

New AMI Redriver Flow

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Problem Statement

- The upstream cumulative impulse response of the Redriver channel is not provided to the terminal Rx (including Retimer Rx) in AMI_Init. If the terminal Rx has DFE, the end-to-end impulse response needed in statistical simulations is not available.
- The upstream cumulative impulse response of the Redriver channel is not provided to either Tx or Rx in AMI_Init. AMI_Init can not perform optimization on the upstream signal.
- The combination of Tx GetWave model and Rx Init-only model leads to deconvolution in time domain simulations.

Proposal

- A new Boolean reserved parameter Use_v7p1_AMI_Flow
- Add two additional columns at the end of the impulse matrix if Use_v7p1_AMI_Flow=True. One for the upstream cumulative impulse response , the other for the impulse response of the model's EQ (including AGC).
- A new simulation flow for cases where all models support the new parameter and the terminal Rx has AMI_GetWave if the model has DFE

New Parameter Use_v7p1_AMI_Flow

- Usage of Use_v7p1_AMI_Flow is In. The EDA tool can set its value to either True or False in the AMI_Init call to inform the DLL whether the new flow or the old flow is being executed.
- A model specifies the Use_v7p1_AMI_Flow parameter in its .ami file must also specify Init_Returns_Impulse=True. The AMI_Init function must support both cases of Use_v7p1_AMI_Flow being set to True and False.

Convention

h_{AC} = Impulse response of analog channel

h_{TxAC} = Impulse response of Tx + analog channel (returned by Tx Init)

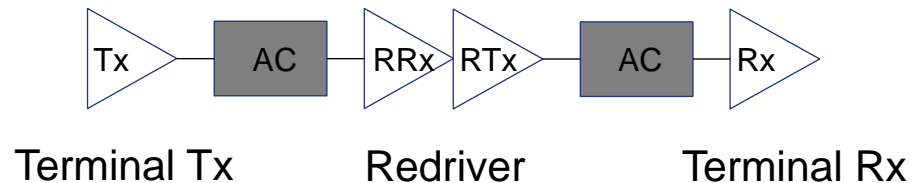
h_{TxACRx} = Impulse response of Tx + analog channel + Rx (returned by Rx Init)

Tx: Terminal Tx

RRx: Redriver Rx

RTx: Redriver Tx

Rx: Terminal Rx



Additional Columns in Impulse Matrix

	Input to AMI_Init	Output of AMI_Init
Tx	h_{AC} of direct downstream section h_{AC} to direct victims Upstream cumulative impulse (*) Place holder (*)	h_{TxAC} of direct downstream section h_{TxAC} to direct victims Upstream cumulative impulse convolved with Tx/RTx EQ (*) Impulse of Tx/RTx EQ (*)
RRx	h_{TxAC} of direct upstream section h_{TxAC} from direct aggressors Upstream cumulative impulse (*) Place holder (*)	h_{TxACRx} of direct upstream section h_{TxACRx} from direct aggressors Upstream cumulative impulse convolved with RRx EQ (*) Impulse of RRx EQ (*)
RTx	h_{AC} of direct downstream section h_{AC} to direct victims Upstream cumulative impulse (*) Place holder (*)	h_{TxAC} of direct downstream section h_{TxAC} to direct victims Upstream cumulative impulse convolved with Tx/RTx EQ (*) Impulse of Tx/RTx EQ (*)
Rx	h_{TxAC} of direct upstream section h_{TxAC} from direct aggressors Upstream cumulative impulse (*) Place holder (*)	h_{TxACRx} (excluding DFE) of direct upstream section h_{TxACRx} (excluding DFE) from direct aggressors Upstream cumulative impulse combined with Rx EQ (including DFE) (*) Impulse of Rx EQ (excluding DFE) (*)

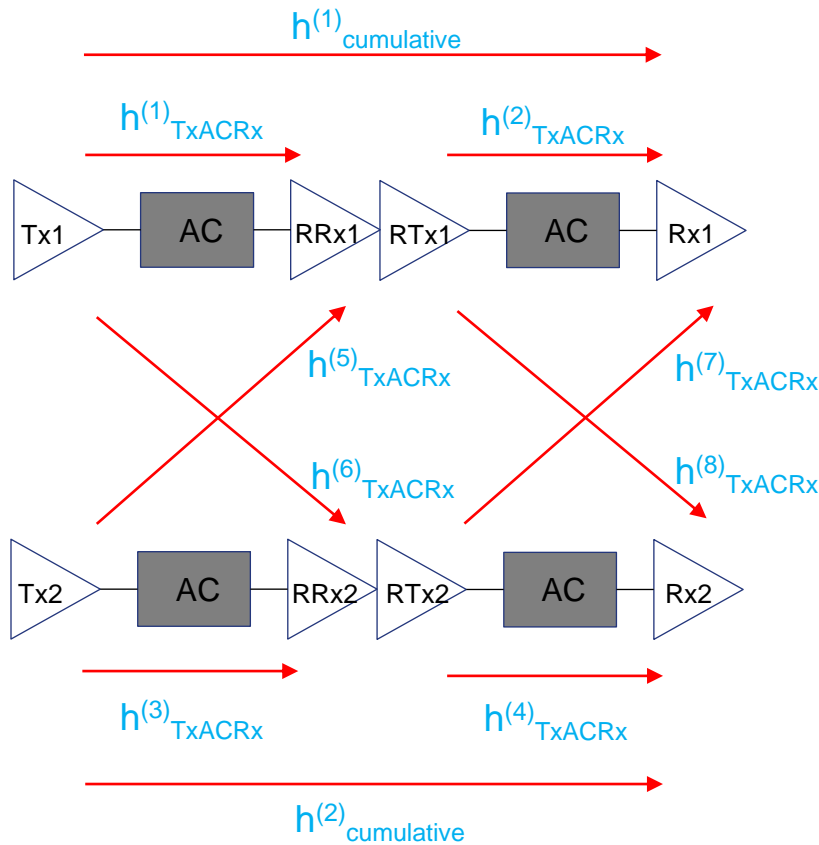
* Column is included if EDA tool sets Use_v7p1_AMI_Flow=True

Note: blue color highlights new columns/data in the impulse matrix in the new flow compared to the current flow. Black color highlights existing columns in the current flow.

New Time Done Simulation Flow

- New flow applies to cases where all models specify parameter Use_v7p1_AMI_Flow and the terminal Rx has AMI_GetWave if the model has DFE
- Since the EDA tool can use the impulse response of the model's EQ returned by AMI_Init to construct an AMI_GetWave function for the model if it does not have one, effectively all models have AMI_GetWave.
- Simulations proceed as if all models have AMI_GetWave.
- No deconvolution is needed.

New Statistical Simulation Flow (with Crosstalk)



Tx1 -> Rx1 paths: $h^{(1)}_{\text{cumulative}}$

$$h^{(6)}_{\text{TxACRx}} * h^{(7)}_{\text{TxACRx}}$$

Tx2 -> Rx1 paths: $h^{(3)}_{\text{TxACRx}} * h^{(7)}_{\text{TxACRx}}$

$$h^{(5)}_{\text{TxACRx}} * h^{(2)}_{\text{TxACRx}}$$

- New flow applies to cases where all models specify parameter Use_v7p1_AMI_Flow
- The EDA tool constructs impulse responses of all possible paths using the cumulative and sectional impulse responses returned by AMI_Init functions

Thank You