

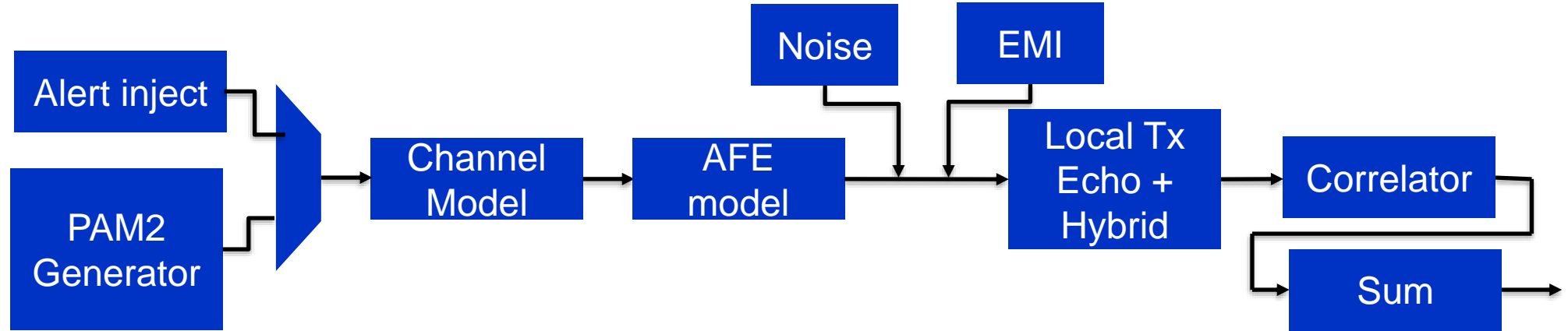


# Alert Detect for 802.3ch

Saied Benyamin  
Dragan Labalo

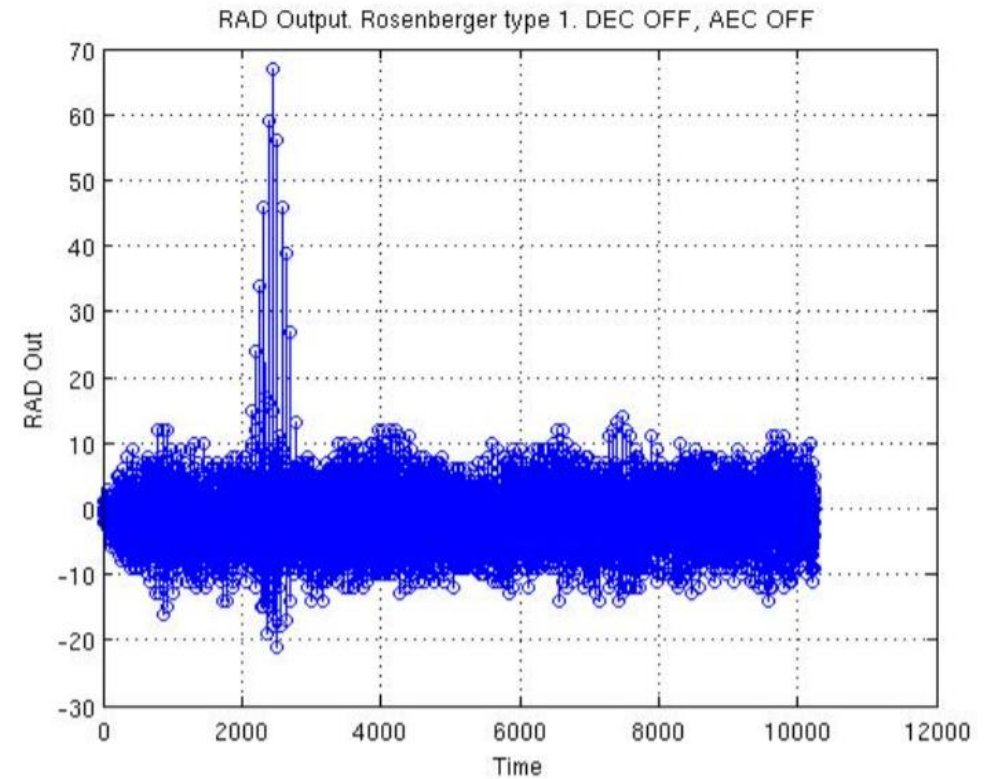
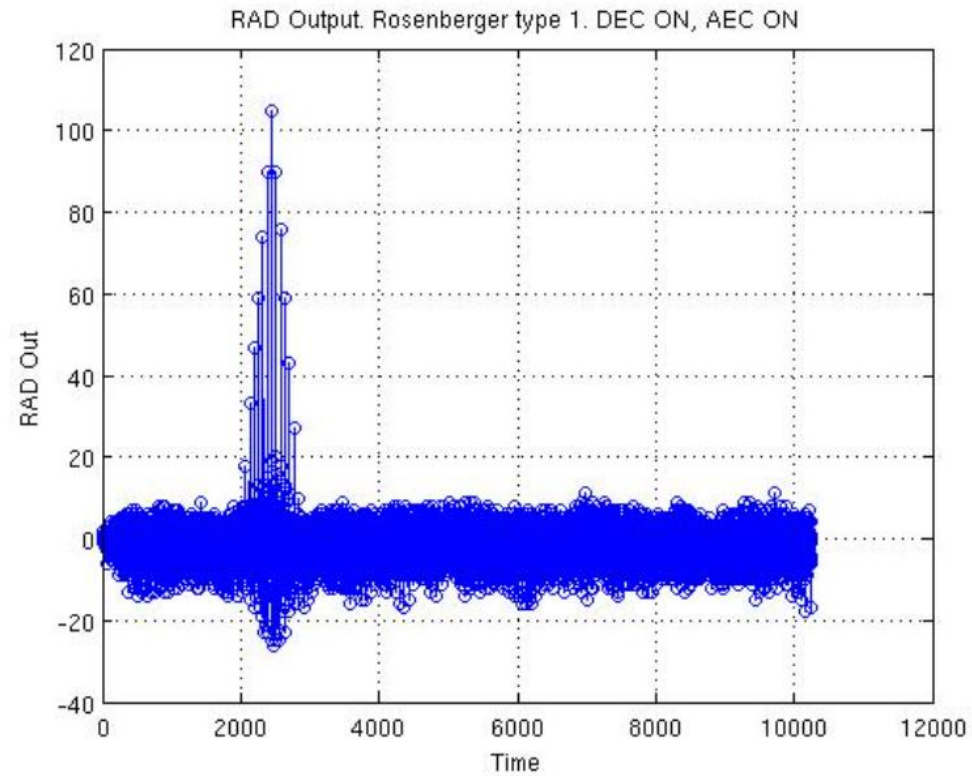
- Objective
  - Analyze if 10GBaseT style alert detect can be used in automotive environment.
- Methodology
  - Simulate full environment in presence of noise and EMI with a correlator for detection
- Assumptions
  - Alert sequence in 10GBase-T is as follows
    - PAM2 64 bit sequence, every bit repeated, resulting in 128 bits
    - The 128-bit sequence is repeated 7 times followed by 128 bits of quiet
  - Proposal for 10GBase-T1
    - PAM2 same 64 bit sequence, every bit repeated 16 times resulting in 1024 bits,
    - The 1024 bit sequence is repeated 7 times followed by 1024 bits of quiet
  - A correlator is used to detect presence of Alert
  - 10nf-100nF coupling cap used for A/C coupling, no magnetics

# Simulation Environment



- Remote transmitter generates PAM2 sequence with Alert embedded at a random point
- Channel model with insertion and return loss based on DeBiaso and Rosenberger cable models and realistic analog front end models
- White noise of 10dB is added (compared to the Rx signal level)
- EMI injection from ingress measurements with BCI test based on JLR test level severity 2, probe distance of 450mm with a Leoni STP cable and a Rosenberger HMTD connector resulted in 4.5mV rms
- The resulting signal is then passed through a correlator
- Local echo canceller is turned off
- For successful detection, the alert detect correlator should have high peak value at the symbol number where alert is inserted and small value otherwise.

- Correlator summation output with and without echo canceller

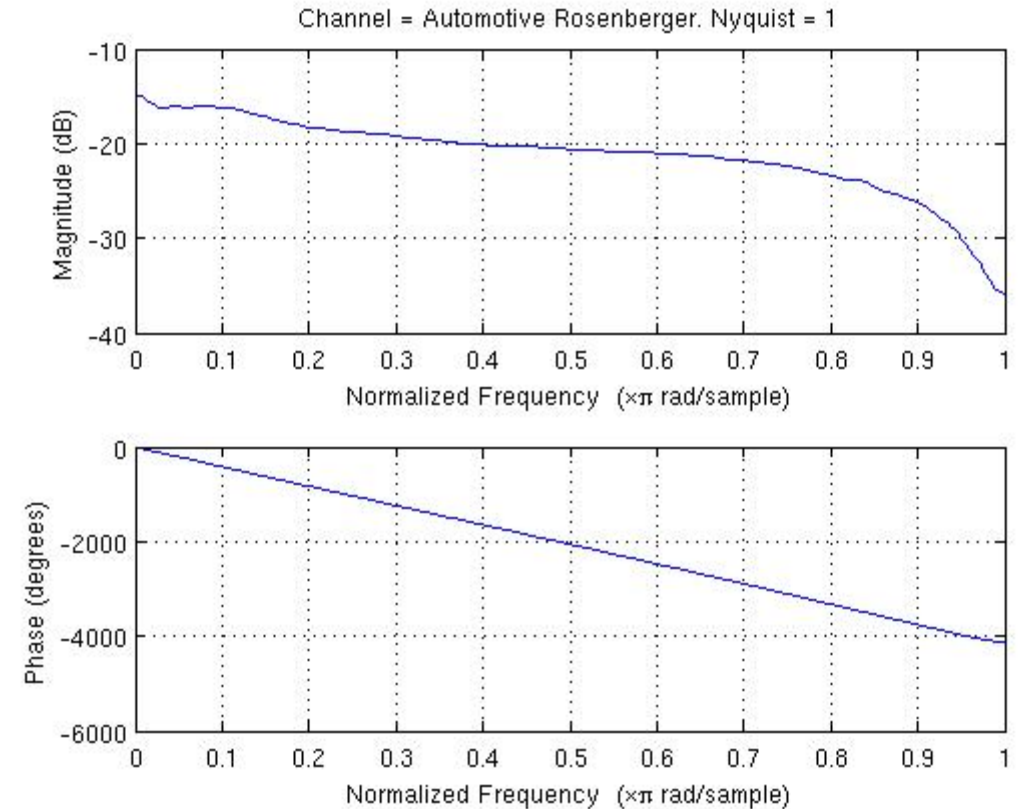
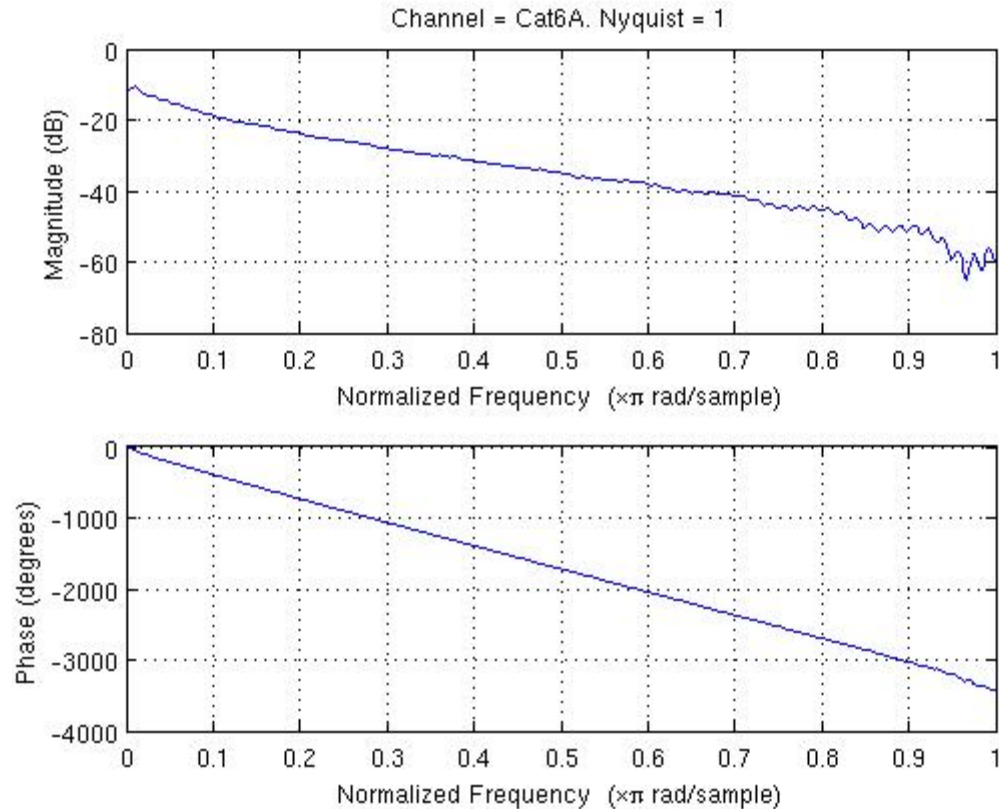


- Detection peak to average ratio is greater than 40dB

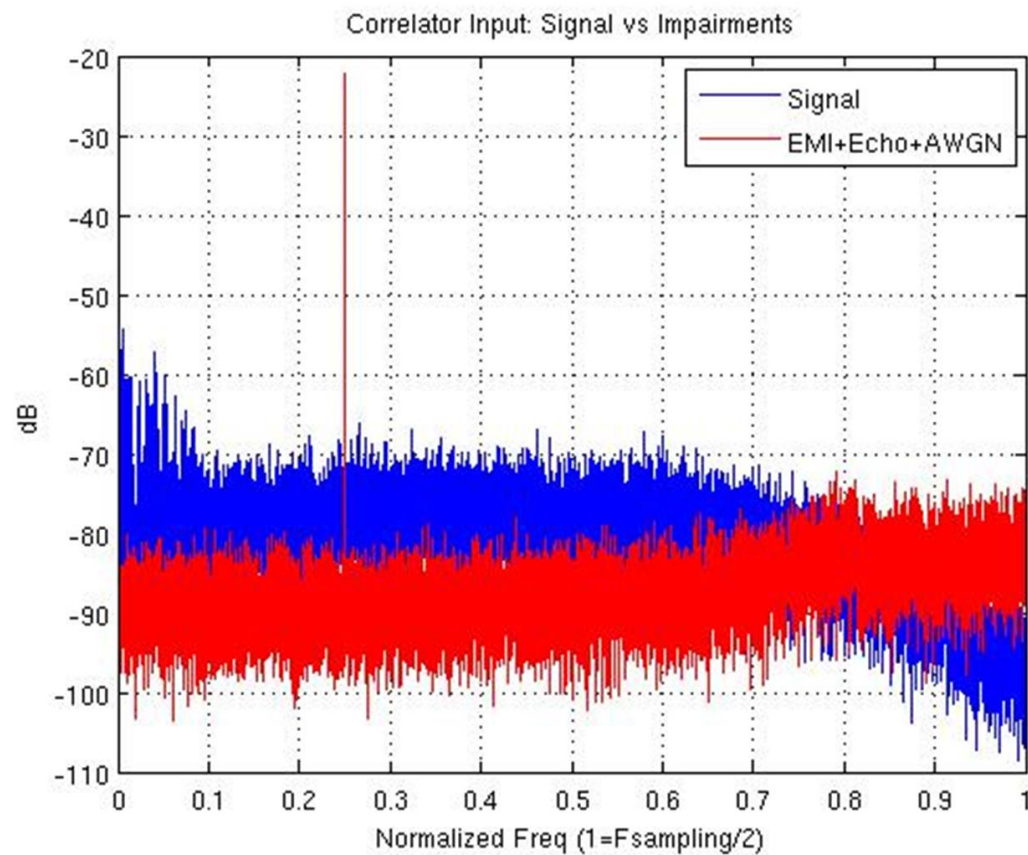
Thank you.

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# BACKUP – Channel Models



# Backup - Noise model



# BACKUP – EMI Model

Measured Ingress Voltage at MDI Port for Various BCI Immunity Tests  
Scaled to JLR Test Severity Level 2 Test Current, CW, 2m STP (H-MTD) Cables

