An Effort to Create Multi-vender Environment for 100 Mb/s P2P optical Ethernet Access in Japan

Yasushi KIDA - Sumitomo Electric Industries, Ltd.
Tatsuhiro ONO - NEC Corp.
Eisuke SATO - Hitachi, Ltd.

Contact: kida-yasushi@sei.co.jp

Access Market in JAPAN

- 100 Mb/s P2P Ethernet Services for mass market have already started since early 2001.
  - 12k subscribers in Sep. 2001 (Tokyo and Osaka)
  - Since Oct. 2001, service area has been expanding and several other carriers started field trials.
  - They also announced that their FTTH service will start in the 1st half of 2002.

- Japanese gov. "e-Japan" targets at least 10 million ultra-high speed internet access lines (optical access) installed in 5 years.

- To meet Japanese market, 100 Mb/s P2P Ethernet equipment for access use has been developed.

- Because of 100 Mb/s P2P discussion in the last meeting, we want to introduce Japanese situation.

Our Effort to Meet the Market

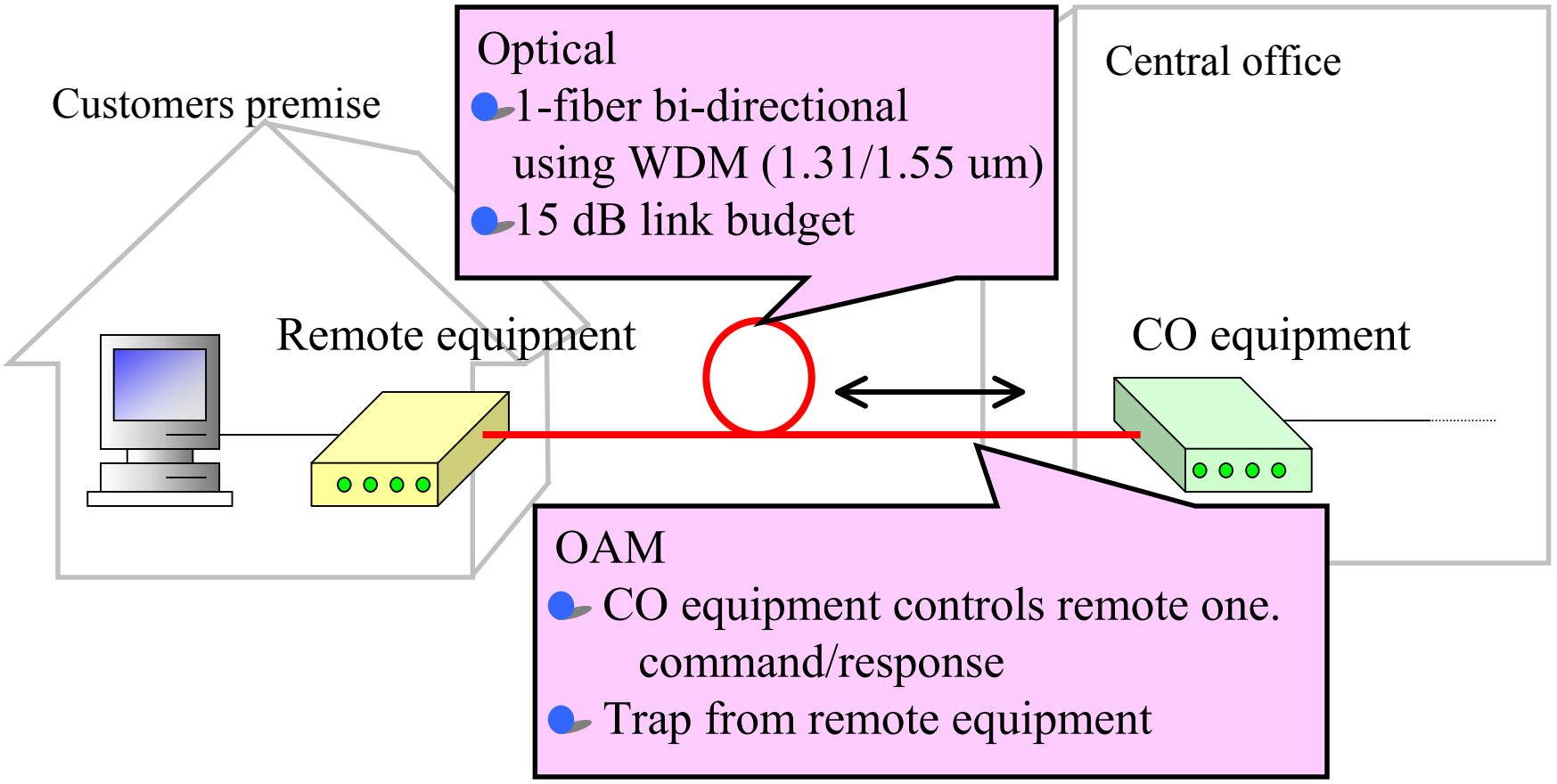
- To meet Japanese FTTH market, we started to create multi-vender environment for 100 Mb/s P2P optical Ethernet link.

- Our goal is to create cost-effective specification for interoperation.
  - Carriers' requirement for cost is very severe
  - simple specification for very low cost, easy implementation and quick interoperability

- Multiple implementation is expected to be commercially available in the 1st half of 2002.

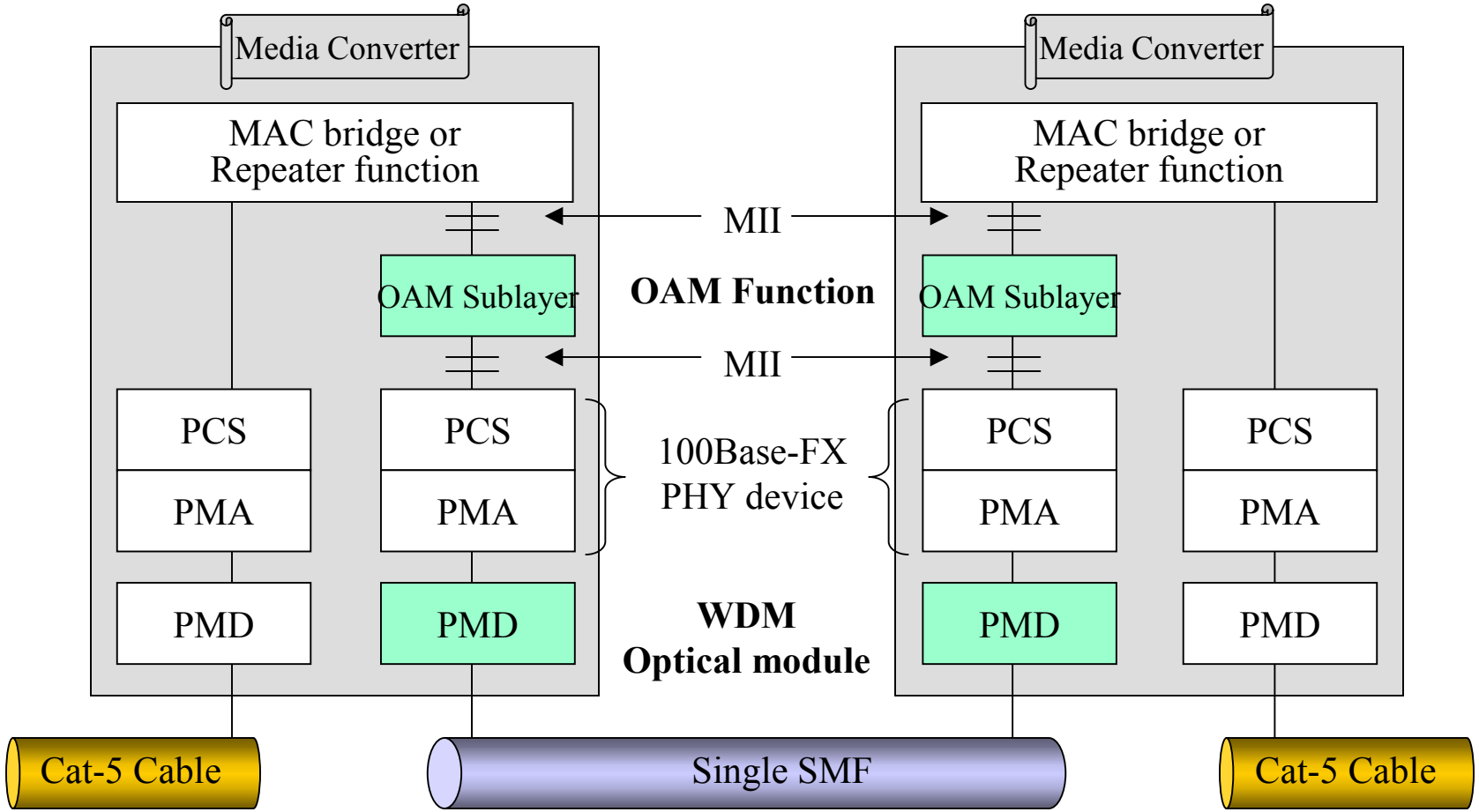
Outline of the Specification

- We believe that the specifications meet basic requirements of all Japanese carriers, even though the conditions of access networks are different for every carriers.



Layer Structure

- Define new PMD for low cost single SMF / full duplex WDM link
- Define OAM sub-layer at MII to allow use of existing FX-PHY devices / repeater implementation



PMD: Requirements and Approach

Requirements :

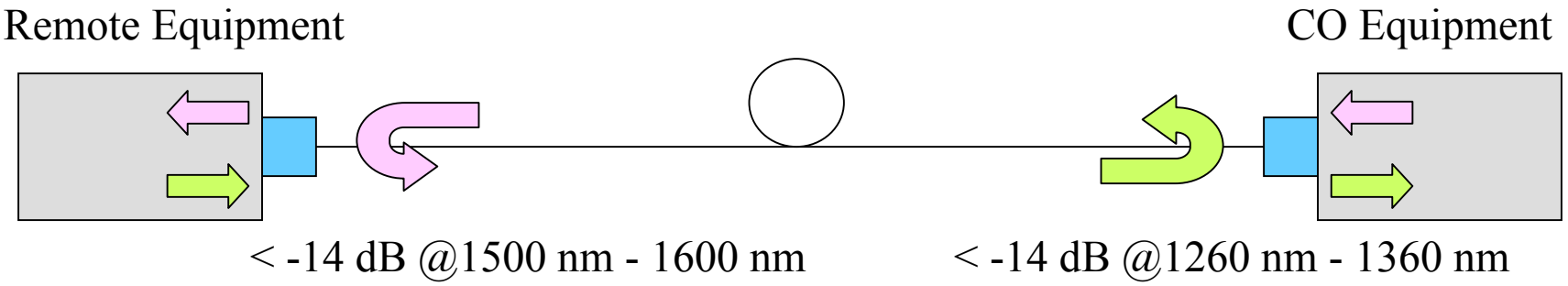
- Low cost, Early availability
- 100 Mb/s Ethernet, SMF, single fiber bi-directional

Approach :

- 1310 nm/1550 nm WDM
- Un-cooled FP laser for both 1310 nm/1550 nm
- Relaxed specification for early availability (1550 nm FP laser)
  - Limited reach at first

PMD: Specifications (Common)

Bit rate	125 Mb/s
Fiber	Single SMF
Optical connector	Not specified
Maximum reflectance	-14 dB
Power budget	15 dB
Maximum transmission distance	7.5 km (estimate)

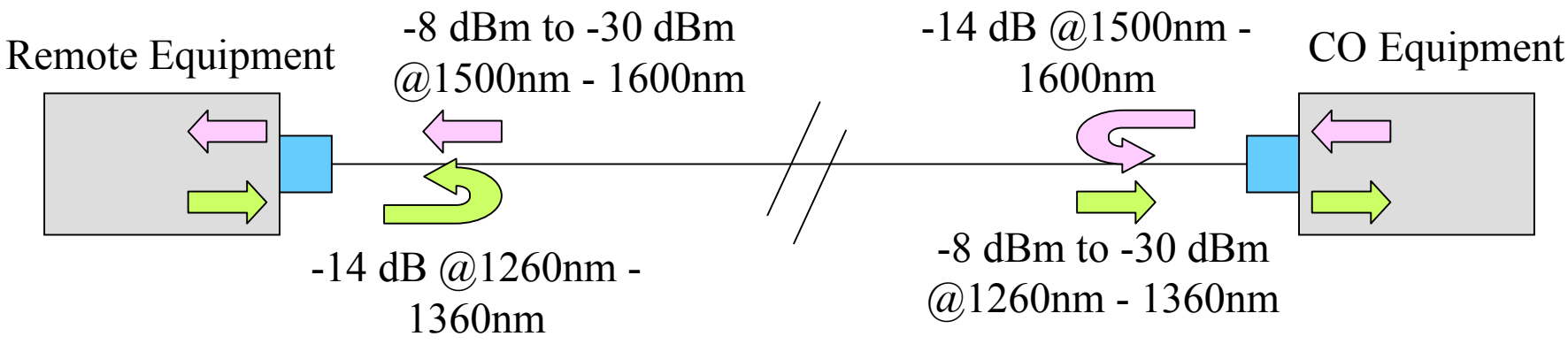


PMD: Specifications (Transmitter)

	Remote equipment	CO equipment
Operating wavelength	1260 nm - 1360 nm	1500 nm - 1600 nm
Max. rms spectral width	7.7 nm	6.0 nm
Max. average launched power	-8 dBm	
Min. average launched power	-15 dBm	
Min. extinction ratio	8.2 dB	
Pulse mask	Same as STM-1	

PMD: Specifications (Receiver)

	Remote equipment	CO equipment
Operating wavelength	1500 nm - 1600 nm	1260 nm - 1360 nm
Max. average input power	-8 dBm (BER<=1E-10 w/max reflectance)	
Min. average input power	-30 dBm (BER<=1E-10 w/max reflectance)	
Signal detect function	No false assertion w/max reflectance	



OAM: Requirements and Approach

Requirements:

- Low cost, Quick implementation with existing devices

Approach:

- Limit functions to minimum
  - Notify events only which cause interruption/restoration of service
  - Loopback testing while blocking user data
  - Identification of Remote equipment (Vendor ID, Model info.)
- Define simple sublayer on top of FX-PHY
  - Allows MAC-less, non-intelligent implementation at Remote equipment
  - Fixed format 12 bytes short frame for OAM signaling
  - Intrusive insertion of OAM signal: may destroy user frame
  - Dedicated to P2P link only

OAM: Specifications outline

Signal format	12 bytes fixed format short frame, defined at MII
Signal insertion	Intrusive, with minimum 12 bytes IFG
Error check	8 bits CRC
Signal types	Command (CO to Remote: Loopback start/end, Status request), Response (Remote to CO), Trap (Remote to CO)
Status info.	Power supply, Optical link status, UTP link status, other failures, Loopback status
Vendor ID	OUI code
Loopback test	Intrusive, CO controlled with fallback timer, uses Ethernet frame

Conclusion

- 100Mb/s single SMF P2P Ethernet link is becoming the choice of Japanese FTTH today.
- To meet this today's demand, a multi-vendor implementation effort is taking place.
- New PMD for single SMF/100Mb/s and simple OAM for P2P Ethernet link are defined.
- Interoperable implementation from multiple vendors is expected in the 1st half of 2002.
- If EFM is to include 100Mb/s single SMF P2P link in its effort, we would appreciate IEEE's consideration of possible common specification where applicable.