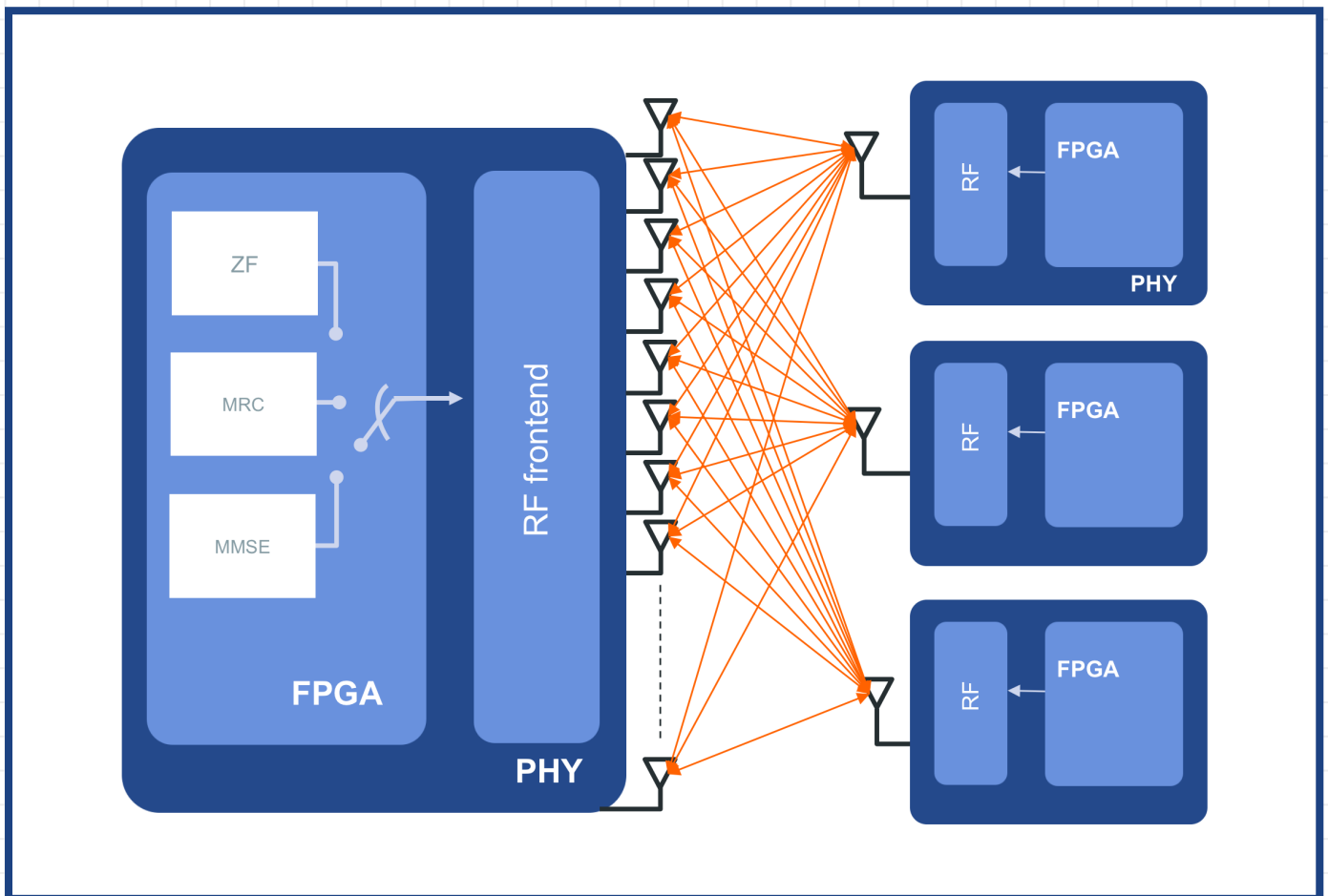


SDR DATA PLANE FUNCTIONALITY

PHY improvements: Massive MIMO



→ Testbed configuration up to 64 TX antennas.

→ Selection of linear receivers:

-----> Zero forcing.

-----> Maximum ratio combining.

-----> Minimum mean squared error.



SDR DATA PLANE FUNCTIONALITY

PHY improvements: Massive MIMO

CONTEXT

Data rate requirements for users are increasing rapidly over the last few years for both mobile and fixed users [1]. New technologies, which offer a high throughput per connection, are needed. Massive MIMO is considered a promising solution to improve the capacity, coverage area, spectral and power efficiency by narrowly beaming the transmit energy towards the receiver.

In a wireless system with MIMO technology two or more transmitters and receivers use multiple-input multiple-output for data transmission at the same time. With massive MIMO, the antennas can be configured as co-located or distributed large arrays, each with multiple antennas. This can greatly improve the performance as the spatial diversity of the antennas can be used to multiplex multiple transmissions concurrently.

UNIQUE SELLING POINT

- Our testbed offers up to 64 synchronized antennas.
- Joint precoding possible over high data rate backplane.
- The number of antennas are configurable from 4, 8, 16, 32 and 64.
- FPGA-based linear receivers can be selected (zero forcing, maximum ratio combining, minimum mean squared error).

OPPORTUNITIES

- New massive MIMO waveform design.
- Optimization in signal processing implementation.
- Indoor channel measurement for different room setup.

REFERENCES

For the explanation of massive MIMO [2], [3].

1 https://www.cisco.com/c/m/en_us/solutions/service-provider/vni-complete-forecast/infographic.html

2 A. Nordrum and K. Clark, "5G Bytes: Massive MIMO Explained," 17 June 2017. [Online]. Available: <http://spectrum.ieee.org/video/telecom/wireless/5g-bytes-massive-mimo-explained>

3 T. Marzetta, "An Introduction to Massive MIMO," September 2016. [Online]. Available: <http://5gwnews.com/index.php/mimo/335-massive-mimo-explained-what-the-heck-is-it>