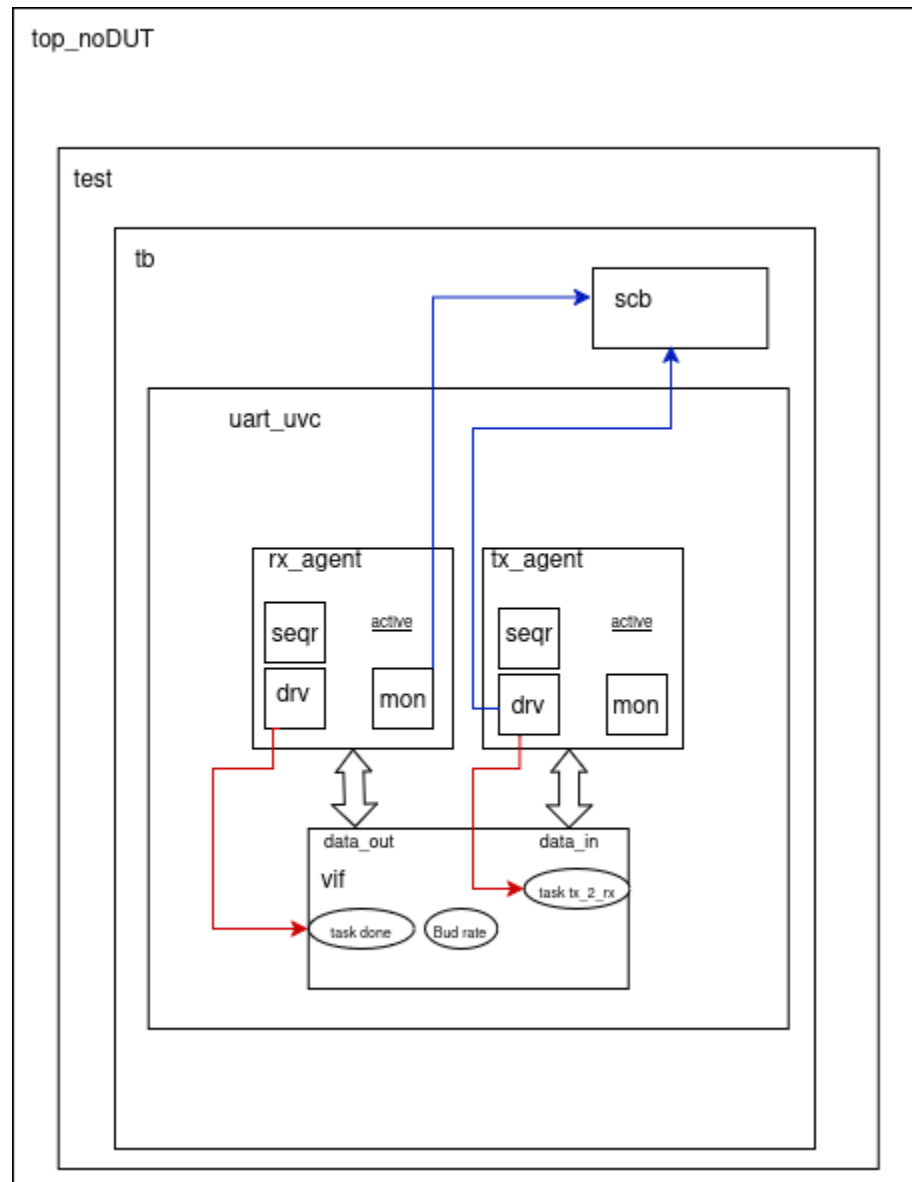# Verification Plan

The goal of the UART verification plan is to make sure the UART works correctly. This includes checking that it follows the UART rules (like how data is sent and received), makes sure data is sent and received without mistakes, and works well with other parts of the system. We want to test everything, make sure it's fast and reliable, and handle tough situations like errors or heavy us

## Testbench Architecture:

**Phase 1: UART UVC Without DUT**

in a UART UVC where we have one UVC has 2 agents RX and TX without a DUT, the **interface** can include a **virtual UART** with Baud Rate to serialize and deserialize data. The **Tx Agent** sends a data, which is serialized and sent to the **Rx Agent**, where it is deserialized

and verified. This approach allows you to test the UVC independently and ensures that the agents work correctly before integrating with the actual DUT

**Phase 2: UART UVC With DUT**
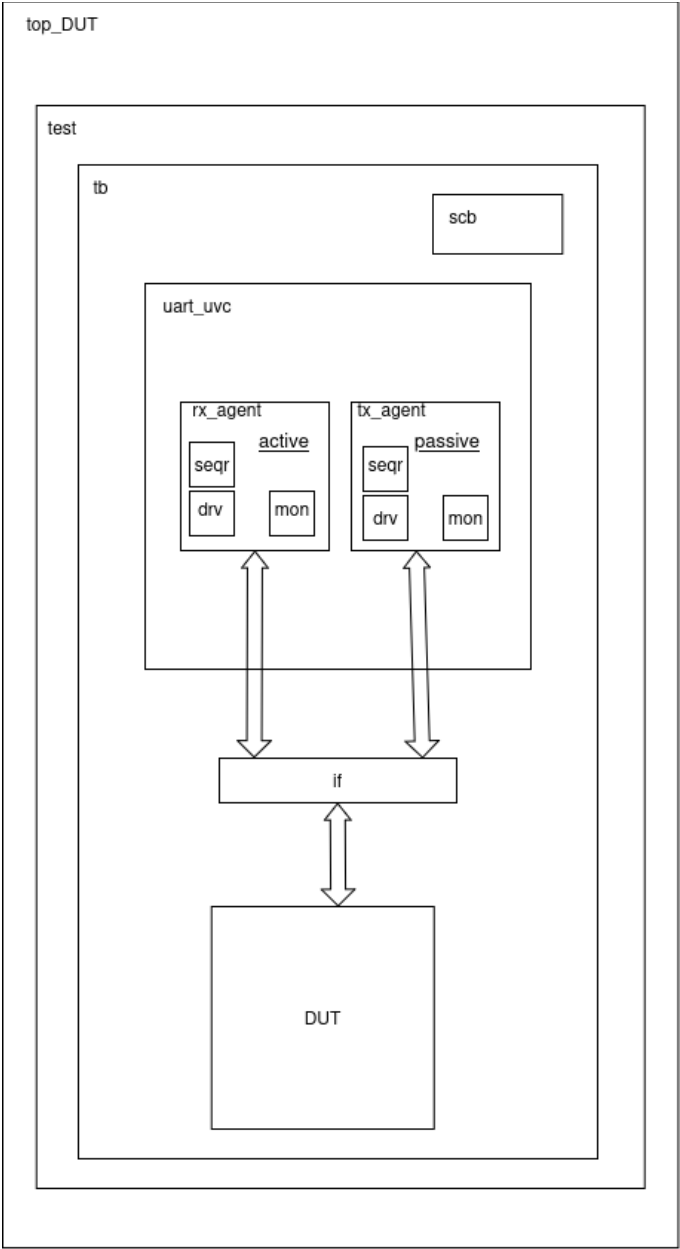


# Verification Plane:

| UVM_TEST= | Test case | Test Description | Test type |
|---|---|---|---|

| uart_base_test | Single 0xFF send | Send 0xFF from TX and verify reception via RX agent monitor. | Directed |
|---|---|---|---|
| uart_idle_test | Idle line check | Keep TX idle for a while, then send data (RX should not detect garbage). | Directed |
| uart_overflow_test | Overflow test | Send more than 8 bits to check RX buffer handling. | Directed |
| uart_parity_test | Parity test | Send correct & incorrect parity and check RX detection. | Directed |
| uart_dual_send_test | Send from both agents | TX and RX both send fixed values, and data is verified. | Directed |
| uart_rand_dual_send _test | Send both agents random | TX and RX both send random data, and RX verifies reception. | Randomize d |
| uart_loopback_test | Loopback test | TX sends a fixed value, and RX must echo it back correctly. | Directed |
| uart_back_to_back_t est | Back-to-back transmission | Send multiple bytes without gaps to check RX buffer stability. | Directed |
| uart_interrupt_test | Interrupt data | Send data mid-transmission to check RX behavior (overwrite/drop?). | Directed |
| uart_rand_test | Rand_test | All inputs (except clk) are randomized. | Randomize d |