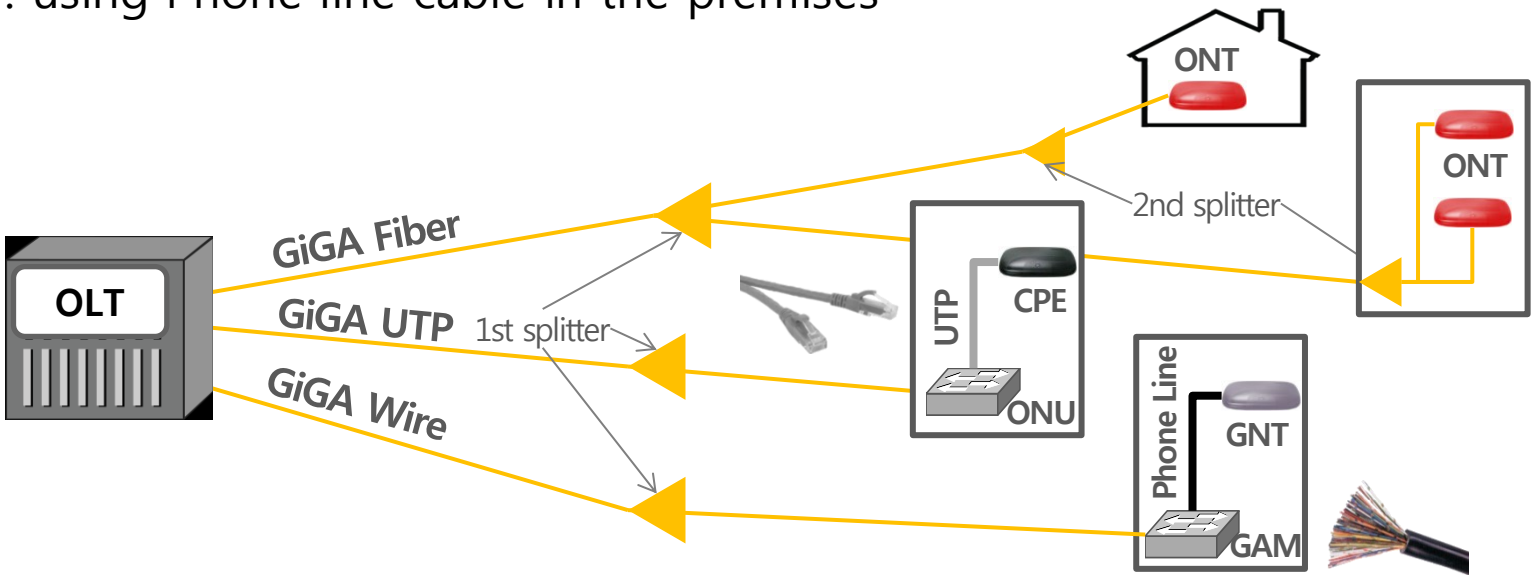
Co-existence with Legacy and NG-EPON

2016. 07

1 Various Network solution

- **KT is providing GiGA Internet service after declaring GiGAtopia, June 2014.**
- **KT is leading GiGA Internet as No.1 operator.**
  - Over 40% M/S in fixed broadband service in Korea.
- **KT developed the various solution for providing GiGA Internet service in various environment.**
  - GiGA Fiber : using Fiber from end to end
  - GiGA UTP : using UTP cable in the premises
  - GiGA Wire : using Phone line cable in the premises



2 Preparation for Next

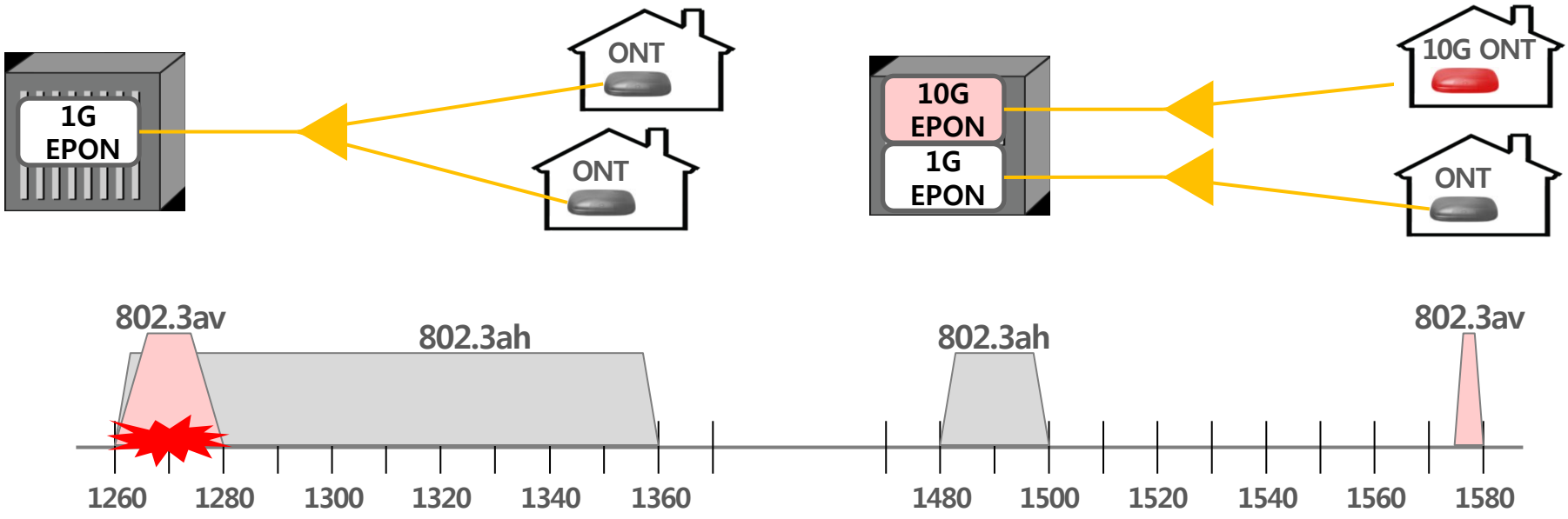
- **After launching GiGA Internet, subscriber's needs for bandwidth is increasing.**
- **To meet the subscriber's needs, KT is investigating how to migrate from current network topology to the future cost-effectively.**
  - Increase split ratio, Long distance and etc
- **KT is also considering the new technology such as Wave2 WiFi, NBASE-T.**
  - To provide new service, the backhaul system should be supported.
- **KT is trying to provide the 5G trial service at 2018 Pyeong-Chang Olympic.**
  - NG-EPON can be considered as one of solutions to support the 5G trial service.

Wi Fi ™
802.11ac

NBASE-T ™
ALLIANCE

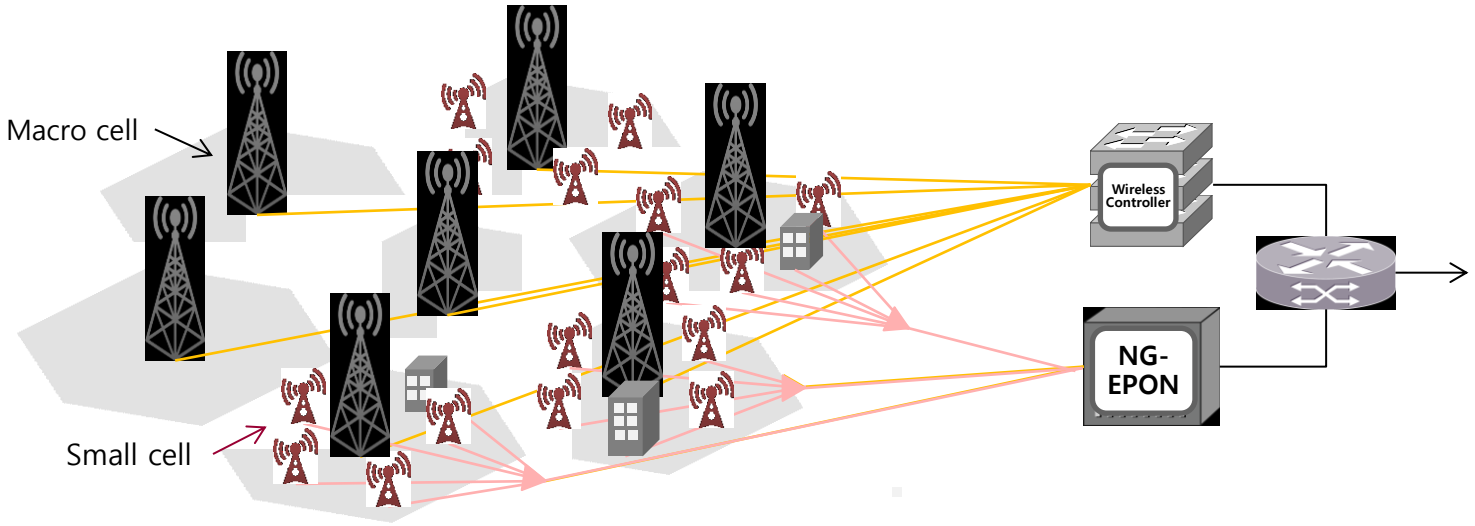
3 Co-existence issues

- **To provide 1G and 10G service through the same ODN, the wavelength is an one of issues.**
  - Early SFP transceivers of 1G EPON have a quite broad spectrum
  - The upstream wavelengths of 1G and 10G EPON is overlapped.
- **Therefore, another optical fiber should be deployed for 10G EPON.**
- **It means that additional CAPEX have to invest fiber deployment.**



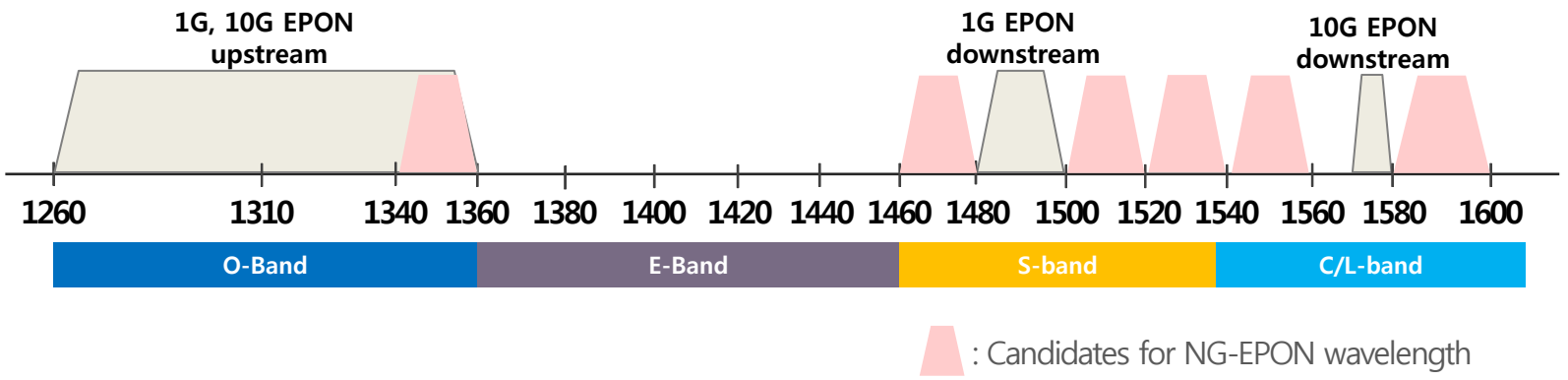
4 NG-EPON possibility

- **NG-EPON, 25Gbps single channel or 100Gbps 4 channels, could be a candidate for wireless backhaul, specially 5G small cell.**
  - 5G system could be consisted of macro cell and small cell.
  - 5G small cell maybe cover the shadow regions of downtown.
- **In the downtown area, deploying additional optical fiber costs very high.**
  - Because the existing infrastructures, digging and installation can be limited.
- **Using existing FTTH network could be most efficient way.**



5 Propose NG-EPON wavelength plan

- **Through the FTTH ODN, the wavelength plan of NG-EPON should be coexisted to provide wireline service and wireless backhaul.**
  - 1G and 10G EPON is using O-band, S-band and some of L-band.
  - The remain wavelengths are S-band, C-band and L-band.
- **As an EPON's operator, GPON's wavelengths also could be used.**
  - NG-PON2 uses C-band for upstream and L-band for downstream.
- **The subscriber's side cost is more important because the OLT side cost is divided into each subscriber.**
  - The cost per subscriber = (OLT side + ODN)/the number of subscribers + subscriber's side cost



6 Conclusion

- **The coexistence has to be considered in the same ODN.**
  - Operator should consider various environments.
  - Moving the users using legacy system to the new system would take very long time.
  - Due to 1G EPON upstream, O-band signal would be affected.
- **Should be considered how to provide services using NG-EPON.**
  - The specification of NG-EPON is to provide 25Gbps per channel.
  - 25Gbps is very big bandwidth for a single wireline user.
  - NG-EPON could be a candidate of wireless backhaul.
- **In the integrated environment of wireline and wireless network, the new technology could accommodate the legacy.**

Thank you