

Wavelength Plan and Power Budget Questionnaire

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Ad hoc Group Participants

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Introduction

- This ad hoc group was created to investigate wavelength plans and power budgets.
- As a part of this investigation, a survey was created to gather information from service providers on such items as their desired loss budget, distance requirements, and future expansion plans.
- The source of all information will be kept strictly confidential. The summary results will be presented to the working group.

Target Service Providers

- This survey will be distributed to the following operators:

- Advanced Newhouse Communications (MSO)
- AT&T
- Batelco (Bahrain)
- Bell Canada
- Bell South
- Bezeq
- Brasil Telecom (Brazil)
- British Telecom
- China Netcom
- China Telecom
- Chinghua Telecom (Taiwan)
- Deutsche Telecom
- Eircom
- France Telecom
- GTD (Chile)
- Hanaro (Korea)
- IMPSAT (Argentina)
- Intelig Telecom (Brazil)
- KDDI
- K-Opticom
- Korea Telecom
- KPN Telecom
- Maxcom (Mexico)
- NTT
- QTel (Qatar)
- Qwest
- Rostelecom (Russia)
- SingTel
- Sprint/Embarq
- Telecom Italia
- Telecom Malaysia
- Telecom New Zealand
- Telecom South Africa
- Telefonica de Espana
- Telemar (Brazil)
- Telia
- Telmex (Mexico)
- Telstra
- Telstra Clear (New Zealand)
- Telus
- Verizon
- Vivax (Brazil)

Questionnaire

- Three Sections to the Questionnaire
- Section 1: Existing Passive Optical Network Deployments
 - Current PON Technology being deployed
 - Size of their present customer base
 - Maximum Distance
 - Split Ratio
 - Optical Budget
 - RF Overlay
- Section 2: Future PON Networks
 - % of customers planned to be on fiber by 2010
 - Size of their potential customer base
 - Interest in 10G EPON
 - Interest in lower split ratio
 - Interest in shorter optical reach
 - Interest in longer optical reach
 - Interest in higher split ratio
 - RF Overlay
- Section 3: Coexistence of Disparate PON Technologies

Section 1: Existing Passive Optical Network Deployments

- 1.1 What versions of PON are currently or soon-to-be in use in your network? (You may select multiple answers.)
 - a. ___ 1G EPON
 - b. ___ GPON
 - c. ___ BPON
 - d. ___ other _____
 - e. ___ none

- 1.2 What is the size of your customer base currently served by fiber? _____

- 1.3 In your current PON network, what is the maximum distance (design limit) between an OLT and an ONU?
 - a. <10 km
 - b. 10 km
 - c. 10-20 km
 - d. other _____ km

Section 1: Existing Passive Optical Network Deployments

- 1.4 What is the typical split-ratio of your existing PONs?
 - a. ____ 1x16
 - b. ____ 1x32
 - c. ____ 1x64
 - d. ____ other 1x____

- 1.5 What is the optical loss budget for your existing PONs?
 - a. ____ 21.5 dB
 - b. ____ 25.5 dB
 - c. ____ 28.0 dB
 - d. ____ 29.0 dB
 - e. _____ dB

- 1.6 What is the optical design margin (in dB) for your existing PONs?
_____ dB

Section 1: Existing Passive Optical Network Deployments

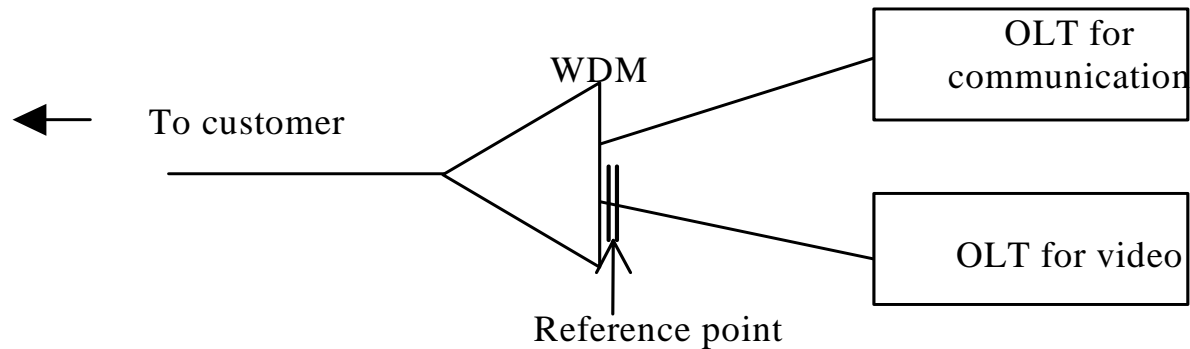


Figure 1.5.c

- d. What is the receive-power level (in dBm) of the analog video signal? _____ dBm
- e. What CNR (in dB) do you require at the ONU for the analog video channels? _____ dB

Section 1: Existing Passive Optical Network Deployments

- 1.8 Please indicate the percentage of deployed ONUs determined by OLT-to-ONU distance:
 - a. < 10km _____% ONUs
 - b. 10-20km _____% ONUs
 - c. > 20km _____% ONUs (Max distance _____km)
 - d. _____ Information not available

Section 2: Future PON Networks

- 2.1 In your estimation, what percentage of your entire, existing customer base, will be served with fiber by 2010?
 - a. <1% _____
 - b. <5% _____
 - c. <10% _____
 - d. <50% _____
 - e. >50% _____

- 2.2 What is the size of your customer base that could potentially be served with fiber? _____

Section 2: Future PON Networks

- 2.3 Please characterize the extent of your interest in deploying 10G EPON in your network in the future.
 - a. _____ Definitely will deploy
 - b. _____ Probably will deploy
 - c. _____ Neutral – hard to predict
 - c. _____ Probably will not deploy
 - d. _____ Definitely will not deploy

Additional comments:

Section 2: Future PON Networks

- 2.4 Please select the option that best describes your level of agreement with the following statement:

A 10G EPON solution that provides 1×16 split with reduced cost and complexity (compared to a 1×32 solution) would be:

- a. Of great value in my network,
- b. Of some value in my network,
- c. Of little or no value in my network.

- 2.5 Please select the option that best describes your level of agreement with the following statement:

A 10G EPON solution that provides 10 km reach with reduced cost and complexity (compared to a 20 km solution) would be:

- a. Of great value in my network,
- b. Of some value in my network,
- c. Of little or no value in my network.

Section 2: Future PON Networks

- 2.6 Regarding longer-reach (more than 20 km) solutions for 10G EPON:
 - a. Would you characterize longer-reach (more than 20km) solutions as
 - i) ☐ vital,
 - ii) ☐ of some value,
 - iii) ☐ of slight value,
 - iv) ☐ of no value,

for any plans you might have for deployment of 10G EPON?

- b. If long-reach 10G EPON would be valuable to you, would you accept lower PON split-ratios (ie. less than 1 x 32) at extended distances?

☐ Yes ☐ No

If the answer is yes, what is the minimum split ratio acceptable to you:

Section 2: Future PON Networks

- c. If long-reach 10G EPON would be valuable to you, would you accept more cost and complexity in PON equipment when compared with today's commercial PON products, to get this capability?

___ Yes ___ No

- d. Please provide any additional comments you may have on long-reach 10G EPON. Please include comments about the percentage increase in cost compared to existing PON solutions that would be acceptable to you.

Section 2: Future PON Networks

- 2.7 Regarding higher split ratio (greater than 1×32) solutions:
 - a. Would you characterize higher split ratio (greater than 1×32) solutions as
 - i) ☐ vital,
 - ii) ☐ of some value,
 - iii) ☐ of slight value,
 - iv) ☐ of no value,

for any plans you might have for deployment of 10G EPON?

- b. If higher-split ratio 10G EPON would be valuable to you, would you accept lower distances?

☐ Yes ☐ No

Please comment on the minimum distance you would accept:

Section 2: Future PON Networks

- c. If high-split ratio 10G EPON would be valuable to you, would you accept more cost and complexity in PON equipment, compared with a 1x32 split 10G EPON product, to get this capability?

___ Yes ___ No

- d. Please provide any additional comments you may have on high split-ratio 10G EPON. Please include comments about the percentage increase in cost compared to existing PON solutions that would be acceptable to you.

Section 2: Future PON Networks

2.8 Regarding analog video overlay on the PON fiber plant:

- a. Do you anticipate using a dedicated wavelength for analog video delivery on a future, 10G EPON network?

☐ Yes ☐ No

(If the answer is No, skip questions b – e.)

- b. Do you anticipate the wavelength range of the analog video signal would be 1550 - 1560 nm?

☐ Yes ☐ No

If the answer is no, enter your wavelength here _____nm

- c. What launch power (in dBm) of the analog video signal at the reference point in the Figure 1.5.c do you anticipate?

_____ dBm

Section 2: Future PON Networks

- d. What is the receive power level of the analog video signal in dBm?

_____ dBm

- e. What CNR (in dB) do you require at the ONU for the analog video channels?

_____ dB

Section 3: Coexistence of Disparate PON Technologies

3.1 Regarding the need for PON technology upgrade capabilities:

- a. By 2010, I will have a significant portion of my subscriber network converted to a current PON technology.

☐ Yes ☐ No ☐ Not Sure

(If the answer is No, skip questions b and c.)

- b. Please indicate what existing PON technology would be deployed before 2010 (check all that apply):

☐ 1G EPON
☐ GPON
☐ BPON
☐ other _____

Section 3: Coexistence of Disparate PON Technologies

- c. Which of the following statements best describes the anticipated needs of your network (ie. in the 2010 timeframe)?
- i. A future PON (eg.10G EPON) solution that facilitates coexistence with my preexisting PON systems (ie. on the existing fiber plant) would be vital to my upgrade strategy.
- a. Would you accept additional cost and complexity in the future PON equipment (relative to similar technology without coexistence capability) to get this capability?

☐ Yes ☐ No

If yes, then what percentage increase in cost would you accept _____

- b. Would you be willing to deploy a blocking filter at each installed pre-10G ONU to get this capability?

☐ Yes ☐ No

Section 3: Coexistence of Disparate PON Technologies

- ii. Future PON technologies (e.g. 10G EPON) would be used primarily in greenfield deployments or circumstances in which all PON subscribers upgrade at the same time. I do not anticipate that the coexistence on a common fiber plant of an existing PON solution and future PON deployments will be vital to my upgrade strategy.

___ Yes ___ No

- iii. Other (please describe):

Schedule

- Week of November 13th – Finalize Survey and Covering Letter
- November 20th – Send Questionnaire to Service Providers with a requested two week response time (Dec 4th)
- Week of Dec 4th – Collect and analyze results
- Week of Dec 11th – Schedule conference call to discuss results with ad hoc group

Motion to Approve

- _____ Yes
- _____ No
- _____ Abstain