

## Mobile Optics (MOPA) for the 6G Era

**Show Floor Moderator:**  
*Stefan Dahlfort, Product Development Leader, Ericsson, USA*

# MOPA - Operator advisory board

Philippe Chanclou,

**Orange Innovation Networks**

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## Potential topics for MOPA 1/2

### Transceiver Circular Economy:

- Reducing waste: packaging and protection of transceivers (no waste at cell site)
- Optimising sourcing: limited classes/references of transceivers
- Reusing of existing transceiver (secondhand market):
  - appropriate and publicly archived documentation
  - refurbish MOPA transceivers
- Harmonization of evaluation performance:
  - test plan for refurbish certification
- Open compatibility : cell site uses multi-RAT with multi-vendors, we need to simplify transceivers operation (transceiver compatible for several RAT or vendors)

### Transceiver Energy efficiency:

- multi-rate operation : could-we decrease power consumption by decreasing line rate?
- indicator of transceiver power consumption : static, dynamic? (+ which sleep mode ? )
- power saving mode ( possible sleep mode in the transceiver, cf. Annex for timing On/off ? )
  - switch off ports of RAN equipment: which impact on transceiver?
  - Transceiver power saving mode with 2 (or more) x SFPs per RU or in Daisy chain RU configuration
  - power saving mode (based on cycle) of RAN equipment :
    - do we have timing impact of/on transceiver?
    - same on/off timing for B&W and WDM colorized transceivers?

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## Potential topics for MOPA 2/2

### Transceiver OAM:

- dying gasp: compatibility of RAN equipment and transceiver to support dying gasp
- transceiver RSSI accuracy/precision : increase the telemetry relevance
- remote monitoring adoption (already, discussion based on WDM G.metro): two major options : centralized remote equipment (master equipment) or two face-to-face transceivers for auto-alignment wavelength.

### WDM operation : colored transceiver

- @25Gbit/s : Due to cost, O band operation is privileged but with limited number of wavelength channels. C/L Band operations exist at high cost but with more wavelength channels and tunable feature. Can we expect a change of economic model for “25Gbit/s colorized operation with 18 channels”?
- @50/100Gbit/s and more : solution needs to be developed, in O-Band and C Band ?

### Transceiver technology : what & when could we expect with « Coherent » low cost, short reach (20 -40 km) transceiver?



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## Sleep mode RAN Tx/Rx – O-RAN WG4

Sleep Mode	Time Duration (millisecond)	Description (Use Case)
Micro Sleep Mode (SM1)	[OFDM symbol duration to 1ms]	The gNB does not need to operate TX/RX within the next few OFDM symbols ( $T_{\text{OFDM-Symbol}} < T \leq 1\text{ms}$ ). The RF transceivers can be turned off for the prescribed period. Note: No Need for additional specification as existing specifications can cover implementation of the sleep mode automatically when there is no transmission.
Light Sleep Mode (SM2)	~ [5 - 10]	The gNB does not need to operate TX/RX within the next $5\text{ms} \leq T \leq 10\text{ms}$ . The RF transceivers and additional hardware components can be turned off for the prescribed period. The power consumption is typically lower compared to that of micro sleep mode. This sleep mode can be implemented via transmission blanking when there is no SSB in downlink or PRACH or other uplink signals to be transmitted/received.
Deep Sleep Mode (SM3)	~ [50 - 100]	The gNB does not need to operate TX/RX within the next $50\text{ms} \leq T \leq 100\text{ms}$ . Additional hardware components can be turned off for the prescribed period. Note that some hardware components such as timing circuitry must be kept at standby or on, allowing fast transition to Active State. The power consumption in this mode is typically lower compared to that of light sleep mode. This sleep mode requires coordination with other neighbouring cells since user experience would be affected if cell is turned off for over 50ms. This sleep mode can also be implemented via transmission blanking when there is no SSB in downlink or PRACH or other uplink signals to be transmitted/received.
Hibernate Sleep Mode (SM4)	~ [1000]	The gNB does not need to operate TX/RX within the next T ms ( $T \sim [1000]$ ms). Most hardware components can be turned off except some hardware components such as timing circuitry which must be kept at standby or on, allowing fast transition to Active State. The power consumption in this mode is typically much lower compared to that of deep sleep mode. Sleep durations greater than 1000ms are not precluded.



Thank You

