# Definition of Downstream Wavelength Bands for P2MP EFM

Tom Murphy
Infineon Technologies
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thomas.murphy@infineon.com

# Co-sponsors

| | | | |
|---|---|---|---|
| Barret, Bob | Fiberintheloop | McCammon, Kent | SBC |
| Bartur, Meir | Zonu | Mickelsson, Hans | Ericsson |
| Effenberger, Frank | Quantum Bridge | Peng, Lisa | Corning |
| Fredricx, Francois | Alcatel | Piehler, David | Harmonic |
| Gummalla, Ajay | Broadcom | Soto, Walter | Agere |
| Horne, David | Intel | Sasaki, Akira | Oki NT |
| Ivry, Raanan | BroadLight | Valencia, Hernando | NEC eLUMINANT |
| Liu, Zheng-Yang | NEC eLUMINANT | | |

# Introduction

## Definition of Downstream Enhancement Band

1 **Want to adopt the following downstream wavelength bands for point-to-multipoint operation:**

- **Basic Band: 1480 to 1500 nm**
- **Enhancement Band: 1539 to 1565 nm (Digital Data)**
  **or**
  **1550 to 1560 nm (Broadcast Video)**

2 **Advantages of an Enhancement Band**

3 **What are the issues OLT and ONU side**

4 **Open issues**

# Advantages of Downstream Enhancement Band

## Inclusion of Enhancement Band in-line with SP's requirements

- **Provision of broadcast video services without loss of downstream Basic Band bandwidth**
- **Provision of additional digital services, such as TDM**
- **Future use for CWDM, DWDM**
- **Eases upgradability of network**

# OLT Side

## Various issues with Enhancement Band

| Issue | Comment |
|---|---|
| Power Budget | For a 20 km link, 0.2 dB difference between DFBs at 1550 nm and 1490 nm |
| Technical Feasibility | Same manufacturing process for DFBs at 1550 nm and 1490 nm |
| Cost | DFBs at 1490 nm currently more expensive than 1550 nm. In a few years??? |

Two l downstream not an issue for the OLT

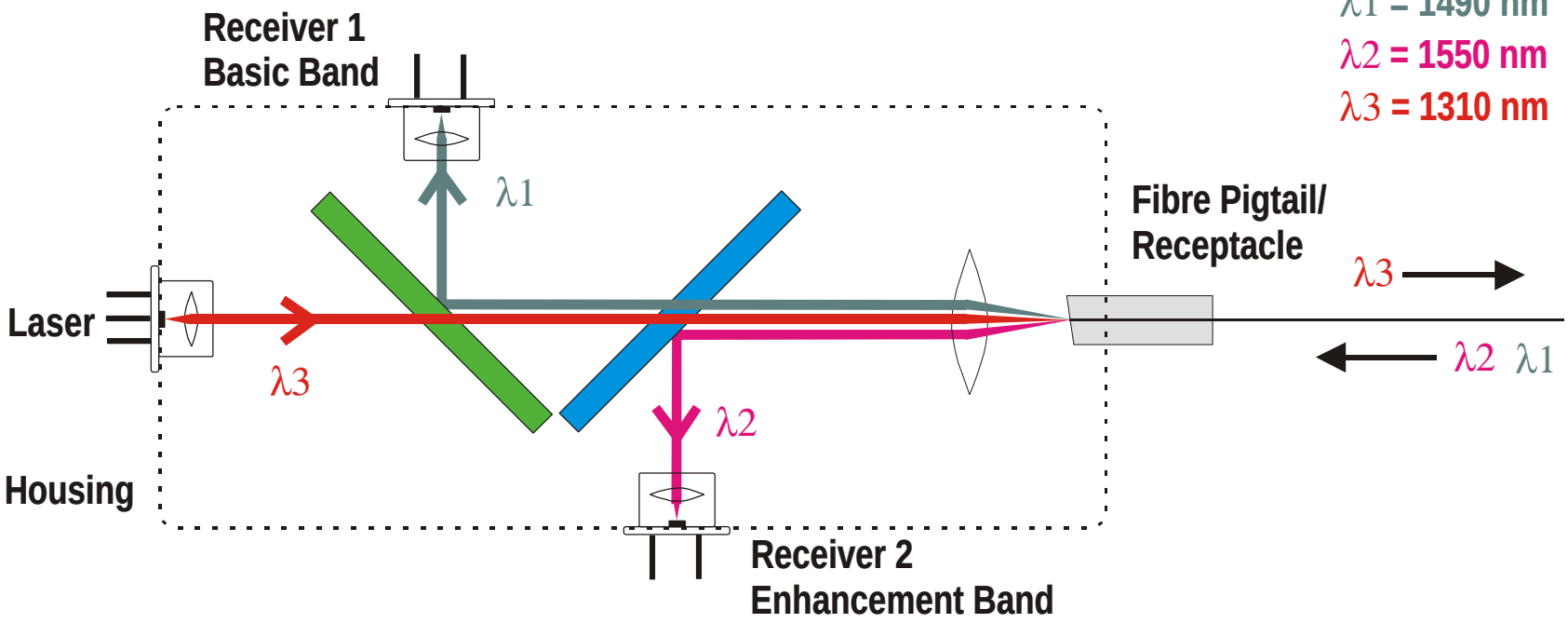
# ONU Side

## ONU optics, option 1

**WDM Filter 1 (Data)**
High Reflection λ1
High Transmission λ3

**WDM Filter 2 ( Video...)**
High Reflection λ2
High Transmission λ1
High Transmission λ3

**λ1 = 1490 nm**
**λ2 = 1550 nm**
**λ3 = 1310 nm**



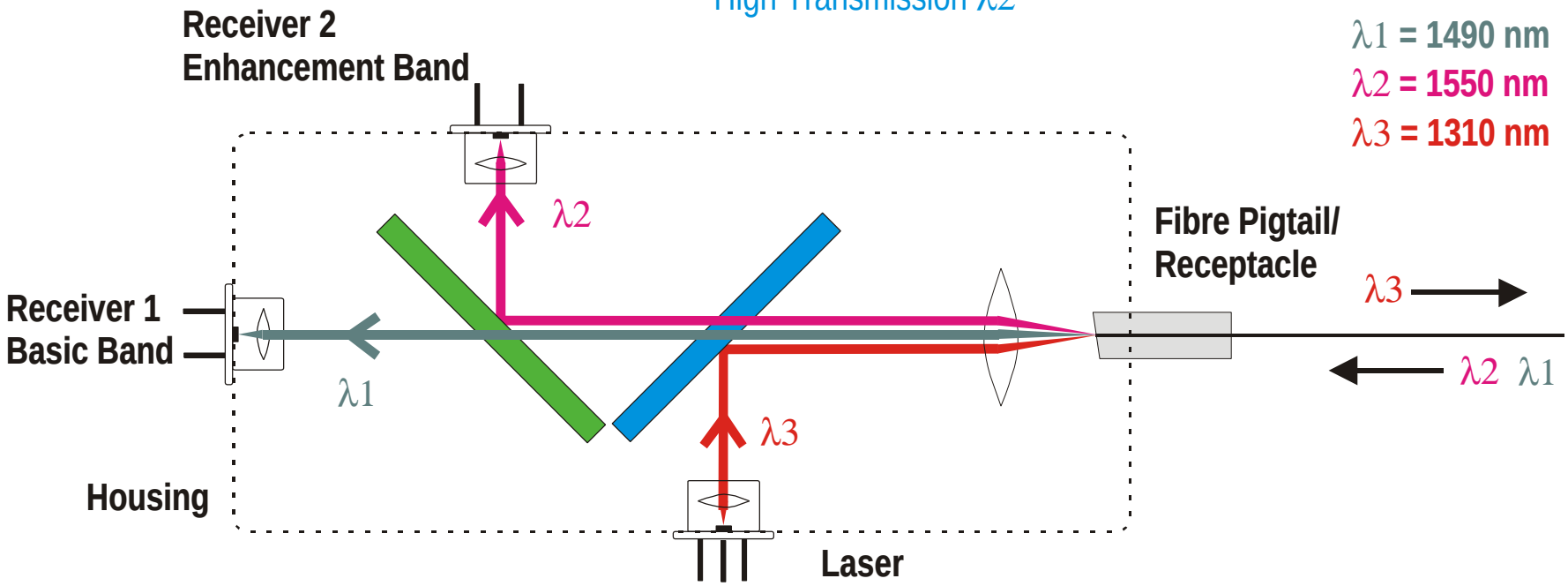

**Higher sensitivity for Receiver 2**

# ONU Side

## ONU optics, option 2

**WDM Filter 1 (Video...)**
High Reflection λ2
High Transmission λ1

**WDM Filter 2 (Laser)**
High Reflection λ3
High Transmission λ1
High Transmission λ2




**Higher launched power**

# ONU Side

## Various issues with Enhancement Band

| Issue | Comment |
|---|---|
| Technical Feasibility | Optical modules can be realised with internal WDM filters |
| Cost | 20% cost increase for 2-port vs 3-port bi-directional optical module |
| | 5% cost increase for 2-port module with WDM Video filter as ‘video-blocker’ |

Two l downstream not an issue for the ONU

# Open Issue

Solutions for the specification of Enhanced Band optical parameters

| Solution | Comment |
| --- | --- |
| Define values in 802.3ah | Application specific and also out of scope |
| Reference G983.3 recommendations | Filter values too conservative and difficult (expensive) to achieve |
| Don’t define in 802.3ah, values based on application | Most realistic approach |

# Summary

1 The following downstream wavelength bands were presented:

- Basic Band: 1480 to 1500 nm
- Enhancement Band: 1539 to 1565 nm (Digital Data)
  or
  1550 to 1560 nm (Broadcast Video)

No technical issues to the proposed bands were identified

2 Minimum optics cost increase for Enhancement Band, however, far outweighed by advantages.

3 Some open issues regarding Enhancement Band optical parameters such as launched power, responsivity and isolation. These are best decided by the particular application.

# Motion

**That this group accept the following downstream wavelength bands for point-to-multipoint operation:**

| | |
|---|---|
| **Basic Band:** | **1480 to 1500 nm** |
| **Enhancement Band:** | **1539 to 1565 nm (Digital Data)**<br>**or**<br>**1550 to 1560 nm (Broadcast Video)** |