

Open-WDM FH solution for 5G C-RAN

Jinri Huang, China Mobile

IEEE 1914 WG F2F

October 09, 2019, Singapore



Compliance with IEEE Standards Policies and Procedures

Subclause 5.2.1 of the *IEEE-SA Standards Board Bylaws* states, "While participating in IEEE standards development activities, all participants...shall act in accordance with all applicable laws (nation-based and international), the IEEE Code of Ethics, and with IEEE Standards policies and procedures."

The contributor acknowledges and accepts that this contribution is subject to

- The IEEE Standards copyright policy as stated in the *IEEE-SA Standards Board Bylaws*, section 7, <http://standards.ieee.org/develop/policies/bylaws/sect6-7.html#7>, and the *IEEE-SA Standards Board Operations Manual*, section 6.1, <http://standards.ieee.org/develop/policies/opman/sect6.html>
- The IEEE Standards patent policy as stated in the *IEEE-SA Standards Board Bylaws*, section 6, <http://standards.ieee.org/guides/bylaws/sect6-7.html#6>, and the *IEEE-SA Standards Board Operations Manual*, section 6.3, <http://standards.ieee.org/develop/policies/opman/sect6.html>

**IEEE 1914.1 TF
1914 NGFI WG
Jinri Huang, huangjinri@chinamobile.com**

Open-WDM FH solution for 5G C-RAN

Date: 2019-10-09

Author(s):

Name	Affiliation	Phone [optional]	Email [optional]
Jinri Huang	China Mobile		huangjinri@chinamobile.com

C-RAN is preferred as deployment method

5G Network Deployment Guideline:

C-RAN as the recommendation from the very beginning of 5G

Elaborate cost analysis conducted to verify the benefits of C-RAN in 5G era

- D-RAN 4G + D-RAN 5G
- D-RAN 4G + C-RAN 5G
- C-RAN 4G (requiring N/W reconstruction) + C-RAN 5G

4G and 5G with C-RAN is the most cost effective

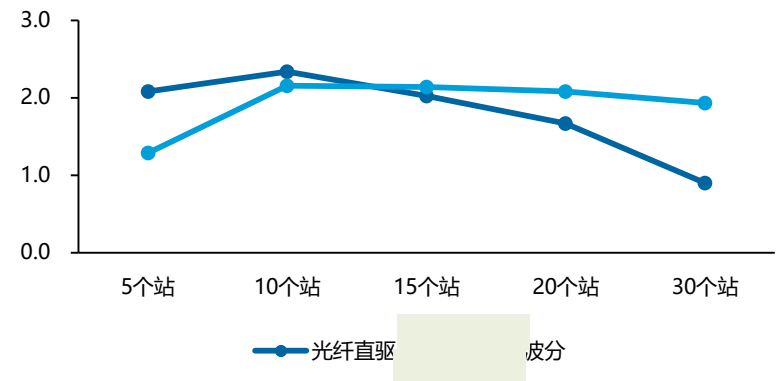
- ~13% CAPEX reduction, mainly due to saving on transport equipment
- ~20% OPEX reduction mainly due to power consumption saving

Optimal scale of centralization is around 10-15 BS

* Note: Exact cost number is removed for confidentiality

~3.6 Billion USD TCO saved for 5 years, assuming a C-RAN 5G network of 200,000 BS with centralization scale of 10 (BS) and adoption of passive WDM FH solution

Cost saving on transport equipment per site



Potential challenges & requirements

- Major concern still on the fiber consumption: 14 fiber strands needed for single 4G/5G co-existing site even with Bi-Di

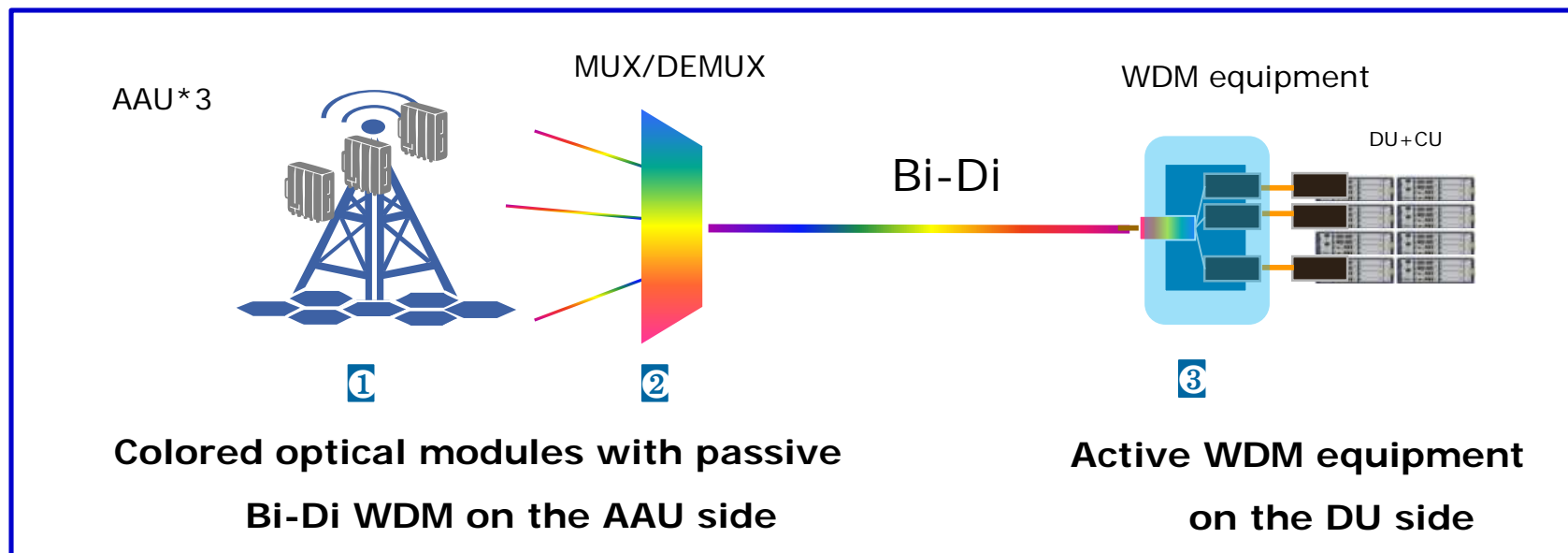
	Frequency	# of RRU/AAU	# of fiber strand	
			Dark fiber	Bi-Di
5G	2.6G (100M)	3	6	3
	2.6G (160M)		12	6
4G TDD	1.9G (F)	3	6	3
	2.6G (D)	3	6	3
4G FDD	900M	3 (cascade)	2	1
	1800M	3 (cascade)	2	1

- Other requirements
 - Bi-Di should be supported for the sake of synchronization
 - Manageability is critical given the large scale of C-RAN network
 - Industrial level temperature requirement: -40°C ~ +85°C
 - Protection is preferred;

Open-WDM as potential solution

Open-WDM is a **semi-active** system with simplified **management and control** functions

- AAU side: colored optical modules and **passive** Bi-Di WDM.
- DU side: **active** WDM equipment.



PoC being developed with industry partners with target at field trial by early 2020

- What could/should be done in 1914WG?

Thank you!