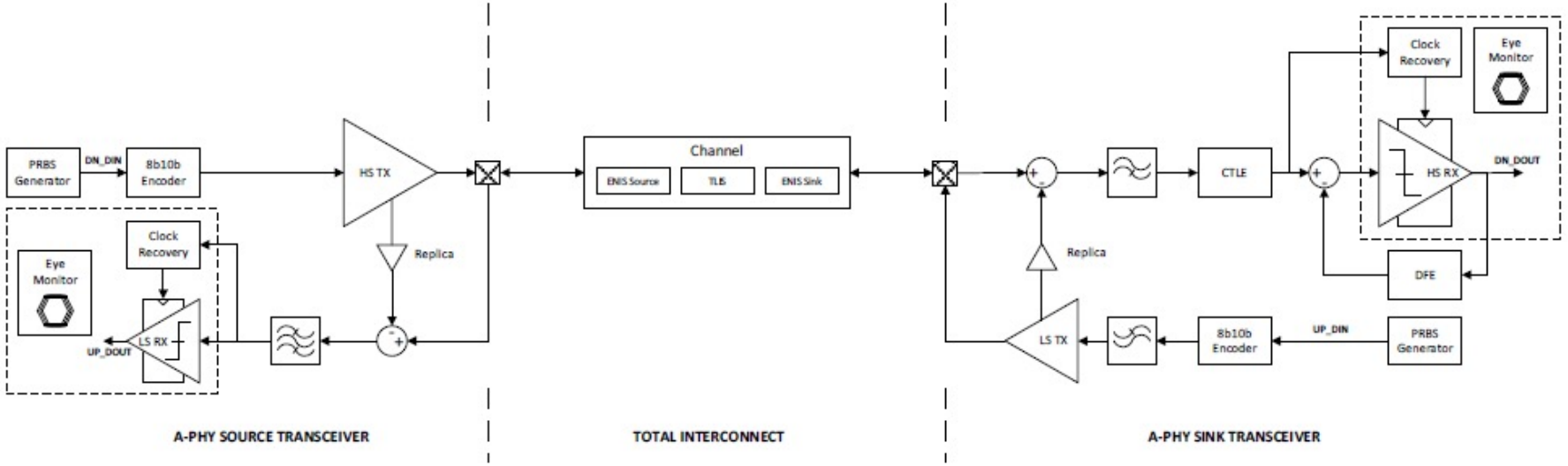


Figure 1 System Validation Model

4.1.3 Downlink Validation

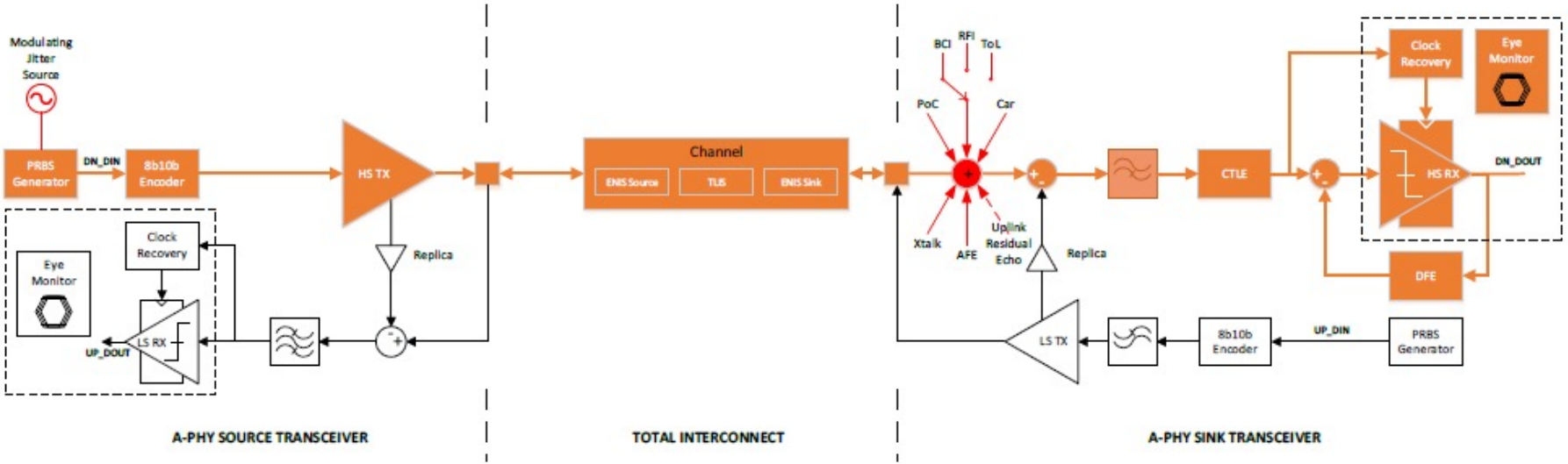
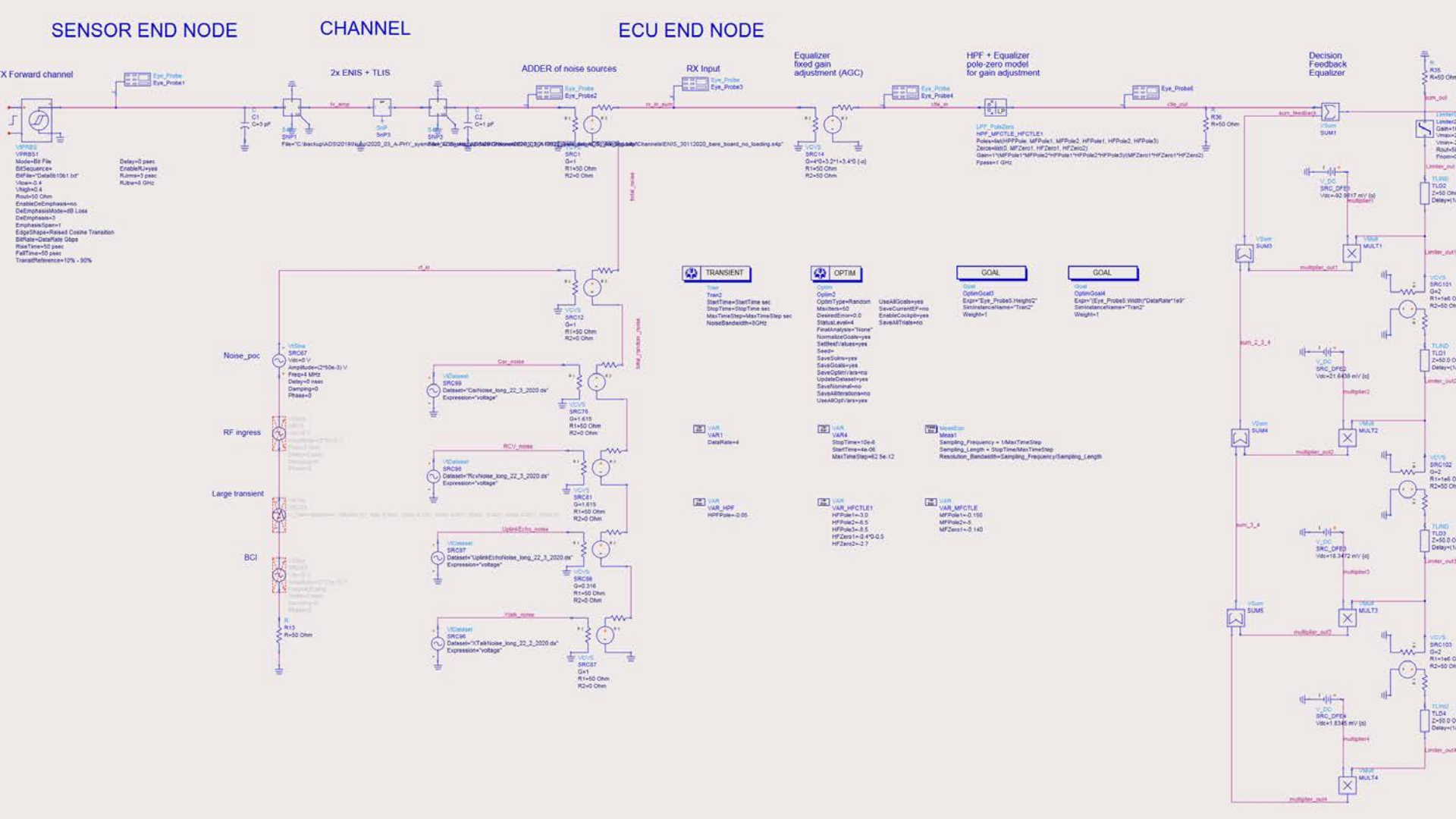
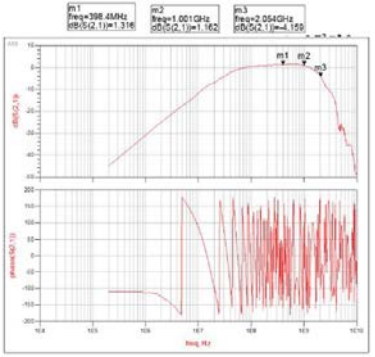


Figure 2 Downlink Validation Model with Noise Sources

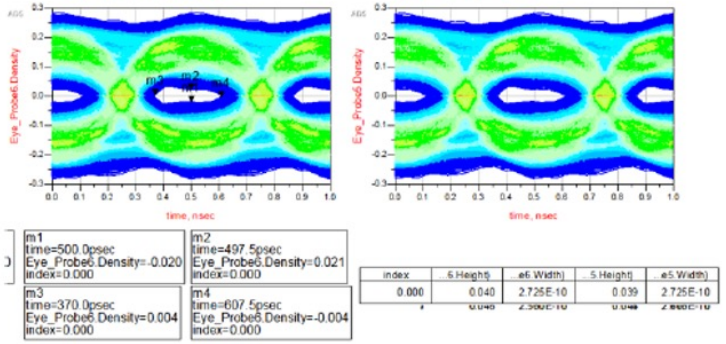

SENSOR END NODE
CHANNEL
ECU END NODE
X Forward channel
2x ENIS + TLIS
ADDER of noise sources
RX Input
Equalizer
fixed gain
adjustment (AGC)
HPF + Equalizer
pole-zero model
for gain adjustment
Decision
Feedback
Equalizer
Noise_poc
RF ingress
Large transient
BCI
TRANSIENT
OPTIM
GOAL
GOAL

Profile 1 G1 – Channel + AGC + HPF + CTLE



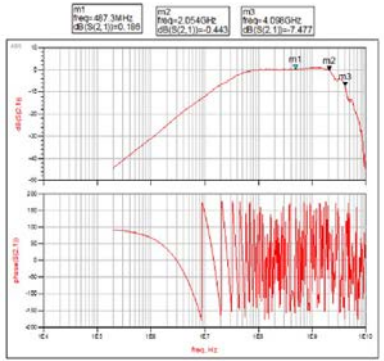
After CTLE

After DFE

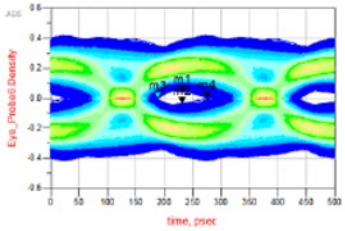


index	.6 Height	.e6 Width	.5 Height	.e5 Width
0.000	0.040	2.725E-10	0.039	2.725E-10

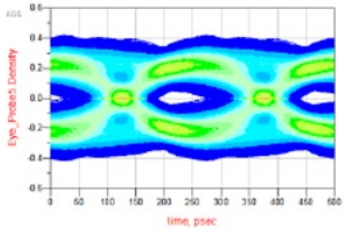
Profile 1 G2 – Channel + AGC + HPF + MFCTLE + HFCTLE



After CTLE



After DFE



m1
time=232.5psec
Eye_Probe6.Density=0.042
index=0.000

m2
time=231.3psec
Eye_Probe6.Density=-0.035
index=0.000

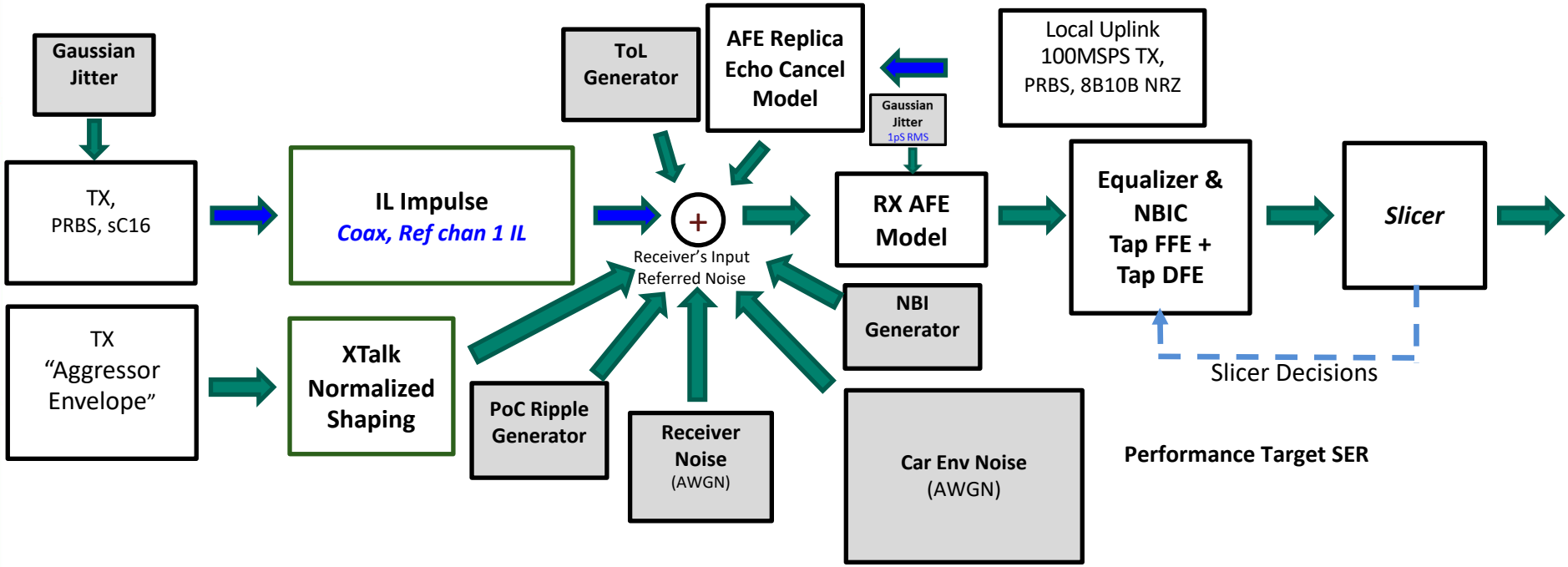
m3
time=188.8psec
Eye_Probe6.Density=0.000
index=0.000

m4
time=275.0psec
Eye_Probe6.Density=0.002
index=0.000

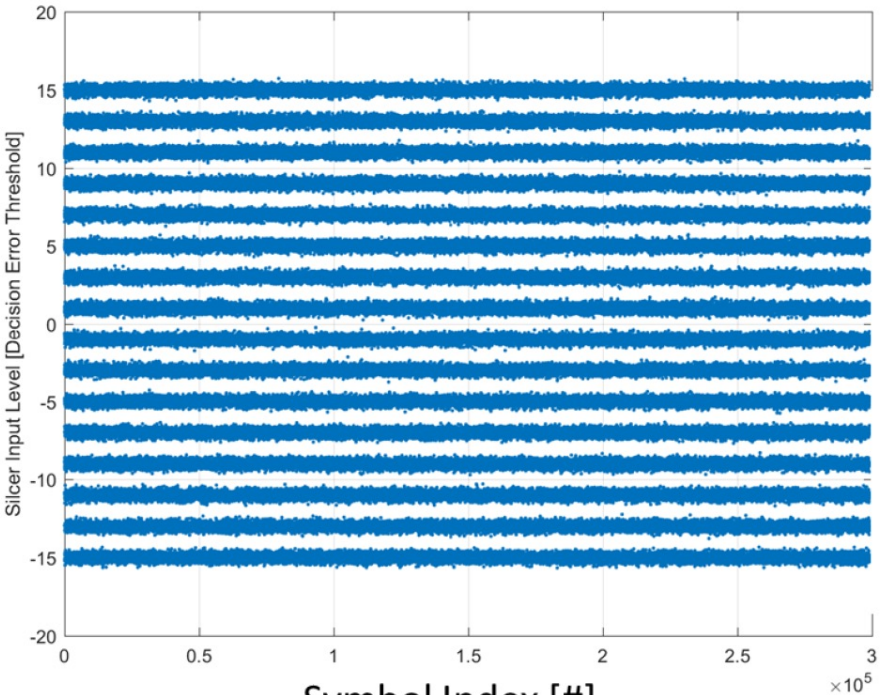
index	...e6.Height)	...e6.Width)	...e5.Height)	...e5.Width)
0.000	0.093	1.213E-10	0.091	1.175E-10

A-PHY Profile 2 Architecture

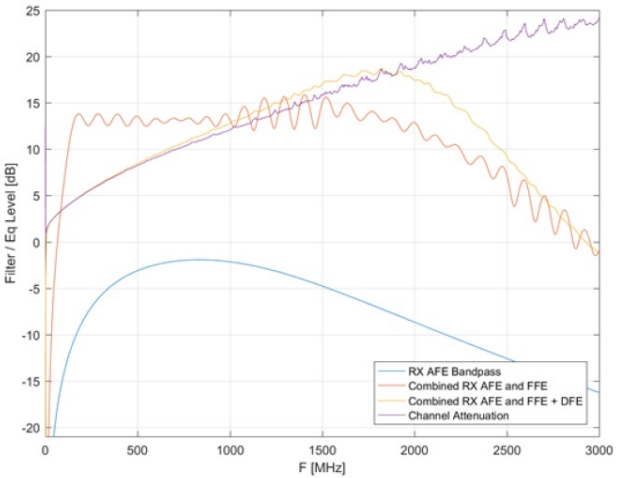
G5: sC16, 500mVpp Downlink, Time Domain Simulation

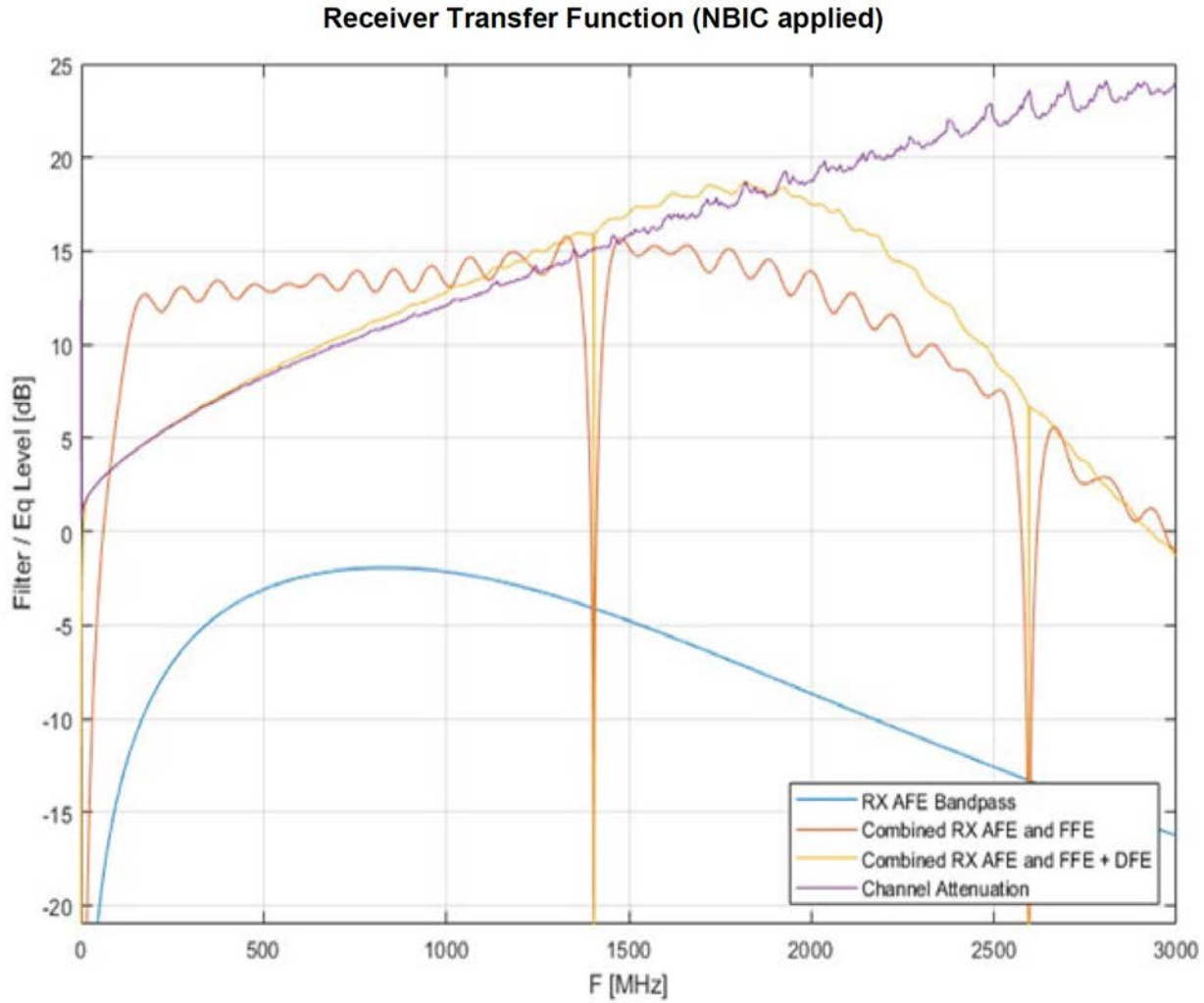


Step1: Pure RX Signal & Fixed Noises (wide band noises + PoC), Slicer Input After Equalizer, 44-Tap FFE, 84-Tap DFE (FFE and DFE are used for NBI Canceller)



RX AFE, FFE only Equalizer and 1/Channel Responses




Receiver Transfer Function (NBIC applied)
Filter / Eq Level [dB]
F [MHz]
25
20
15
10
5
0
-5
-10
-15
-20
0
500
1000
1500
2000
2500
3000
RX AFE Bandpass
Combined RX AFE and FFE
Combined RX AFE and FFE + DFE
Channel Attenuation

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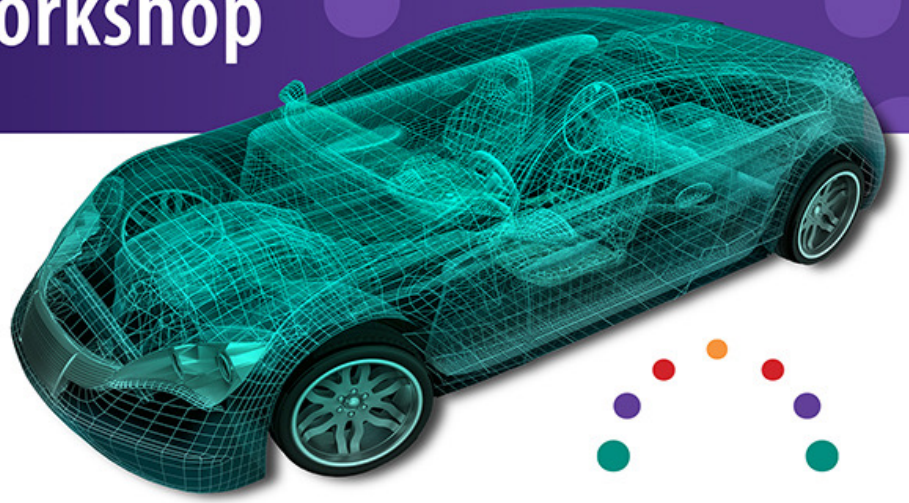

An in-depth look at the MIPI Automotive SerDes Solutions (MASS) framework

Q&A