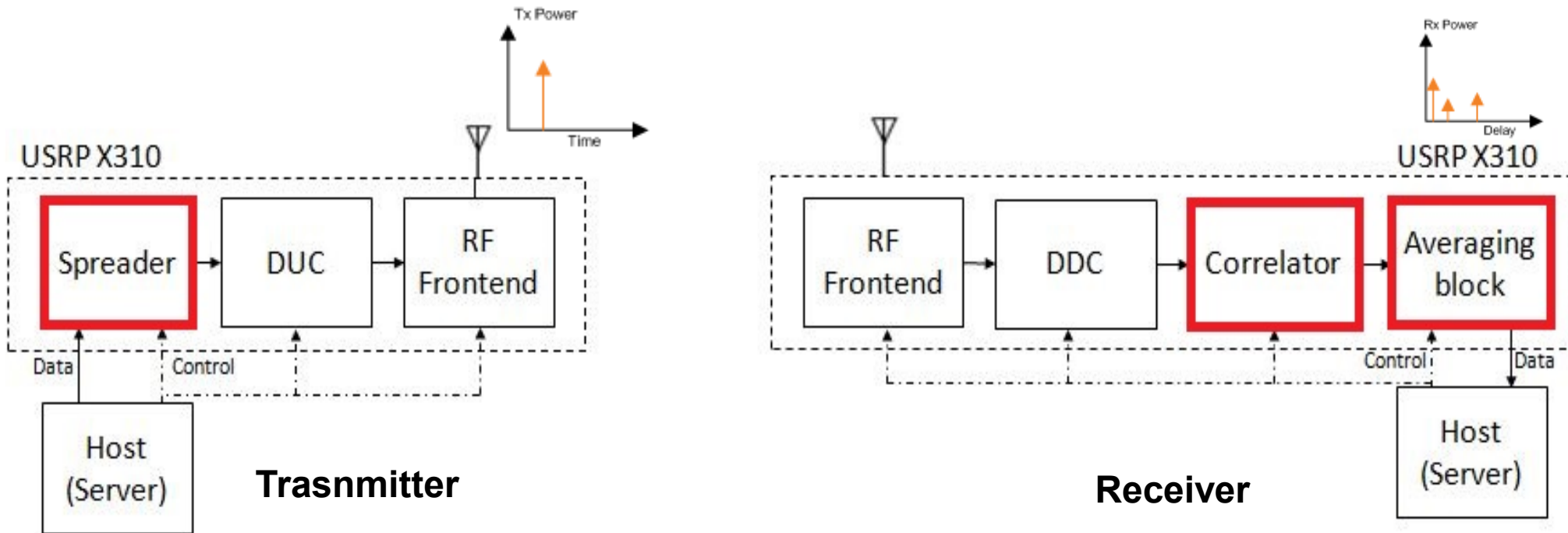


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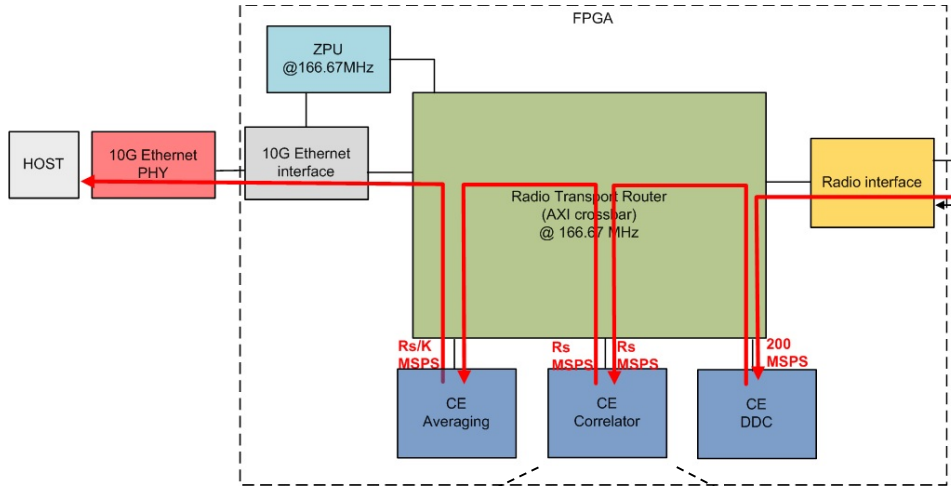
COSMOS Tutorial

Wideband Channel Sounding

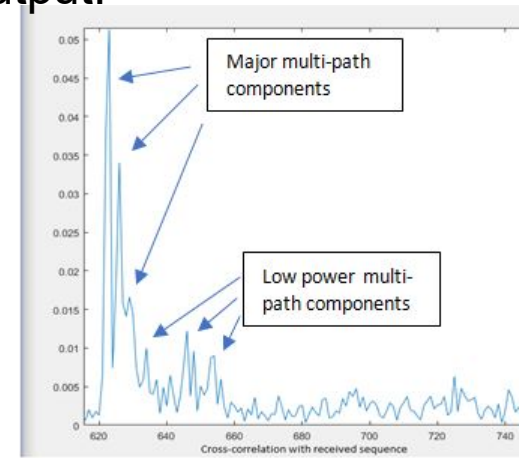
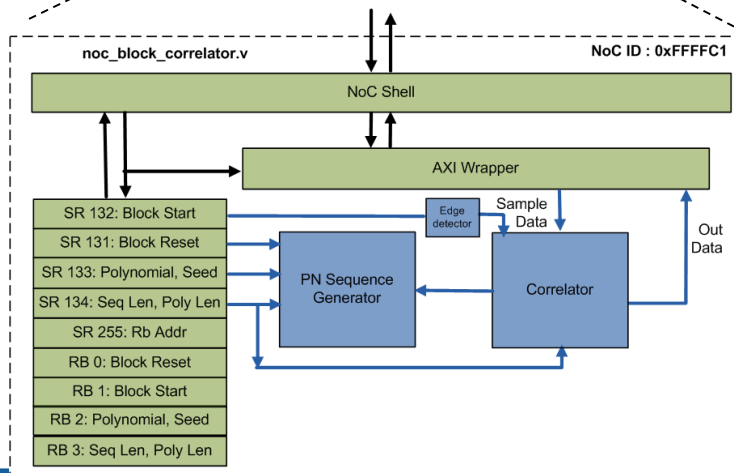
Spread Spectrum Channel Sounder



RFNoC Correlator



- Ettus Research RFNoC framework for 3rd generation USRP devices (X310, E310, N310, etc.)
- Plug and play custom Computation Engines.
- Correlator CE Identifies delayed versions of PN sequence, gives out correlation power.
- Averaging CE computes average over contiguous sets of correlator output.



ORBIT/COSMOS EXPERIMENT

Prepare host nodes

- Image the nodes
`omf load -i channel-sounder.ndz -t system:topo:group-<color>`
- Turn the nodes on
`omf tell -a on -t system:topo:group-<color>`
- Check node status
`omf stat -t system:topo:group-<color>`
- ssh to the nodes
`ssh root@node<tx_node>`
`ssh root@node<rx_node>`

Check USRPs

- USRPs are assigned to each group. Check the image using `uhd_usrp_probe --args="addr=<TX USRP or RX USRP>"`

Group color	TX USRP	RX USRP
red	10.10.23.16	10.10.24.16
yellow	10.10.23.1	10.10.24.18
green	10.10.23.14	10.10.24.14
purple	10.10.23.15	10.10.24.15
blue	10.10.23.12	10.10.24.13
black	10.10.23.11	10.10.24.11
cyan	10.10.23.13	10.10.24.12
white	10.10.23.18	10.10.24.17

Set up web based streaming

- Web proxies for receive nodes are already setup.
- Set up SSH tunnel from your local port 5100 to:
grid.orbit-lab.org:5100<group number>

See https://wiki.cosmos-lab.org/wiki/tutorials/ssh_tunnel

Group color	Group number
red	1
yellow	2
green	3
purple	4
blue	5
black	6
cyan	7
white	8

Run the experiment

- Run TX application (on first node in your group)
`/root/uhd/host/build/examples/rfnoc_tx_mobicom --group <color>`
- Run RX application (on second node in your group)
`/root/uhd/host/build/examples/rfnoc_rx_mobicom --group <color>`
- Download `channel_sounding_display.html` and open it in a browser.
- Multi-path effects as well as ISI due to lack of symbol timing synchronization can be observed in the PDP.