

# Technical feature of Optical DMT transmission system

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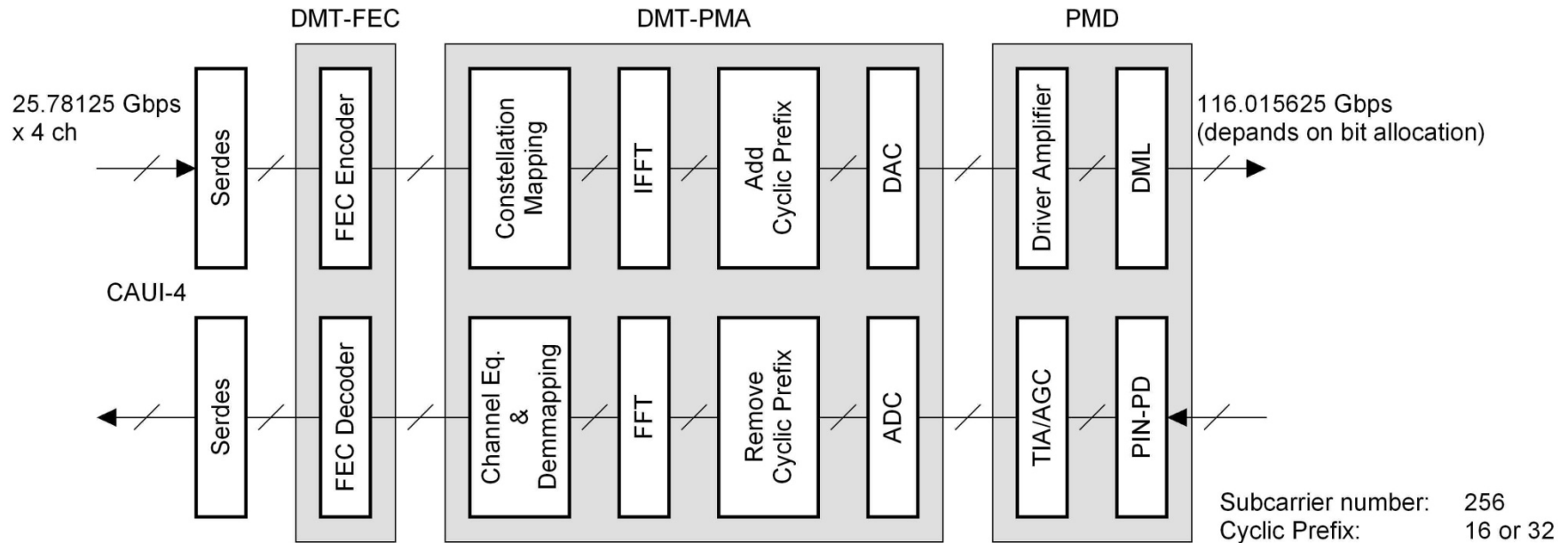
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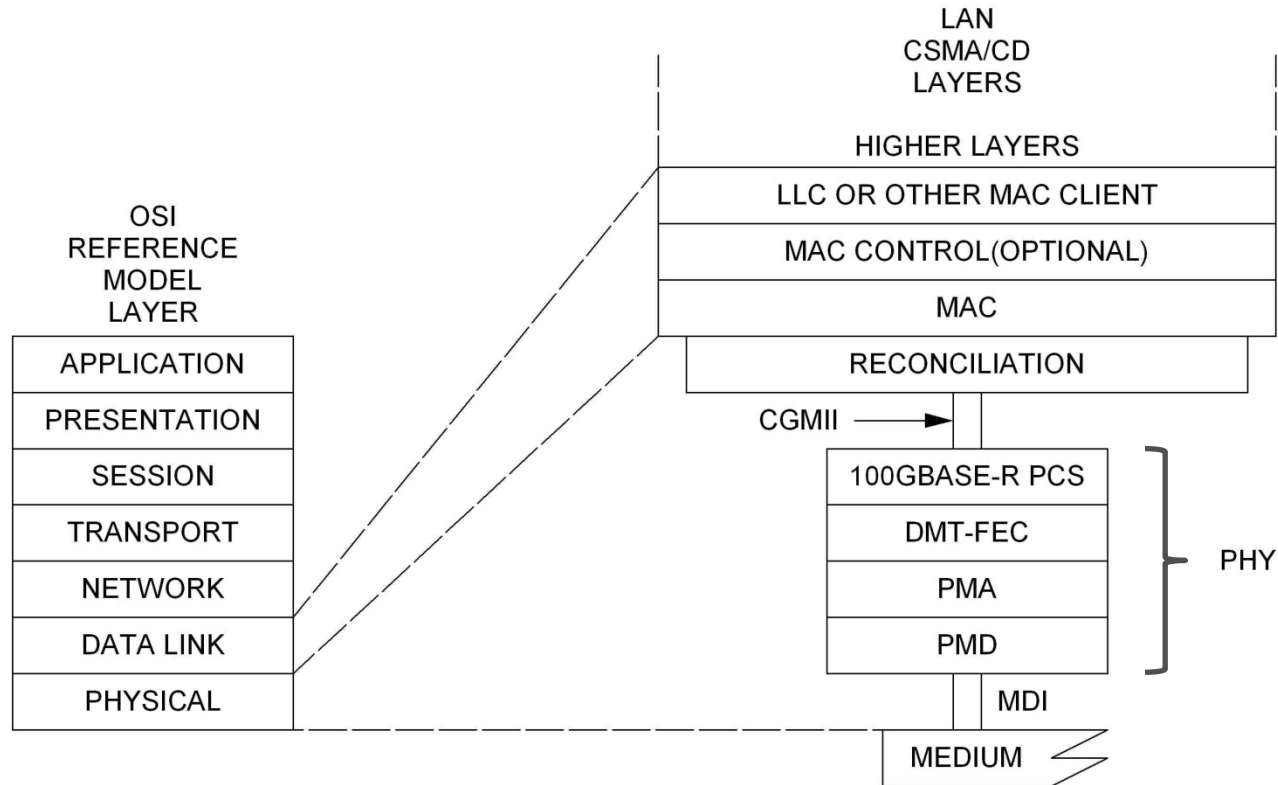
# Function diagram of Discrete Multi-Tone



## ■ Feature of Discrete Multi-Tone transceiver

- Single fiber and single wavelength 100 Gbps architecture
- Digital signal processing with realized high-speed ADC & DAC
- Feasible with conventional optical & electrical devices
- Conventional FEC coding

# DMT-FEC



## ■ Feature of Discrete Multi-Tone transceiver

- 12.5 % overhead supports reasonable coding gain and clock architecture  
9/8 clock ratio is appropriate for clocking architecture.

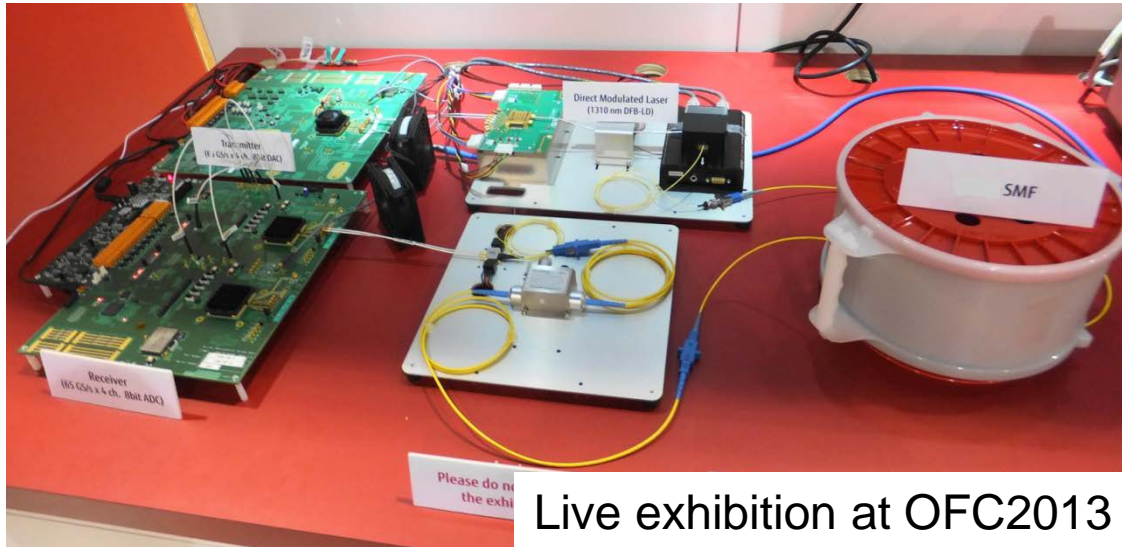
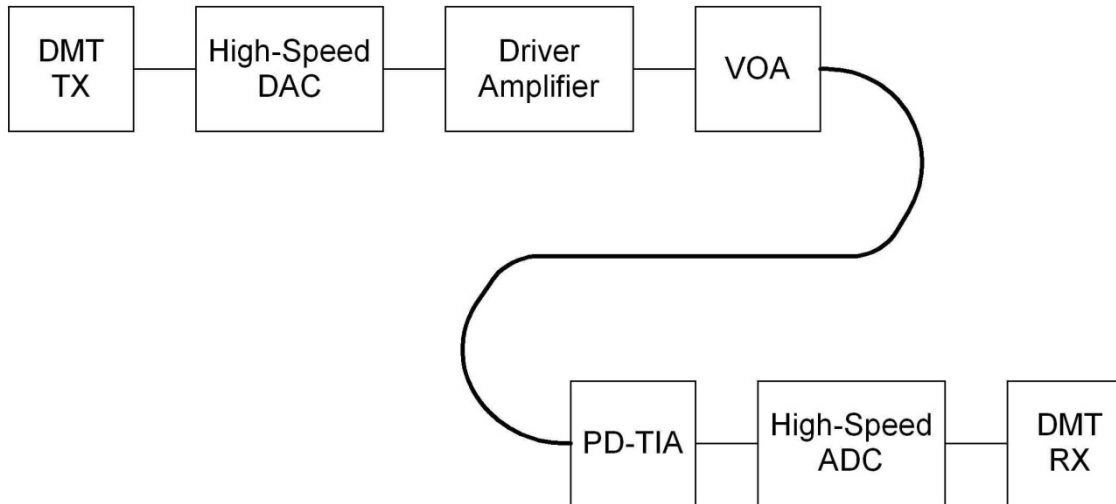
# Comparison of proposed technologies

	CWDM	PSM4	PAM-8	DMT
Number of Fiber	2	8	2	2
Configuration	4 lane Optics (Standard?)	4 lane Optics (Dedicated)	1 lane Optics (Dedicated)	1 lane Optics (Standard)
LSI		FEC?	(DAC)/ADC FEC	DAC/ADC FEC
400GbE	8 fiber?	32 fiber?	2 Fiber with WDM	2 Fiber with WDM

Discrete Multi-Tone needs conventional one lane optics for 100 Gbps transmission.  
Discrete Multi-Tone needs special LSI, but it is more cost effective than optics in the case of massive production.

This results in cost effective transceivers.

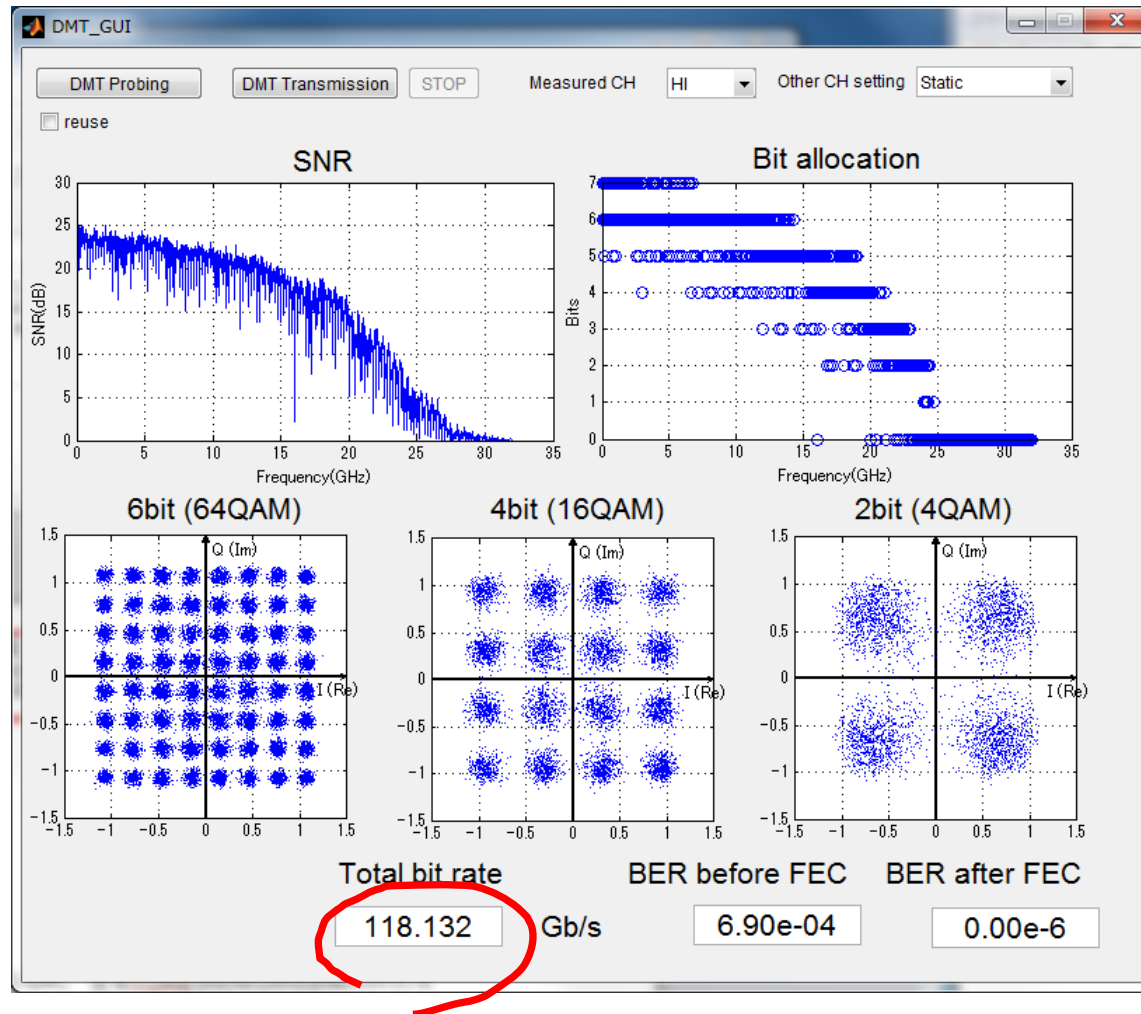
# State of the experiment



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

Live exhibition at OFC2013

# Experimental Results



Channel bandwidth was limited to 10GHz due to long PCB traces on DAC & ADC evaluation boards.

# LSI circuit scale for DMT

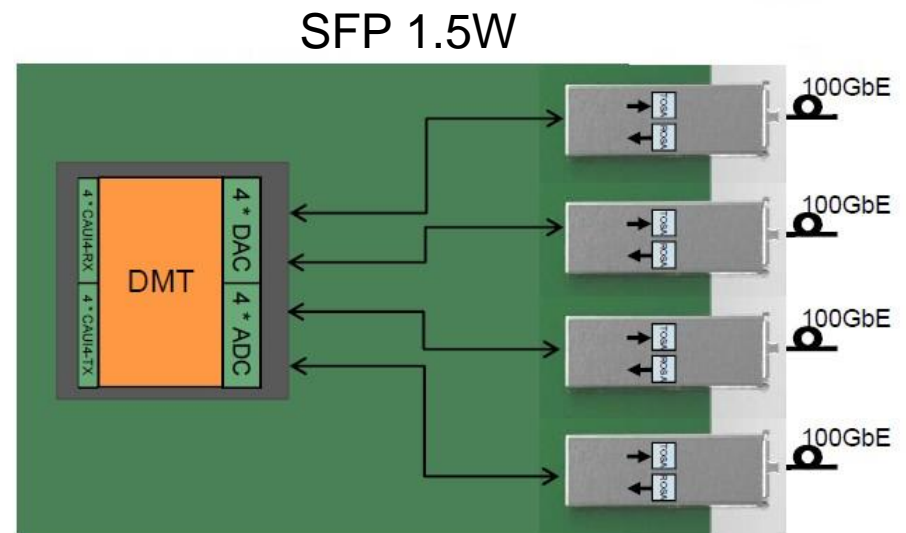
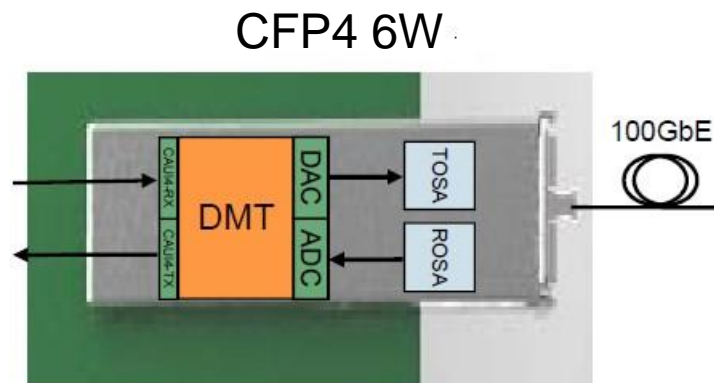
## ■ Detail research of DMT LSI design is on going.

- Potential cost of LSI is relatively low.

Estimated circuit scale is less than LSI for Digital Still Camera.

- Power consumption is under estimation.

Practical transceiver size and power consumption for Ethernet PHY is feasible using DMT.





# Summary

- We have proposed Discrete Multi-Tone technology for cost effective 100GbE solution.
- We have proposed the use of Discrete Multi-Tone modulation applied to single Directly Modulated Laser.
- 100 Gbps transmission has been demonstrated using real converters and off-the-shelf optical components.

# Thank you