

Technical feasibility of DMT transceiver for 400GbE SMF transmission

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Tomoo Takahara, Toshiki Tanaka, Masato Nishihara,
Jens C. Rasmussen

Fujitsu Laboratories Ltd.

Supporters

- Hideki Isono Fujitsu Optical Components
- Daniel Stevens Fujitsu Semiconductor Europe
- Matt Pope Semtech
- Craig Hornbuckle Semtech
- Song Shang Semtech
- Francois Tremblay Semtech

WDM technologies with Advanced modulation

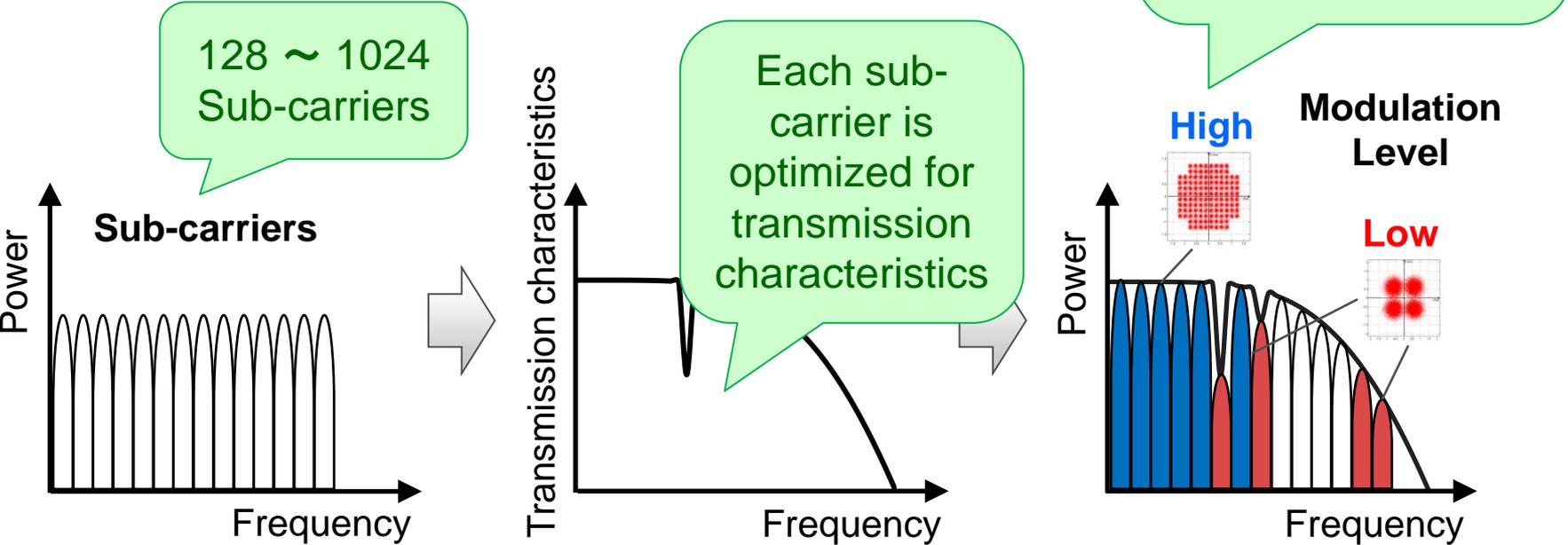
- In the last Geneva meeting, some contributions referred to the demand of the transmission length. In those discussions, the importance of relatively long reach transmission was highlighted.
- For the transmission range of 10km and 40km, single fiber (non-multiple fiber) solution is strongly preferred.
- From the viewpoints of cost, size and power consumption, single channel configuration has specific merits. However 400 Gbps transmission is extremely difficult using simple single channel configuration. Therefore, we believe that LAN-WDM or CWDM configuration with advanced modulation format, is feasible and emerging solutions for 400GbE.

Concept of Discrete Multi-Tone modulation format

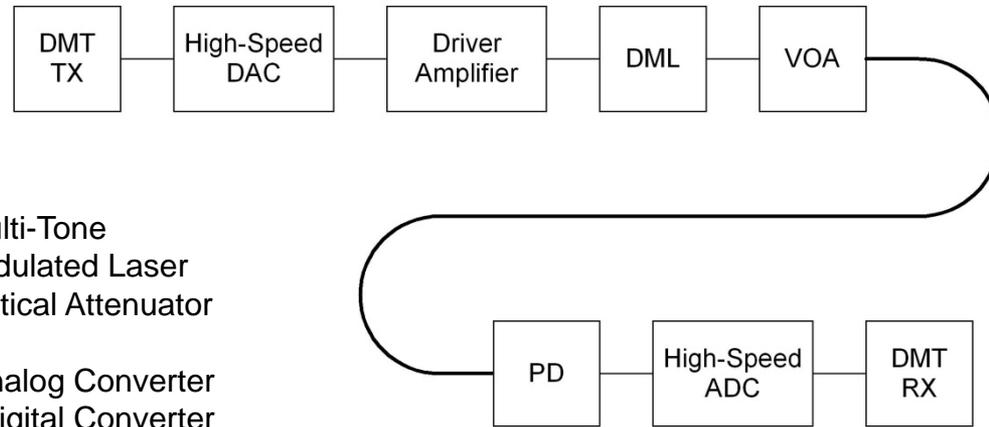
Discrete Multi-Tone is one of the advanced modulation format. It has been widely used in xDSL technologies.

DMT can use up the “frequency spectrum” of Tx and Rx.

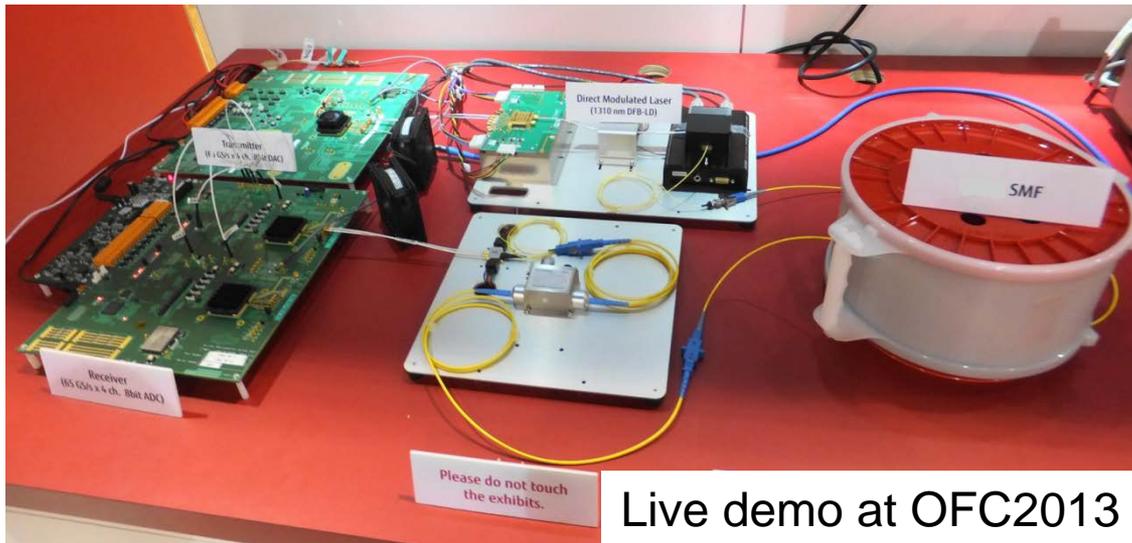
Multi carrier and Multi level



Experimental setup for 100Gbps transmission



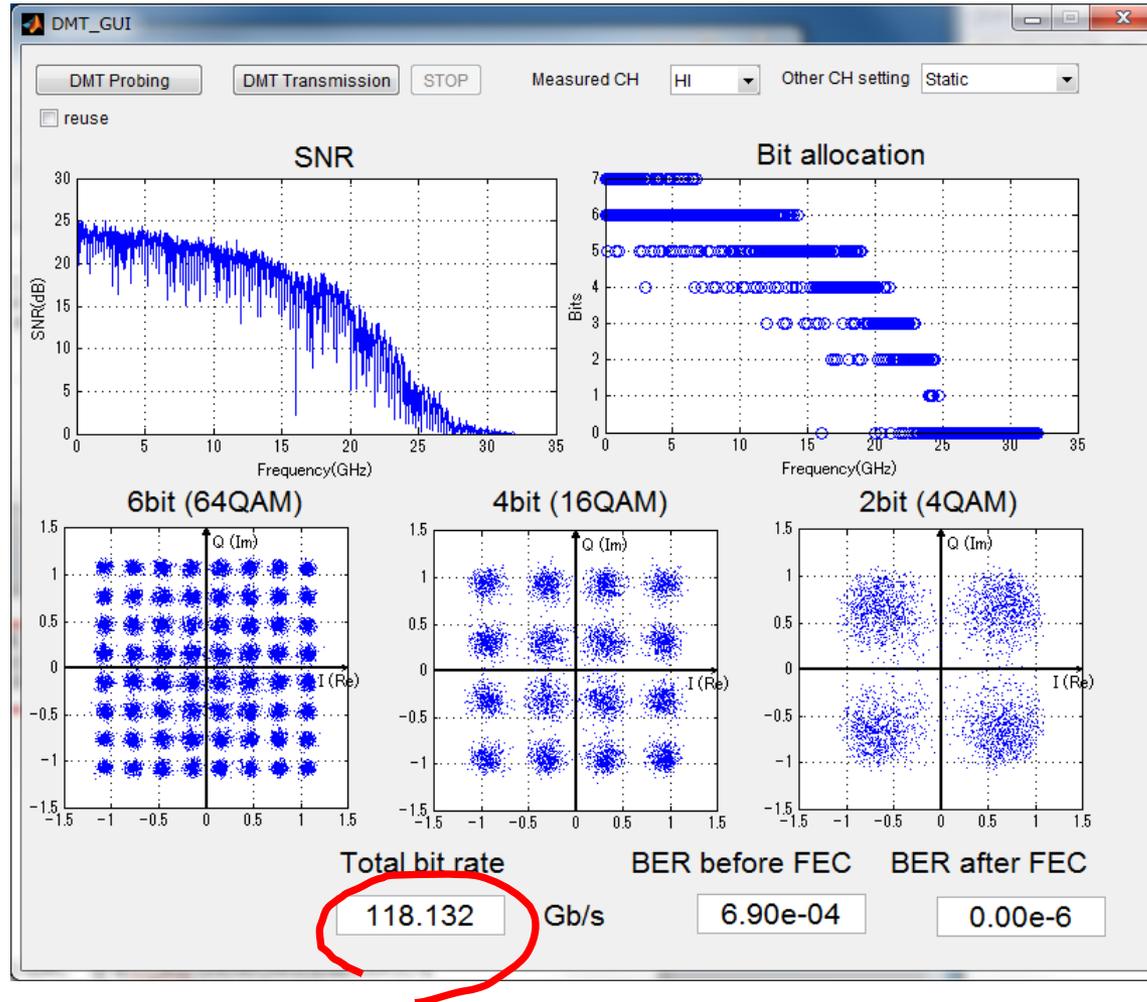
DMT: Discrete Multi-Tone
DML: Directly modulated Laser
VOA: Variable Optical Attenuator
PD: Photo Diode
DAC: Digital to Analog Converter
ADC: Analog to Digital Converter



Live demo at OFC2013

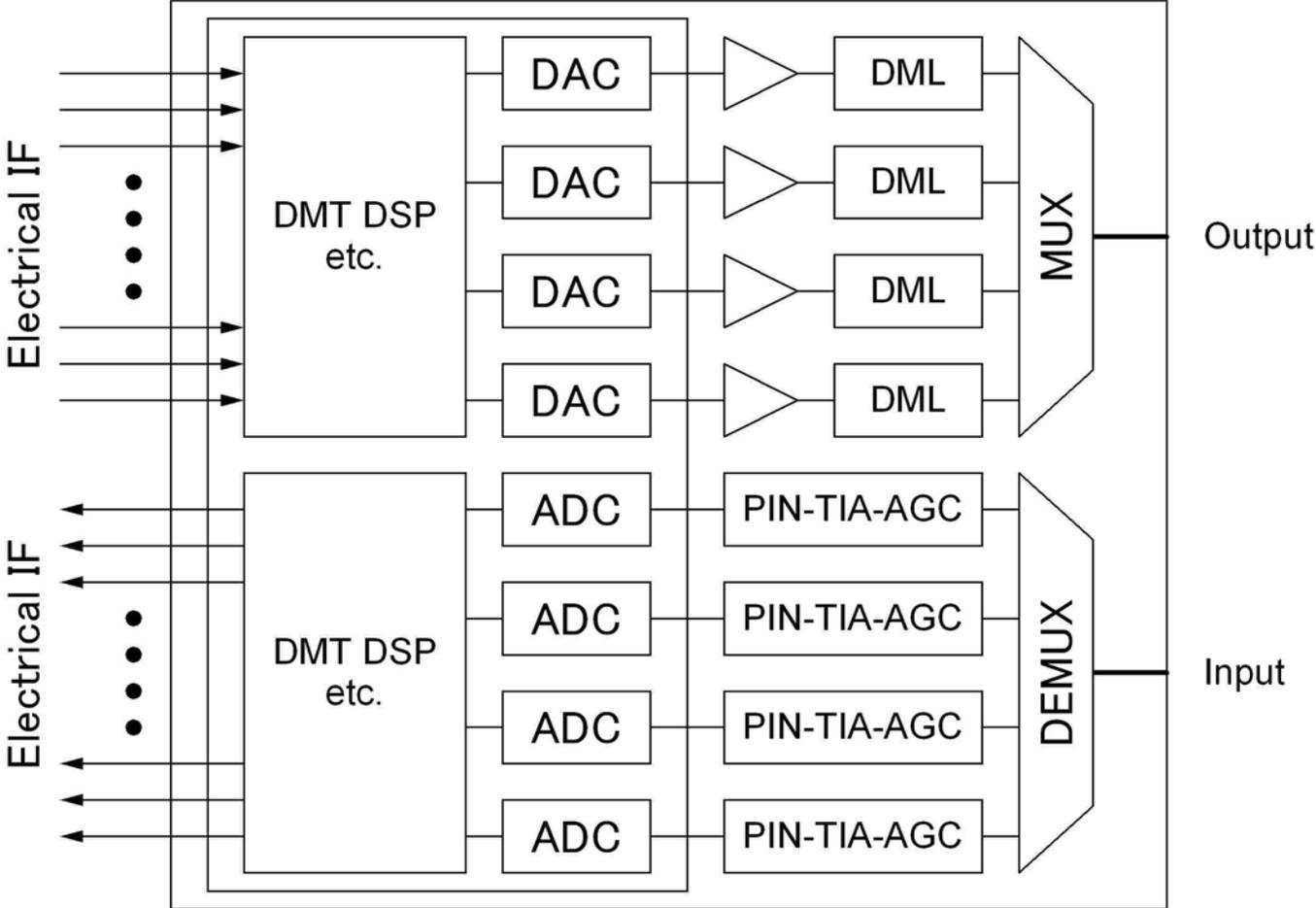
- Commercial devices
- Internal DAC & ADC evaluation boards
- Off-line processing
- 10 km

100Gbps transmission results



100 Gbps transmission using single wavelength is already feasible.
Single fiber 400GbE is also achievable, if DMT & WDM are combined.

400GbE transceiver configuration plan



Summary

- We have presented transmission experiment result of Discrete Multi-Tone (DMT) modulation format.
- We have shown 100 Gbps transmission using single wavelength by DMT.
- DMT can transmit more than 10 km without compensation with simple photo diode.
- Combination of DMT and WDM technologies is one of the best candidate for 400GbE transceivers.

(400GbE transmission data will be introduced in the near future global conference.)

Thank you