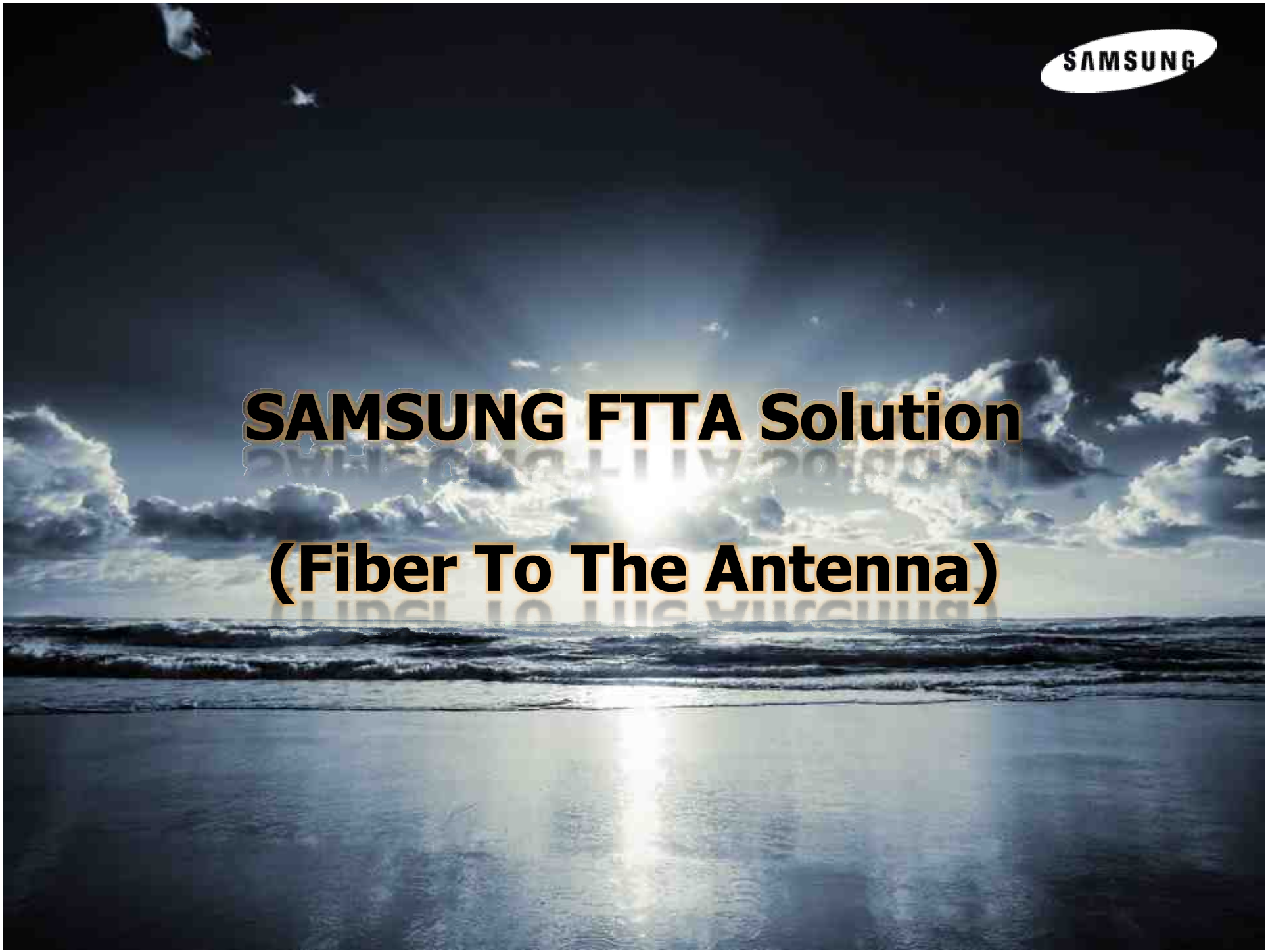
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SAMSUNG FTTA Solution
(Fiber To The Antenna)

Contents

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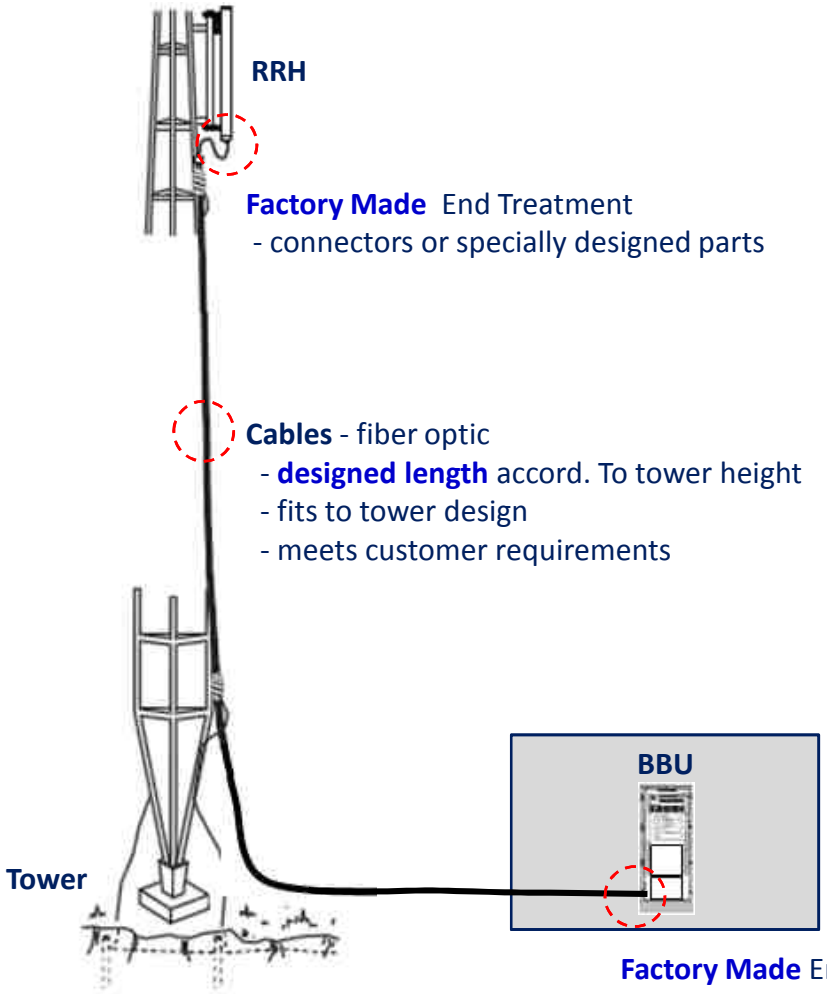
Fiber To The Antenna (FTTA) Solution ?



- **Connecting Base Station (BBU) to Remote Radio Head (RRH) with one-stop solution using optical fibers**
  - Reduced installation time
    - pre-designed cable length per tower design
    - Factory-made end treatment with connectors or customized hardwares
  - Small diameter and light weight
    - lighter burden to tower capacity
    - reduced wind loading
  - High signal transmission efficiency by fiber optic technology
    - low power loss

Why FTTA Solution?

Trends which drives transmission upgrade

Users

- Increased mobile users
- Wants faster reacts
- Versatile mobile devices

Bandwidth

- Huge data amounts files
- Higher quality demands
- Boomed clouding service

TALK

Ch@t ON Ch@tON

Carriers

- Shall satisfy customers' up-righted needs
- Need to find out new services for their revenue

WCDMA 3G → LTE 4G

Demand for high transmission capacity

to Carriers – need to expand their capability

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Why FTTA Solution?

Current status

Needs of Saving Money

- Reduce installation cost by reducing installation time
- Reduce maintenance cost
- Reduce additional equipment or system by using fiber optic solution

Current status

- High signal loss due to coax solution
- Dangerous crowded towers
  - by heavy and big structures and systems
- Too longer installation cost due to complex installation procedures

Why FTTA Solution?

Needs for FTTA solution

- **Find out cost effective installation method**
  - **let's install them as fast they can !**
  - **want store some parts for future expansion !**
- **Low maintaining cost**
  - **don't want to spend more money for one purpose !**
- **Little damage to tower**
  - **tower owners don't want their real estate to be damaged !**
- **High signal transmission capability (low loss)**
  - **copper or fiber solution ?**

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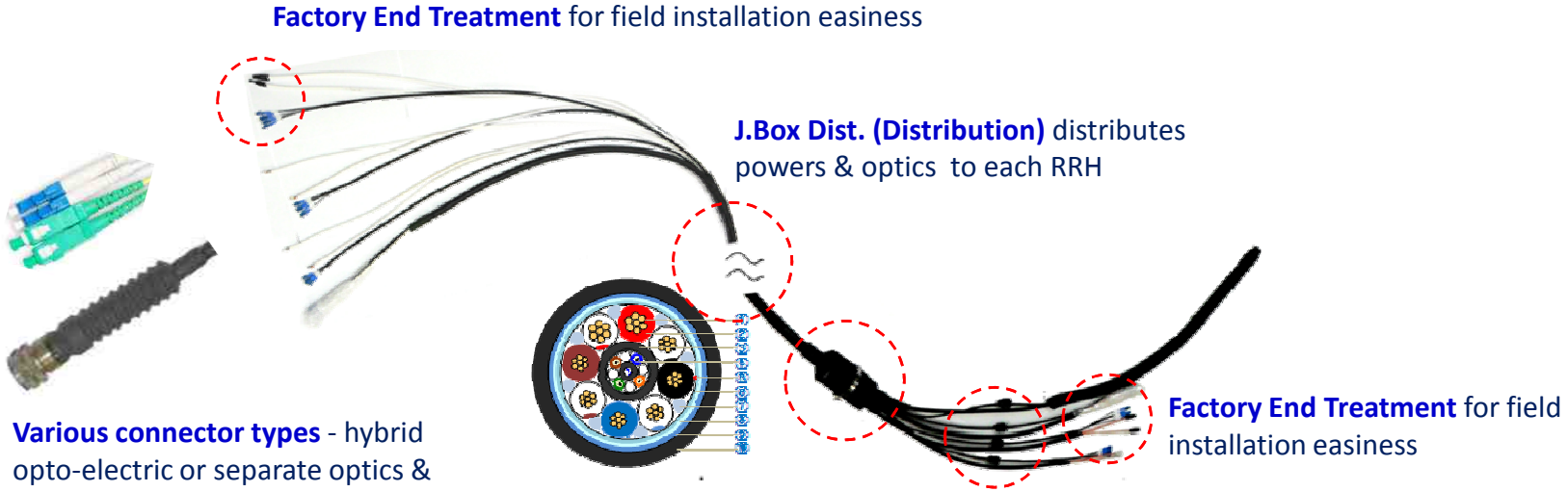
Samsung's FTTA Solution

End-To-End Construction

- **Samsung FTTA Solution: HFC (Hybrid Fanout Cable) with Combined Power & Optic Hybrid type**
- **Factory assembled End-to-End treatment with connectors**
- **J.Box distribution of powers and optics to each RRH Units**
- **UL listed for safety requirements (US Area)**



Samsung's FTTA Solution

Comparison to Conventional Tower solution

		Conventional	FTTA
Construction		3 individual powers with 3 individual signal media	combined powers and fiber optics in one cable
Material cost	Individual	Low	High
	Combined	High (3 cables)	Low (3 in 1)
Installation Time & Cost	Individual	Short / Low	Long / High
	Combined	Long (3 Cables) / High	Short (3 in 1) / Low
Performance		High signal loss (Coax) Heavy weight & large diameter	Low signal loss (optic) Light weight & small diameter
Maintenance cost	Individual	Low	Medium
	Combined	High	Low
Future upgrade		New installation	Save additional capacity in one cable

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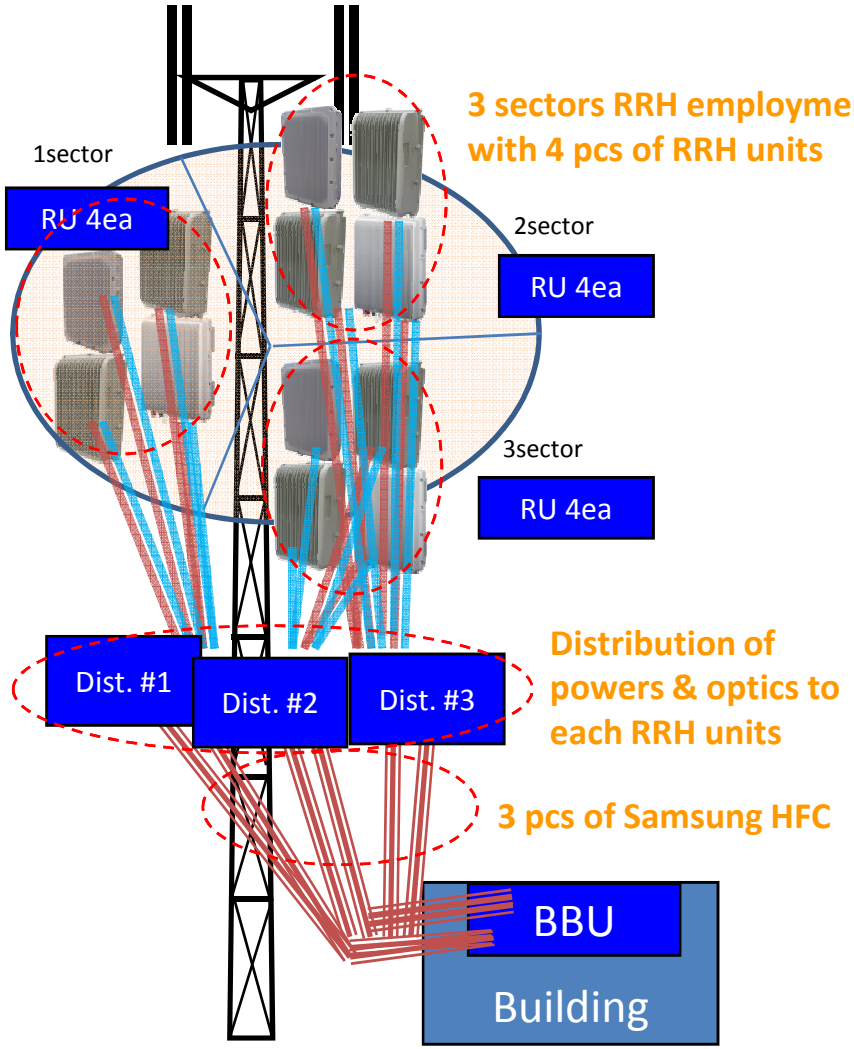
Samsung's FTTA Solution

Tower Application



Pros

- Low installation cost - fast installation
- Low maintenance cost – 2 in 1 cable
- Well cope with future expansion plan
- Pre-proven fiber solution with factory assembled connectors
- Less damage to tower and other structures

Cons

- High material cost – HFC
- Needs precise prediction of system length

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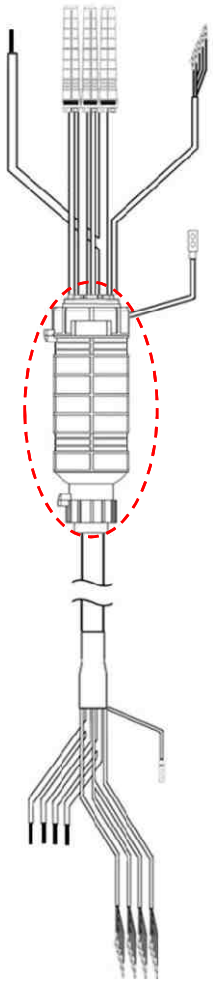
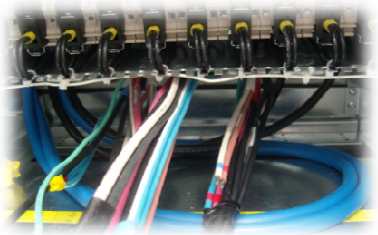
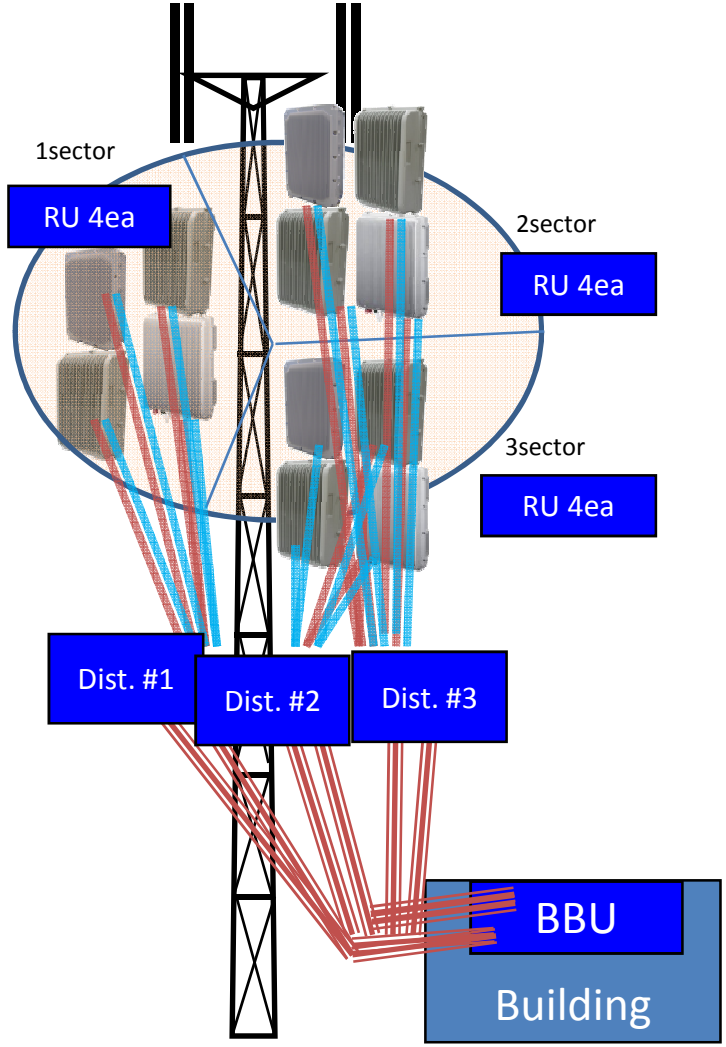
Samsung's FTTA Solution

Field Installation @ US





Plug-In type factory assembled end treatment @ BBU



Detail Specification & Safety Listings

Core Construction	Power	4 Pairs with Pure Copper	Customized design
	Optic	LWPF (G.652D) Loose Tube 20 fibers (5 fibers / tube) LC connectors	Customized design Fiber: Telcordia cerfied (DA-1875)
Material	Insulation	Core: XHHW or THHW Fanout: XHHW & THWN	UL44 & UL83 Listed
	Jacket	Flame Retardant PE	UL 1277 Listed (Tray Cable)
Electrical Data	Voltage Rating	600V	
	Temperature	-40°C ~ +80°C	
IP		IP-67	
Length		15m ~ 150m	Customized

- Above factors are customized design. In order to employ Samsung HFC to each FTTA conditions, other customizations are essentially required.

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Summary

- **By the results of increased demand for high bandwidth, 4G solution will be eventually required**
- **Carriers need to find out cost effective bandwidth expansion solutions for CAPEX/OPEX savings**
- **Seeking for high efficiency signal transmission methods**

- **Samsung FTTA solution meets the needs of Carriers who are seeking for low cost tower solutions !**