OKI Open up your dreams

Considerations for 10G-EPON coexistence

1.15-16.2007
IEEE802.3av TF meeting @ Monterey, CA

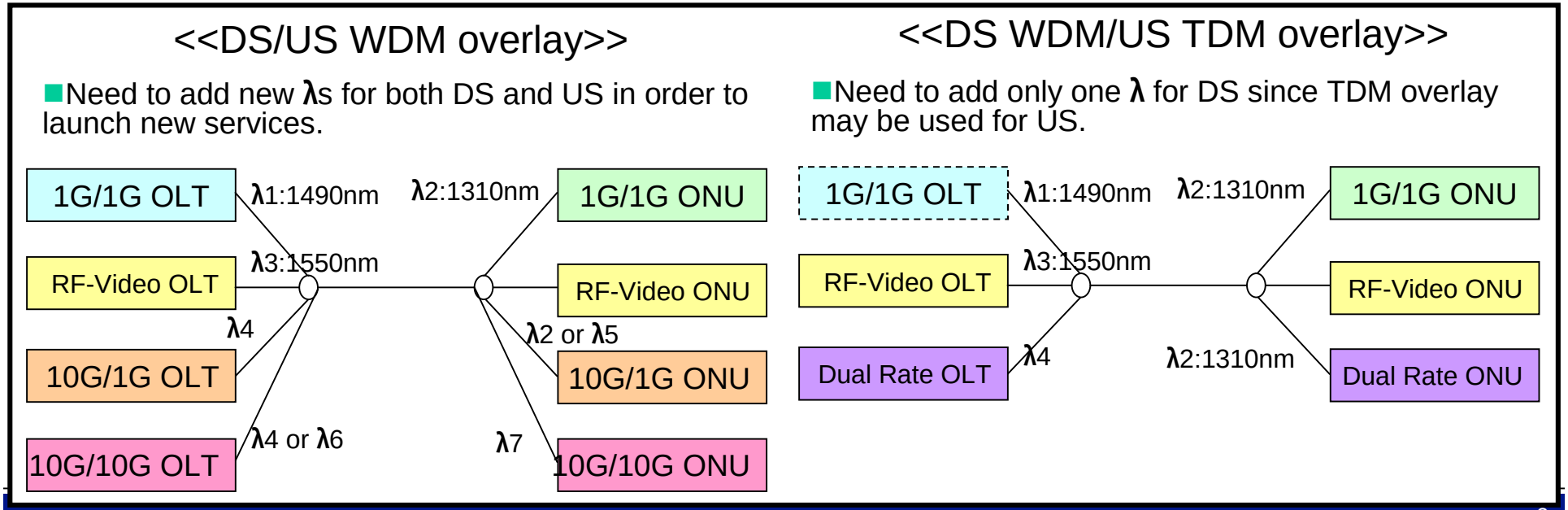
Kiyoshi Uematsu
Oki Electric Industry Co., Ltd.

Introduction

There are basic requirements for coexistence between 1G-EPON and 10G-EPON.

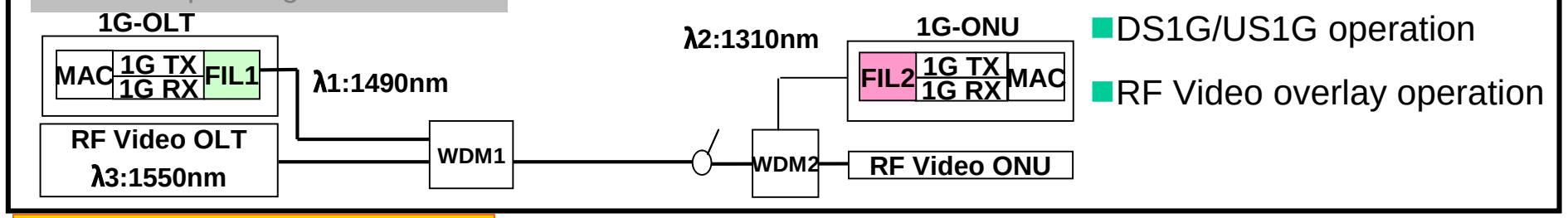
- The following services can coexist and be offered on a same optical fiber
  - Existing DS1G/US1G service and RF-Video service
  - DS10G/US1G service
  - DS10G/US10G service
- Existing 1GE-PON infrastructure should be used.

For coexistence study, it is necessary to consider about issues coming up during migration process from existing 1G-EPON service.



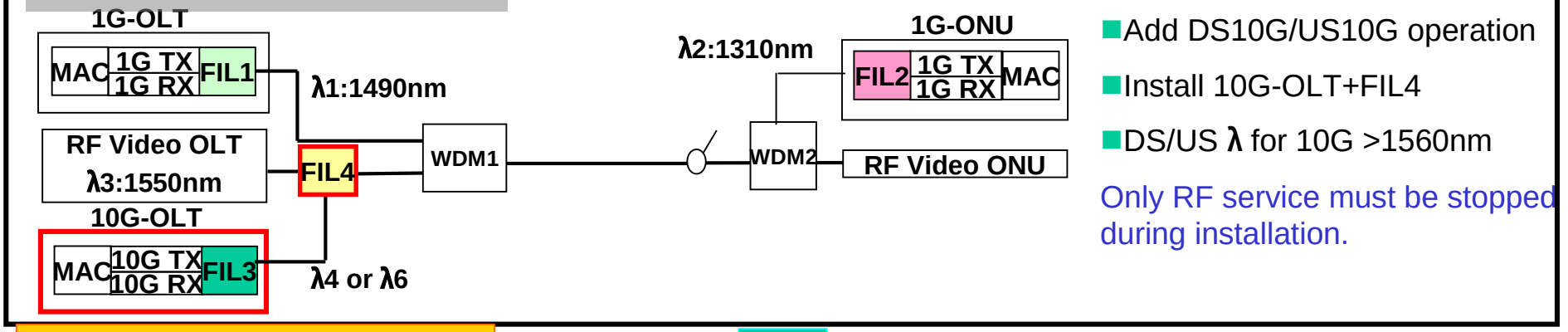
Migration Scenario: DS/US WDM overlay

STEP1: Operating 1G-EPON



- DS1G/US1G operation
- RF Video overlay operation

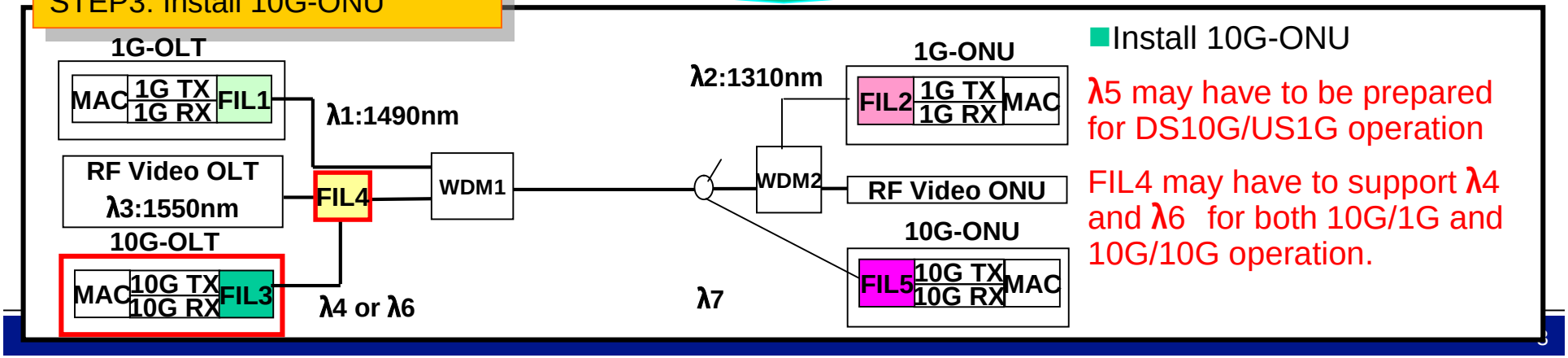
STEP2: Install 10G-OLT



- Add DS10G/US10G operation
- Install 10G-OLT+FIL4
- DS/US λ for 10G >1560nm

Only RF service must be stopped during installation.

STEP3: Install 10G-ONU



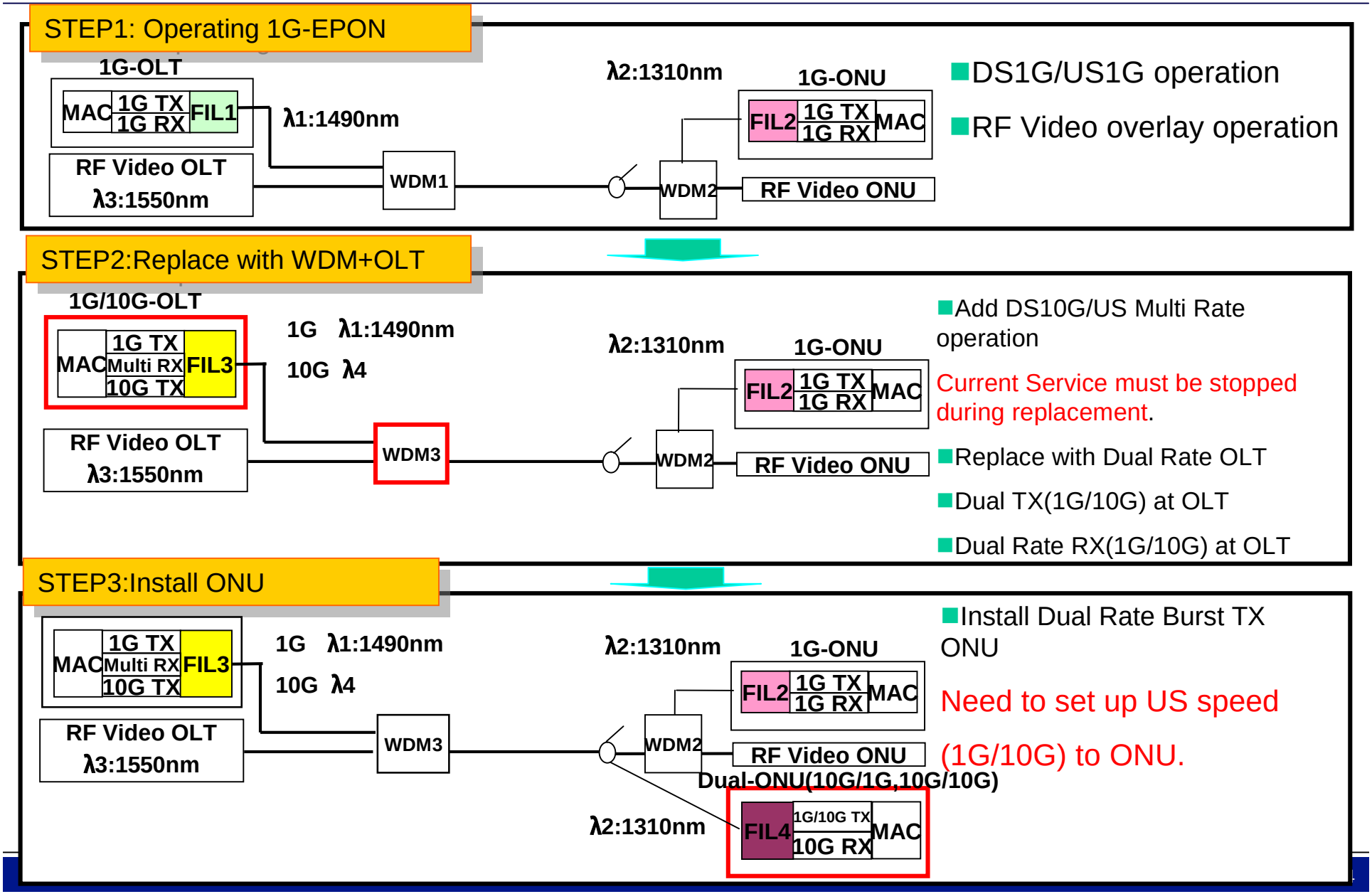
- Install 10G-ONU

λ5 may have to be prepared for DS10G/US1G operation

FIL4 may have to support λ4 and λ6 for both 10G/1G and 10G/10G operation.

OKI Open up your dreams

Migration Scenario :DS WDM/US TDM overlay



Considerations for Coexistence

- DS WDM/US TDM option sharing US wavelength=1310nm may have advantages from a point of view of installation and operation, but interruption of existing 1G-EPON service due to OLT replacement seems to be a big problem.
- It is necessary to make comparative study based on technical feasibility for both options.

	Migration of existing 1G-EPON, DS10G/US1G and DS10G/US10G service	
Installation &Operation	DS/US WDM overlay	DS WDM/US TDM overlay
	■No interruption on existing DS1G/US1G service, but RF-video services have to be stopped.	■Existing DS 1G/US 1G services and RF-video must be stopped.
	■Need to prepare additional 4 λs and 4 filters at ONU/OLT in maximum case.	■Only additional 1λ required by sharing the US wavelength, and additional 2 filter at ONU/OLT and WDM3 required.
	■Need to study if filter at OLT may cause additional loss for RF-video signal.	■WDM replacement may not cause additional loss for RF-video signal.
	■max. 2 types of ONU required.	■Only 1 types of ONU required if dual rate burst ONU can be applied.
Study Items	■New filters feasibility ■Wavelength plan including potential future services.	■Dual TX(1G/10G),Multi Rate RX(1G/10G) and Multi Rate DBA at OLT ■Dual Rate TX(1G/10G) at ONU ■Set up procedure for US speed at ONU

Conclusion

For coexistence study, it is necessary to consider about issues coming up during migration process from existing service.

- DS/US WDM overlay vs. DS WDM/US TDM overlay
  - Consideration whether or not service interruption of 1G-EPON service and RF- video service are allowed.
  - Study for possible wavelength plan including potential future services.
  - Additional loss for RF-video signal caused by filter insertion at OLT.
  - Comparative study based on technical feasibility for both option such as new filters, dual rate TX, multi rate RX, and Multi rate DBA.
  - Burst rate set up if dual burst mode ONU applied(1G/10G).

(study if necessity of new feature to be defined within the standard scope.)