The introduction of a new FTTH Standard in Japan

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Purpose of this presentation

- Dual-wavelength 100Mbps P2P bi-directional PMD is close to be standardized in Japan's standard organization, TTC, as "TS-1000".
- This presentation is intended to introduce the specification and the background of this standard.

What is TTC?

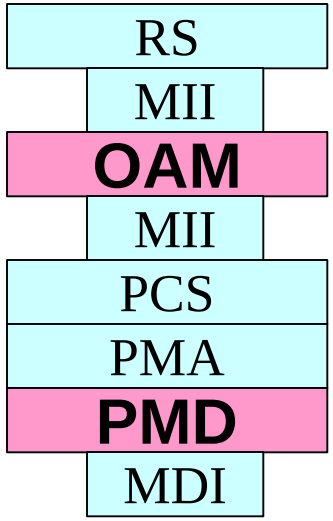
- TTC; The Telecommunication Technology Committee
  - Established in October 1985 as a private organization in Japan
  - Develop standards for telecommunications networks
- Members include;
  - Agilent Technologies Japan, Alcatel Japan, Allied Telesis, Avaya Japan, Compaq Computer, Fujitsu, Hitachi, Hitachi Cable, IBM Japan, Intel K.K., Lucent Technologies Japan, Motorola Japan, NEC, Nippon Ericsson, NTT, Nokia Japan, Nortel Networks, Siemens K.K., Sony, Sumitomo Electric Industries, TI Japan, Unisphere Networks
- Details can be found at: http://www.ttc.or.jp/e/index.html

Background

- Several service providers in Japan started FTTH services based on proprietary 100BASE-FX single fiber ‘media converter’ since early 2001.
  - Total 26k FTTH subscribers by 2002/3
- Deployments grew rapidly and there were needs for multi-vendor interoperability
- Domestic system vendors formed a MSA during 2001 and started to specify 100Mbps single fiber PMD
- NEC and Hitachi volunteered to bring MSA specification to TTC in 2001/11 while Sumitomo introduced the spec to IEEE802.3ah at 2002/2 Interim (kida_1_0102.pdf)

Overview of TTC bi-di standard

- Title of the standard:
  - "TS-1000 Optical Subscriber Interface One Fiber WDM System"
- Brief description:
  - 100Mbps Ethernet Optical PMD and OAM intended for FTTH use
    - PMD: Single Fiber Dual-wavelength bi-directional 100Mbps
    - OAM: Proprietary short frame based OAM
      - Remote Link, User Link Monitor, Loopback, Dying Gasp, Vendor and revision management, etc.



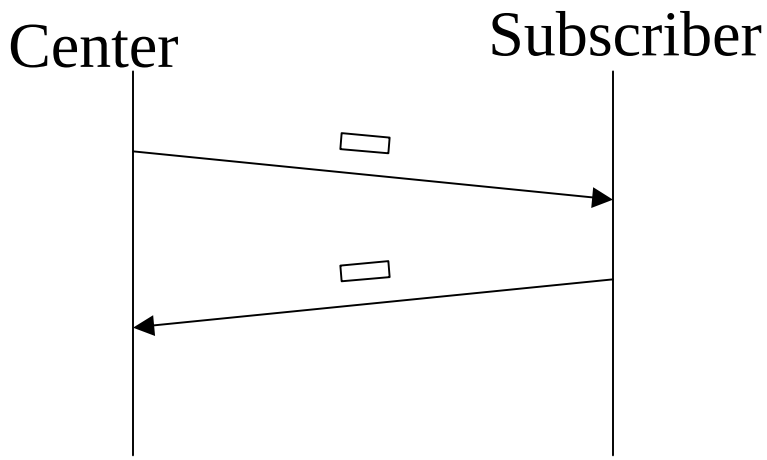
TS-1000 PMD (Class S) Overview

Item	Downstream	Upstream
Transmit Power	-8 dBm to -14 dBm	
Receive Sensitivity	-8 dBm to -30 dBm	
Transmit Wavelength	1480 - 1580nm (1500 -1600nm is also allowed)	1260 to1360nm
Spectral Width (RMS)	< 6nm*	< 7.7nm
Extinction Ratio	> 8.2	
Maximum Return	-14dB	
Pulse Mask	TTC JT-G957 (STM-0/STM-1) compatible	
BER	$< 10^{-10}$	

- Remarks
  - RMS on Downstream (6nm@1550nm) would limit the distance to approximately 7km
    - **Reducing max RMS to support 10km distance has been proposed.**
  - Longer Distance specs (Class A[20km] and Class B[30km]) are also under consideration.

TS-1000 OAM Overview

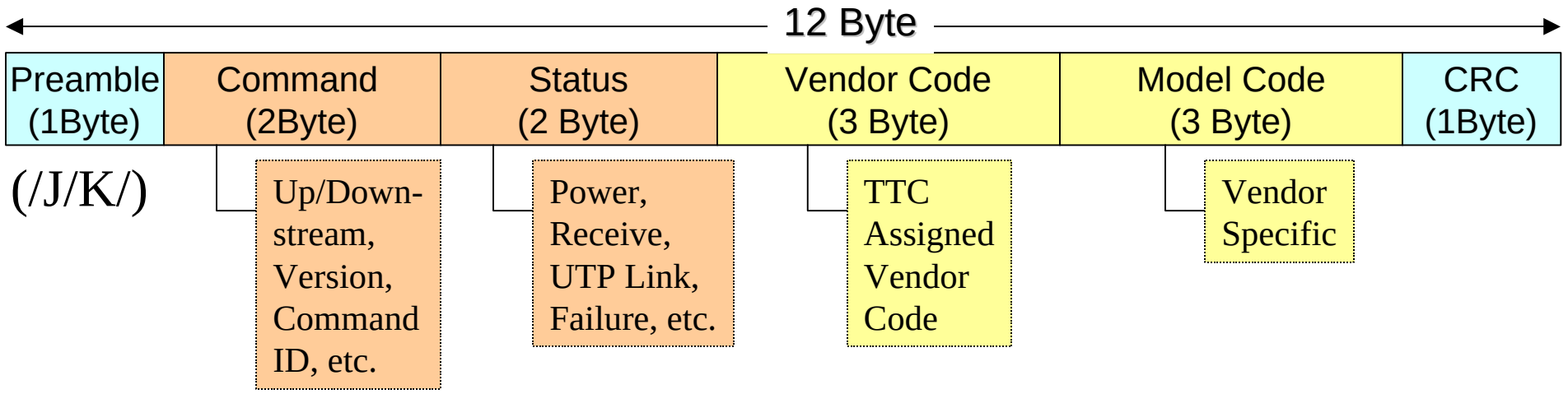
- Exchange OAM information Using 12Byte Short Frame



- Functions
  - Remote indication and inquiries
    - Dying Gasp, Remote Fault, UTP Link (user port) Failure, etc.
  - Loopback Test

TTC OAM Short Frame

➢Frame Format



- ➢ Remarks
  - ➢ Not compatible with IEEE802.3 Ethernet Frame Format
  - ➢ Not usable for IEEE802.3ah EPON because there is no space for PHY-ID and/or CRC.
    - ➢Not applicable to IEEE802.3ah EFM

Japan's FTTH deployments

- 26k subscribers by 2002/3*
- NTT alone is expecting more than 600k subscribers by 2003/3*
- Several FTTH SPs have expressed their intention to use TTC compatible equipment in their future deployments
  - They need standard-based equipment NOW and cannot wait for IEEE802.3ah standard…
- Dual-wavelength Single Fiber 100Mbps PMDs, both 1310nm and 1550nm, are getting less expensive as volume grows

* Nikkei Communications 5/6/2002

IEEE802.3ah actions to TTC Spec?

- Choice 1: Ignore and define a new 100Mbps PMD specs
  - Pros: We can do it Our Way
  - Cons: More works at 802.3ah, Market devide
- Choice 2: Use TTC as a ‘base’ or ‘reference’
  - Pros: Less work at 802.3ah
  - Cons: TTC has no liaison with IEEE and their intention to let other organization use their spec is not known.
- Choice 3: Do nothing and let TTC PMD spec a de-fact spec for 100Mbps P2P signle fiber
  - Pros: No work at 802.3ah
  - Cons: TTC Spec does not meet some of 802.3ah objectives (i.e. BER)
- Choice4 : ????

Straw Poll

- Choice A: 802.3ah develops a 100Mbps single fiber PMD
- Choice B: 802.3ah specifies PMD specs identical to TTC 100Mbps single fiber PMD
- Choice C: 802.3ah specifies PMD specs based on TTC 100Mbps single fiber PMD
- Choice D: 802.3ah decides not to specify 100Mbps single fiber PMD
- Straw Poll results amond 802.3ah Optical PMD sub-taskforce attendees (5/21/2002 2:30pm)
  - Choice A: 0 Choice B: 1 Choice C: 17 Choice D: 10