Strømforbruk og strømsparing i mobilnett.

Mobil Agenda 17.01.23

26 January 2023

Strømforbruk og strømsparing i mobilnett.

1. Intro
2. Motivation
3. Solution options
4. Next

ice 2022

250
ansatte

718 286
mobilabonnenter

2,3
milliarder
omsetning i
2021

52 000
bedriftskunder

95%
befolkningsdekning

12%
markedsandel mobil

3200
basestasjoner

35%
av 4G og 5G frekvensene

25%
markedsandel MBB

Ambition

ice

Ice bikker 700.000 privatkunder, skal være 1.000.000 i løpet av 2025

10.1.2023 07:34:37 CET | ice

Del

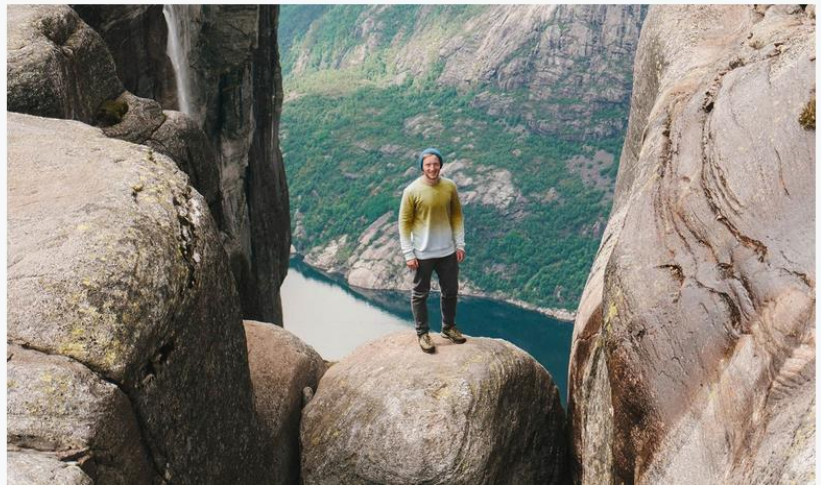
De aller fleste som bytter mobilabonnement velger Ice. Det gjør at selskapet nå har vokst seg like stor som Oslo kommune.

Massiv satsing på mobilnett i verdensklasse

Publisert 22. desember 2022

Kjerag-prosjektet er en milliardsatsing på videre utbygging av nasjonalt 5G-nett. Opp mot 3000 av ice sine basestasjoner oppgraderes og 4000 nye rulles ut. Dermed blir nettet rustet for kraftig vekst i forbruket.

Del denne saken med noen du kjenner



ice

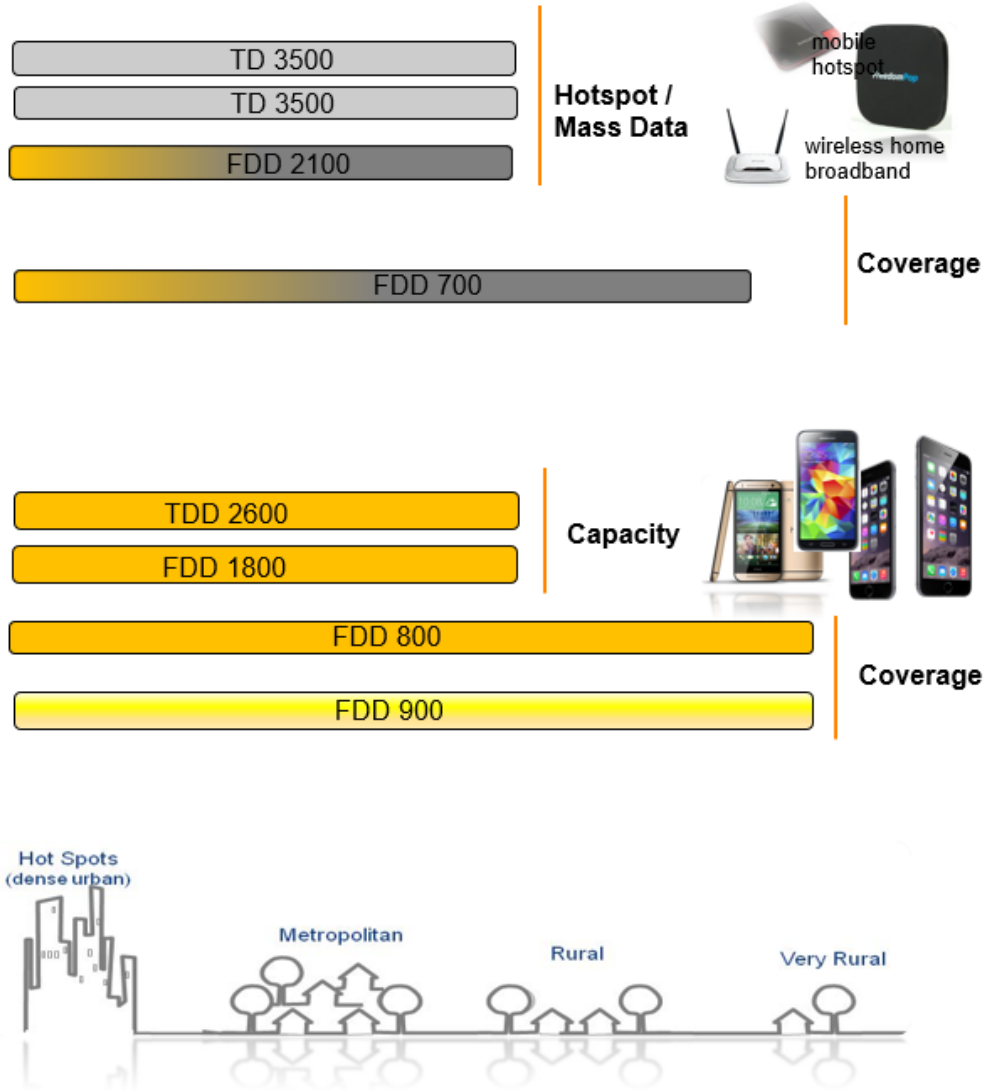
Freq bands

TDD
- 3500 — 1x 80 MHz
- 3500 — 1x 100 MHz

FDD
- 2100 — 2x 20 MHz

TDD
- 2600 — 1x 50 MHz
- 1800 — 2x 20 MHz

- 900 — 2x 5 MHz
- 800 — 2x 10 MHz
- 700 — 2x 10 MHz
- 450 — 2x 5 MHz



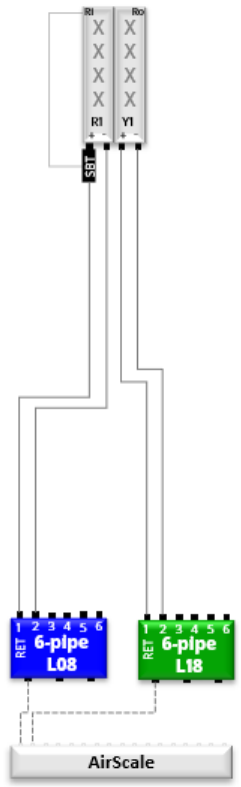
Models and power

Old 4G solution

Bands:
- b20 – 10MHz
- b3 – 20MHz

Configuration:
- 2x2 MIMO (FDD)
- 30 MHz (DL)bandwith
- Primary coverage = L08
- LTE 2CC

Measured power consumption:
744 kWh/mo

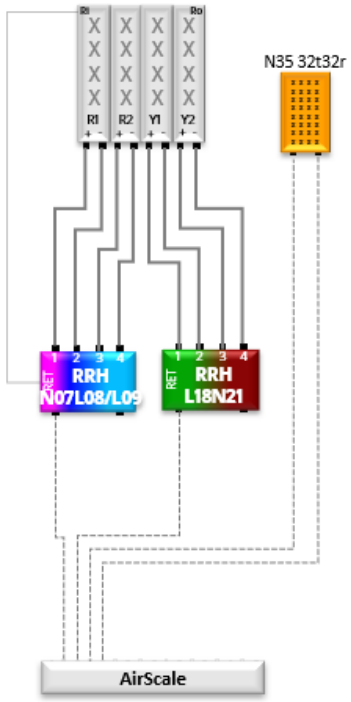


5G solution

Bands:
- b20 – 10MHz
- b3 – 20MHz
- n28 – 10MHZ
- n1 – 20MHz
- n78 – 180MHz
- (b/n8 – 5MHz optional)

Configuration:
- 4x4 MIMO (FDD)
- 240 MHz (DL)bandwith
- Primary coverage = L08/N07
- All carrier combos enabled

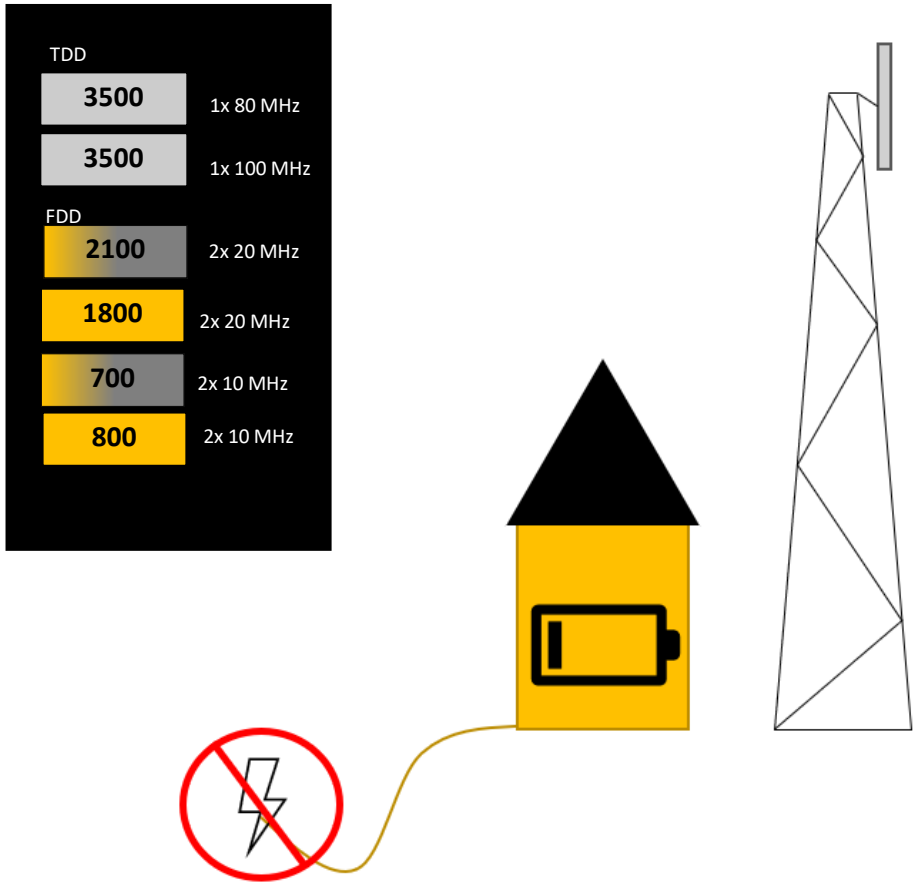
Measured power consumption: :
2934 kWh/mo



Power saving

- Efficient planning
- Mains down
- µDTX
- Cell muting
- Tx Muting
- Power saving for Ues

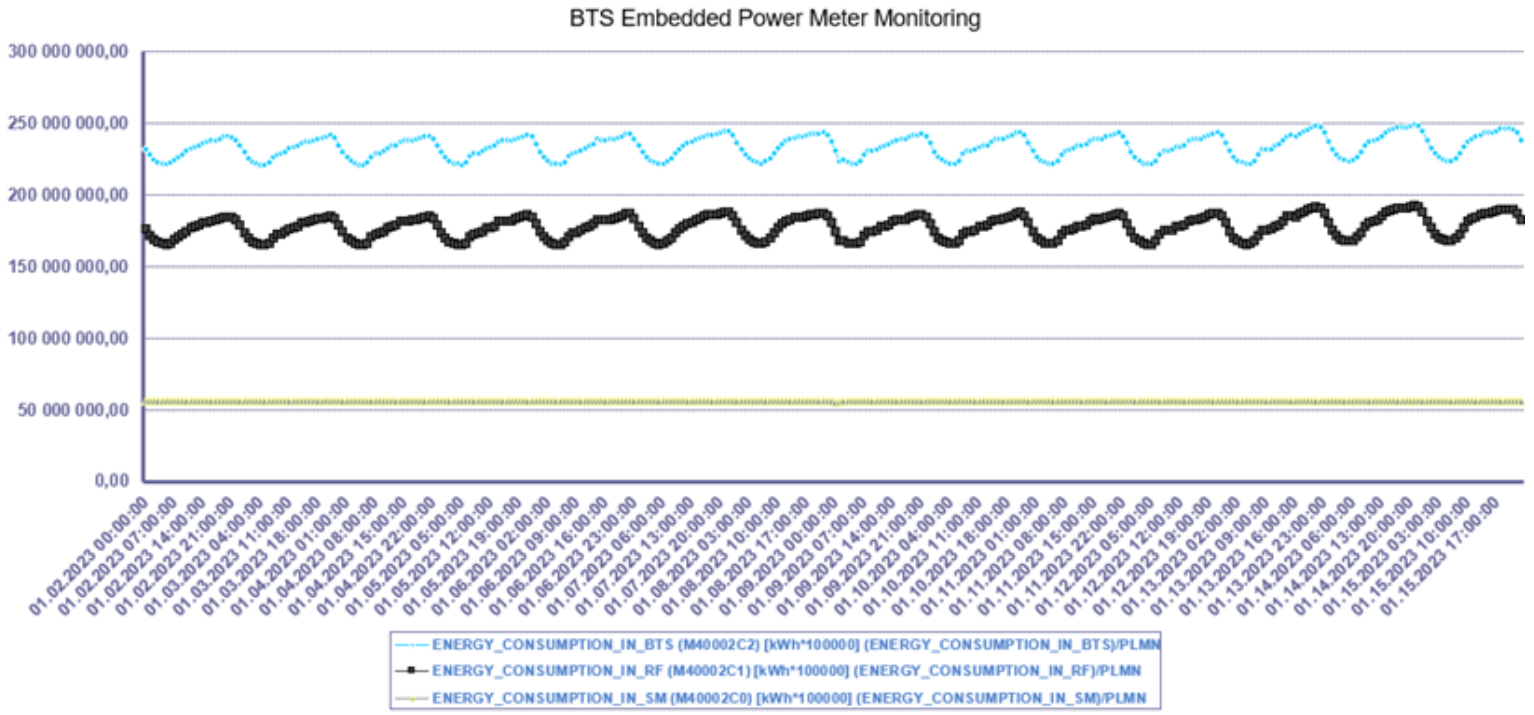
Mains down



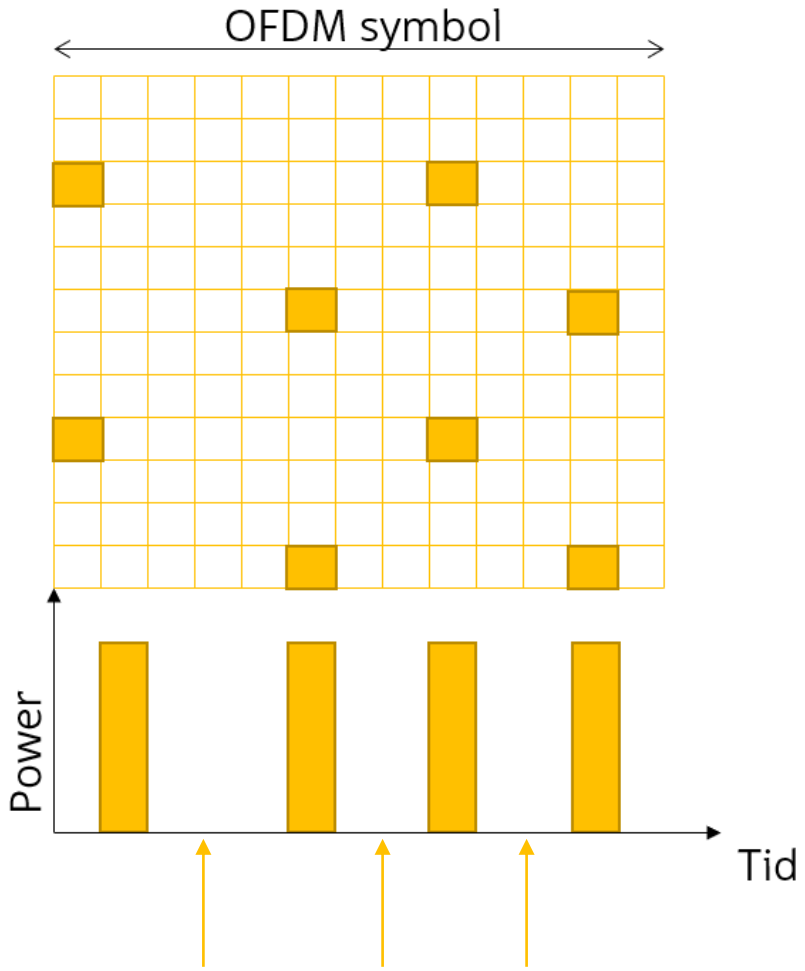
- Shut down capacity layers
- Power usage:
  - Normal: 5026W (ETSI-average)
  - Using batteries: 3574W (100% power)

Energy usage vs load

- Load variation: 50% on DL PRB utilization between max and min
- Power usage variation: 10% between max and min.

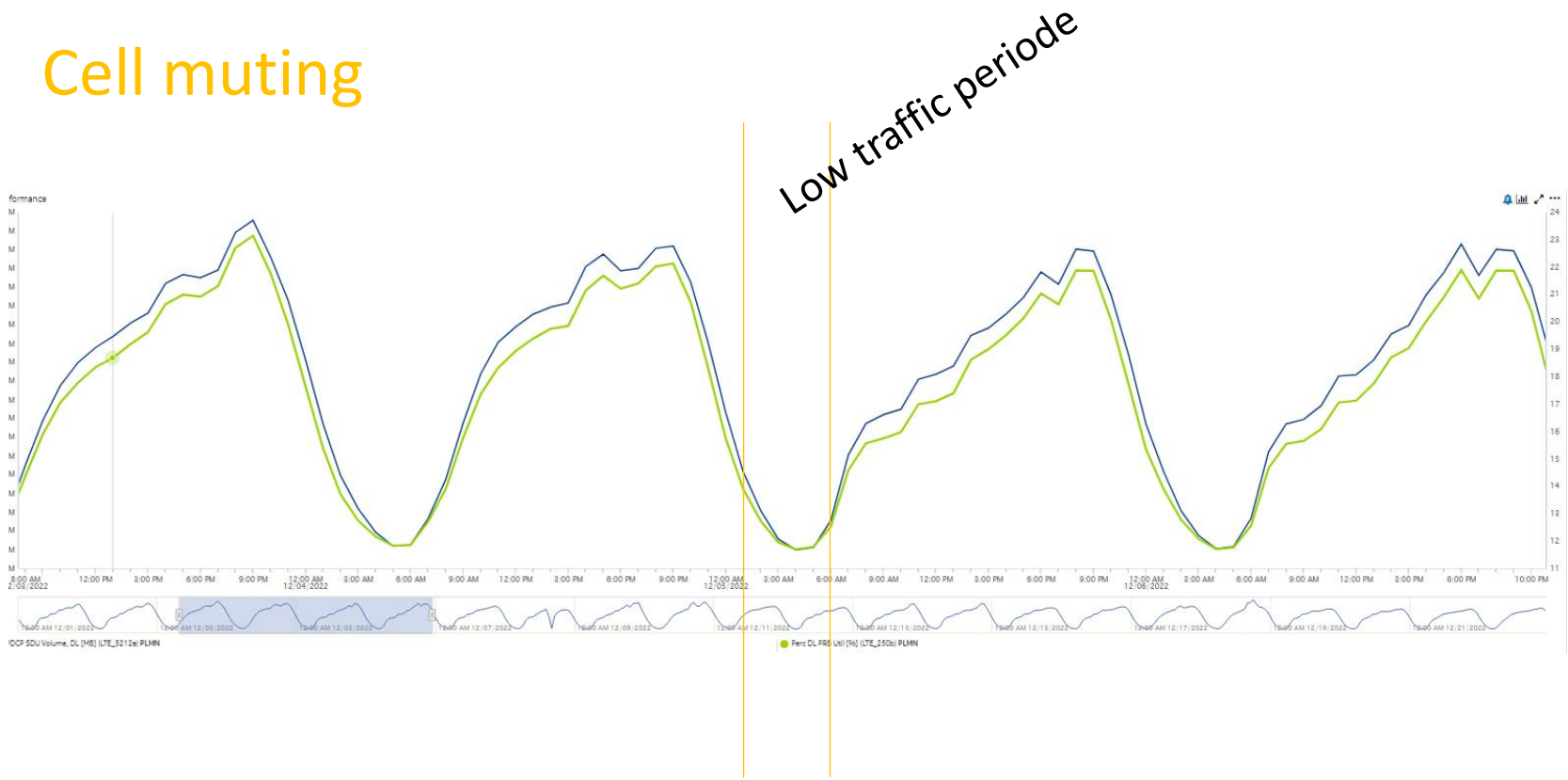


µDTX



- 14% average energy savings in trials
- Upwards towards 20% for newest radio units
- Tradeoff: May impact latency

Cell muting



TDD

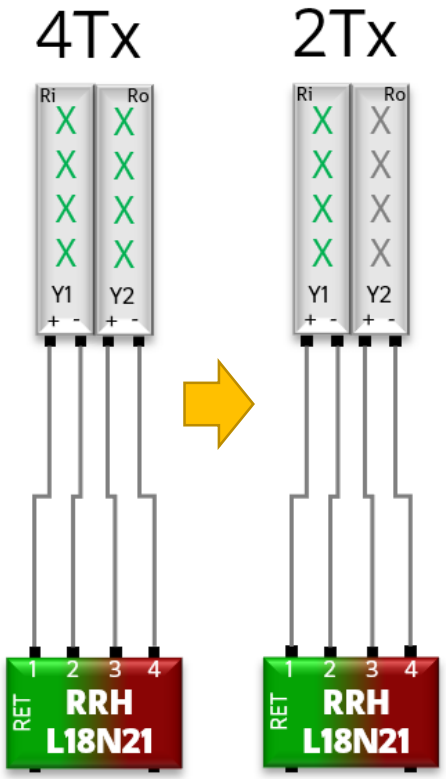
3500	1x 80 MHz
3500	1x 100 MHz

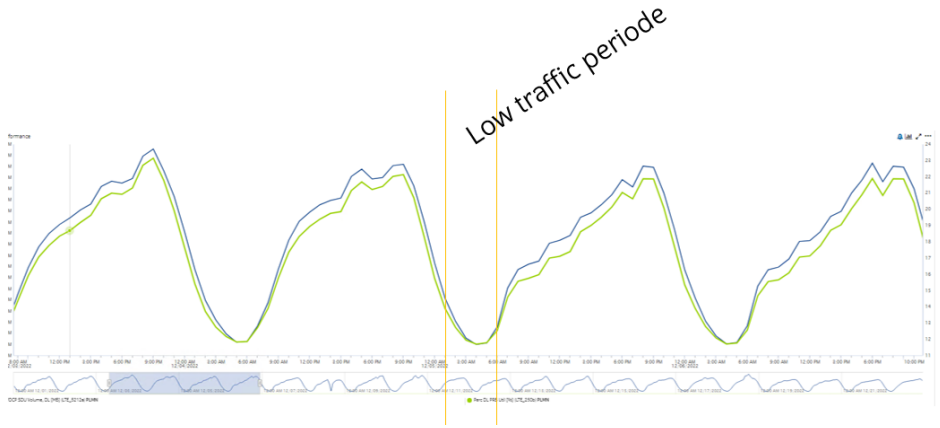
FDD

2100	2x 20 MHz
1800	2x 20 MHz
700	2x 10 MHz
800	2x 10 MHz

- Relevant for multilayer sectors
- 7% energy saved in trials
- Tradeoff:
  - Instant peak throughput not available
  - SINR decreas

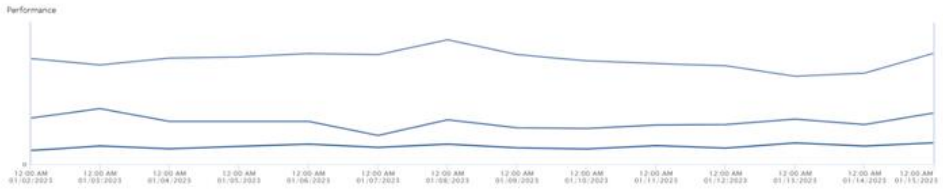
Tx muting





- Relevant for cells with higher order MIMO
- 2Tx -> 1Tx show 1% energy saved.

Next



Automation -> SON is needed

Reduced cost
Improve stability
Motivation towards SON

Thank you!