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Remote Performance Monitoring and Control in 5G/6G Networks

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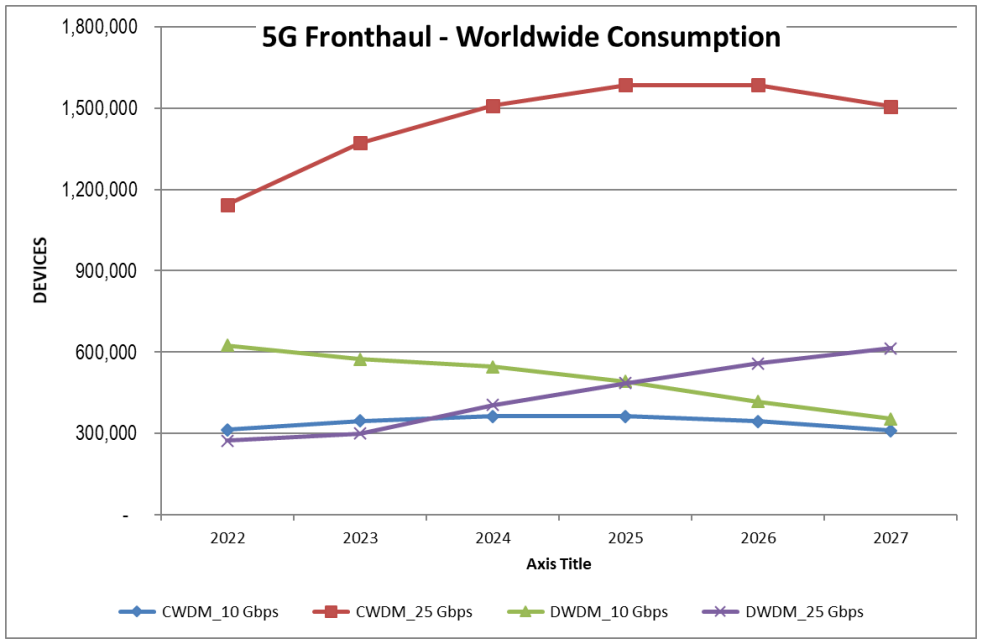
Workshop: “Mobile Optics (MOPA) for the 6G Era”

5G Market Overview: WDM



LIGHTCOUNTING

Summary:

5G WDM roll outs full swing worldwide

- Requires cost optimized solutions with features that are:
  - Available, Proven and Standardized
  - Give end users visibility and control of optics in fronthaul and mid-haul networks

LUMENTUM is advancing this through

SmartTunable MSA

- Champions interoperable self-tuning optics

MOPA Mobile Optical Pluggables Alliance

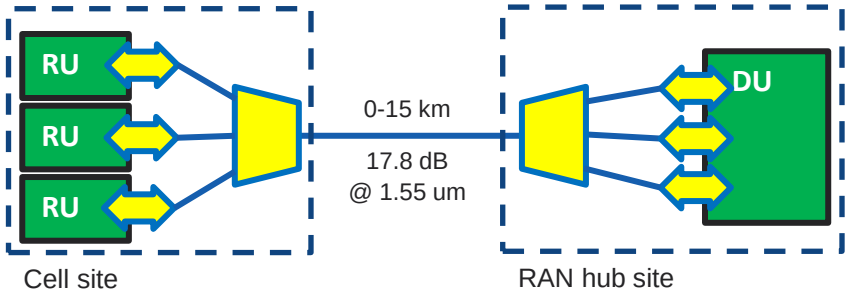
- Defines blueprints and recommendations for ex. to enable (interoperable) Remote Performance Monitoring and Control

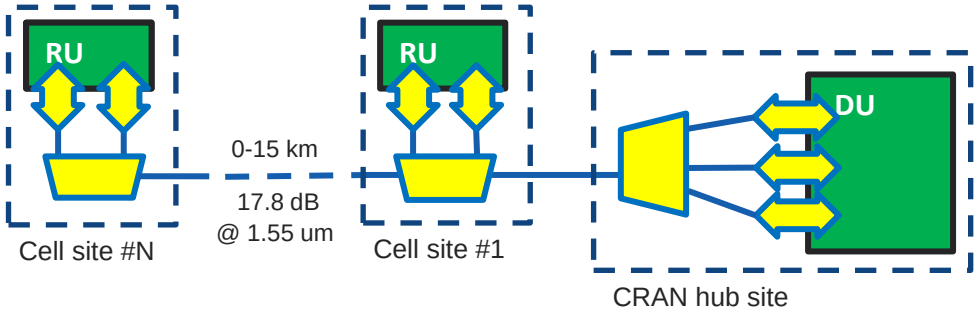
O-RAN ALLIANCE

- Promotes DWDM optics (WG9)
- Worldwide interop PlugFest events

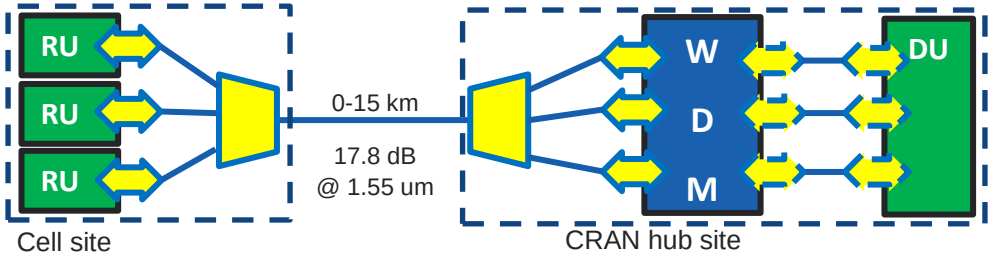
5G WDM Blueprints (MOPA)

15 km RU-DU, passive DWDM over a single fiber Blueprint





15 km RU-DU, semi-active DWDM over a single fiber Blueprint



WDM Blueprint

- Up to 15 km
- Up to 48 channels
- 17.8 dB loss budget
- Primarily CRAN + Fiber Constrained applications
- Option: Fixed or Tunable

Preferred by MOPA

Tunable Advances (10 and 25G)

- Automatic Wavelength Tuning

SmartTunable MSA

Specification available at:
http://www.smarttunable-msa.org

MOPA
Mobile Optical Pluggables Alliance

Specification publicly available in MOPA V2.1 Technical Paper
https://mopa-alliance.org

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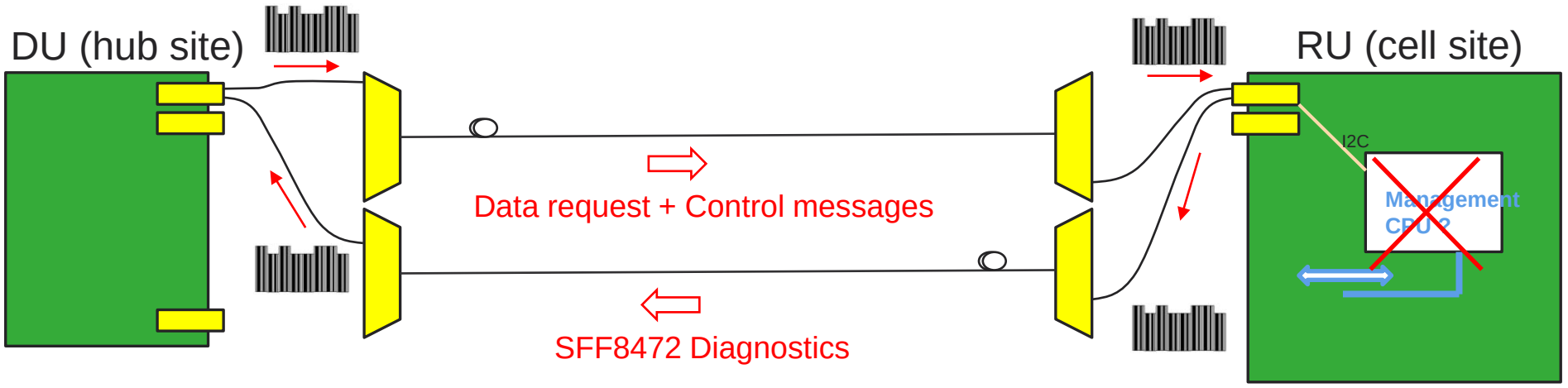
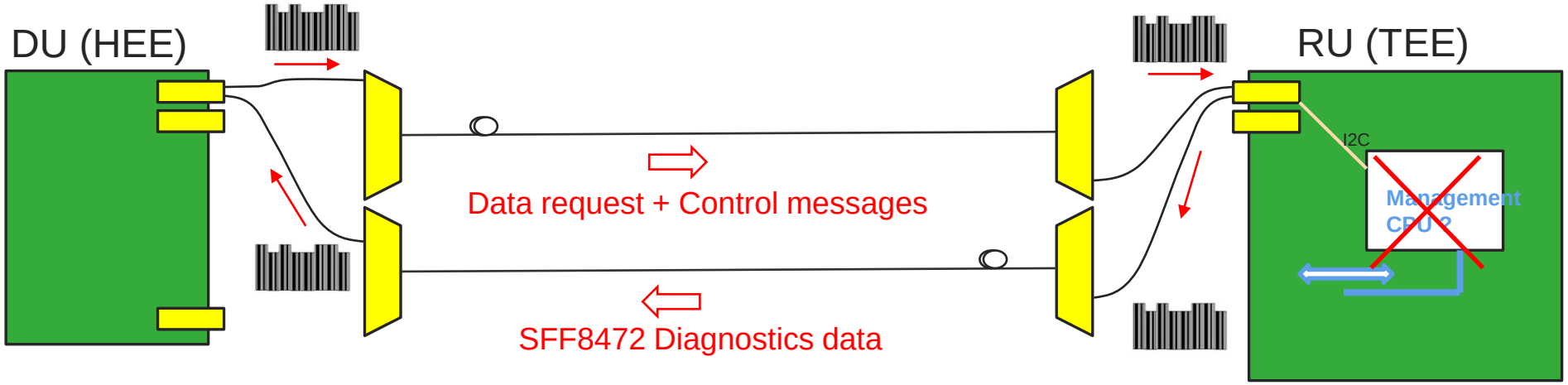
New! Remote Performance Monitoring and Control – Method

- Defined and updated in **MOPA technical paper v2.1 Annex B** (https://mopa-alliance.org/)
- Provides option for monitoring and controlling optical modules in a multi-vendor ecosystem
  - Current focus is Remote Performance (Diagnostics) Monitoring (also known as Remote DDMI)
- ITU-T G698.4 (G.metro) like – but optimized for 5G fronthaul



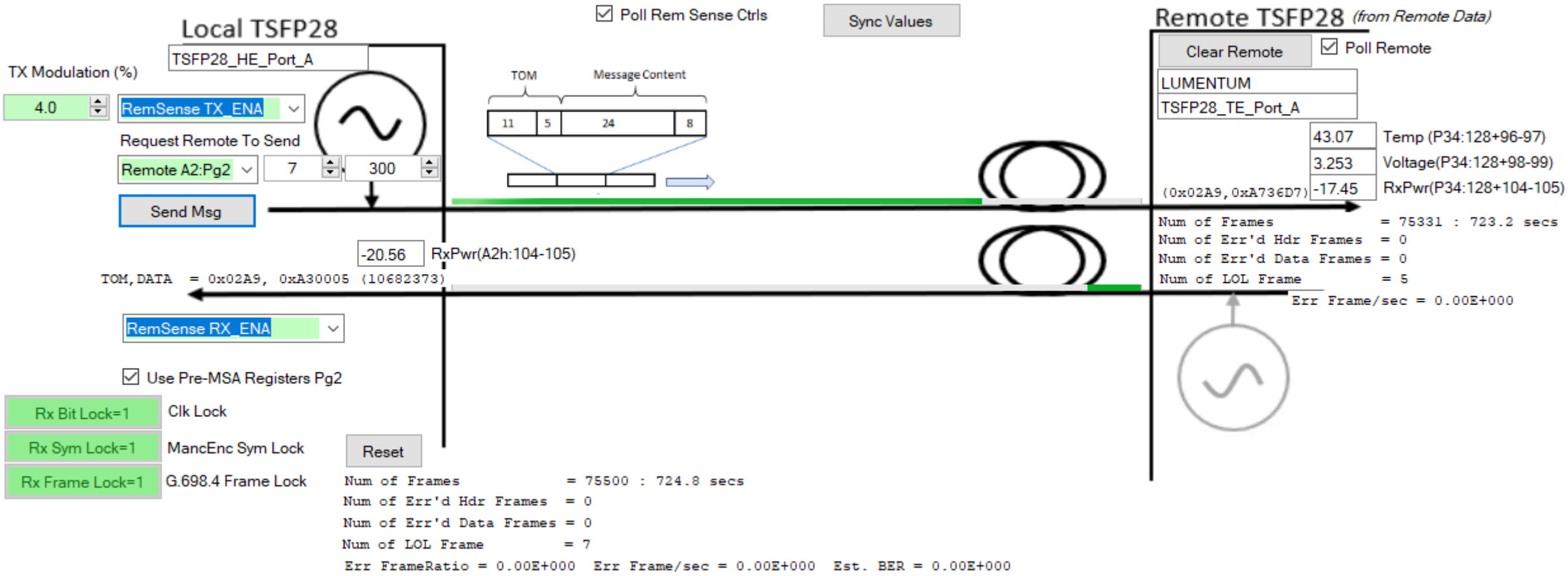
New! Remote Performance Monitoring and Control – Method (cont'ed)

- **Overview**
  - 5 kb/s RF overlay - Amplitude Modulation at < 10% modulation index (Manchester Coding)
  - Messaging based on ITU-T G.698.4 frame format
  - Time to send digital diagnostics between (TEE) RU to (HEE) DU within max 2s
  - Avoids the need for in-band supervisory channel as in CPRI or OTN



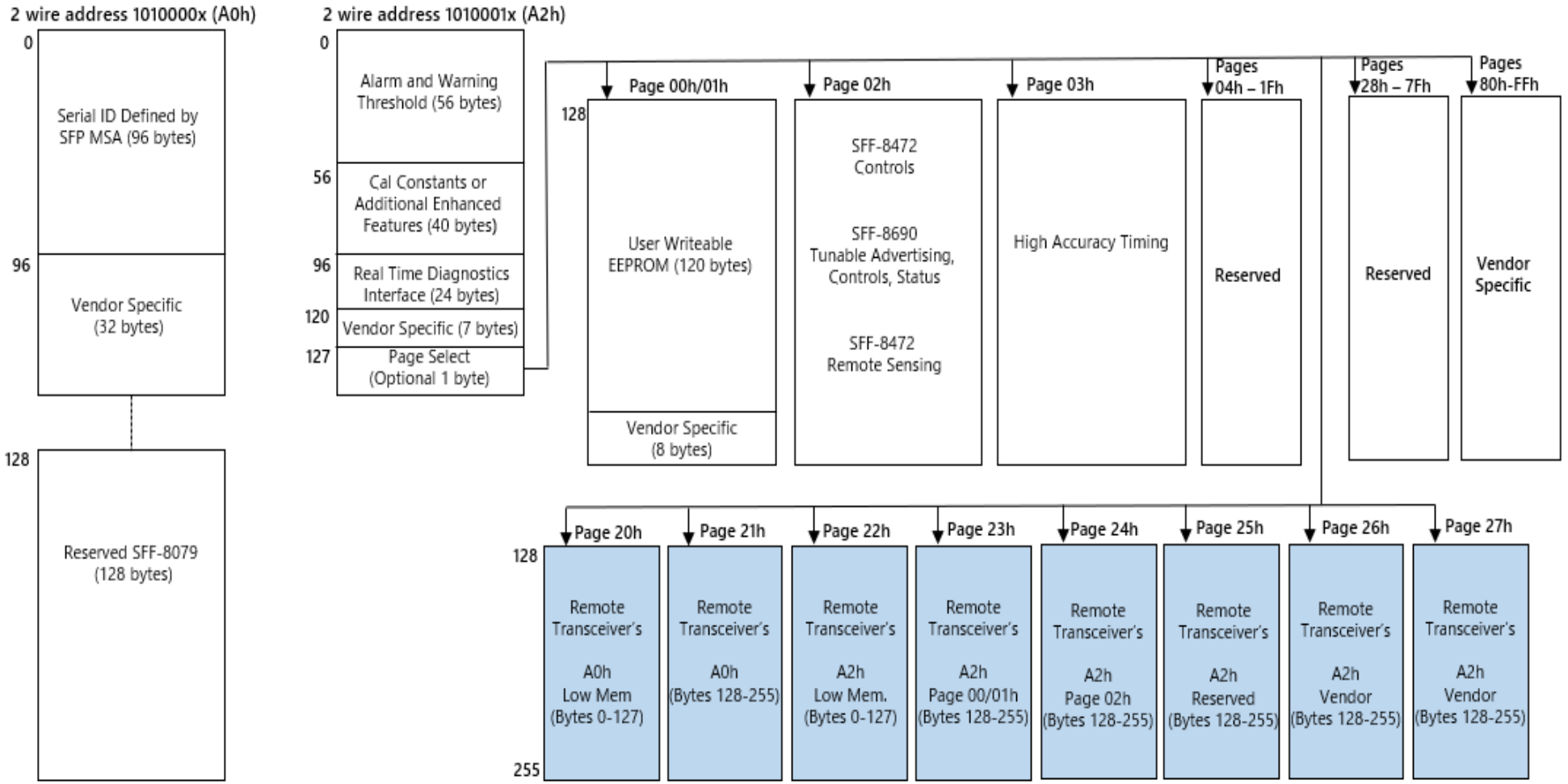
- **Comparison to G.metro**
  - Messaging not used for module tuning, so high data rate (50 kb/s) is not needed
  - Simplified scheme using existing MCU in SFP modules = module redesign not needed

New! Remote Diagnostics and Control – Integration and Proofing



Demos for Smart Tuning and Remote Performance Monitoring at Booth #3415

New! Remote Diagnostics and Control – New registers



5G Next steps

SmartTunable MSA

MOPA
Mobile Optical Pluggables Alliance

- Validate it
- Make Interoperable
- Make it Available
- Standardize it

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Thank you