

GUIDELINE OF IN-BUILDING FIBRE CABLING FOR HIGH SPEED BROADBAND NETWORK

Committee Representation

- Communication and Multimedia Commission, Malaysia
- DiGi Telecommunications Sdn Bhd
- MAXIS Communication Sdn Bhd
- Measat Broadcast Network Systems Sdn Bhd
- U Mobile Sdn.Bhd.
- Telekom Malaysia Berhad
- Zettabits Technologies (M) Sdn Bhd

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1. Introduction

Objective

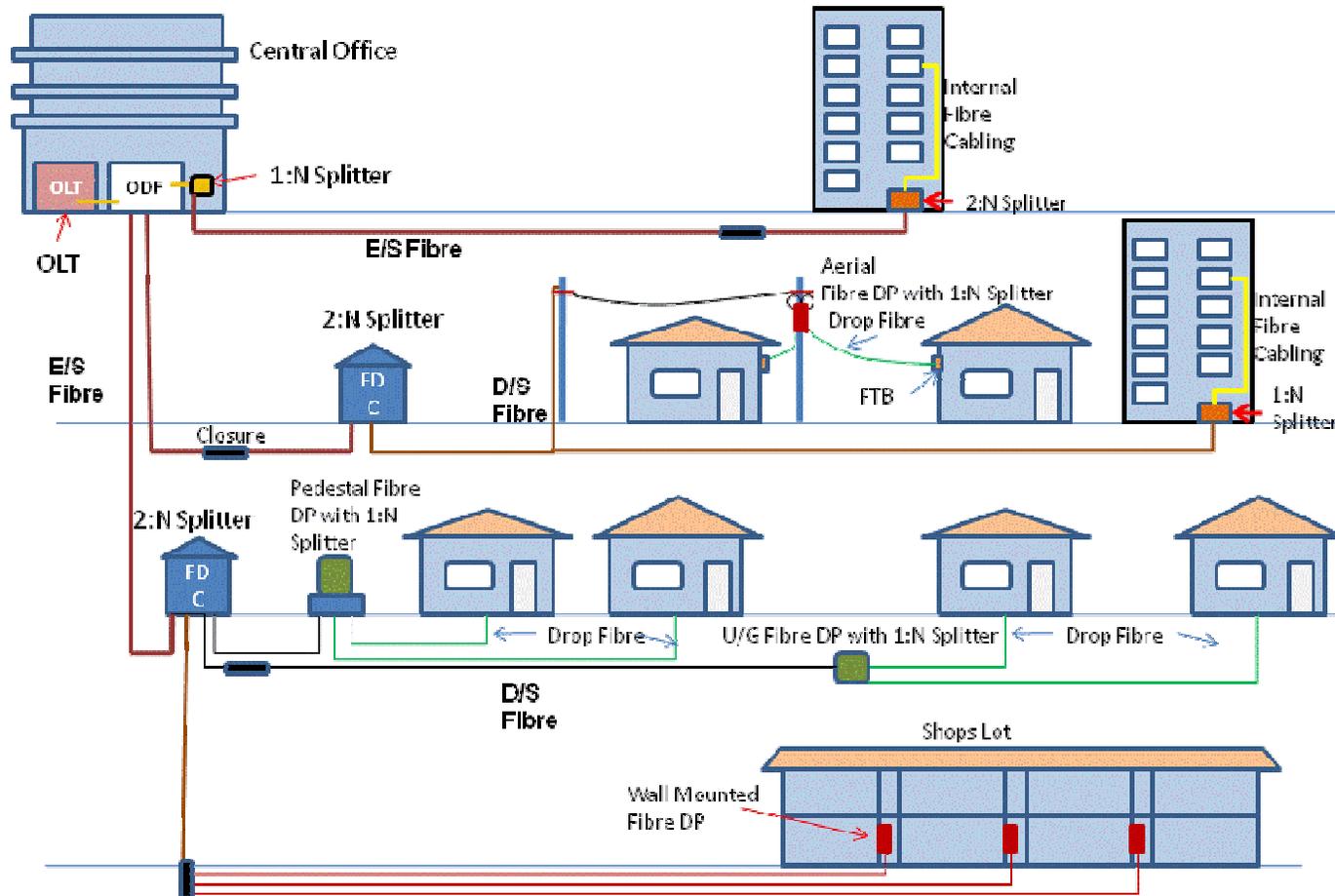
- outlines the *infrastructure requirements* to consulting engineers, Developers, owners and other responsible parties for the *provisions* to be made available in the buildings.
- provides the *minimum technical specifications* necessary for the in-building fibre cabling for high speed broadband distribution system to function as required in buildings.

Scope

- System infrastructure requirement in the buildings (condo/ apartment, low cost flats, single dwelling and office buildings).
- Minimum installation guidelines and standards.
- Minimum technical specifications.

2. Service Provider

- The entities that provide the fixed network services such as voice, broadband or high speed broadband. Generally, the high speed broadband is served via technology called the Fiber-To-The-Home, FTTH.
- FTTH Network



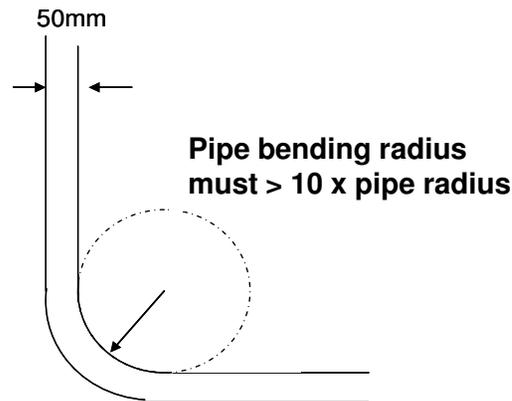
3. Building Type

Single Dwelling Unit (SDU)	Multi Dwelling Unit (MDU)
Condo / Apartment/Low Cost < 6 floors without Telecommunication Room	Condo / Apartment/Low Cost \geq 6 floors with Telecommunication Room
Bungalow	
Semi-Detached	
Terrace Single Storey	
Terrace Double Storey	
Office Building/Shop House < 6 floors without Telecommunication Room	Office Building/Shop House \geq 6 floors with Telecommunication Room
Industrial Lot	
Hotel	
Schools	
Hospital	
Club house	
Rumah kampung	

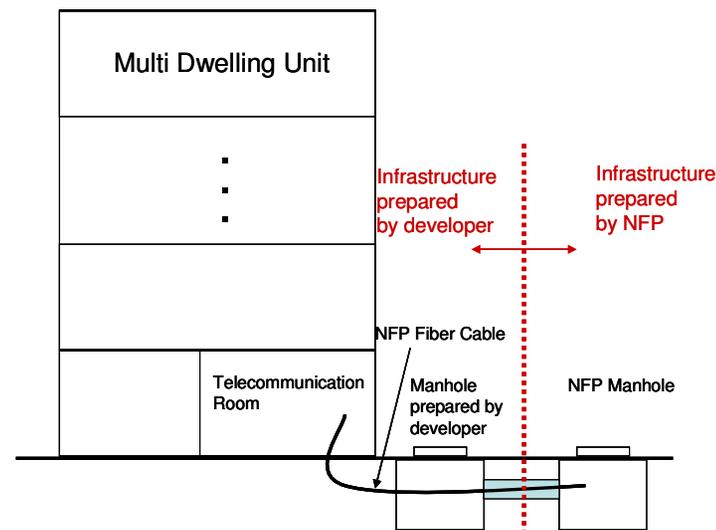
1. Single Dwelling Unit (SDU)
 - Terrace, Bungalow, Shop Lots.. etc
2. Multi Dwelling Unit (MDU)
 - premise with Telecommunication Room (TR) (or traditionally called SDF-Subscriber Distribution Frame room) located at the basement of the building.

4. External Building Requirement For The In-Building Fibre Cabling

- Infrastructure Demarcation -Private Property Line
 - MDU : Manhole connected to TR
 - SDU : Fence or boundary mark of the premise
- Manhole - road side outside the building/compound must be prepared by the Developer
- Underground (U/G) Duct

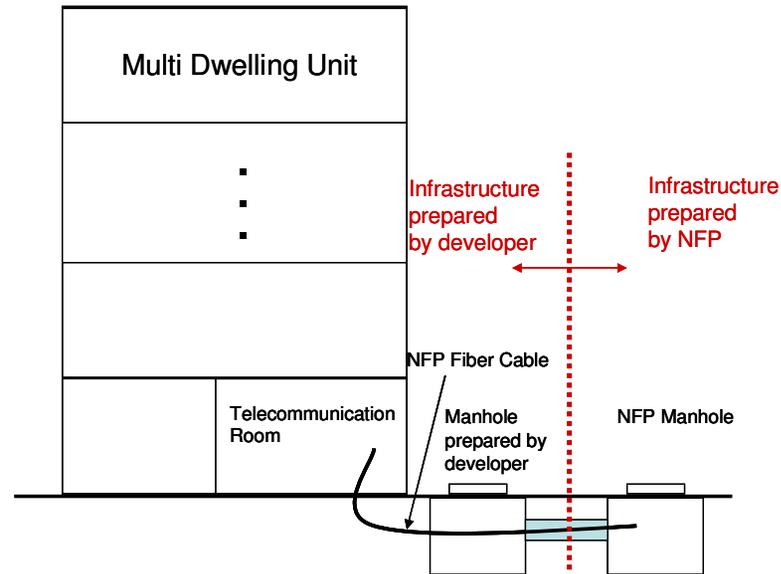


- Manhole and U/G Route Design for MDU

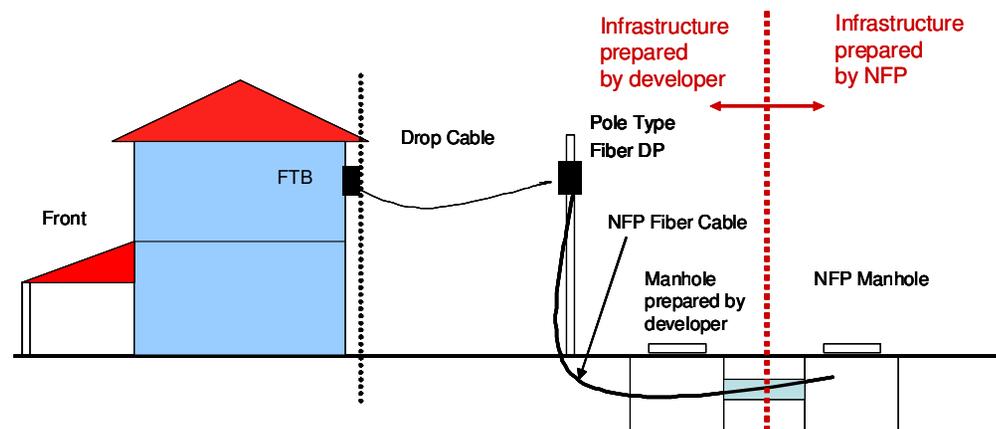


External Building Requirement For The In-Building Fibre Cabling

- Duct and Manhole Connection for MDU**

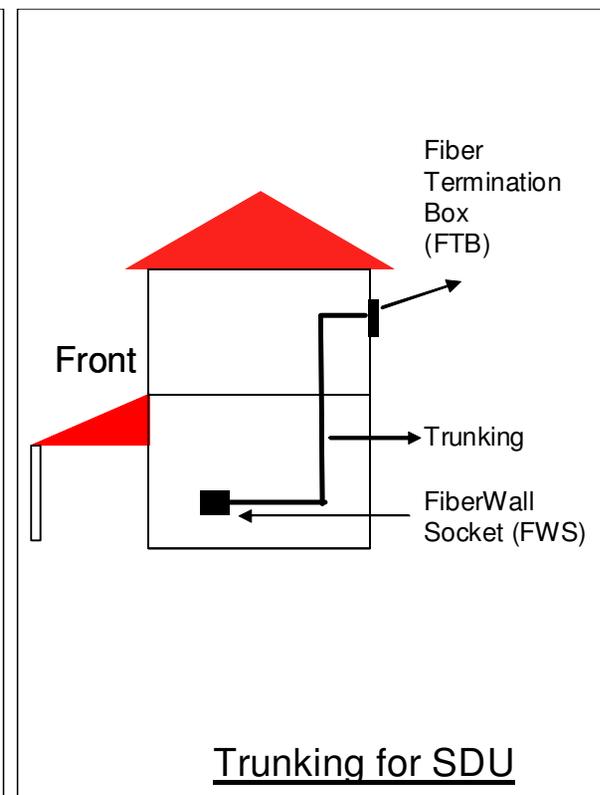
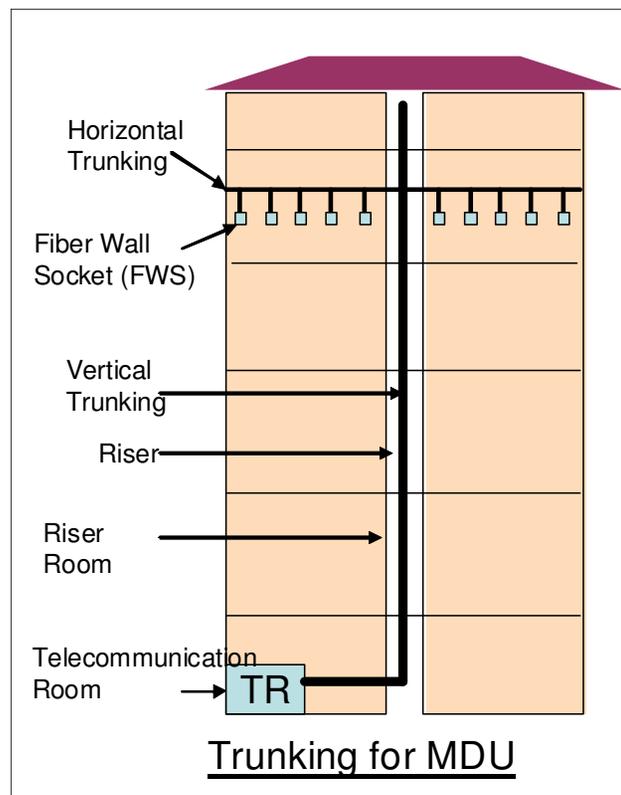


- Duct and Manhole Design for Pole Feeding Properties**



5. Internal Building Requirement For The In-Building Fibre Cabling

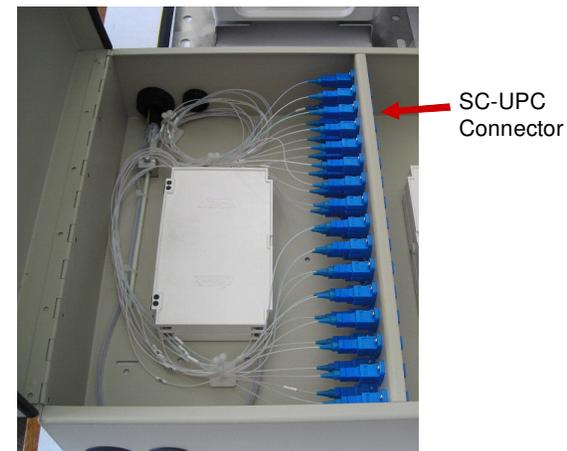
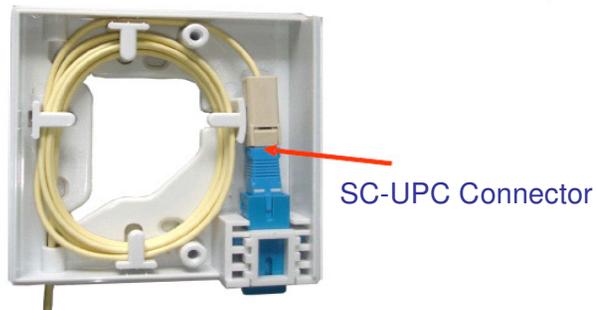
- Telecommunication Room Requirement
 - ❖ Same as in TSIR Part 1
- Riser & Trunking
 - ❖ Bending Radius < 10 X Trunking Radius



Internal Building Requirement For The In-Building Fibre Cabling

- Fibre Termination Box

- the connection point between the Network Facilities Provider's fibres and the in-building fibre cable

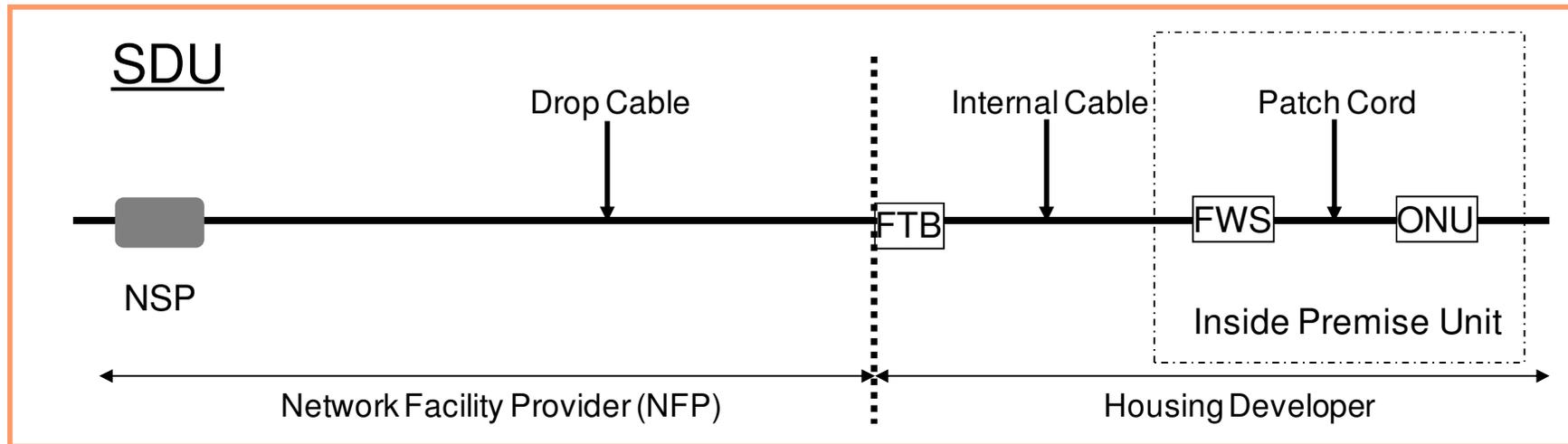


- Fibre Wall Socket

- termination point for the Internal Fibre cable and act as a connection point to the Customer Premise Equipment (CPE).

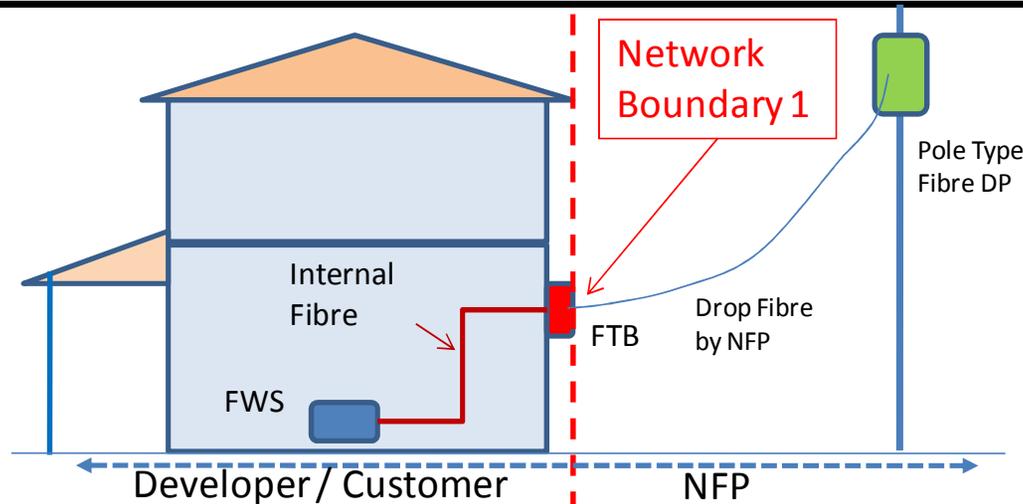


6. Cabling for Single Dwelling Unit (SDU)

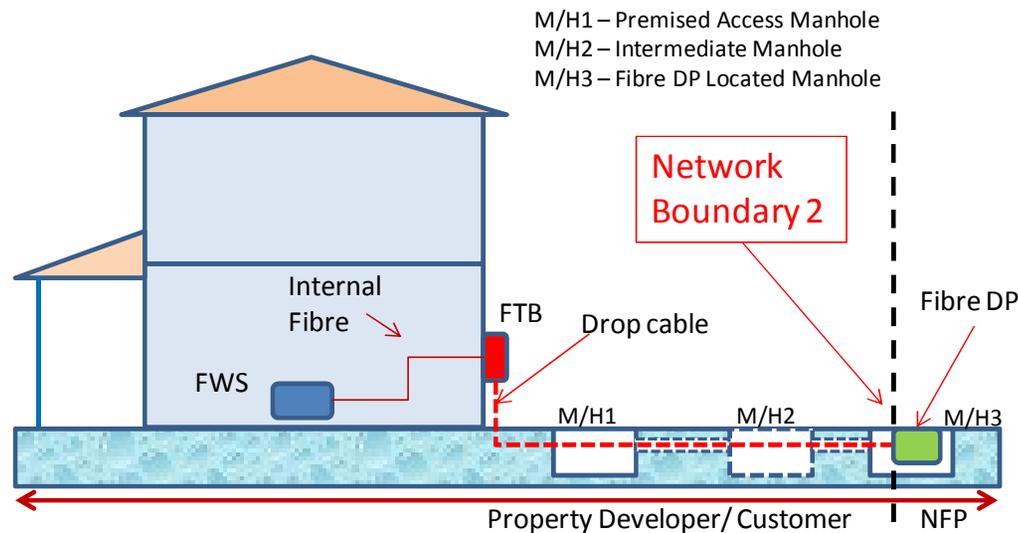


Schematic Diagram for SDU Cabling

Cabling and Demarcation

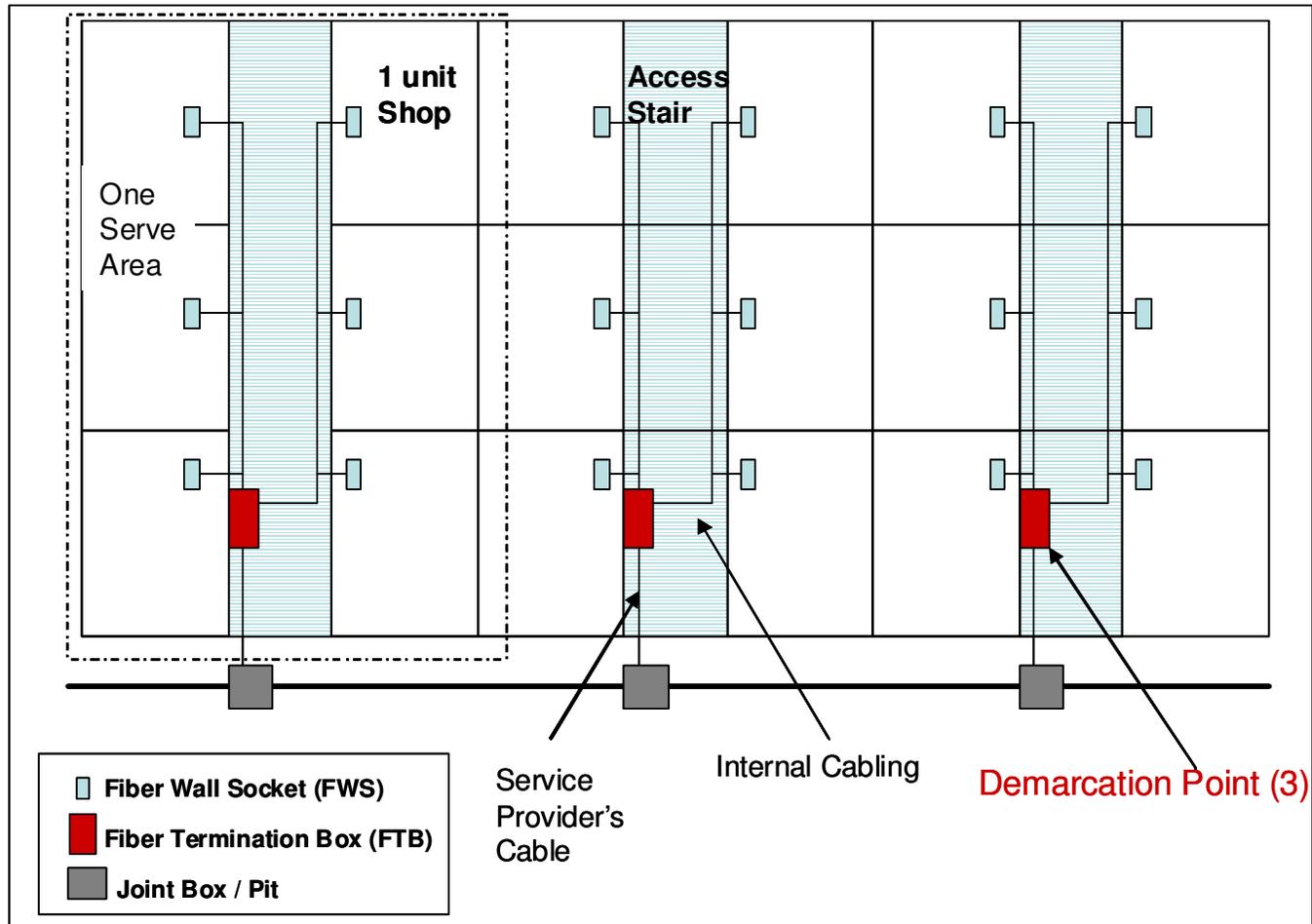


Cabling and demarcation point for SDU served by pole



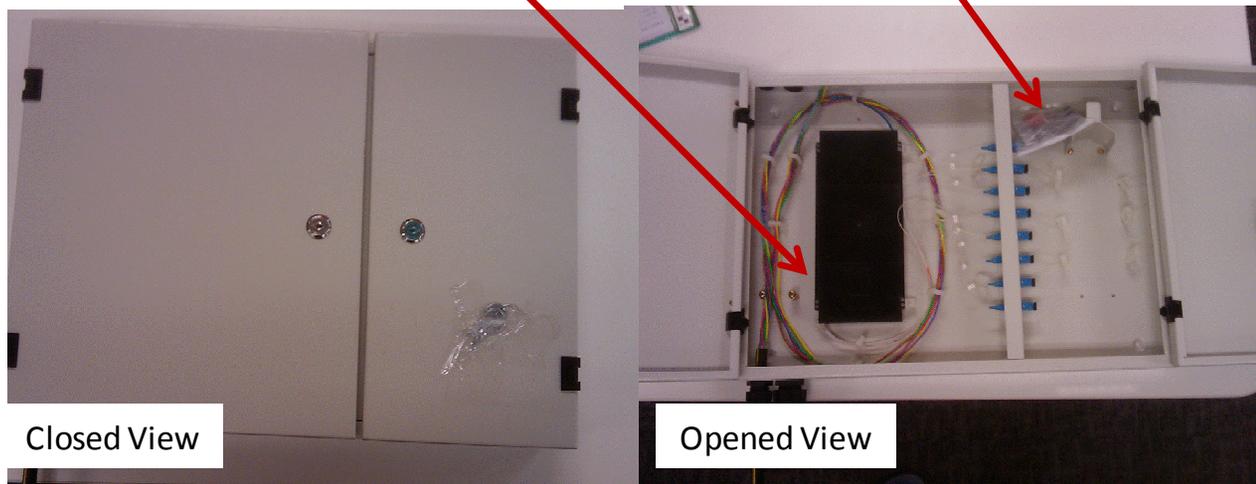
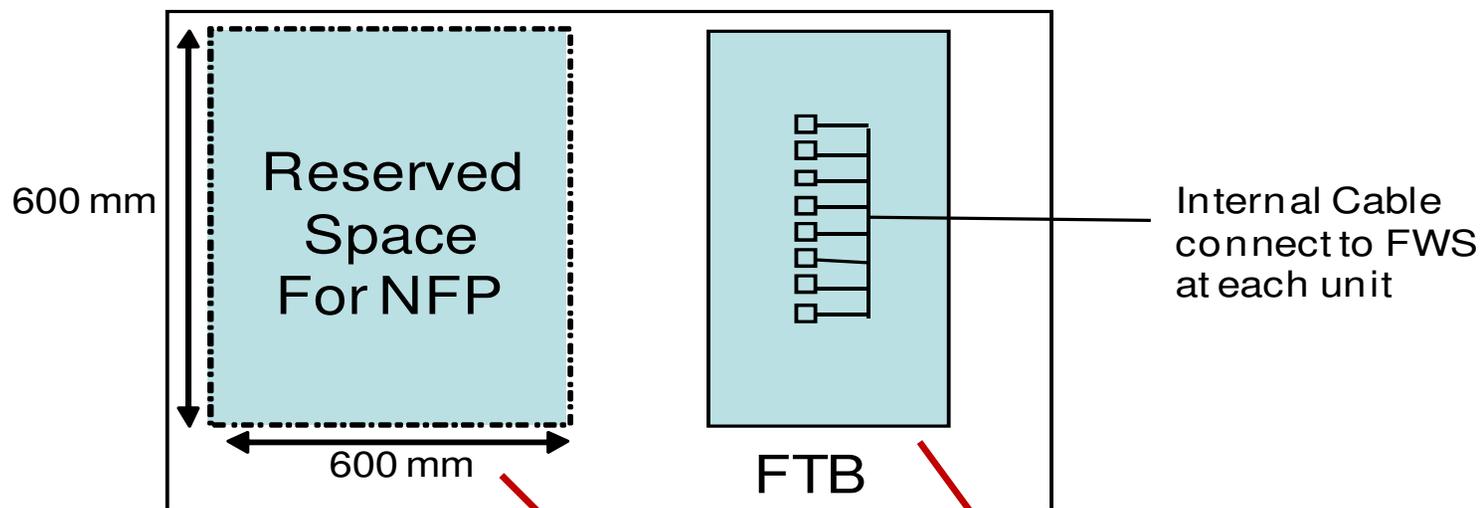
Cabling and demarcation point for SDU served by U/G

Cabling for Shop Lots



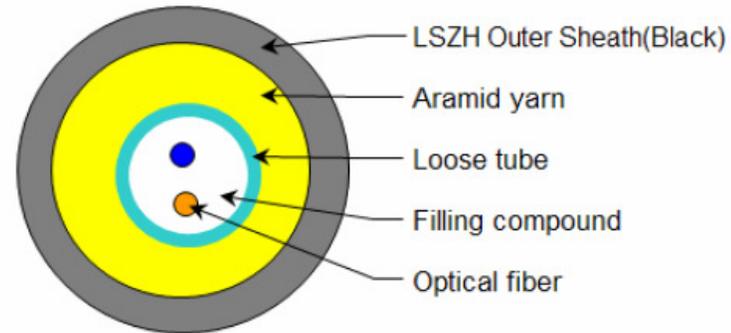
Cabling and demarcation point for SDU – Shop Lots

Location of DP and FTB for Shop Lots

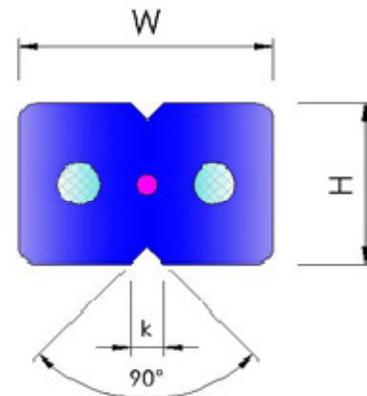
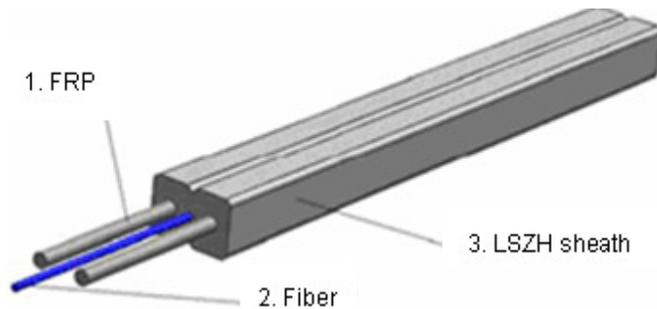


Specification of Internal Cable

Specification for U/G Drop Fibre – ITU-TG. 657 A



Specification for Internal Fibre - ITU-T G 657 A

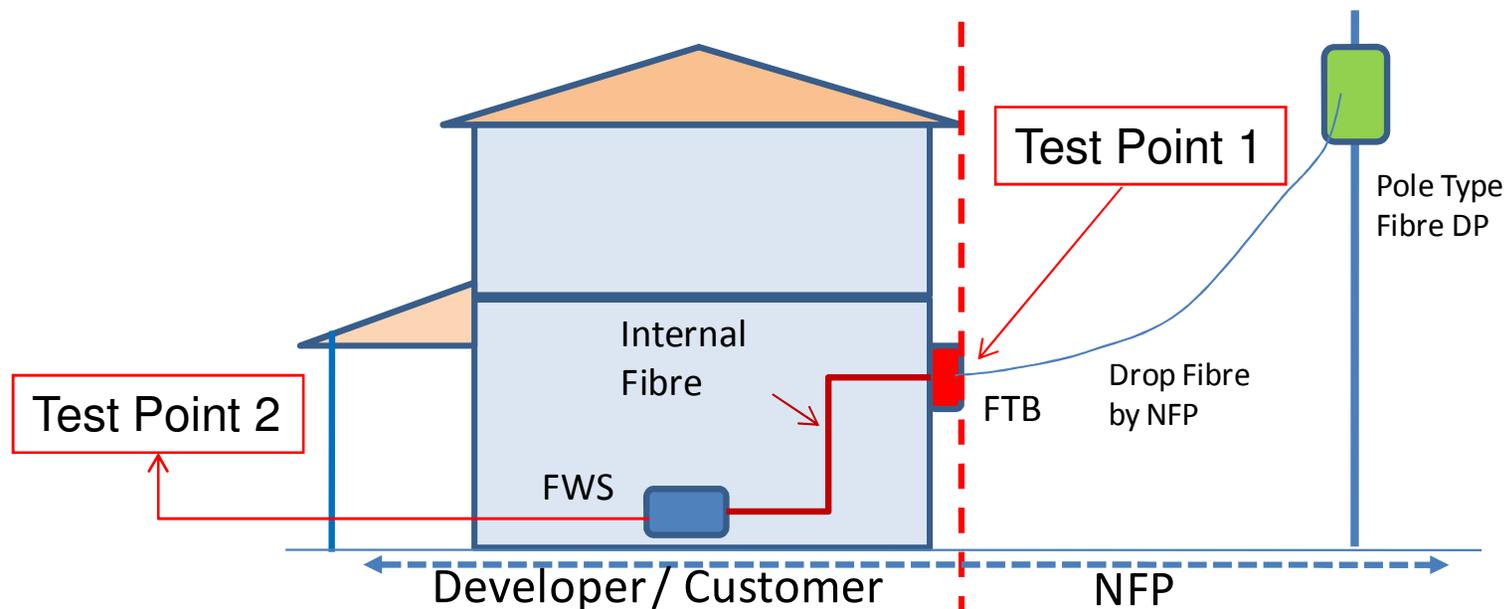


Minimum bending radius for G.657 A = 15mm and also called as “bend insensitive” cable

Attenuation Loss

Attenuation loss for SDU Cabling – Pole Type

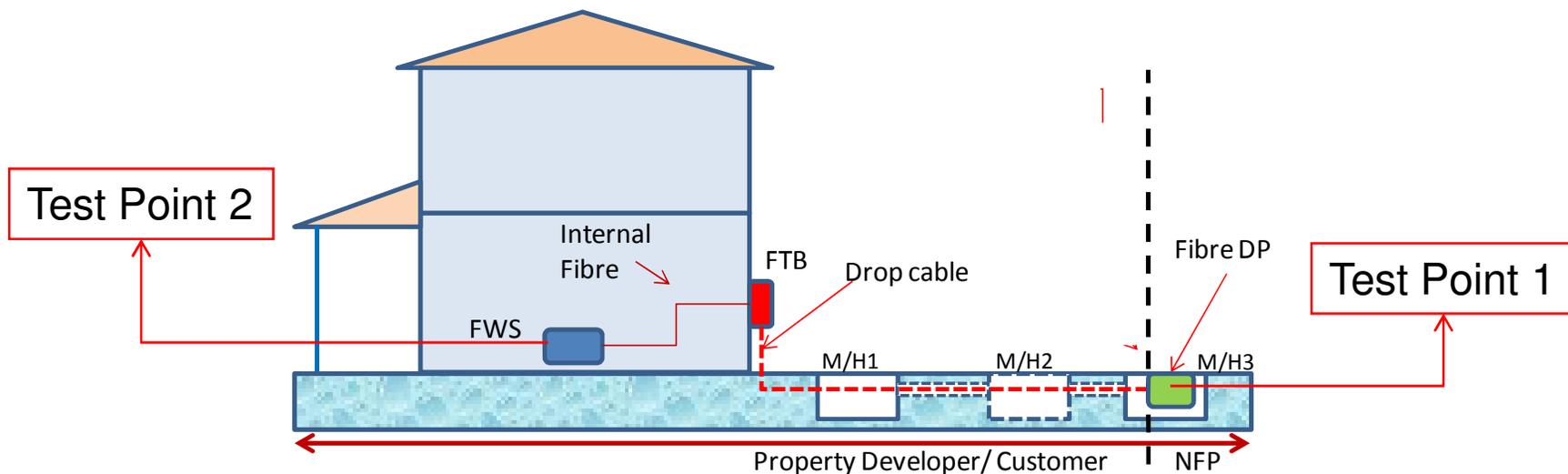
Location	Item	Unit Loss	Unit	Total Loss	Detail
FTB	FTB : FA-SC Connector	0.7	1	0.7	FA-SC connector = 0.7 dB
Internal Cable	Cable (1310 =0.4 db/KM) *	0.0004	50	0.02	Horizontal Cable (50m) = 0.02 dB
Inside Premise	FWS - FA-SC Connector	0.7	1	0.7	FA-SC Connector = 0.7 dB
Other	Other marginal Loss	0.1	1	0.1	Other = 0.1
Total				1.52	Total = 1.52 dB



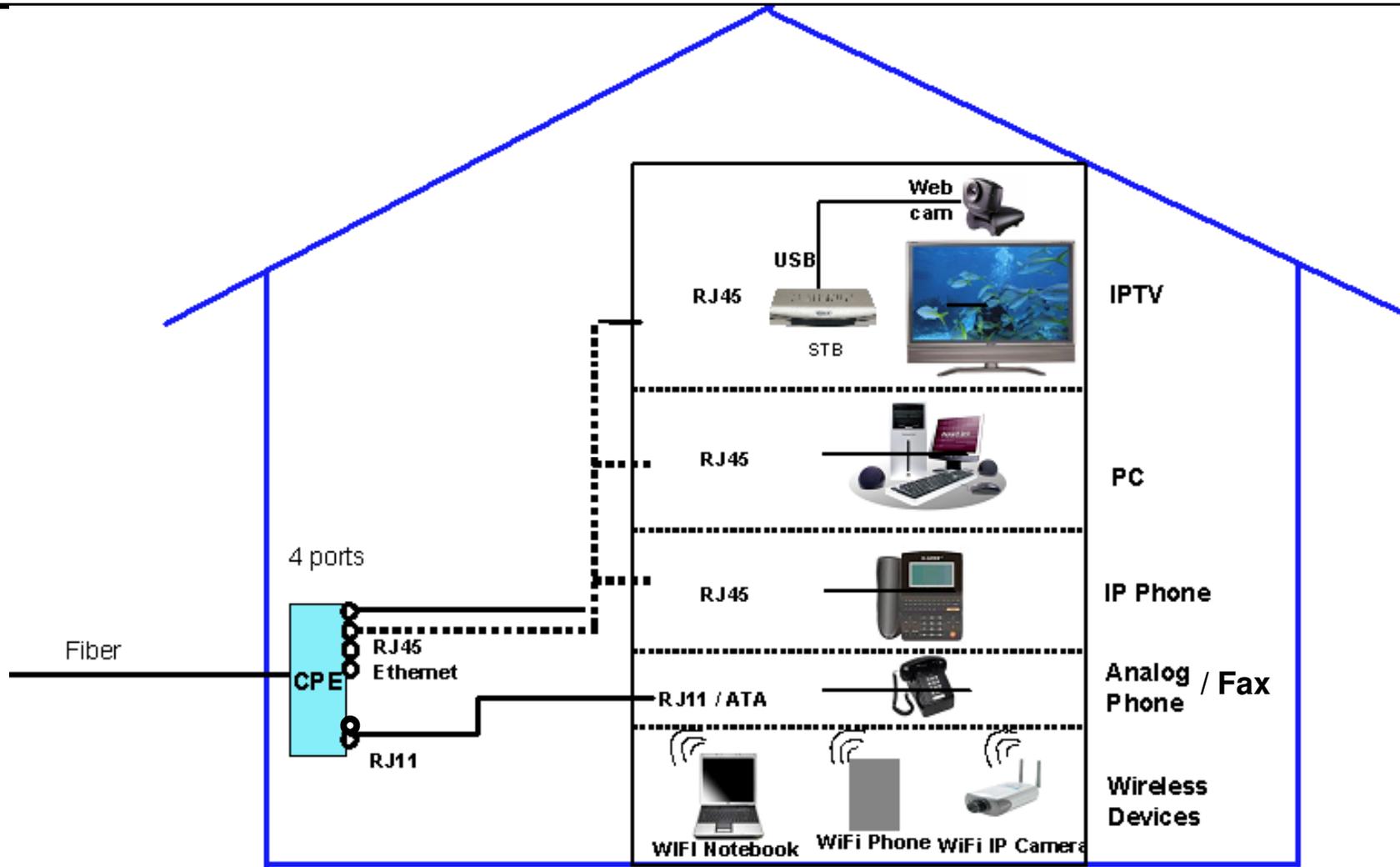
Attenuation Loss

Attenuation loss for SDU Cabling – Underground Type

*Location	Item	Unit Loss	Unit	Total	Detail
Drop Cable end (inside Manhole)	FA-SC Connector	0.7	1	0.7	FA-SC connector = 0.7 dB
Drop Cable	Cable (1310 =0.4 db/KM)*	0.0004	50	0.02	Drop Cable (50m) = 0.02 dB
FTB	FTB: FA-SC Connector	0.7	1	0.7	FA-SC connector = 0.7 dB
Internal Cable	Cable (1310 =0.4 db/KM)*	0.0004	50	0.02	Internal Cable (50m) = 0.02 dB
Inside Premise	FWS - FA-SC Connector	0.7	1	0.7	FA-SC Connector = 0.7 dB
Other	Other marginal Loss	0.16	1	0.16	Other = 2.3
Total				2.3	Total = 2.3 dB



Cabling Inside Premise Unit

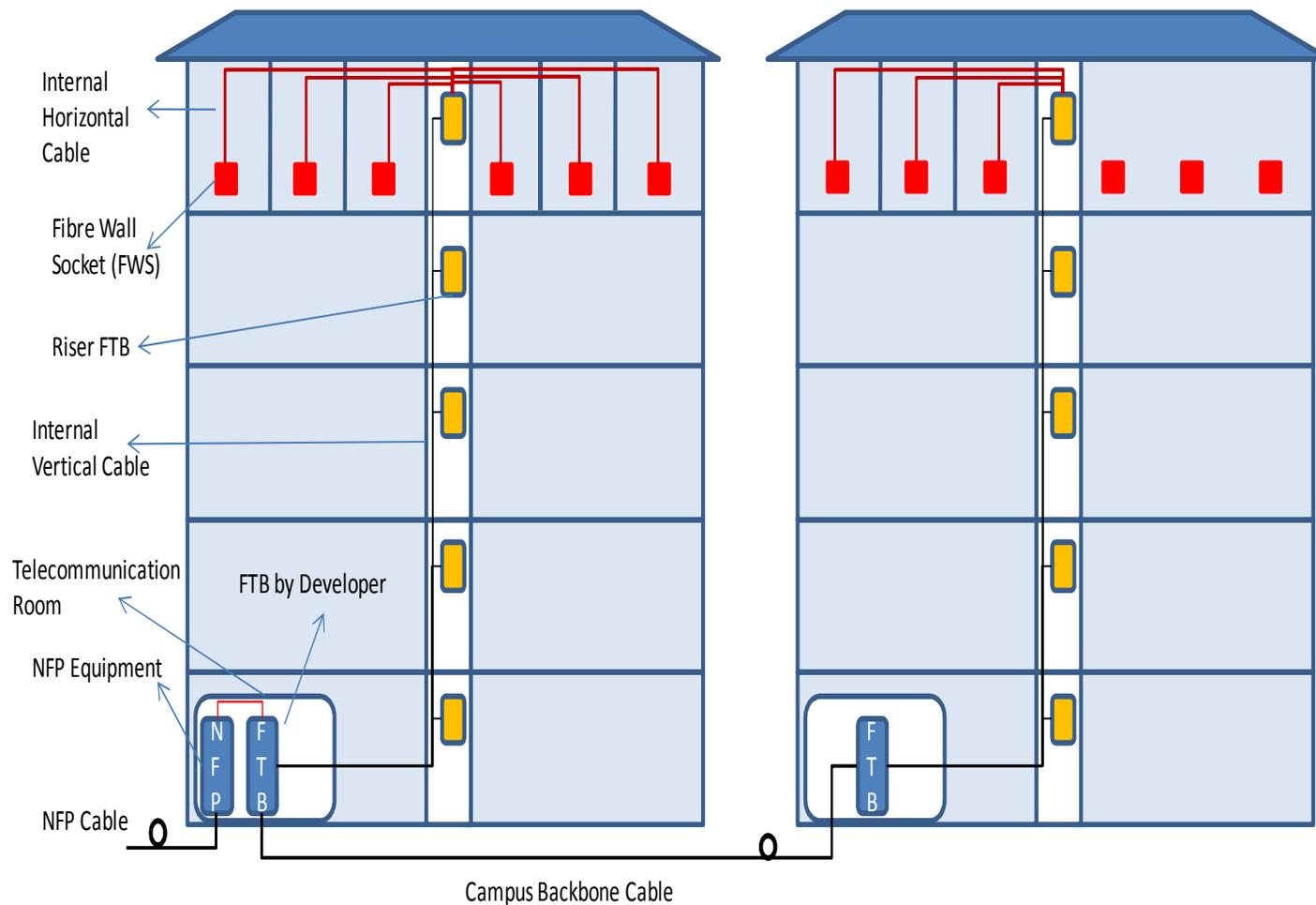


Customer Premise Equipment (CPE)

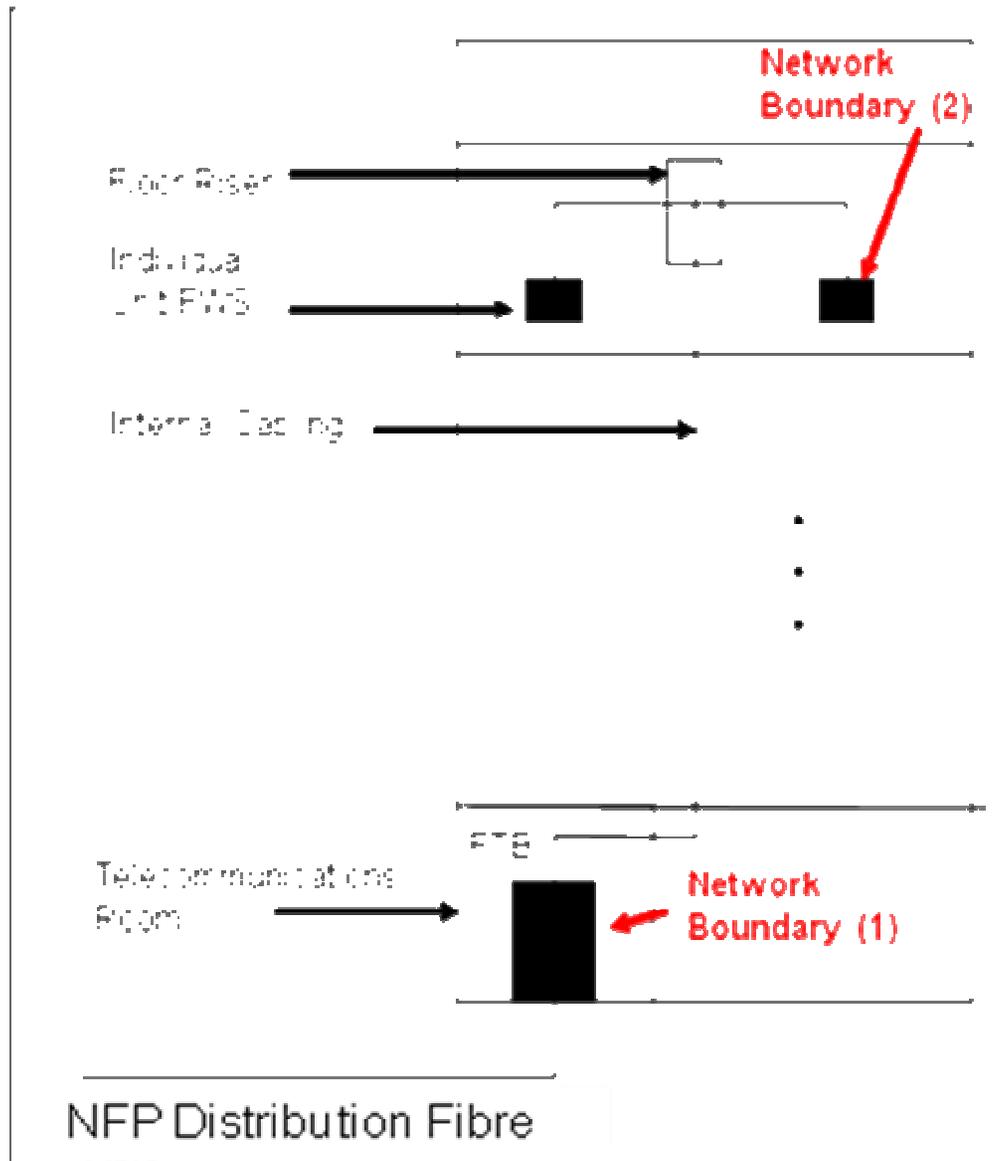
7. Cabling for Multi Dwelling Unit (MDU)

Cabling for MDU

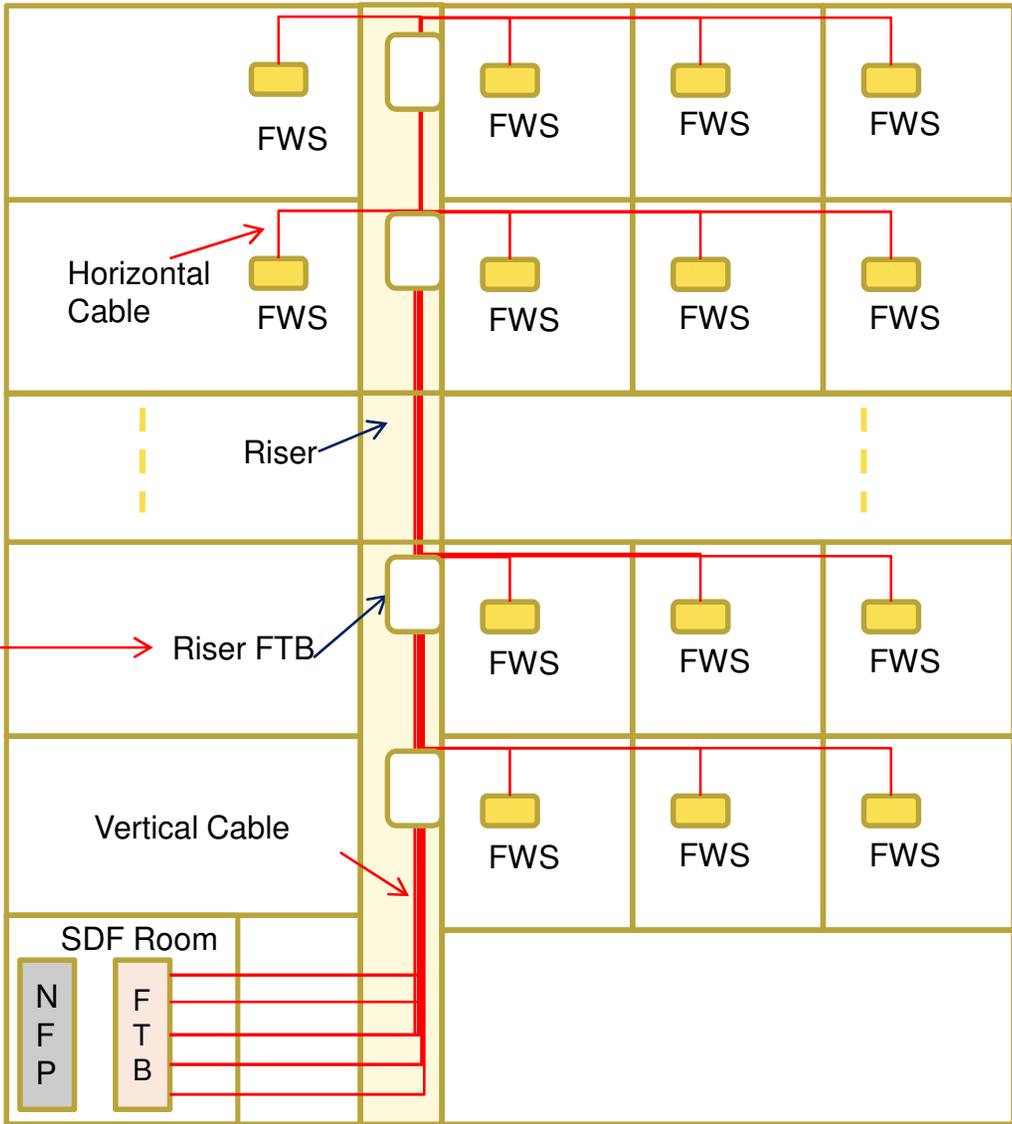
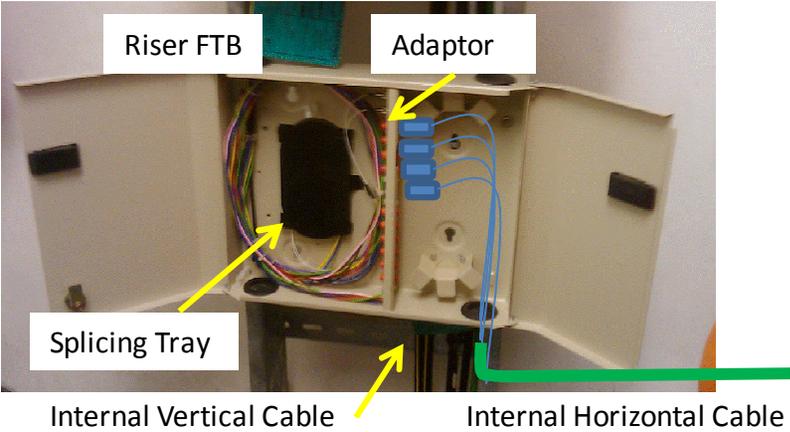
- Campus backbone cabling;
- Building backbone
- Vertical cable;
- Building horizontal cable; and
- Telecommunication outlet cabling.



MDU : Demarcation Point



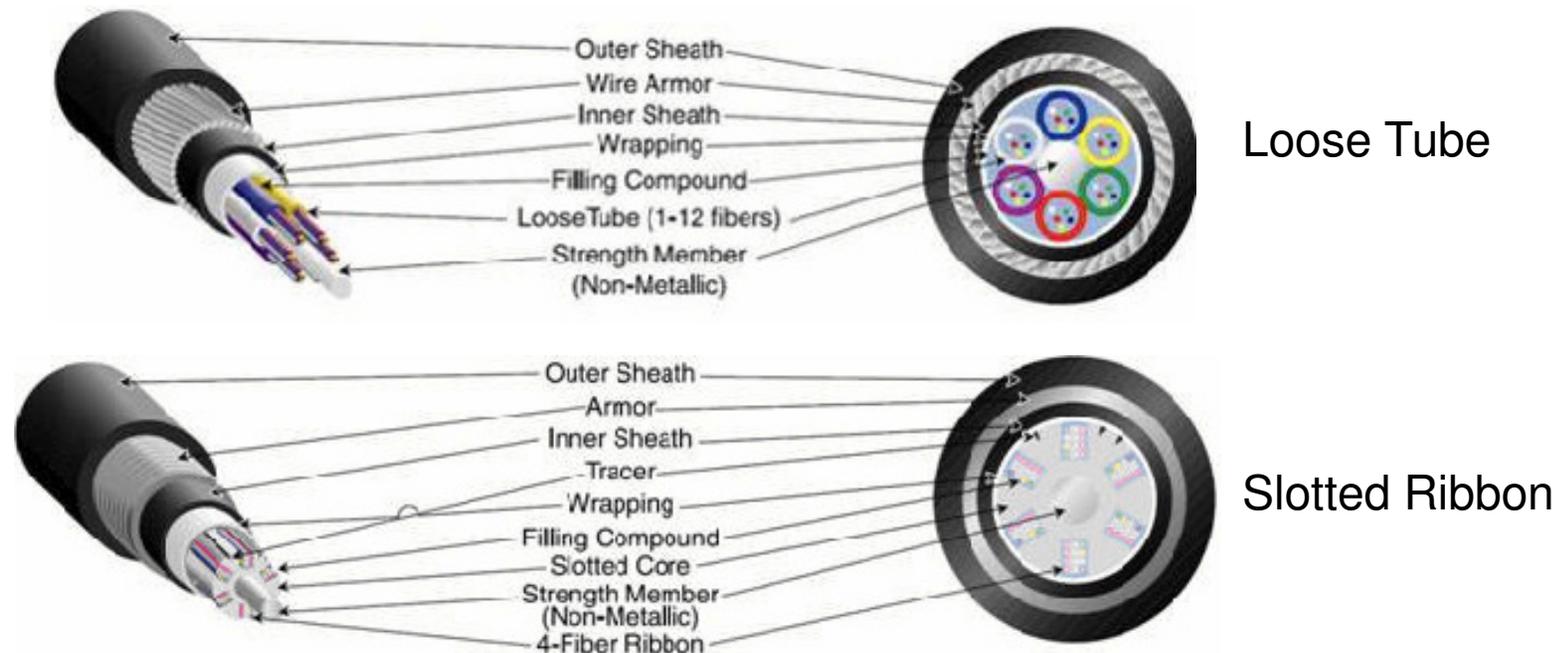
MDU: Vertical & Horizontal Cabling



MDU : Cable Specification

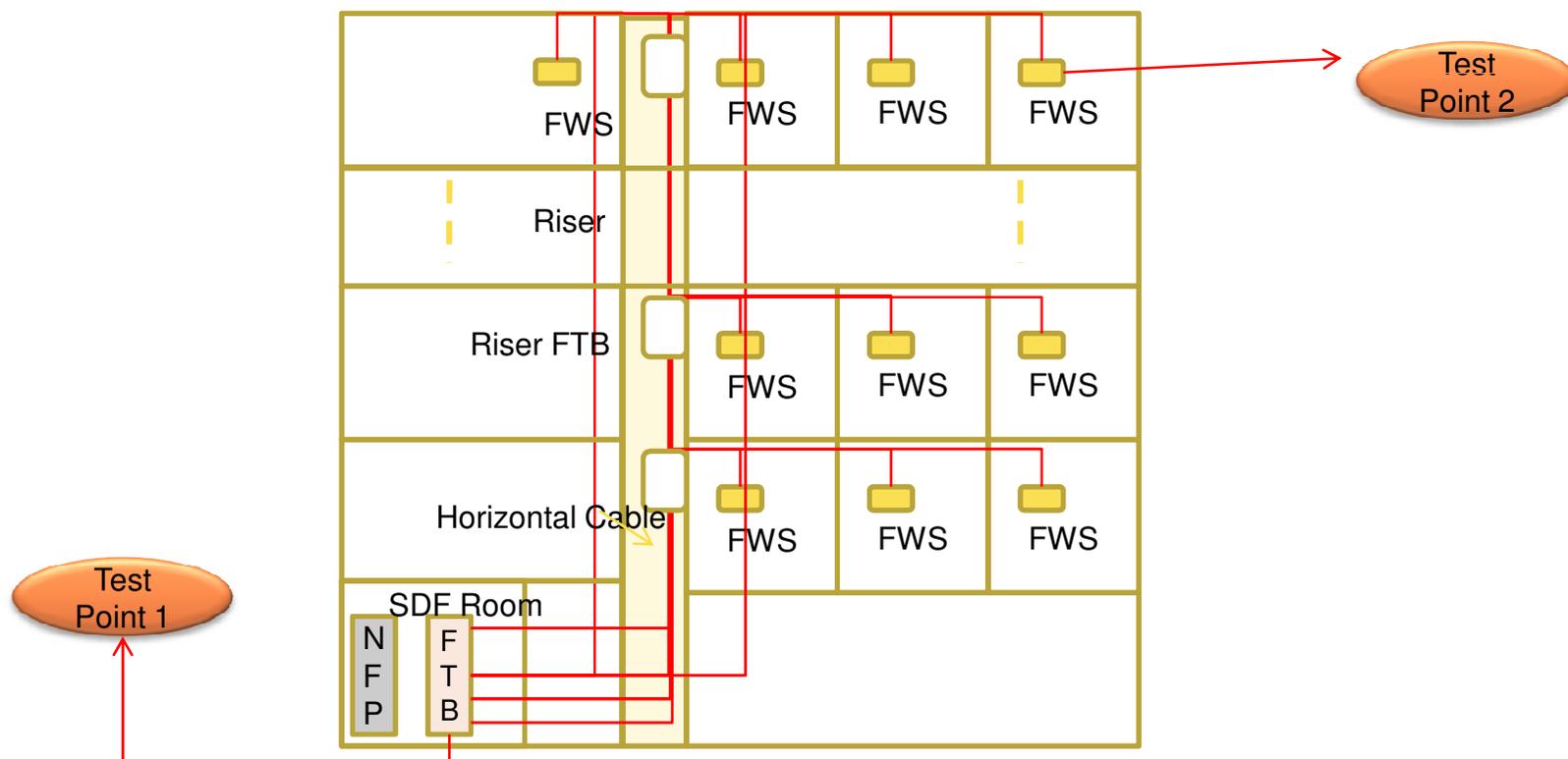
Specification for MDU Internal Fibre

Cable	Cabling Portion	Specification
Campus Backbone	Main TR to other building TR	Single Mode ITU-T G.652 D
Internal Vertical Cable	FTB at TR to each Floor Riser	Single Mode ITU-T G.652 D or ITU-T G.657 A
Internal Horizontal Cable	Floor Riser to Individual Unit Premise FWS	Single Mode ITU-T G.657 A
Telecommunication Outlet Cable	CPE to other Telecommunications Outlet	UTP Cable- Cat5, Cat5e or Cat6.



MDU : Attenuation Loss

Location	Item	Detail
Campus Backbone cable	Cable (1310 =0.4 db/KM)*	Campus Backbone Cable (200m) = 0.08 dB
Telecommunicatin Room	FTB	Connector Loss = 0.5 dB
Riser	Cable (1310 =0.4 db/KM)*	Vertical Cable (100m) = 0.04 dB
	FTB	Mechanical Splice + Adaptor = 0.7 dB
Horizontal Trunking	Cable (1310 =0.4 db/KM)*	Vertical Cable (50m) = 0.02 dB
Inside Premise	FWS	FA-SC Connector = 0.7 dB
Other Marginal Loss	Others	Other loss = 0.16
		Total = 2.2 dB



Coding and Tagging

Coding and Tagging for MDU's Internal Cable

Vertical Cable Naming Convention

Item	Vertical Cable		Riser Info	Horizontal Cable	
	Cable No.	Core No.	Floor	Cable No.	Core No.
Code	FVxxx	xxx	FLxxx	FHxxx	xxx
Example	FV001-FV999	000-999	FL020	FH001-FH999	000-999

Horizontal Cable Naming Convention

Item	Horizontal Cable		Vertical Cable		Premise
	Cable No.	Core No.	Cable No.	Core No.	Premise Unit No.
Code	FHxxx	xxx	FVxxx	xxx	xxx
Example	FH001-FH999	000-999	FV001-FV999	000-999	005

THANK
YOU