L1 offload demonstration of NGFI downlink

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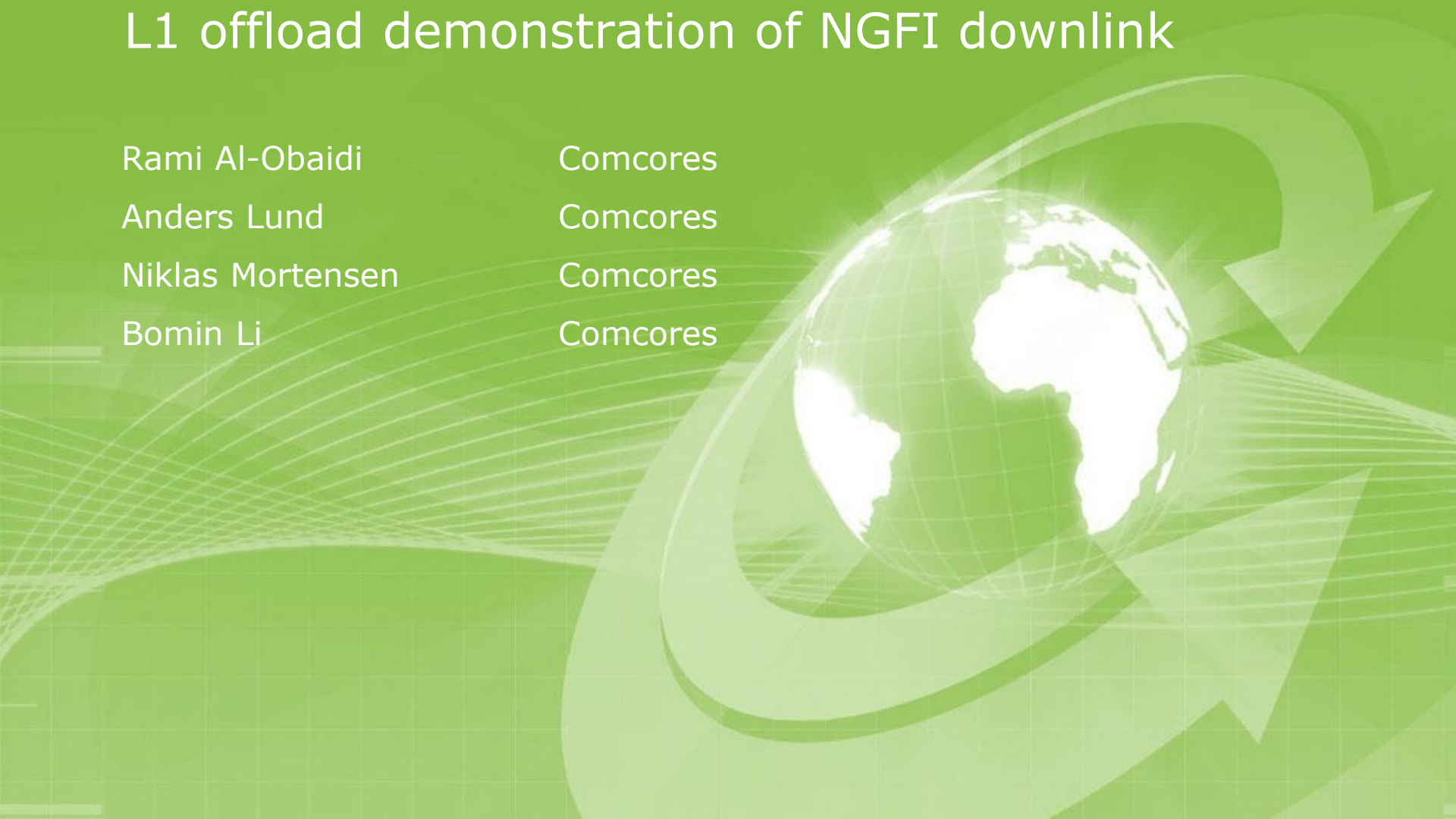
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IEEE 1914
NGFI – Next Generation Fronthaul Interface
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L1 offload demonstration of NGFI downlink			
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Outline

- What we did

- Background

- Demonstration platform

- Take away points

What we did

- LTE RRH with:
  - Partial offload of LTE L1 functions
  - Proprietary protocol based on 1914.3 RoE
  - Validated multiple scenarios

- NGFI split 4 variant
  - More than 4-factor data reduction compared to CPRI
  - ~300 Mbps for single antenna 20 MHz LTE cell
  - < 10 Mbps during low load

Function repartitioning

1. Packet based network

2. Cell load dependent traffic

3. Support for coordinated functions

4. Decouple traffic from number of antennas

Different functional splits proposed
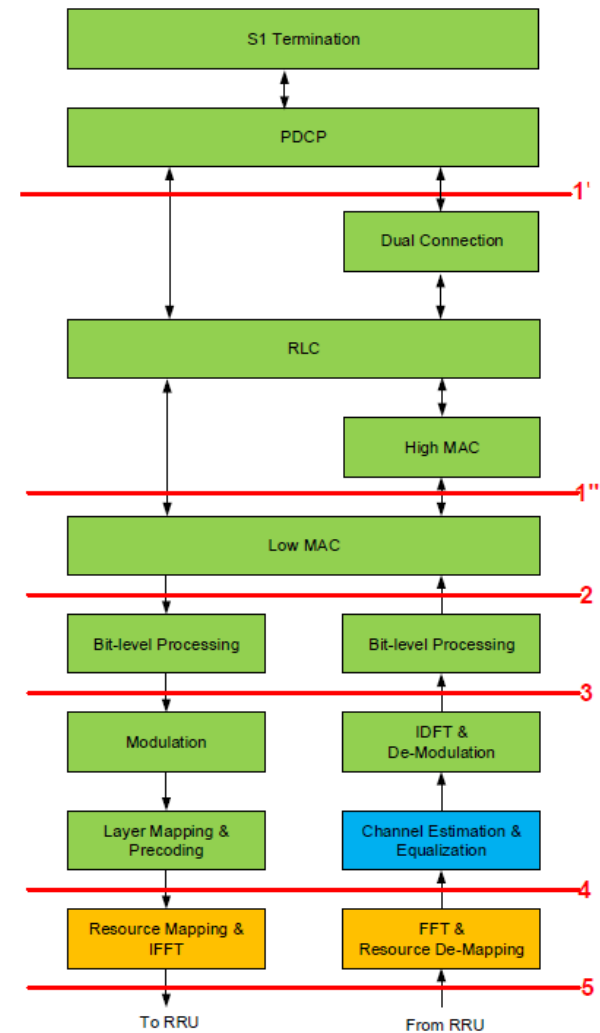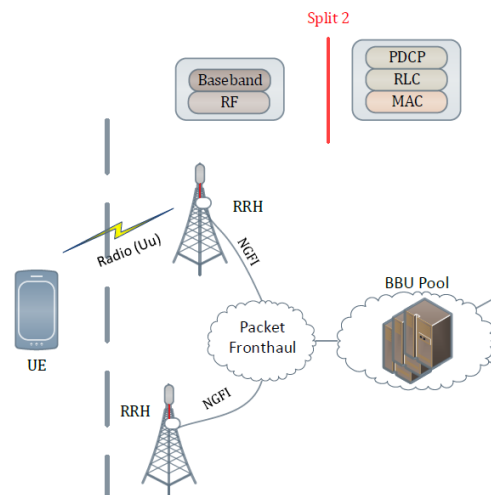
Source: "White Paper of Next Generation Fronthaul Interface"

No "one size fits all" solution

	Split 1	Split 2	Split 3	Split 4	Split 5
RRH complexity	High	High	High	Low	Lowest
FH Interface complexity	Low	High	Medium	Low	Low
Pooling gain	Small	Relatively small	Relatively small	Large	Large
Complexity of upgrading and maintenance	High	High	High	Low	Low
Delay requirement	< 100 ms	< 1 ms	< 1 ms	< 1 ms	< 1 ms

Source: "White Paper of Next Generation Fronthaul Interface"

Split 4 has low implementation complexity and offers cell-load dependent fronthaul traffic

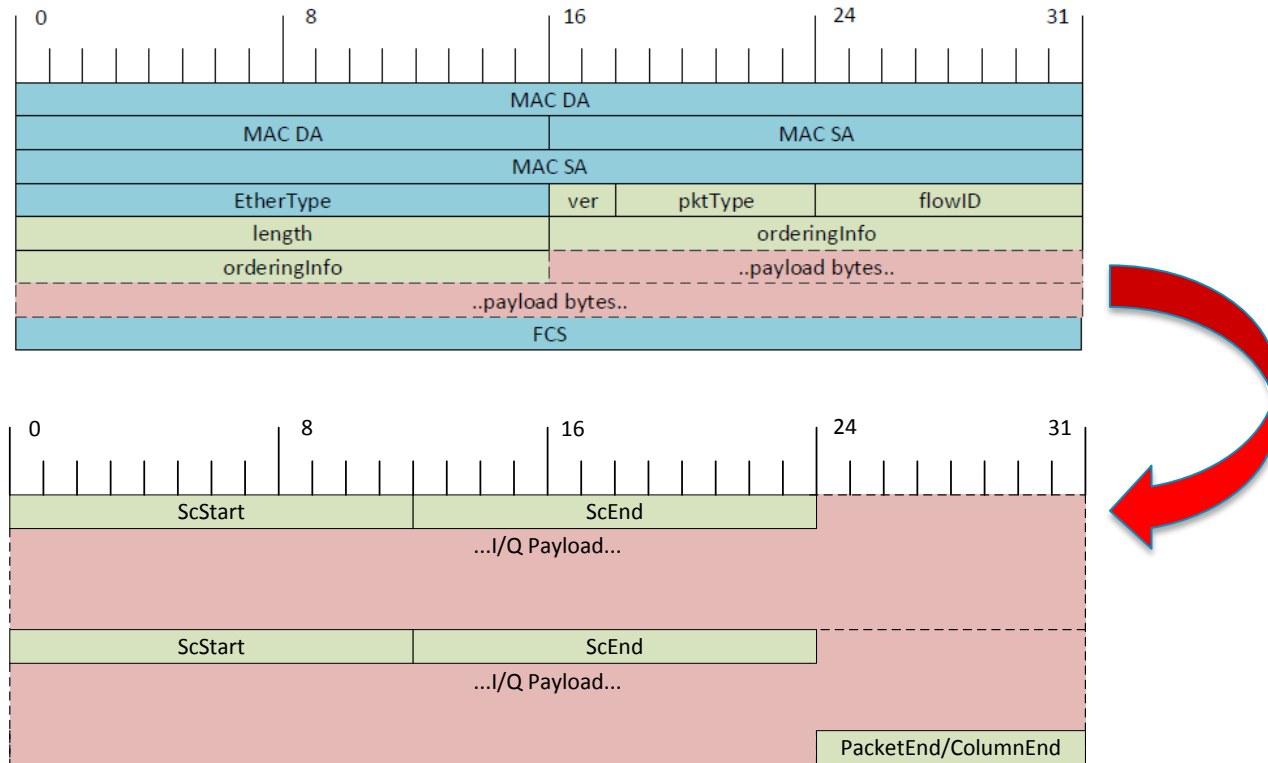It is the most obvious choice for a Proof of Concept implementation
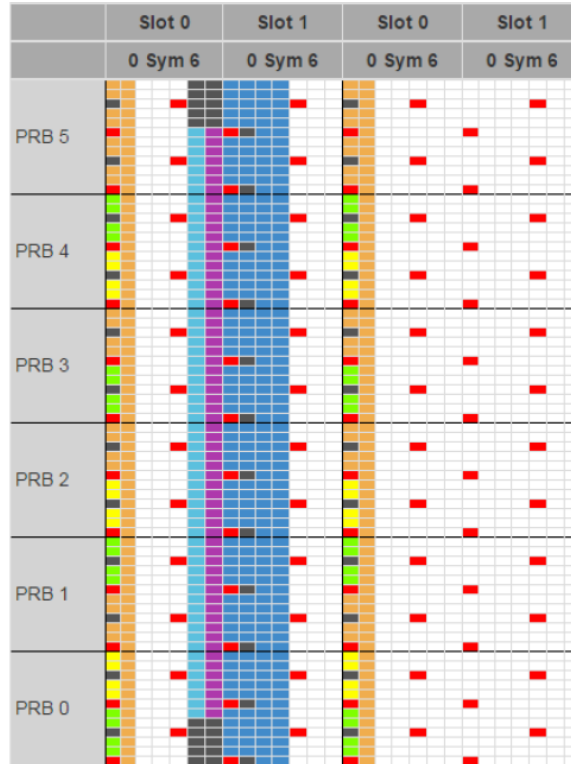
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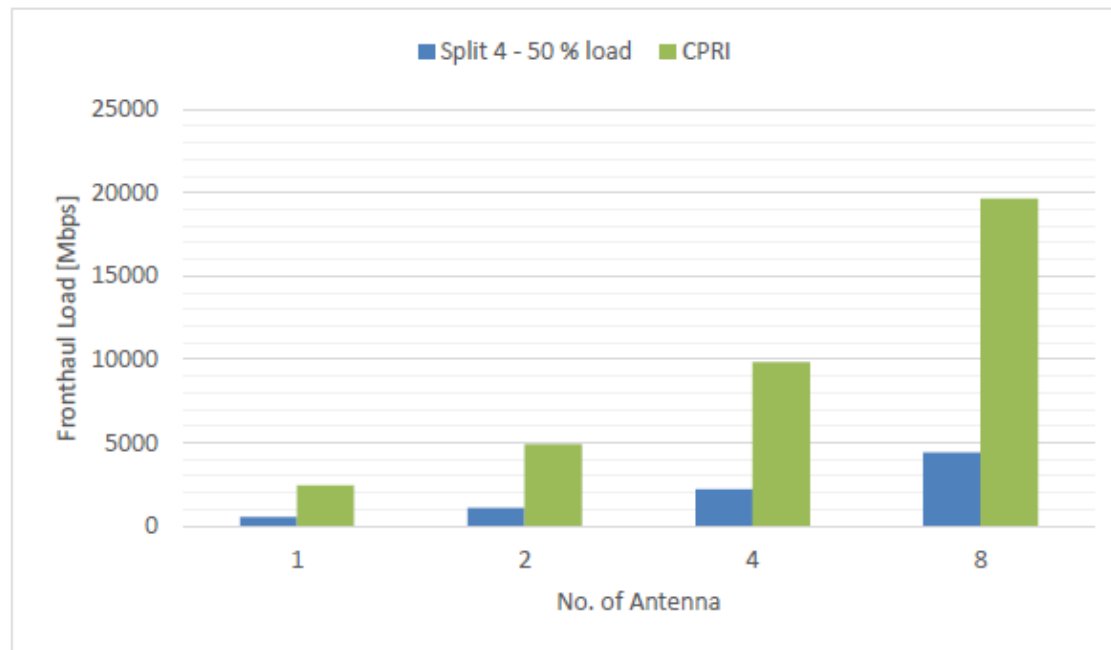
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Split 4 NGFI

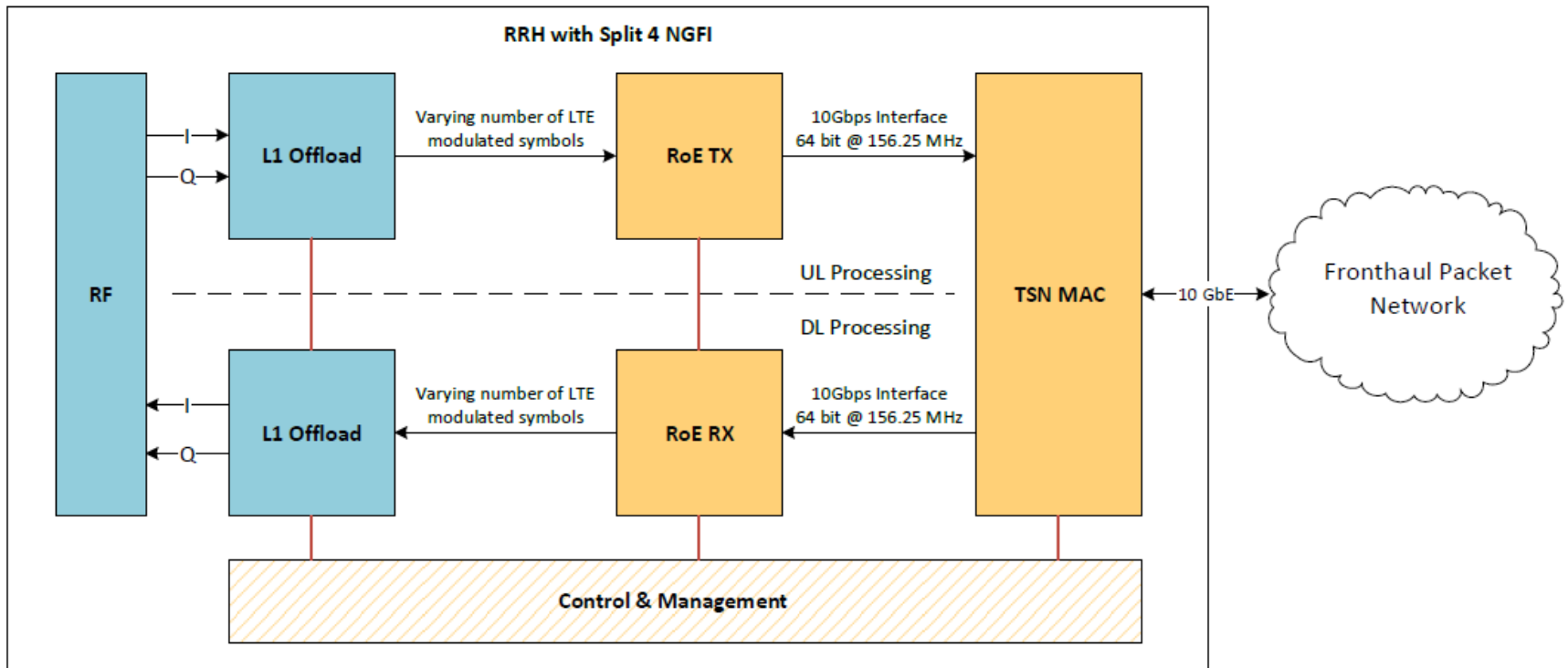Source: http://dhagle.in/LTE

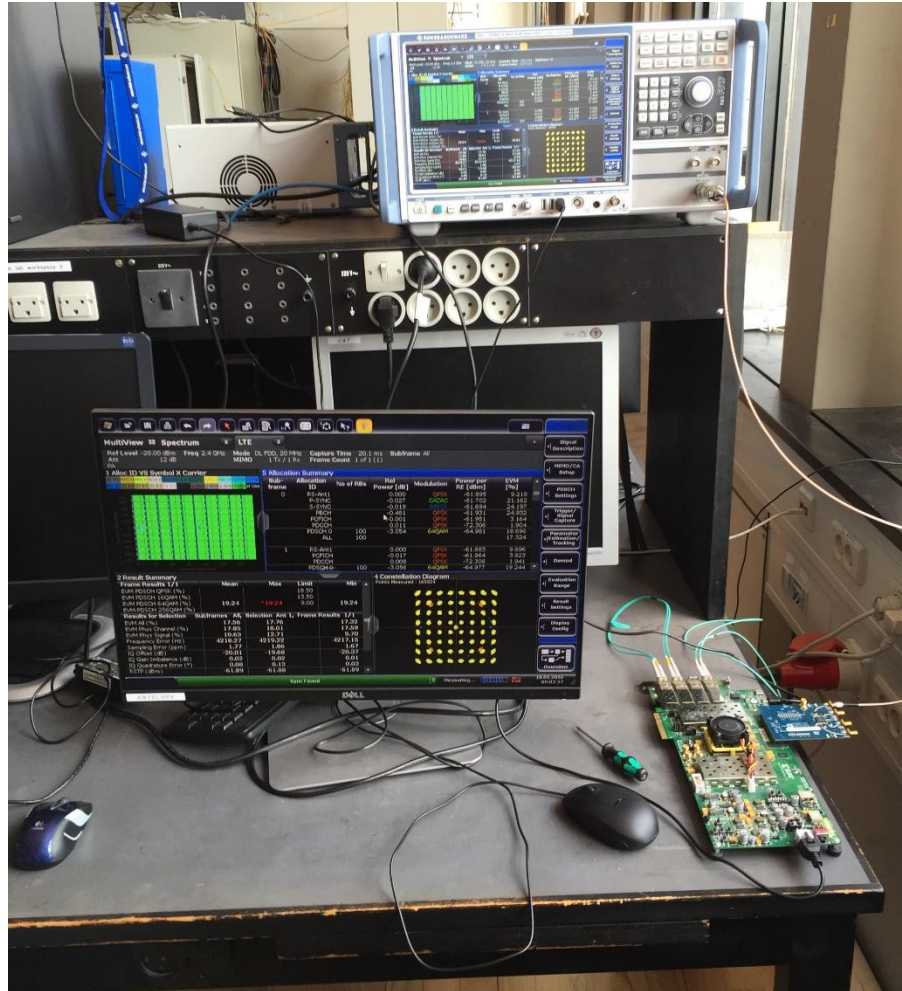# RoE frame

Split 4 NGFI

3-sector LTE site fronthaul load as a function of antennas
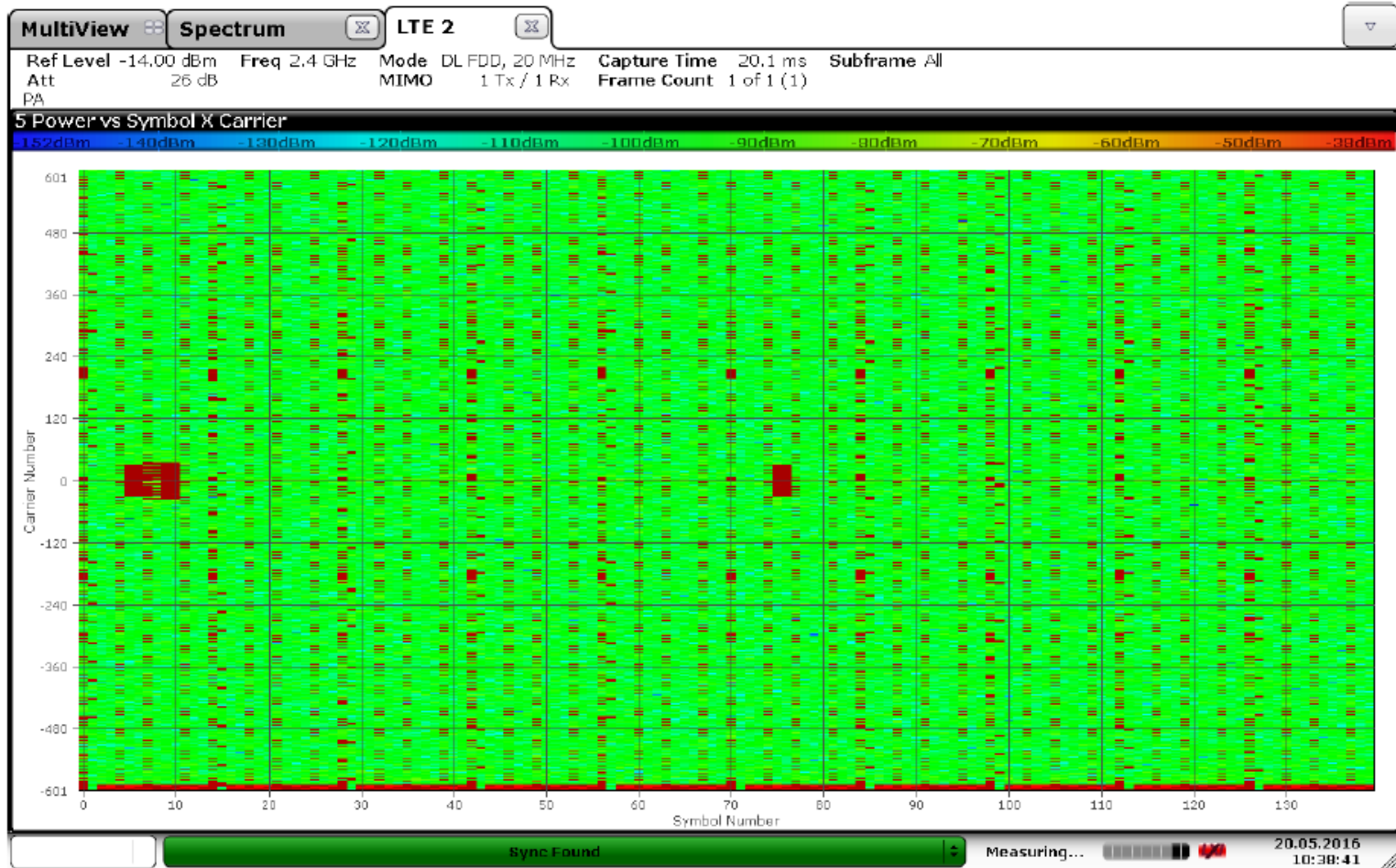
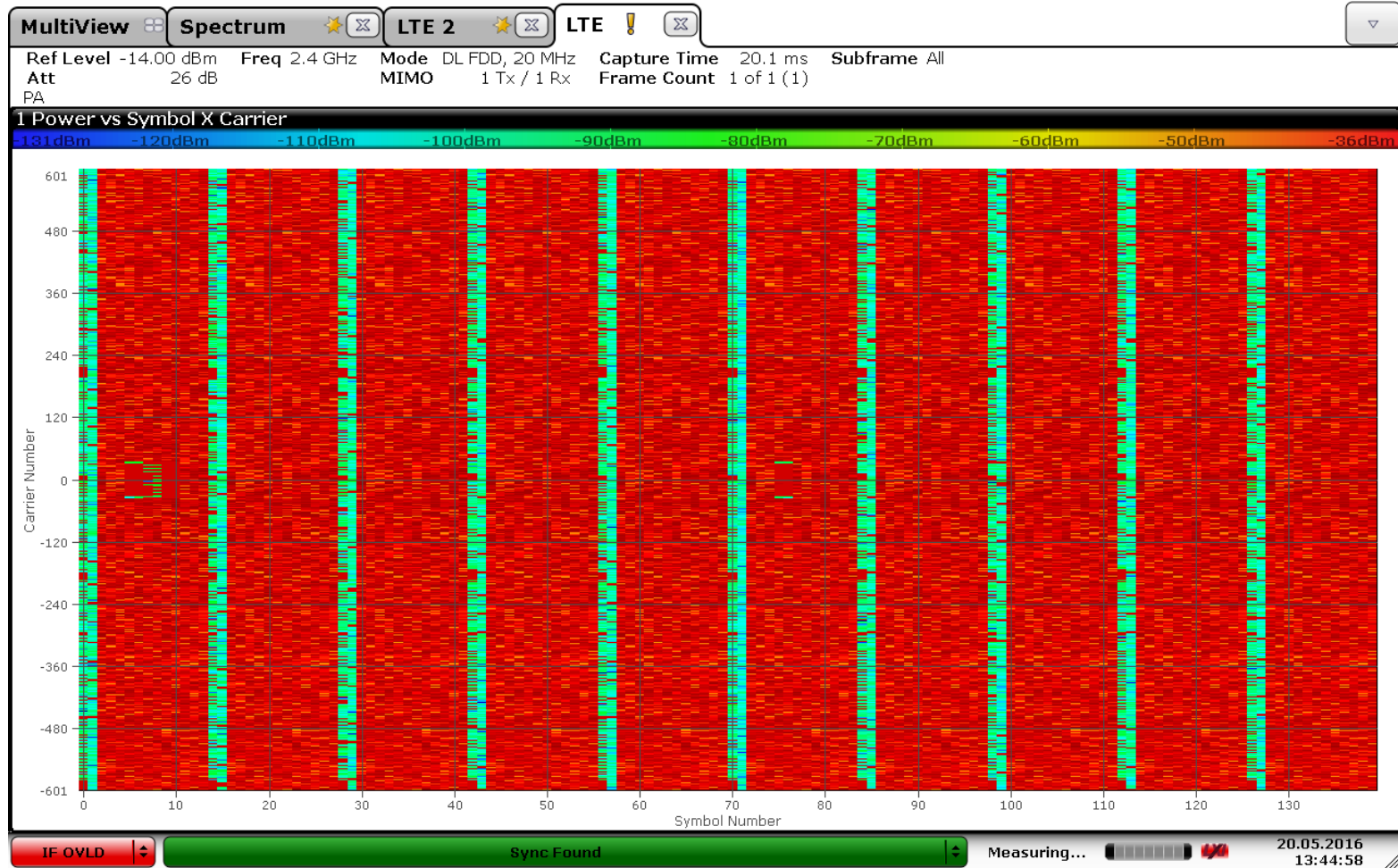CPRI vs. Split 4 NGFI

Split 4 NGFI RRH

Test platform

Signal analysis – Low load

Signal analysis – High Load

Summary

- Established DL LTE RRH with partial L1 offload

- Generated a legitimate LTE signal – verified by signal analyzer

- No surprises from test platform - theory matched practice