Joint ITU-T / IEEE Workshop on Next Generation Optical Access Systems

1Gbit/s P-P Ethernet OAN Enhancement

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Background of the proposal

The Ethernet access system is one of the strong solutions for the broadband services; however the existing specifications are not enough to cover all of the requirements for the access system due to the following reasons;

- Optical Interface

  The channel insertion loss bigger than one specified in IEEE802.3 1000BASE-BX10 is required to be introduced from the point of views of actual access lines' deployment.

- OAM

  The OAM for Link layer management has already been specified in IEEE802.3, but OAM for System management has not yet.
  The OAM for System management is essential for operators and it's a commmon issue on Ethernet based access network despite of its topology (PON or P-P system).

Background of the proposal

In addition to the above mentioned enhancement, the following 2 functions are required.

- Silent Start function

  Both PON and P-P system is possibly deployed in same access network environments and when the P-P system is connected to the PON system by mistake, all the subscribers in the PON system is interfered without this function.

- Power Saving function

  The Global warming is common issue among every industrial fields. So a function to contibute this issue should be considered.

We have started studying new recommendation regarding 1Gbp/s P-P system to tackle with above mentioned 4 issues.

Scope of specifications

- Optical Interface Specifications
  - Three Classes due to transmission distance and parameters
- OAM Specification
  - Link layer management
  - System management (ONT management)
- Silent Start function
  - New proposal to ITU-T G.985 for prevention of interference to PON system in case P-P system is connected is taken into consideration.
- Power Saving function

Overview of specifications

- Optical Interface Specifications
  - Three Classes

    The ODN requirement should be consistent with ITU-T Recommendation G.985 so that 1Gbit/s P-P system can be overlaid over 100Mbit/s P-P system.

1. Class S: ODN loss 15dB, Power penalty 1dB
   for the transmission within 10Km of distance
2. Class A: ODN loss 20dB, Power penalty 1dB
   for the transmission within 20km of distance
3. Class B: ODN loss 25dB, Power penalty 1dB
   for the transmission within 30Km of distance

Overview of specifications

- Optical Interface Specifications
  - Parameters

    Parameter supposed to be defined follow the ones defined in the G.985.

1. Nominal Bit rate
2. Transmit wavelength
3. Line code
4. Spectral characteristics
5. Mean launch power (MAX, MIN)
6. Minimum overload
7. Minimum sensitivity
8. Power Penalty
9. Extinction ratio
10. Pulse mask
11. S/X (Optical return condition, Bit error ratio)
12. Optical return loss of the interface

Overview of specifications

- OAM Specification
  - Link layer management

    OAM functions defined in IEEE 802.3 Clause 57 is referred and some of them will be applied to realize following alarm-supervising functionality.

1. ONT Link Fault (Link Fault in IEEE 803.2 Clause 57)
2. ONT Failure (Critical Event in IEEE 803.2 Clause 57)
3. ONT Power down (Dying Gasp in IEEE 803.2 Clause 57)

Overview of specifications

- OAM Specification
  - System management (ONT management)
    OAM for dedicated use on system management is not specified in IEEE802.3 Clause57. OMCI defined in the ITU-T G.984.4 seems applicable for this purpose. Following supervising function has been studied based on the OMCI.
    The System management OAM function is essential for Ethernet based access network despite of its topology and we will proceed our study to get this system management OAM can be applied to all the Ethernet based access networks commonly.

1. ONT production information
   (ONT vender code, ONT model number)
2. Loop-back test
3. UNI management

1) Remote Setting
   (Link condition, Link speed, Link Duplex, Autonegotiation capability)
2) Status notification and indication
   (Link condition, Link speed, Link Duplex, Autonegotiation capability)

Overview of specifications

- Silent Start function
  - New proposal to ITU-T G.985 for prevention of interference to PON system in case P-P system is connected is taken into consideration.
    Specific measures to realize this function is now under study.

Overview of specifications

- Power Saving function
  - This function is recommended to introduce to new ITU-T recommendation.
    Specific measures to realize this function is now under study.

Coordination activity between IEEE802.3 and ITU-T Q2/SG15

- Liaison relation
  - ITU-T Q2/SG15 sent the Liaison letter to IEEE802.3 at the time when ITU-T started studying this recommendation in Feb. 2008.
  - IEEE802.3 responded above mentioned Liaison letter and showed cooperative statement to the ITU-T Q2/SG15 in Mar. 2008.
  - We are preparing for a response to liaison letter from IEEE802.3 and proceeding study of this recommendation with help of IEEE802.3.