AEONSEMI

EMI considerations and measurement

KY-ANH TRAN, YORK LIU, HENG ZHAO

11/11/24

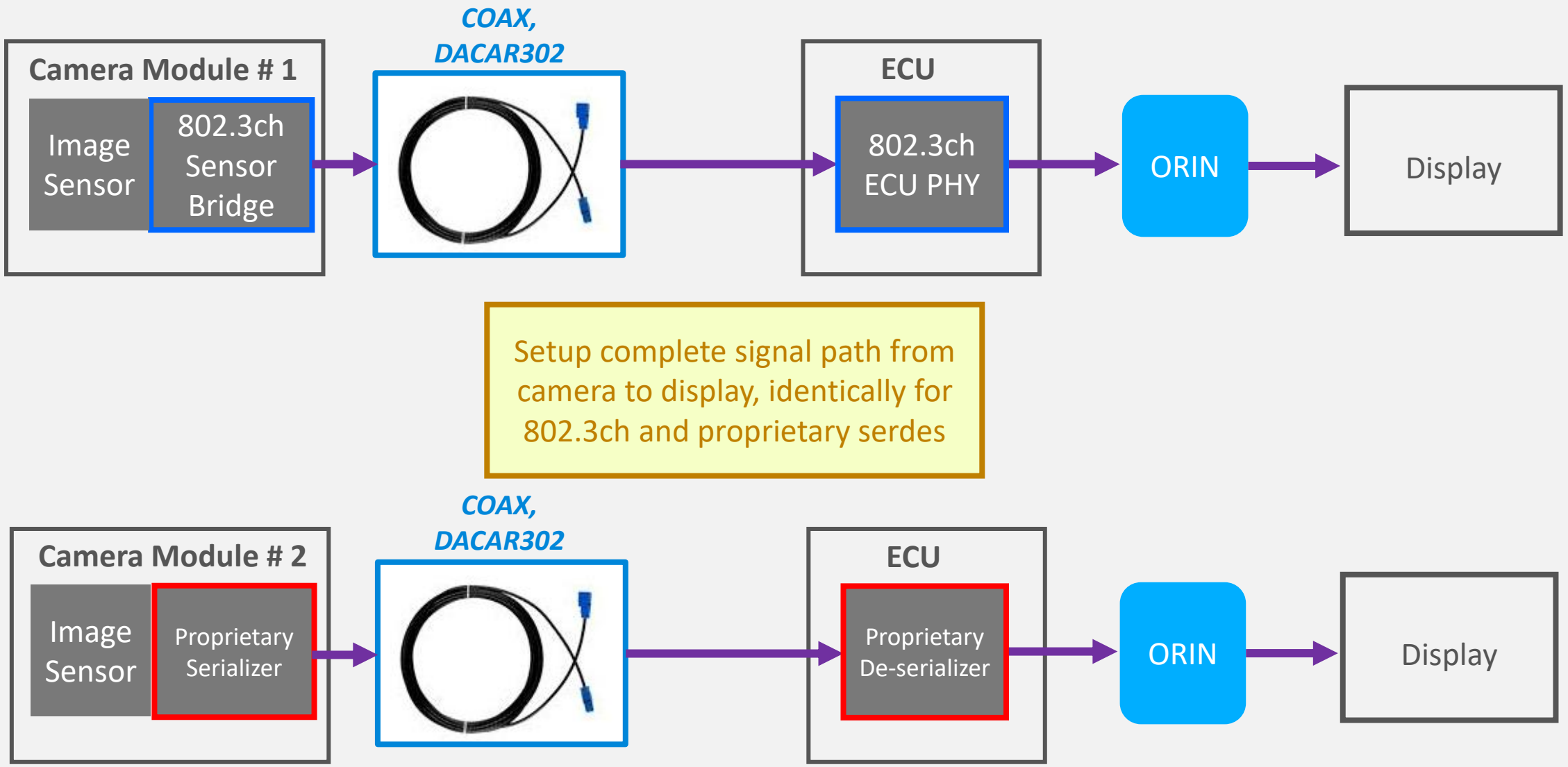
Agenda

- Motivation
- Measurement Setup
- Measurement Parameter Summary
- Measurement Result
- Conclusion

Motivation

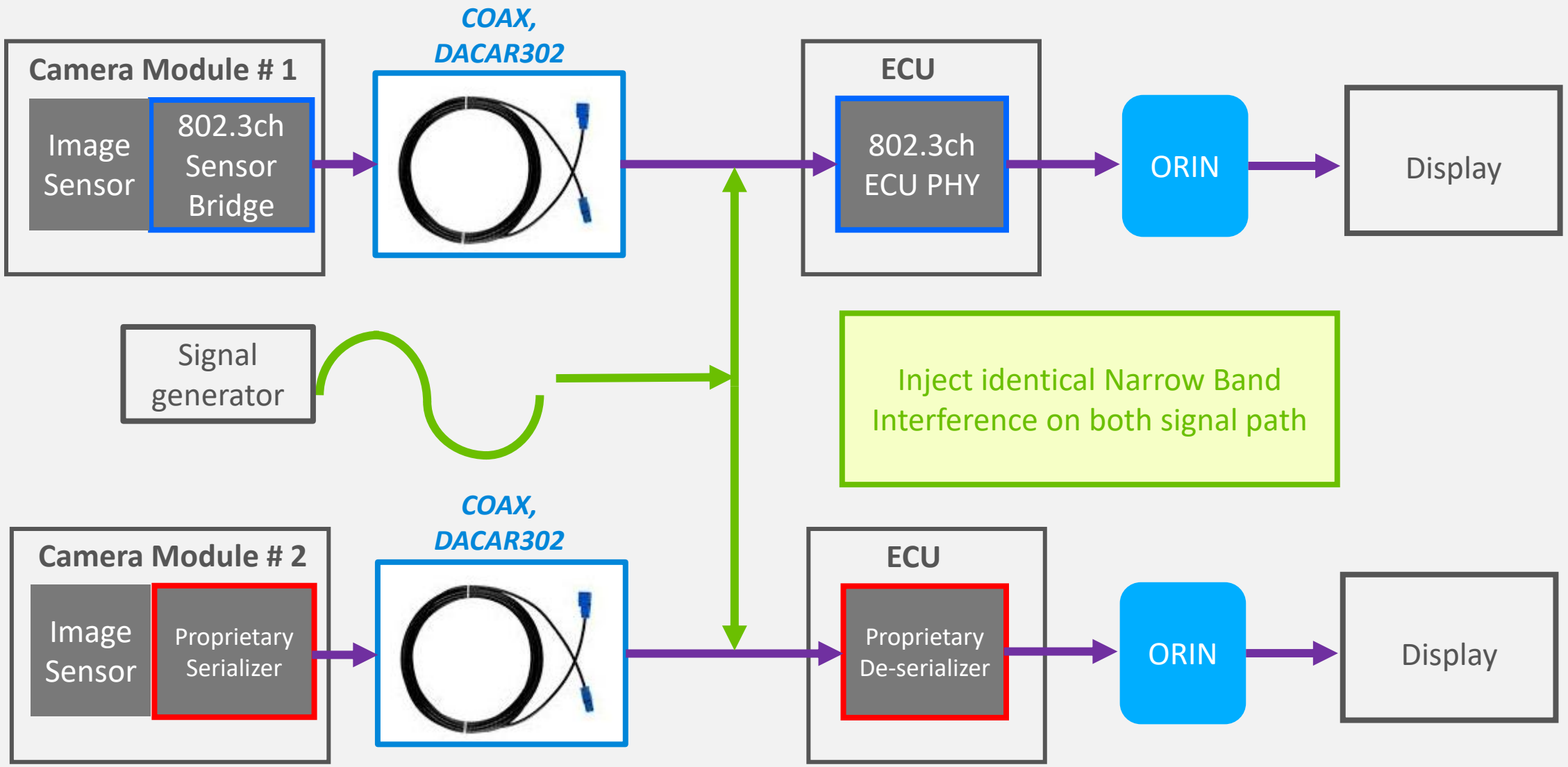
- EMI has been mentioned to be important factor for 802.3dm task group:
  - https://www.ieee802.org/3/dm/public/0524/Chini_Tazebay_3dm_01a_0524.pdf
  - https://www.ieee802.org/3/dm/public/0524/jonsson_etal_3dm_01_05_16_24.pdf
  - https://www.ieee802.org/3/dm/public/0724/jonsson_3dm_01_07_15_24.pdf
- There is currently a discussion regarding the modulation choice for 802.3dm. PAM4 802.3ch modulation downstream has been proposed by multiple individuals.
  - https://www.ieee802.org/3/dm/public/adhoc/101024/jonsson_3dm_01_10_10_24.pdf
  - https://www.ieee802.org/3/dm/public/0924/Lo_3dm_02_0924.pdf
  - https://www.ieee802.org/3/dm/public/0924/jonsson_3dm_01_09_15_24.pdf
  - https://www.ieee802.org/3/dm/public/0924/sedarat_3dm_202409.pdf
- There is considerable advantages to re-use ratified IEEE specification if possible.
- Concern has been expressed with using 802.3ch on Coax medium especially with respect to EMI performance.
- We would like to submit additional EMI measurement data to the task force to help informed decision making.

Setup



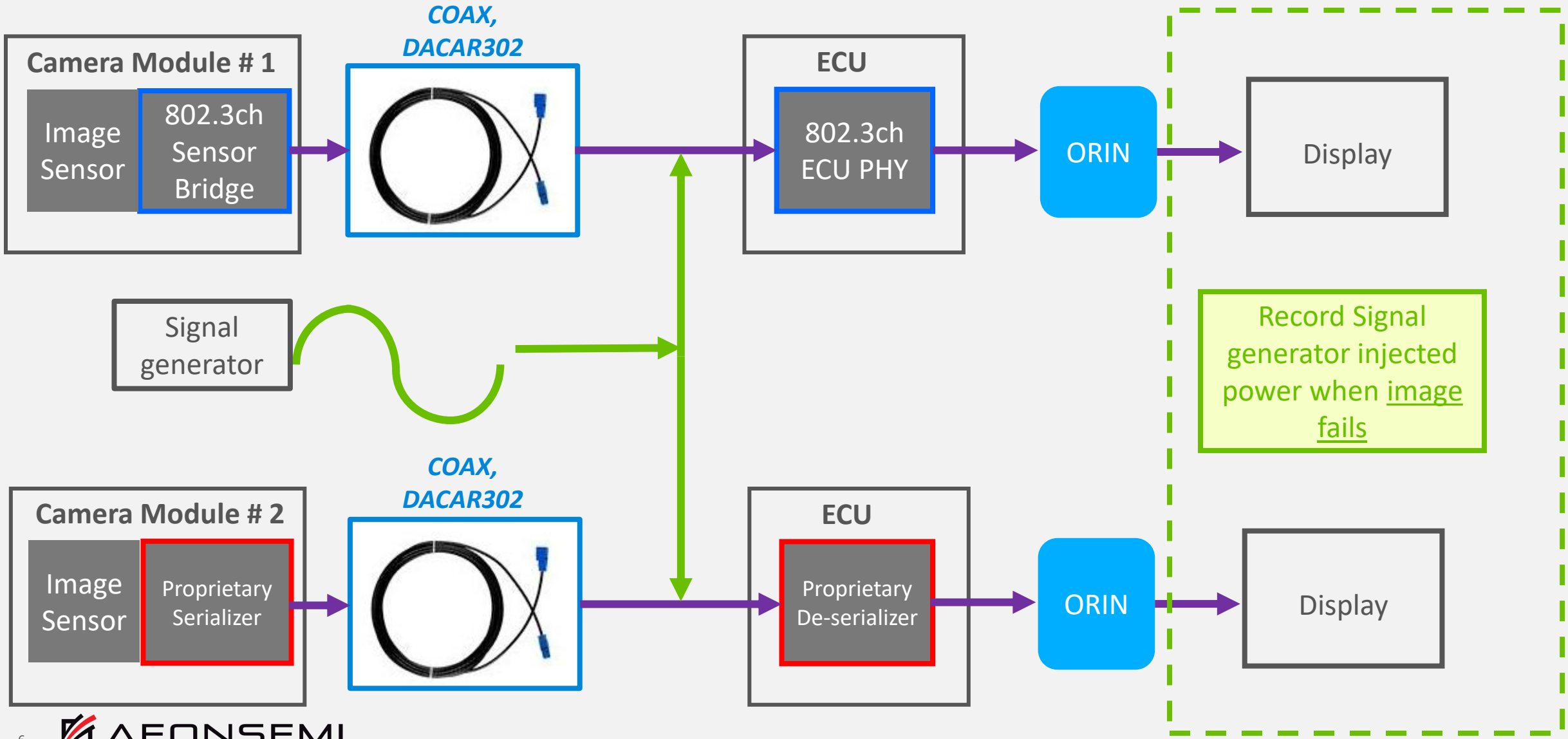
AEONSEMI

Setup



AEONSEMI

Measurement Output



AEONSEMI

Summary Parameters

- 5Gpbs mode allows similar payload BW comparison with proprietary serdes solution.

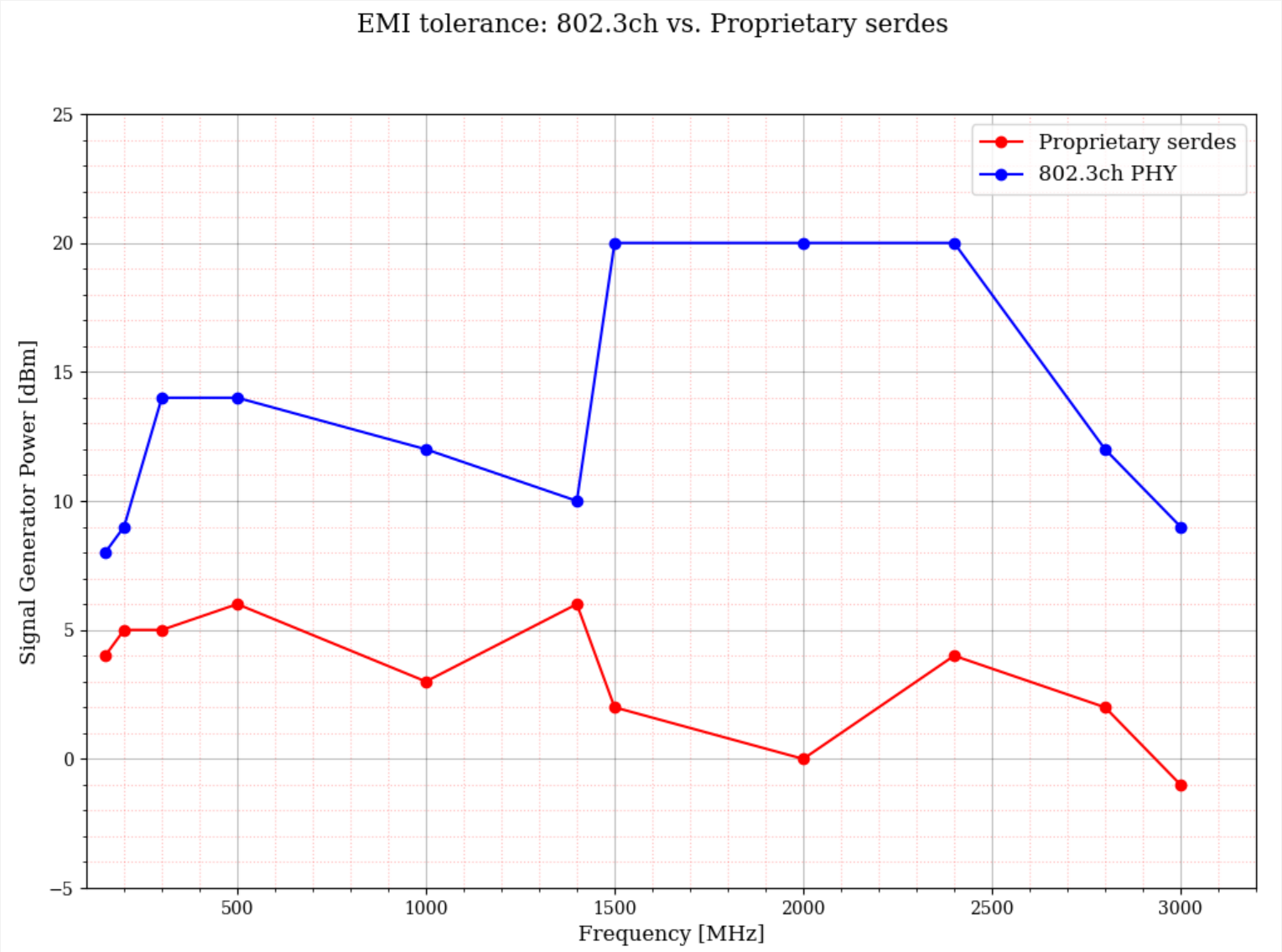
Parameter	802.3ch	Proprietary Serdes
Camera module PoC	1 inductor	3 inductors
ECU PoC	1 inductor	3 inductors
Camera module Board	2cm x 2cm	
Downstream Maximum Payload	5Gbps	5.2Gbps
Upstream Payload	Control data	
Cable	8m Coax (DACAR302)	
Frequency sweep	150MHz -> 3GHz	

Lab Setup

Measurement Results

Better EMI tolerance

- The measurement allows direct comparison between volume shipping serdes and 802.3ch implementation.
- Existing 802.3ch silicon implementation has better NBI tolerance than shipping proprietary serdes.



AEONSEMI

Conclusion

- Data submitted to task group show 802.3ch silicon implementation is competitive in power and latency to proprietary incumbent serdes
  - https://www.ieee802.org/3/dm/public/0924/Power_and_Latency_8023ch_Tran_09182024.pdf
  - https://www.ieee802.org/3/dm/public/0524/Evaluation%20of%20802.3ch_Tran_050142024a.pdf
- Additional measurement show 802.3ch PHY outperforms incumbent proprietary serdes on EMI resilience as well.
  - How much more EMI tolerance is needed relative to incumbent solutions?
- Additional measurements can be made to provide more coverage/data points.