

Pocket Diary FTTx Execution

Pocket Diary

FTTx Execution

R4G-71-FBC-GEN-PR-004

00	20-Jan-17	Reason For Issue			
			Sunil Kumar	Pritesh Samdani	Gurmeet Singh Sandhu
Rev No	Date	Issued For Use	Prepared by	Reviewed by	Approved by

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Amendment Record / Control Sheet (ACS)

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00	20-Jan-17	Issued For Use	Sunil Kumar	Pritesh Samdani	Gurmeet Singh Sandhu	Change in Document number and overall content updated , Old Pocket # R4G-71-FTX-GEN-PR-004

Message from President

I am pleased to welcome you to FTTx execution team of Reliance Jio Infocomm Limited (RJIL) Family.

RJIL is known for its best construction practices across industry. To ensure high quality execution, it is essential to make construction team aware of Company's quality policy, standards and execution approach. This **Pocket Diary** has been created by NHQ to help you to get acquainted with applicable Specifications, Guidelines, Procedures, Drawings and other documents developed for smooth FTTx execution in field.

I strongly recommend you to study this diary carefully, understand its contents and effectively utilize it in your respective work area. This will certainly go a long way in building best quality FTTx network across the country.

With this, I believe, each one of us discharging our individual responsibilities while working together as team, shall considerably contribute towards achieving our Organization's Vision.

Wish you all the very best.....

Declaration

I hereby declare that I have read and understood the content and intent of this Diary and Company's Quality Policy and shall be committed to adopt and drive the implementation of mentioned practices in field.

I would also maintain confidentiality of this document and shall use it for internal purpose only.

Sign this copy of the Diary (only after having read and understood the contents) to personalize.

Signature

Name :

Employee Code :

Date :

Quality Policy

RJIL – FTTx Organization Quality Policy & Objectives


Quality Policy

FTTx deployment organization is committed to rollout seam less, error free Fiber – To-The-Home network.it encompasses laying of optical fiber from Optical Line Terminal (OLT) to a prospective Multi Dwelling Unit (MDU) / Single Dwelling Unit (SDU) / Commercial Access along with installation of ODN element and inter-alia, consistently strive to meet internal customer requirement through technological innovation and continual process and system improvement

Quality Objectives

FTTx Deployment organization has set the following quality objectives:

1. Ensure Fibre-To-The-Home Network connectivity as per established project SLA's/Time lines
2. Ensure timely Handover of the network to O&M as per agreed process
3. Ensure consistency and compliance to laid down procedures and specifications for installation & testing of optical fiber cables and other ODN elements
4. Ensure “ First Time Right” workmanship



Signature:

Date: 09-Oct-2014

Name: Sh. Dhruv K Tayal

Designation: Head, FTTX organization

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Disclaimer- 'This document is a ready reckoner only and in the event of any factual conflict, the project specifications & engineering documents shall prevail'

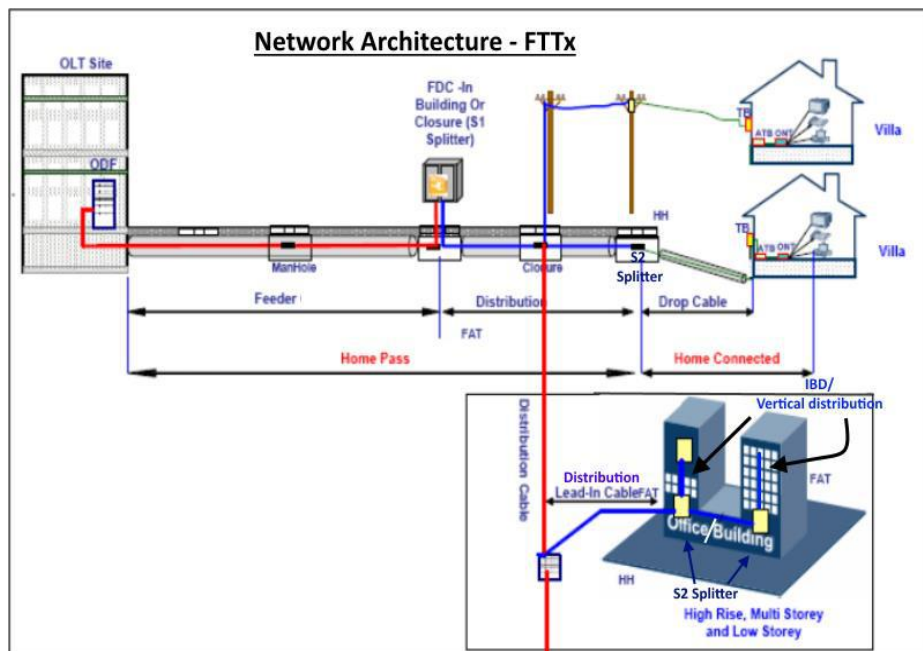
1 Abbreviation

ABD	– As Built Drawing
AOI	– Area of Interest
AT	– Acceptance Testing
ATP	– Acceptance Test Plan
BOI	– Building of Interest
BOM	– Bill of Material
BOQ	– Bill of Quantities
CMM	– City Maintenance Manager
FAT	– Fibre Access Terminal
FC&A	– Finance, Compliance & Accounting
FDC	– Fibre Distribution Cabinet
FDP	– Fibre Distribution Panel
FIM	– Free Issue Material
FSA	– Fibre Serving Area
GIS	– Geographical Information System
GPR	– Ground Penetrating Radar
HDD	– Horizontal Directional Drilling
HH	– Hand Hole
HOTO	– Handing Over / Taking Over
HSE	– Health, Safety & Environment
IB	– Inside Building
IBD	– In-Building Distribution
JC	– Joint closure
MB	– Measurement Book
MDU	– Multi Dwelling Units
MH	– Manhole
NHQ	– National Headquarters of Reliance Jio

NPE	– Network Planning & Engineering
ODC	– Out Door Cabinet
OLT	– Optical Line Terminal
OTDR	– Optical Time Domain Reflectometer
OTB	– Optical Terminal Box
REIMS	– Reliance Enterprise Information Management System
RFS	– Ready for Service
ROW	– Right Of Way
RWA	– Residents Welfare Association
S1	– Level 1 Optical Splitter
S2	– Level 2 Optical Splitter
SDU	– Single Dwelling Units
SUE	– Sub-Surface Utility Engineering
UB	– UP TO Building

2 FTTx- Network Architecture

Following Figure shows typical FTTx Network architecture. Network consists of following main elements:



2.1 Feeder Routes

Feeder route is the section between OLT to first level splitter S1. Feeder route can be part of existing intra-city route / new feeder route which can pass through either main road or societies

2.2 Distribution Routes

Distribution Route is the section between first level splitter (S1) to Second level splitter (S2).

2.3 Passive Network Elements

Terminal facilities include ODCs, JC, FDC, FAT, OTB, Optical Splitters, FDPs etc. required for fiber termination.

3 Objectives and Targets

Sl. No	Objective	UOM	Target Benchmark	Remarks
1	Delivery			
1.1	Execution Ensure FTTx Network Rollout is completed as per established project schedule.	%age	90% building* (IBD work) to be completed within 3 days. 90% FSA deployment to be completed up to building within 26/33** days	The work shall be considered complete only when it's as-built data is uploaded /updated in GIS/NE.

Sl. No	Objective	UOM	Target Benchmark	Remarks
1.2	<p>Handing-Over/Taking-Over (HOTO)</p> <p>Ensure Timely handing over of completed network to O&M as per HOTO process</p>	%age	95% of offered buildings/spans completely handed over to O&M within 7 days from start of HOTO survey.	Complete Handover shall include liquidation of minor/major punch points, if any, and handing over as-built documentation (hard copy as well as soft data (in NE/GIS).
1.3	<p>Workmanship</p> <p>First Time Right</p>	%age	90% buildings/spans offered for HOTO shall not have more than 5 numbers of minor punch points and/or 2 numbers of major punch points each for IB and UB works.	
2	<p>Inspection and Quality Assurance</p>	As per Sampling plan	Buildings/spans to be visited for Quality checks with documentary evidence as per sampling plan	Documentary evidence for such sites can be such as Quality Observation result, ITP's, HSE reports, etc.

Sl. No	Objective	UOM	Target Benchmark	Remarks
Notes:				
<ul style="list-style-type: none"> a. * - Building with size \leq 'G+4' are not to be considered for IBD work. b. For In building work SLA would be considered as 3 days from start of execution. c. ** - Fiber serving area to be executed, 26 days for MDU & 33 days for SDU scenario (SDU cluster will have additional scope of OTB connectivity) d. Major Punch Points – Service affecting punch points. e. Minor Punch Points – All punch point that do not affect services. f. For objective tracking only completed connectivity shall be considered. 				

4 FTTx Execution Scope

FTTx Execution team's scope covers deployment of passive optical network including:

- Feeder Network - from OLT (Optical Line Terminal) to S1 (Stage 1) optical splitter
- Distribution Network - from S1 splitter to S2 (Stage 2) optical splitter
- In-Building (IBD) Horizontal and Vertical distribution

5 Responsibility Matrix (Plan to Build)

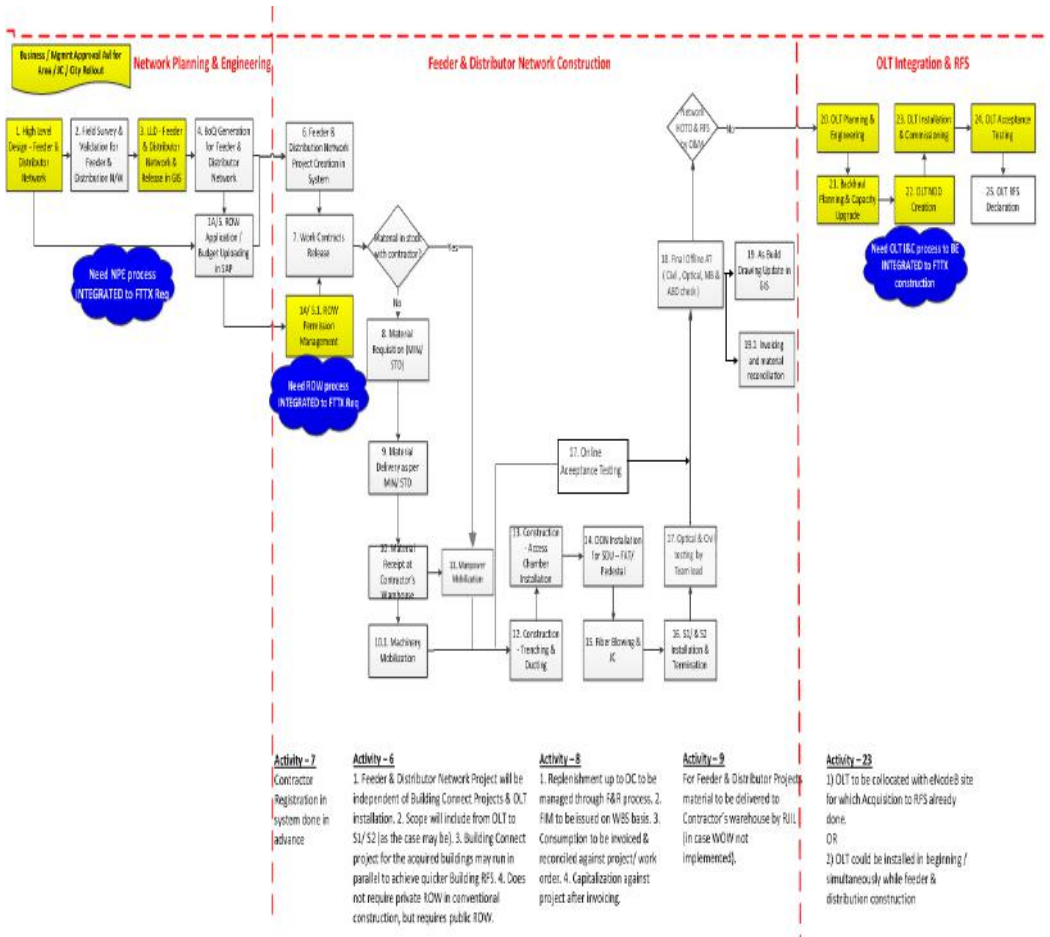
Sr. No	Activity	Responsibility
1	AOI/Building Identification	Business Acquisition Team
2	Assign WBS for the FSA	F C & A Team

Sr. No	Activity	Responsibility
	Joint Survey	Jio Centre FTTx Planning lead , FTTx Jio Centre Lead & Business team
4	ROW/RWA permissions (through IIMS Portal)	ROW Executive (SCO Team) <i>Public ROW (for aerial Pole to pole Feeder/Distribution Network)</i> Building Acquisition executive <i>Private ROW (for feeder/ distribution Network or aerial building to building including IBD network)</i>
5	Vendor Selection and Finalization	P & C
6	Design Drawings and BOM	Jio Centre FTTx Planning lead
7	Work Execution (UB/IB)	FTTx Jio Centre Lead
7.1	Define Work Scope	FTTx Jio Centre Lead
7.2	Resource Identification and mobilization	FTTx Jio Centre Lead
7.3	Material Requisition	FTTx Jio Centre Lead
7.4	Work Assignment	FTTx Jio Centre Lead/ Fiber Engineer

Sr. No	Activity	Responsibility
7.5	Material Dispatch	SCM, Warehouse, State Material Coordinator
7.6	Quality and HSE	Fiber Engineer & QA Engineer
7.7	ITP, Testing and ABD	Fiber Engineer
7.8	GIS/NE ABD update	Fiber Engineer with support of GIS executive
7.9	MB fill-up and to offer for validation	Contractor Supervisor
7.10	MB Validation and Processing	Fiber Engineer, State material coordinator & QSD, Jio Centre Lead, SCM and Ware house
7.11	Material Reconciliation	SCM-Warehouse, State Material Lead
7.12	Change Management	Jio Centre FTTx planning lead & FTTx Jio Centre Lead
8	Invoicing & Pay outs	P&C and FC&A Team
9	Contract Closing	FTTx Jio Centre Lead and P&C Team
10	HOTO	FTTx Jio Centre Lead and CMM
11	Data upload responsibility into REIMS	Fiber Engineer – <i>Construction records including ITPs, measurement books, Audit closure reports, Punch Point List,</i>

Sr. No	Activity	Responsibility
		<i>ROW/RWA permissions, HOTO Documents</i> QA Engineer – Audit observation report

6 Work Flow (Plan to Build)



7 Installation Specification and Guideline

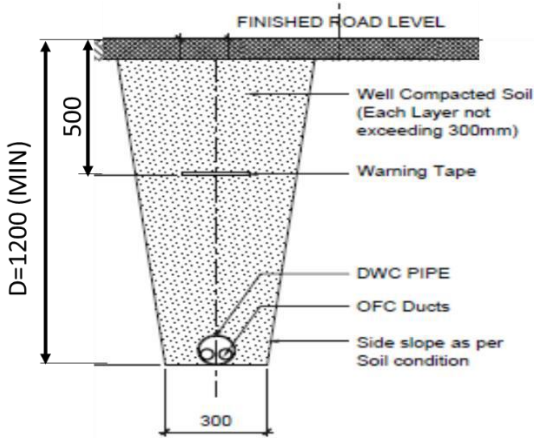
7.1 General

- Always wear recommended personal safety gear
- Keep first aid handy at all times
- Barricade the area where work will be carried out
- Put-up warning signs/tape around dug-up areas
- Dispose-off waste material at designated areas and clear work site after completion of installation
- Install 750(L) x 400(W) x 500(D) Manholes (MH) as per plan
- Install 400(L) x 400(W) x 500(D) Handholds (HH) as per plan
- While storing in loops, cable loop diameter should always be greater than 20 times of the diameter of the cable
- Provide 15m, 10m and 5m cable loop inside MH/HH for feeder, distribution and Access cables respectively

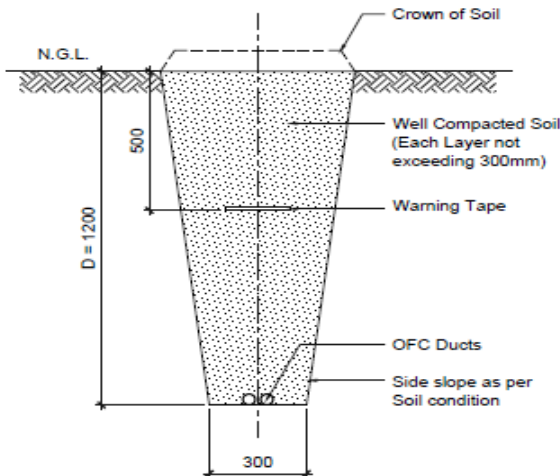
7.2 Open Trenching

- Ducts shall be installed at a depth as given under “Work Acceptance Criteria”. Open trenching under primary road should be avoided.
- Area shall be restored as per permission terms and conditions.
- Route Alignment is marked as planned with no sharp bends
- Smooth trench gradient is maintained and bottom is levelled and free from sharp objects, rocks & debris
- Ducts are cut using duct cutting tool and cut end should be smooth. **DO NOT USE HACKSAW** for cutting Duct.
- After installation ends of ducts are sealed using end plugs
- Backfilling is done with stone free material and well compacted
- Debris shall be cleared and disposed off at approved location
- **Refer latest Drawing # R4G-71-EP-F51-PR-001 for details**

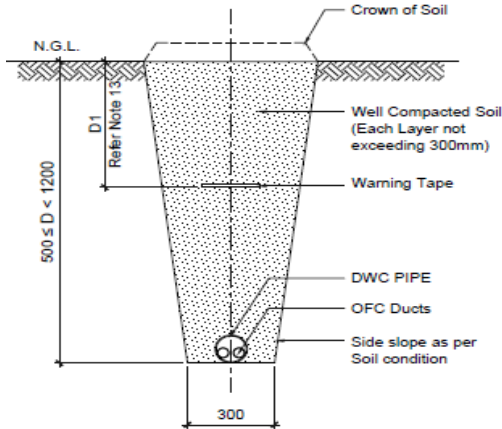
7.2.1 Typical Cross Section of Open Trenching in Normal Soil (For Road Crossing Only)



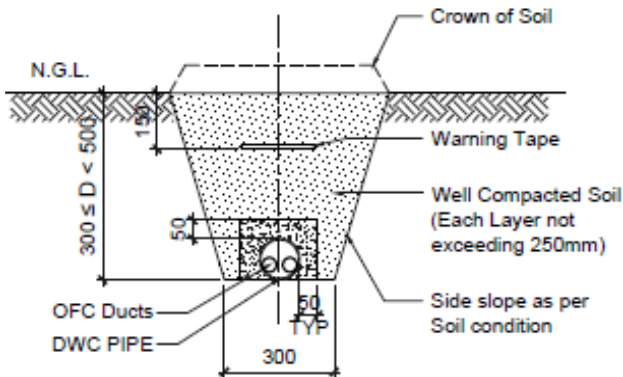
7.2.2 Typical Cross Section of Open Trenching in Normal Soil along main Road (Type-01)



7.2.3 Typical Cross Section of Open Trenching in Normal Soil along main Road (Type-02)

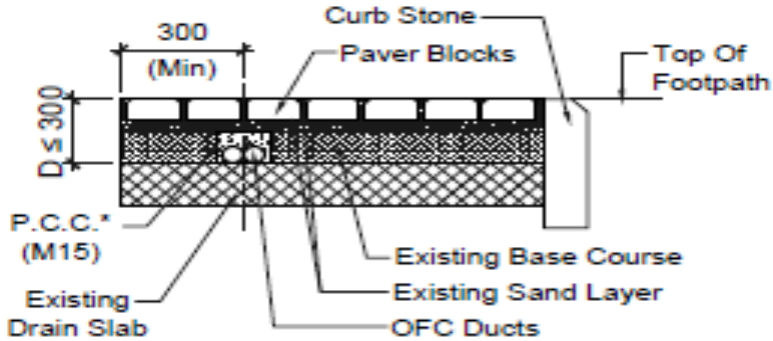


7.2.4 Typical Cross Section of Open Trenching in Normal Soil along main Road (Type-03)

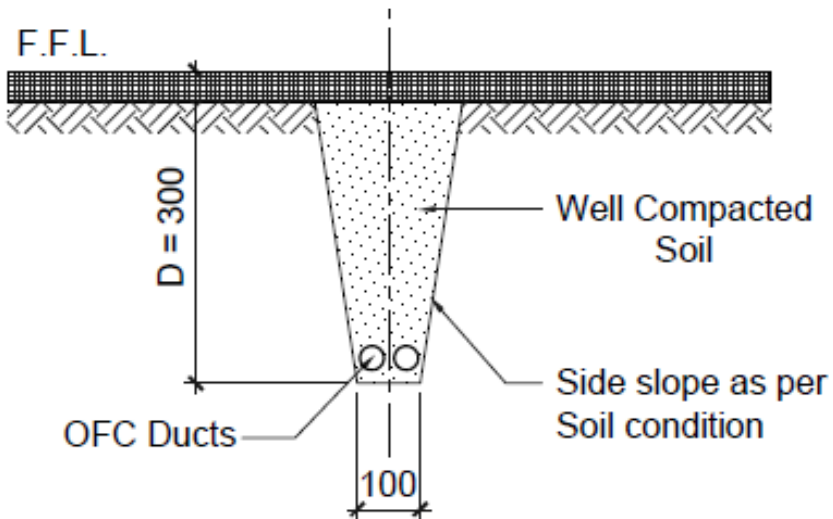


**TYPICAL CROSS SECTION OF
OPEN TRENCHING IN NORMAL SOIL
(ALONG MAIN ROADS: TYPE-03)**

7.2.5 Typical Cross Section of Shallow & Narrow Trench (Only Drain Covers Only)



7.2.6 Typical Cross Section of Shallow & Narrow Trench (Inside Gated Premises Only)



7.3 Micro-Trenching

- SUE Survey to be conducted prior to start of work
- Ducts shall be installed at a depth as given “Work Acceptance Criteria”.
- Trench shall be filled with aggregate and non-shrink grout as per specification.
- Width should be 50mm except at curves where manual trenching may be required.
- Duct Configuration respective to Trench depth are mention below:

Option-1:

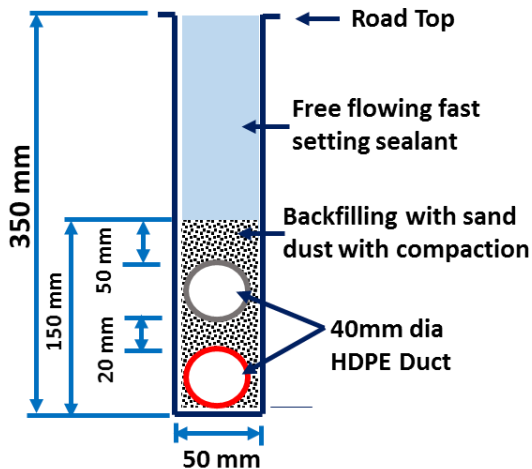


Fig- Micro Trenching (Where max. number of 40mm duct is 2nos)

Option-2:

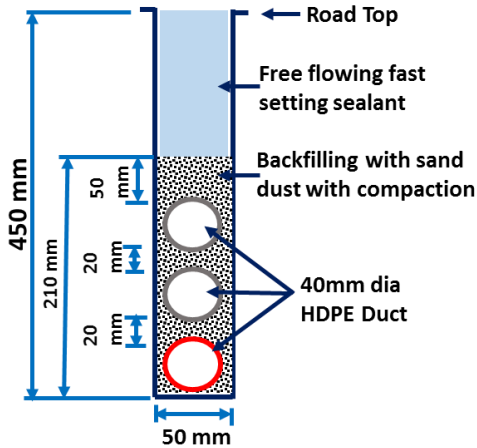


Fig- Micro Trenching (Where Max. number of 40mm duct is 3nos)

Option-3:

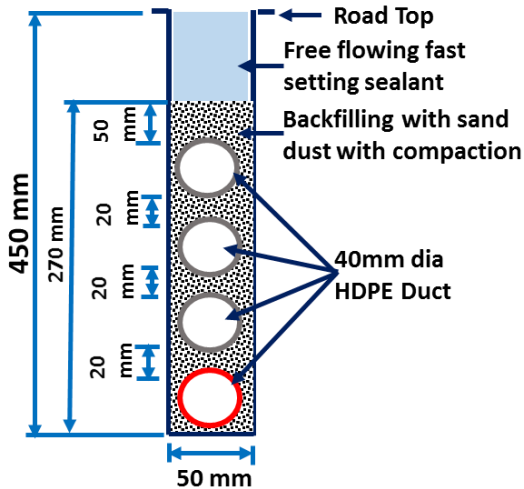


Fig- Micro Trenching (Where Max. number of 40mm duct is 4nos)

7.4 Trenchless

- Installation by trenchless techniques should be carried out after SUE (Sub surface Utility Engineering) survey using GPR (Ground Penetrating Radar) equipment and verification of GPR results by test pits in the presence of SUE survey data interpreter.
- Areas of failed attempts/abandoned drills shall be restored immediately.

a) HDD

- HDD should be used for longer feeder routes and preferably in soft soil strata.
- Ducts shall be installed at a depth mentioned in “Work Acceptance Criteria” except near the entry / exit points where depth shall be minimum 500mm.
- Entry/Exit angle should be between 8-12 degrees.
- HD-20 MH shall be installed at entry/exit pits.
- Beware of any obnoxious smell/inflammable gases/liquids. It could be a result of utility leakage/damage.
- Keep minimum 500mm clearance between existing utility and duct.
- Use proper drill bits and drilling fluids only.
- **Refer latest Drawing # R4G-71-EP-F51-PR-003 for details**

b) Moling

- Moling is more suitable for short length sections such as distribution routes only and where soil is soft.
- Ducts shall be installed at a depth as mentioned in “Work Acceptance Criteria”.
- Unwanted pits (i.e. where MH/HH is not required) to be backfilled and area restored to original state immediately after completion.
- **Refer latest Drawing # R4G-71-EP-F51-PR-011 for details**

7.5 Aerial Installation

a. General

- Pole height (when new poles are installed) shall be minimum 7.5m above ground level. Cable clamp shall be at a height of 7.0m to allow for sag.
- Sag shall be maximum 1% of span length.
- Maximum permissible span for ADSS cables shall be 80m. For span more than 80m use ADSS Lash cable with messenger wire of adequate strength corresponding to free span for support.

b. Maintenance Loops

- 10m cable slack to be provided (stored in loop) at each joint closure/termination box location each cable entering the joint closure/termination box.
- 10m (total, 5m each side) cable slack (stored in a loop) to be provided at termination pole (where no joint closure/termination box is provided).

c. Minimum Clearances

For minimum clearance, please refer Work Acceptance Norms mentioned in 14.1.

7.5.1 Aerial Installation Scenarios

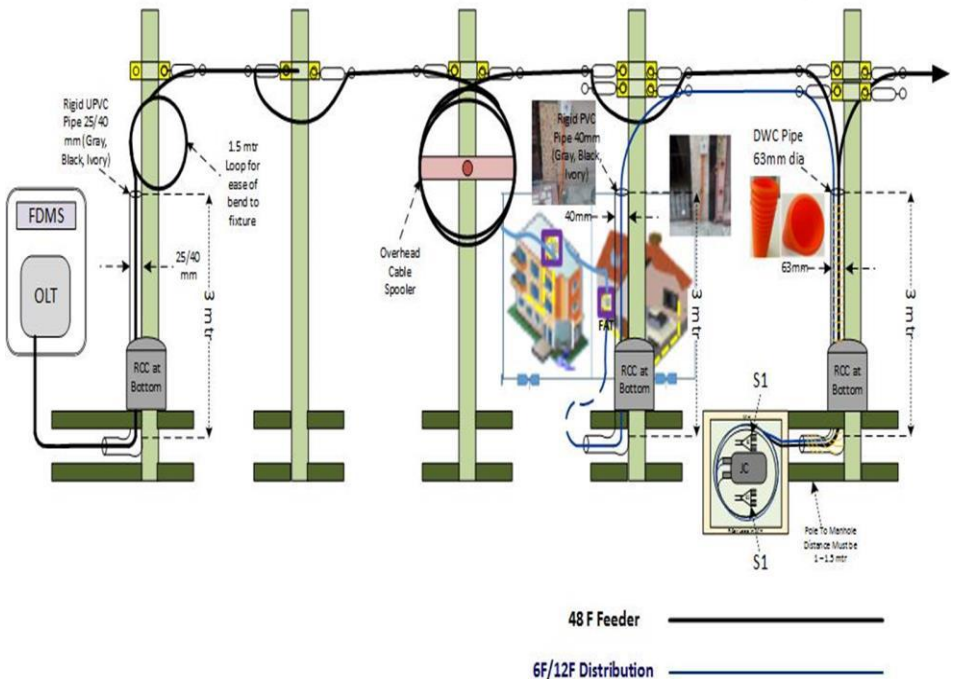
7.5.1.1 Pole to Pole

a. General

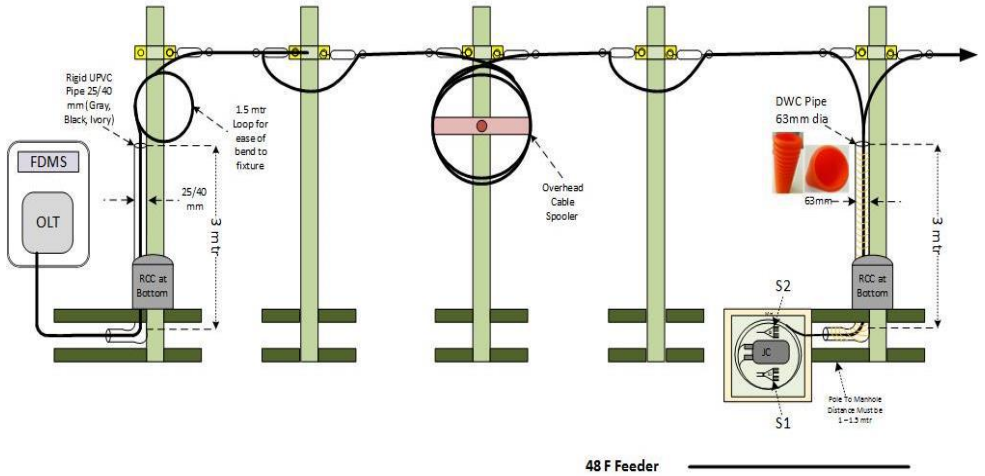
- This installation will be applicable mostly for feeder and distribution cables.
- Use ADSS cable for this installation with proper helical fittings and accessories or lash cable with messenger wire were ever applicable as per plan
- Cable termination at every 3rd pole / 150m whichever is less. If deflection is more than 20 degree, termination is required.
- Below are typical scenarios for Pole to Pole aerial deployment

❖ Scenario – 1

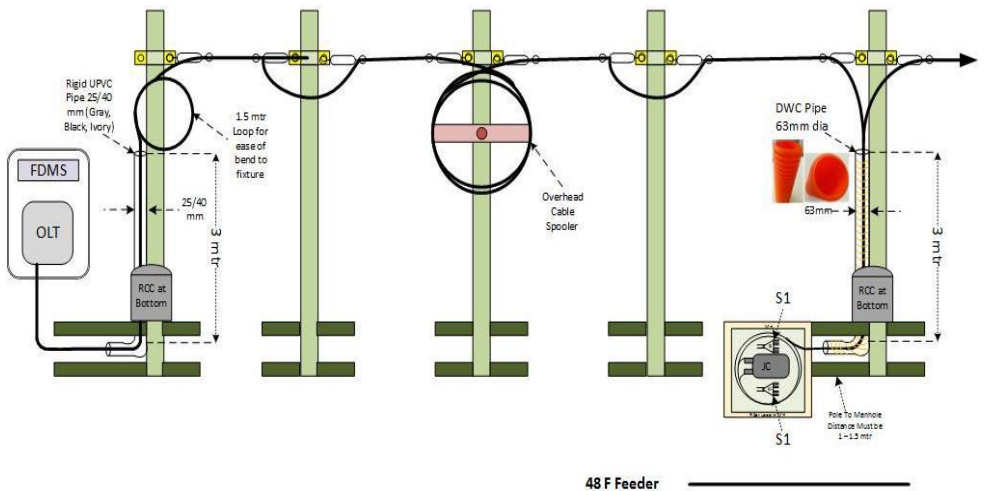
2 no's of S1 are installed in JC in MH and S2 are installed in FAT



❖ **Scenario – 2**
S1 and S2 are installed in JC in MH

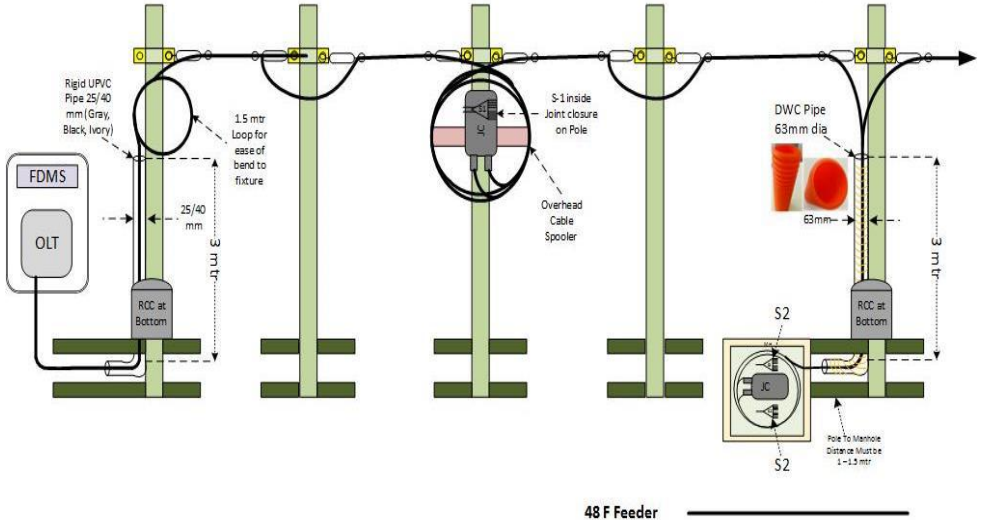


❖ **Scenario – 3**
Only 2 no's of S1 are installed in JC in MH



❖ Scenario – 4

S1 are installed in JC on pole where installation of MH are not feasible due to various reasons



Note:

- For Aerial to Under Ground (UG) transition or vice versa, use 63mm DWC pipe clamped with pole / 40mm Rigid PVC Pipe with clamp
- For Connecting Rigid PVC Pipe and Manhole with proper bend, use corrugated flexible pipe with hose clamp
- Use Proper silicon sealant to seal the top entry point of the cable inside the PVC/DWC Pipe

7.5.1.2 Pole to Building

- This installation will be applicable mostly for distribution cables / Access cable.
- Use ADSS cable for this installation with proper helical fittings and accessories for span length less than 80m. For span more than 80m, lash cable with messenger wire shall be used for support

7.5.1.3 Building to Building

- This installation will be applicable mostly for Feeder / distribution cables/Access cables.
- Use ADSS cable for this installation span length less than 80m.
- For spans of length more than 80m use micro cables with messenger wire for support

7.5.2 Aerial Installation Accessories (B2B)



A Protective Helix

C Wall Plate with single Hook

E Turn Buckles

B Terminating Helix

D D-Shackle

F Thimble

Note: The figure shows typical ADSS installation only

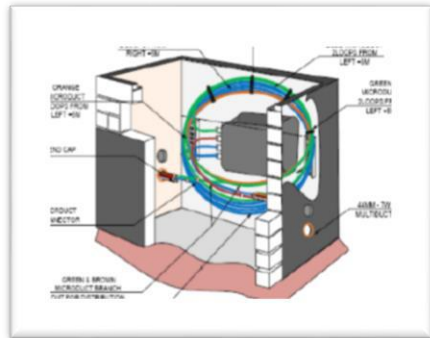
7.6 Installation of Manholes/Hand Holes

Typical MH installation is shown in sketch below:

Level the bottom of pit and place uniform 75mm thick layer of M20 grade (1:1.5:3) PCC with 14SWG MS wire mesh placed in the middle. Let the PCC set before placing MH/HH.

As an option, pre-cast base can be used as per site feasibility

Fill annular space with compacted soil in case of concrete MH/HH and 20mm down aggregate in case of FRP MH/HH. Fill top 100 mm part of this space with M15 grade PCC. Cement used for PCC shall be OPC Grade 43 and make flush with top surface of MH/HH and road/footpath surface.



Refer latest below drawings for detail

- 1) 10070-40-EF-PSS-PR-036 - FRP MANHOLE 750(L) x 400(W) x 500(D)
- 2) R4G-71-EP-PSS-PR-005 - FRP MANHOLE 4000(L) x 400(W) x 500(D)
- 3) R4G-71-EP-C73-PR-002 - Pre-Cast Base
- 4) R4G-71-EP-C73-PR-001 - Typical Bricks MH (for Fttx)

7.7 Vertical Installation (IBD)

In-building vertical installation of distribution/Access cables can be carried out by any of the following methods depending on permissions from building owners/RWA.

a. Through Conduits

Use this method for open areas prone to third party damage and also areas where neat looking installation is warranted. Use PVC conduits and associated fittings (bends/elbows/Tees/Cross)

b. Using Saddles

Use in areas protected from direct third party damages and not visible to public such as building shafts. Use saddles for tying the cables in a neat configuration.

c. Using Cable Trays

Use this method only when authorities /building owners/RWA insist for the same. This is generally applicable for very large establishments having their existing infrastructure on cable trays. Use steel/FRP cable trays with cover.

d. Using Casing/Capping

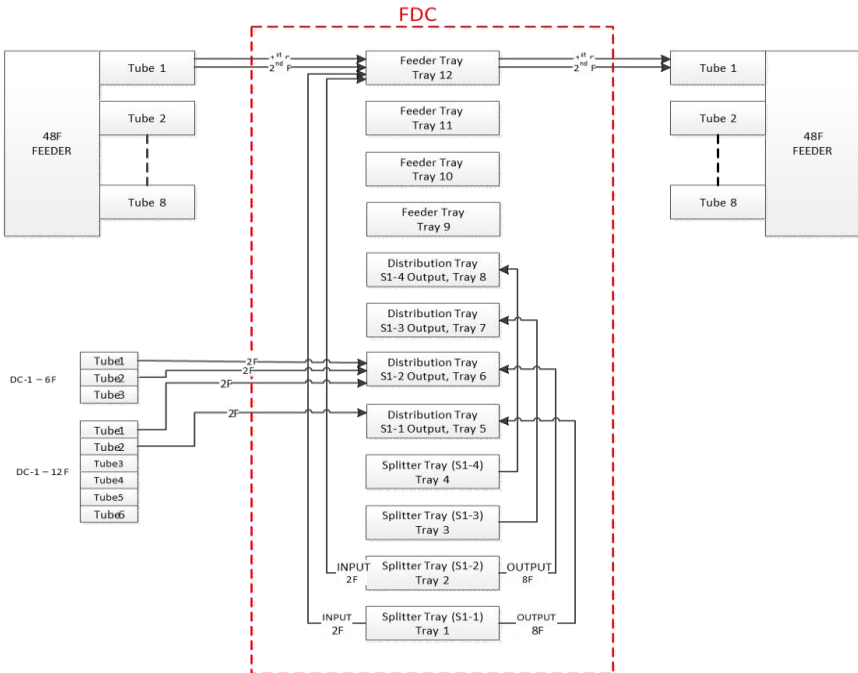
This is similar to conduit method. However, this should be used where:

- i) Access to the cable is required frequently.
- ii) The area is not accessible to general public

Vertical shafts of the building are ideal location for use of this technique.

8 Fibre splice Plan in FDC and Joint Closure

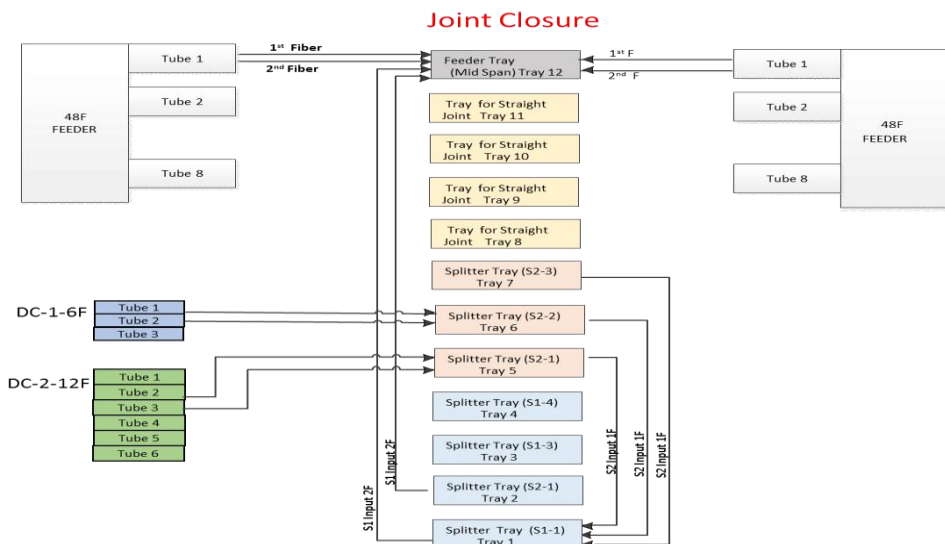
8.1 Feeder Fiber allocated for Multiple S1s are from same tube in FDC



Note:

- Feeder Fiber allocated for Multiple S1s are from Same Tube
- Only S1 Allocated Tubes has cut, Remaining Tubes are uncut
- S1 splice with allocated Feeder fiber from tube and do straight splice for remaining fibers in same tray
- Only Allocated Fiber for distribution splice in distribution tray. Remaining tubes should be coil and secured in the tray provided for uncut tubes

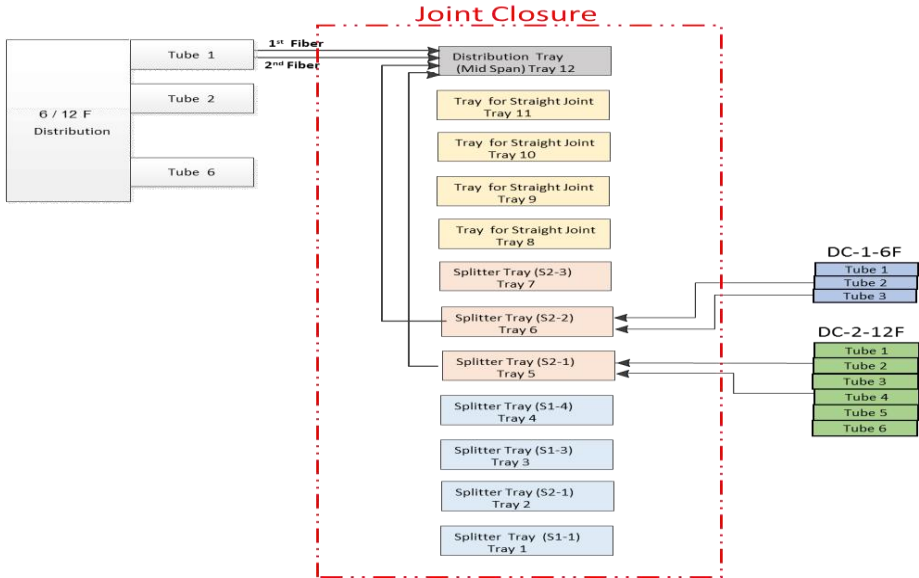
8.2 Feeder & Distribution Fibre allocated for Multiple S1 and S2 in Joint Closure (JC)



Note:

- **Trays Reservation**
 - a) Tray #1 to 4 – For S1 Splitter
 - b) Tray #5 to 7 – For S2 Splitter
 - c) Tray #8 to 11–For Straight Joint
 - d) Tray #12 – For Mid Span / S1 Input
- S1 input should be splice with Feeder cable on tray #12)
- S1 output should be on same tray (Tray #1 to4)
- S2 input should be splice with S1 output on tray # 1 to 4 respectively)
- S2 output should be splice with distribution cable on tray # 5 to 7 respectively)

8.3 Distribution Fibre allocated for Multiple S2 in Joint Closure (JC)









Note:


- **Trays Reservation**
 - a) Tray #1 to 4 – For S1 Splitter
 - b) Tray #5 to 7 – For S2 Splitter
 - c) Tray #8 to 11–For Straight Joint
 - d) Tray #12 – For Mid Span / S2 Input
- S2 input should be splice with distribution cable (coming from S1) on tray # 12
- S2 output should be splice with distribution cable on tray # 5 to 7 respectively)

9 Construction Requirements and Materials

A) Ducts for underground installation (Number, Colour and Allocation)

Route Type	Path	Number, Size and Colour of Duct(s)	Arrangement
Feeder	From OLT to S1 Splitter at FDC/Joint Closure	3 ducts, 40mm OD, Red (For Feeder) and Grey with 4 white strips (for Distribution).	 <p>Open Trenching/HDD/Moiling</p>
		4 ducts, 40mm OD, Red (For Feeder) and Grey with 4 white strips (for Distribution).	 <p>In case distribution cable is > 6 nos.</p> <p>Open Trenching/HDD/Moiling</p>
		3 ducts, 40mm OD, Red (For Feeder) and Grey with 4 white strips (for Distribution).	 <p>Micro Trenching</p>

		<p>4 ducts, 40mm OD, Red (For Feeder) and Grey with 4 white strips (for Distribution).</p>	 <p>In case distribution cable is > 6 nos.</p> <p>Micro Trenching</p>
<p>Distribution</p>	<p>From S1 Splitter to S2 Splitter at FAT/Joint Closure</p>	<p>2 duct, 40mm OD, Grey with 4 white strip</p>	 <p>Open / Micro Trenching/Moling</p>
		<p>3 duct, 40mm OD, Grey with 4 white strip</p>	 <p>In case distribution cable is > 6 nos.</p> <p>Open / Micro Trenching/Moling</p>

Access	S2 Splitter to OTB (when S2 is located outside building premises)	1 duct, 40mm OD, Grey with 4 white strip	 <p>Open / Micro Trenching/Moling</p>
--------	--	--	--

B) Manholes / Hand Holes for Underground Installation

Route Type	Path	MH Design	Installation
Feeder / Distribution Route	From OLT to S1 Splitter at FDC/Joint Closure	FRP/Concrete Heavy Duty (HD-20) Man Hole(MH) of Size 750(L) x 400(W) x 500(D) Load bearing capacity - 20T	Installed along public/private roads when OFC is installed underground by open trenching/HDD/micro trenching (MH at Edge of Carriage Ways)
Inside building / Low Depth	From S1 to S2 or S2 to OTB	Brick Chamber 400 (L) x400 (W) x 500 /500 (mm) (D) or pre-Fabricated Chambers, as per site requirement	To be installed inside gated society or low depth areas

C) Optical Fibre Cables (OFC) for underground as well Aerial installation

Route Type	Path	OFC Design	Installation
Feeder	From OLT to S1 Splitter at FDC/Joint Closure	48F (6F/Tube), Orange Colour (Underground) / Black Colour Lashed Micro Cable (for aerial)	Aerial using Lashed Micro cable & messenger wire for support <i>For all Aerial Lashed Micro Cable, Messengers wire to be laid irrespective of length</i>
		48F (6F/Tube), Black Sheath, ADSS Cable	Use – Building to building, Pole to Pole and Pole to building 1. < 80 Mtr Spans - Without messenger 2. For > 80 Mtr Messenger wire to be used
Distribution	From S1 Splitter to S2 Splitter at FAT/Joint Closure	24F (4F/Tube), Red Colour Sheath, Micro Cable, (Underground) / Black Colour Lashed Micro Cable (for aerial)	Aerial using Lashed Micro cable & messenger wire for support <i>For all Aerial Lashed Micro Cable, Messengers wire to be laid irrespective of length</i>
		24F (4F/Tube), Black Sheath,	Use – Building to building, Pole to Pole and Pole to building

Route Type	Path	OFC Design	Installation
	From S1 Splitter to S2 Splitter at FAT/Joint Closure	ADSS Aerial Cable	<ol style="list-style-type: none"> < 80 Mtr Spans - Without messenger For > 80 Mtr Messenger wire to be used
		12F (2F/Tube), Green Colour Sheath Micro Cable, (Underground) / Black Colour Lashed Micro Cable (for aerial)	<p>Aerial using Lashed Micro cable & messenger wire for support</p> <p><i>For all Aerial Lashed Micro Cable, Messengers wire to be laid irrespective of length)</i></p>
		12F (2F/Tube), Black Sheath, ADSS Aerial Cable	<p>Use – Building to building, Pole to Pole and Pole to building</p> <ol style="list-style-type: none"> < 80 Mtr Spans - Without messenger For > 80 Mtr Messenger wire to be used
Distribution	From S1 Splitter to S2 Splitter at FAT/Joint Closure	6F (2F/Tube), Blue Colour Sheath Micro Cable (Underground) / Black Colour Lashed Micro	<p>Aerial using Lashed Micro cable & messenger wire for support</p> <p><i>For all Aerial Lashed Micro Cable, Messengers wire to be laid irrespective of length)</i></p>

Route Type	Path	OFC Design	Installation
		Cable (for aerial)	
		6F (2F/Tube), Black Sheath, ADSS Aerial Cable	Use – Building to building, Pole to Pole and Pole to building 1. < 80 Mtr Spans - Without messenger 2. For > 80 Mtr Messenger wire to be used
		6F / 12F G657A Riser Cable	In-Building

D) Materials

List of Materials and Accessories

List of Materials and Accessories Required			
Sr. No.	Description	Usage	Picture
Ducts and Accessories			







List of Materials and Accessories Required

Sr. No.	Description	Usage	Picture
1	Pre-lubricated HDPE ducts, 40mm OD x 33mm ID Colour Red / Grey and/or Grey with 4 white strips	Underground OFC Laying	
2	Push Fit Type Duct Couplers	Duct Joining	
3	End Plugs	To Close open end of duct	
4	Simplex Plugs	To Close open end of duct with OFC	
5	DWC Pipe, 110mm /82mm ID	For duct protection	
6	DWC Pipe, 63mm /47m ID	For cable protection	
7	DWC Pipe Couplers	For joining DWC Pipe	
Optical Fibre Cable Accessories			








List of Materials and Accessories Required

Sr. No.	Description	Usage	Picture
1	Suspension Clamp	For ADSS OFC intermediate locations between terminations	
2	Turn Buckle	For ADSS OFC tension/sag adjustment	
3	Thimble	Tension assembly component	
4	Down-lead Clamps	For vertical support in aerial (ADSS) installation	
5	Protective Helix	For ADSS OFC sheath protection	
6	Cable Loop Clamp	For ADSS OFC storage	
7	Pole Clamps	For ADSS OFC holding	
8	Square Wall Anchor Plate -Single cable (suitable for required cable size and span)	For OFC support wire Holding	



List of Materials and Accessories Required

Sr. No.	Description	Usage	Picture
9	Triangular Wall Anchor Plate – Single cable (suitable for required cable size and span)	For OFC support wire Holding	
10	Oval Wall Anchor Plate- Single cable (suitable for required cable size and span)	For OFC support wire Holding	
11	Corner Anchor Plate – Single cable (suitable for required cable size and span)	For OFC support wire Holding	
12	Wall Anchor Plates – Multiple Cable Connection	For support wire or ADSS tension assembly Holding	
13	Three Bolt Suspension Clamps	For OFC suspension	
14	Helical Grip or Termination Helix	For ADSS OFC Termination	
ODN Equipment			



List of Materials and Accessories Required

Sr. No.	Description	Usage	Picture
1	Joint Closures	For cable-cable splicing and / or Splitter housing (aerial/underground)	
2	FDC (S1 Splitter)	For Cable Termination, Splitter housing and distribution	
3	FAT (S2 Splitter)	For Cable Termination, Splitter housing and distribution	
3	OTB	For termination of optical fiber	
4	Splitter (bare)	For optical splitting of one fibre to many	
5	Splitter Cassettes	For optical splitting of one fiber to many, External housing is a cassette	
In-Building Accessories (vertical installation)			
1	Junction Box	For duct to conduit transition	

List of Materials and Accessories Required






Sr. No.	Description	Usage	Picture
2	Clamping kit (Saddle, Screws, Rawl plugs etc.)	For installing conduits	
4	PVC Conduits Colors: Gray / Black / Ivory / Off-white	For cable protection	
5	PVC Fittings (Elbows, 2/3/4 way junction boxes, Tees, couplers, inspection elbows, tees, bends, end plugs etc.) Colors: Gray / Black / Ivory / Off-white	For installation of conduits	
6	Steel reinforced corrugated conduit 25mm dia	For making transition/negotiating skewed bends	
7	Nylon Cable ties (10x200mm)	For cable organizing	
8	Insulation Tape	For taping loose ends together	







List of Materials and Accessories Required

Sr. No.	Description	Usage	Picture
9	Epoxy Sealant	For sealing / closing openings	
10	Folding ladder 6 feet	For Installation of conduit and cable pulling	

10 Installation Material, Tools & Tackles and PPE's

Apart from mentioned list of material following materials/ tools are also important for “First Time Right and Safe” installation and testing.

Sr. No.	Item Description	Category	Type	Picture
1	IsoPropyl Alcohol Bottle	Fibre Splice kit	Consumable	
2	Lint Free wipes (1Pack of 50 Tissues)	Fibre Splice kit	Consumable	
3	Duct Cutting Tool	Duct Cutting Tool	Tools	
3	Fibre Stripper	Fibre Splice kit	Tool	
4	OFC Patch Chord (3m)	Fibre Splice kit	Consumable	

Sr. No.	Item Description	Category	Type	Picture
5	Fiber Cleaver	Fibre Splice kit	Tool	
6	3 in one Fiber Stripper Drop cable	Fibre Splice kit	Tool	
7	Fibre Jacket Cutter for drop cable	Fibre Splice Kit	Tool	
8	Round drop cable Sheath Stripper	Fibre Splice kit	Tool	
9	Splicing Machine (In Rare Case if Required)	Fibre Splice kit	Equipment	
10	Power Meter *	Fibre Testing	Instrument	

Sr. No.	Item Description	Category	Type	Picture
11	Laser Source *	Fibre Testing	Instrument	
12	OTDR *	Fibre Testing	Instrument	
13	Safety goggles	Safety	Safety Kit	
14	Safety Harness with Rope	Safety	Safety Kit	
15	Hand Gloves	Safety	Safety Kit	
16	Safety Helmet	Safety	Safety Kit	

Sr. No.	Item Description	Category	Type	Picture
17	Safety Shoes	Safety	Safety Kit	
18	Reflective Vest	Safety	Safety Kit	
19	Warning Tape	Safety	Public Safety Warning	
20	Barricading Cones	Safety	Public Safety Warning	
21	Portable Fire Extinguisher	Safety	Fire Safety	
22	First Aid Box	Safety	Health Safety	

11 Mandatory Tool Kit and Documents for Vendor

Following items handouts must be shared / available with Jio Centre. FTTx construction Engineer / Lead /contractor to facilitate smooth completion of deployment activities:

- Tablet (Electronic)
- Plan Released by NP&E (Civil, ODN and splice plan)
- IB / UB ROW Permission Copy
- Traffic Permission Copy / Traffic intimation letter
- Existing utility reports/critical survey(SUE) report
- ID Card
- LED Torch
- Measuring and Testing Instruments (mechanical, Electrical and Fibre)
- Public Safety/Warning materials (safety Cones, Warning Tape)
- Portable Fire Extinguisher
- First Aid Box
- Personal Safety Kit
 - ✓ Helmet
 - ✓ Safety Goggles
 - ✓ Safety Harness (if need to work at heights)
 - ✓ Safety hand gloves
 - ✓ Safety shoes
 - ✓ Reflective Vest
- Folder containing Stationary and Pencil
- Phone with Camera (5MP min.)
- MB Sheet
- List of Contractor personnel

Refer table below for applicability.

Sr. No.	Item Description	UB		IB	
		Contractor	Const. Engineer	Contractor	Const. Engineer
1	Plan Release by NP Team	√	√	√	√
2	Copy of Permissions	√	√	√	√
3	Escalation Matrix	√	√	√	√
4	This Pocket Diary	√	√	√	√
5	Folder containing Stationary and Pencil	√	√	√	√
6	Personal Safety Kit	√	√	√	√
7	ID Card		√		√
8	Tablet (Electronic)		√		√
9	Contractor's Personnel List	√	√	√	√
10	Public Safety/ Warning materials (safety Cones, Warning Tape)	√		√	
11	Existing Utility Reports	√	√	√	√

Sr. No.	Item Description	UB		IB	
		Contractor	Const. Engineer	Contractor	Const. Engineer
12	Tools and Equipment	√		√	
13	First Aid Box	√		√	
14	Measurement/Inspection Tools	√		√	
15	Measurement Book	√	√	√	√

12 Company Supplied Free Issue Materials (FIM)

Following major materials will be supplied by Company as FIM to Contractor.

- a. Ducts & Accessories – Ducts(Red & Grey), DWC, Couplers, End plugs
- b. Optical Fibre - Micro, ADSS, Unarmored and Riser cable,
- c. Optical Splitter - Bare fiber & Cassette type.
- d. Passive Network Element – FDP, JC, FDC,FAT,OTB & Accessories
- e. Manhole/Hand Holes / Pull Boxes / Toby Box / Pole
- f. Patch Cords
- g. Aerial Cabling accessories (including messenger wire for supporting cable).

Following material shall be under contractor's scope (Non FIM):

- Duct Couplers, simplex plugs and End Caps
- PVC conduits & Accessories
- Warning Tapes

- Fuel & Water for HDD and MT Machines
- Barricades and warning signs
- Fire extinguisher (portable type)
- Duct De-coilers
- Medium Class G. I. Pipes of various Nominal Bores
- DWC Pipes of various Diameters
- Half round Hume Pipes
- Compressors, shuttles for Duct Integrity Test (DIT)
- Cable blowing/pulling arrangements including compressor, duct roaders etc.
- Tools, tackles & accessories, except splicing M/c, for splicing, jointing & termination of FO Cables, pig tails, rowel plugs, cable tie.. etc.
- Cable Labelling Arrangement including Label Printers and feed Material
- PCC material, Tiles etc. for reinstatement of in-building flooring
- GI Clamps for 40MM Duct Clamping

All materials and consumables shall be supplied by Contractor as per commercial agreement.

Approved makes for all PVC fittings are

- a) Precision
- b) Jain
- c) Kissan
- d) Polycab
- e) Prince
- f) Supreme
- g) Superplast

11.1 Material Issuance and Reconciliation

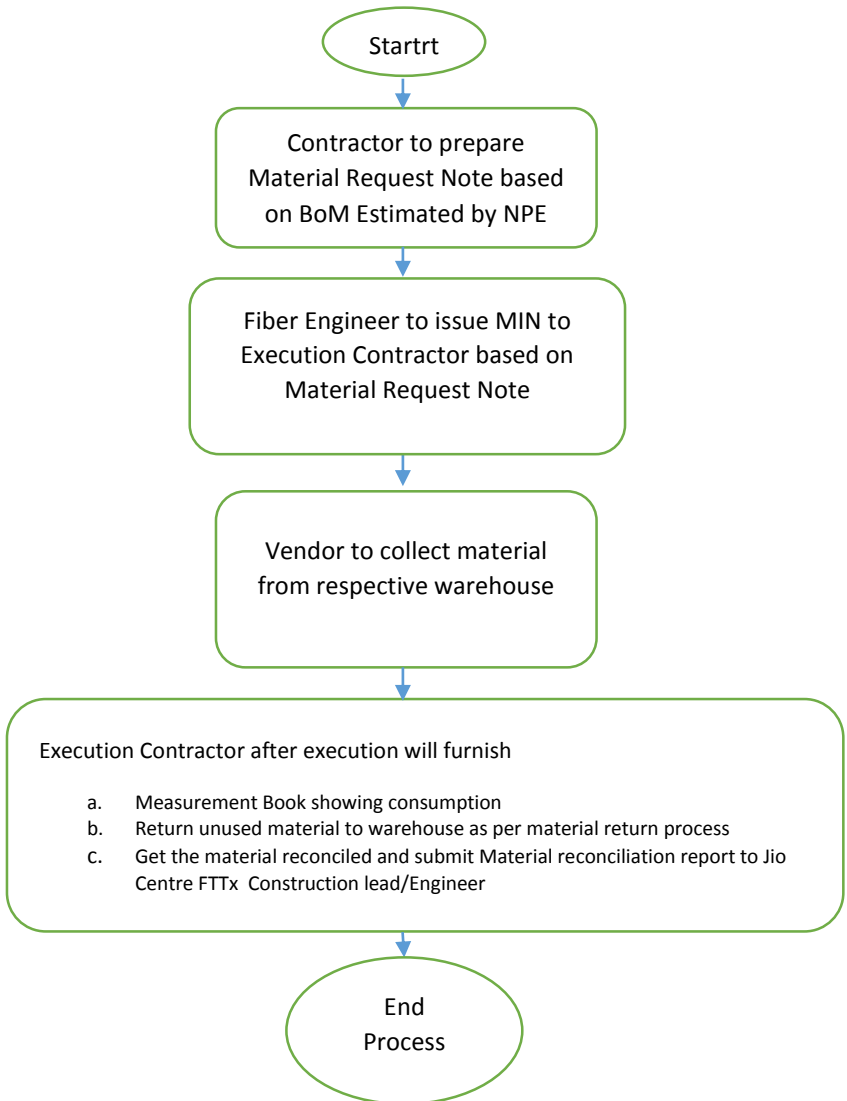
Company supplies Free Issue Material (FIM) to contractor

At the time of getting material issued the contractor shall ensure that;

- If any material defects are observed, material shall be immediately returned to warehouse.
- Poor quality material shall be reported for resolution by supplier.

JIO Center FTTX construction engineer to notify material related issues to Supply Chain Management (SCM)/Product and vendor development team for corrective actions.

Material Issuance and Reconciliation Process Flow-Chart:



13 Quality and HSE Compliances

13.1 Quality Mantra

- First Time Right
- Self-Validation –I am only responsible for quality
- Being aware of Standards and Processes
- Drive for Quality Work
- Ensure Safety at Work
- Ensure Record Keeping and Updating

13.2 Online Compliances

Site supervisor to keep Records of every activity for each UB and IB span in **Specified Template** covering following as part of Online Compliance Process (OCP).

- Photographic evidence in support of public safety arrangements like Barricades, Warning Tapes as well as Personnel Safety Gears used.
- Photographic evidence showing compliance to Specification such as Depth, Restoration Quality, Protection, etc.
- OCP will also be used to capture the online as-built data and for preparing Measurement Book (MB) Sheets.
- Extent of Online Compliance check / Quality Audit is defined hereinafter.
- Online quality records shall be submitted on daily basis.

Pictures showing Quality Norms	Pictures Showing HSE Norms
Depth Duct Laying including Manhole Restoration Clamping/Conduit Work Take 2 Pictures Minimum	Public Safety / Warning Signs Barricading/Warning Tapes Personnel Safety (Vests/ gloves/ helmet/ goggles/ shoes etc.) Take 2 Pictures Minimum
Site Pictures	Site Pictures

Take 2 Pictures Minimum			Take 2 Pictures Minimum		
Prior to Execution of Work			Post Execution of Work		
Date		Span		Jio Centre	
Signature		OLT ID		Engineer	
Document No					
Template for Online Checks / Audit					

* Photos for MH needed

13.3 Quality Audits

Work executed by the contractor shall be checked / audited *on sample basis* by FTTx QA Engineer as per sampling plan mentioned in FTTx Quality Assurance Process. However for 100% of work construction & quality records for compliance shall be made available by Contractor for review to the Fiber Engineer, hence Jio Centre construction FTTx engineer will be responsible to upload the documents to the REIMS on priority basis preferably within 48 hours, post necessary validation on site.

14 Health Safety and Environment (HSE) Audits

HSE audits shall be carried out in accordance with process defined in **R4G-71-HSE-GEN-PR-001**. Audit reports shall be uploaded in document portal REIMS. Auditee shall take corrective action and upload Corrective Action Report in REIMS. Checklist as mentioned shall be considered as a guide for -

- Organization Assets Safety
- House Keeping
- Personal Protective Equipment
- Work at Height
- Electrical Safety
- Safety during Excavation/ Micro trenching / Trenching
- Fire protection & Emergency Plan

- Traffic Safety
- Welfare and General HSE checks
- Safety Promotional activities

14.1 Safety Incident Reporting

All HSE incidents shall be tracked through HSE Incident Management Portal and escalation will be done as per pre-defined Hierarchy.

14.2 Guidelines for Safe Working while Aerial Deployment

SL #	HSE	General	ADSS
1	Wear 10 KV Resistant rubber gloves when working near exposed electrical circuits.	Keep the pulling tension below the cable's rated strength.	Provide cable slack at designated points to allow for future drops.
2	Use the leather gloves when climbing or descending a pole	Avoid pulling across sharp turns.	Dynamometers must be used to measure the dynamic tension in the cable
3	Use a safety harness on all bucket trucks and aerial lifts.	While installing aerial cable, place enough cable blocks along the route to keep cable sag to minimum. Excessive sagging will increase pulling tension	The cable is installed from a midpoint to the endpoints
4	Before climbing a pole, inspect it for significant deterioration and safety hazards splintering, insect nests, sharp protrusions, etc.	When pulling, do not let the cable ride over the reel flange as it may scuff or tear the jacket	When installing aerial cable, make certain that the path is clear of tree limbs.
5	Personnel should not be in an area where a cable is being pulled around a piece of hardware under tension. Ensure that the work area is public-free.	NEVER EXCEED the minimum bending radius.	For pulling the ADSS OFC, wind the protective helix around the cable and then pull by using either a Cable Pulling Grip or 12mm Nylon rope.

SL #	HSE	General	ADSS
6	The aerial telecommunications cable shall not be run above the power line.	Unloaded means that the cable is under no tension or up to a residual tension of around 25% of its maximum pulling tension	Never attempt to install ADSS cables with unskilled personnel
7	Keep hands free of tools or materials when climbing or descending a pole or ladder.	Follow all pulling tension and minimum bending radii instructions and specifications issued	Provide cable slack at designated points to allow for future drops.
8	Do not step on cables, cable enclosures, or suspended equipment which might provide unsafe footholds.	plan the cable path to eliminate as many curves and bends as possible. Curves and bends add to the attenuation of the fiber optic signal.	Avoid pulling across sharp turns.
9	Ensure proper clearance from electric power lines and other cables that may sag near the fibre optic cable.	Keep the pulling tension below the cable's rated strength.	As the cable is placed under tension, weaknesses in the cable plant can cause failure of pole fittings, support hardware or even the poles themselves.
10	Do not climb intermediate poles as the span they support is being placed under tension. If possible, passers-by on the ground should be kept away from the poles during this operation.		Re-check the Installation for the correctness and Cable sag.
11	Crossing of Telecommunication cable over the power lines up to 440 Volts only shall be permitted subject to keeping a minimum clearance of 1000 mm.		

15. Acceptance Testing (AT)

Acceptance testing can happen at two stages/phases.

Phase 1 – Civil work Acceptance Testing

Phase 2 – Optical Acceptance Testing

Various things to be checked as part of AT are given in Tables below.

Sr. No.	Broad Categories	Unit	Phase -1 Civil / Physical AT	Phase -2 Optical AT
1	Feeder Route - On the road	One Stretch	Following to be covered in Measurement 1. Stretch length, 2. Strata 3. Duct Length 4. Protection, 5. Restoration 6. Road Crossing	Following measurements to be given as a part of optical testing 1. Splices at FDP/ JC/ FDC 2. Splitter installation charges to be given 3. Feeder cable pulling measurement
2	Feeder Route - With in Society	No (Per Building)		
3	UB/Distribution Route	One Stretch	1. Civil Measurements (As mentioned above) 2. Fiber Pulling Physical measurements to be given, in case S1 to S2 or S2 to S2 cable pulling has been completed and testing can be done from FDC to FAT 3. For few stand alone buildings where FAT to FAT wiring has been done more than 3 months ago, we will be giving consumptions** for wiring and service charges	
4	IBD	No (per Building)	1. Pipe clamping or civil construction like floor drill or trenching to be given 2. Physical Box installation to be given 3. Riser cable pulling to be considered	

To avoid multiple visits and to ensure First Time Right (FTR) installation, the contractor shall be asked to submit compliance sheet (refer Table below) while offering system for Acceptance Testing to the Jio Centre FTTx field construction engineer / lead.

Compliance Statement				
Building ID				Date:
Engineer Name				Jio Centre Name:
Building Name				Home Pass (No):
Sr. No.	Category	Build Readiness	Yes	No
1	IB	PVC Clamping and Box Installation	√	

2	IB	Cable Pulling	√	
3	IB	Splitter Installation and Splicing certification	√	
4	IB	ABD preparation and Fibre Drop details	√	
5	IB	Labeling at all Network Equipment	√	
6	IB	Change Management (if Any)		√
7	IB	LSPM measurement	√	
8	IB	OTDR testing (If applicable)	√	
9	IB	AT Template upload in drive	√	
10	UB	Trenching completion and restoration	√	
11	UB	Cable Pulling	√	
12	UB	ABD Preparation, Splice distribution certification	√	
13	UB	Splitter Installation and Splicing done	√	
14	UB	Labeling, Loop Details and Cable detail capturing	√	
15	UB	LSPM measurement	√	
16	UB	OTDR testing	√	

15.1 Work Acceptance Norms

15.1.1 Civil / Physical Acceptance Norm

Field Construction team to strive for compliance to below specification during execution. In order to ensure “First Time Right” implementation and smooth as well as fast delivery of network.

Installation of Ducts/OFC along Feeder/Distribution			
Paths Up to Building i.e. UB Paths			
Sr. No.	Installation Method	Depth / Height of Ducts / OFC (in mm)	Remarks
1	Installation of Ducts (underground Installation)		
1.1	HDD	≥ 1650	Except at entry/exit pit location minimum depth to be 500mm
1.2	Moiling	≥ 1000	
1.3	Open cut Road Crossing	≥ 1200	Install Manhole at both side of road depending upon S1 and S2 location, duct should be inside DWC pipe
1.4	Open Trenching along main roads (feeder / Distribution)	1200	With no additional protection
		≥ 500 but < 1200	With additional protection by DWC Pipe
		≥ 300 but < 500	With additional DWC Pipe and 50mm PCC protection around DWC
1.5	Shallow and narrow trenching on drain covers	< 300	Direct burial with PCC

Installation of Ducts/OFC along Feeder/Distribution Paths Up to Building i.e. UB Paths			
Sr. No.	Installation Method	Depth / Height of Ducts / OFC (in mm)	Remarks
1.6	Shallow narrow trenching inside gated premises	≤ 300	Restoration as per actual surface
1.7	Micro Trenching on (roads / Footpaths)	350	Including restoration required, if any
1.8	Bridge / Culvert Crossing	N/A	Direct clamping on side wall using GI/steel clamps or laying on surface inside GI pipe and covering with 250x250 mm PCC
2	Aerial Installation <small>[See Note]</small>		
2.1	Pole to Pole/building	6000	With maximum sag 1%, Span < 80m
2.2	Building to Building	As per site	With maximum sag 1%, Span < 80m
Note: For Spans more than 80 mtr, messenger wire shall be used to support the cable.			

Installation of Ducts / Conduits /Trays / OFC along Distribution / Access Paths Inside Building Premises (i.e. IB Paths)

Sr. No.	Installation	Requirement	Value	Remarks
1	Clamping on Walls	Distance between clamps	1000 mm	Use saddles/ tray/ conduit to support cables
2	Moiling	Depth	1000 mm	
3	Aerial (pole to Building)	Height	6000 mm	

Miscellaneous Works (Common to UB/IB Paths)

Sr. No.	Activity	Parameter to Check		Remarks
1	Labelling	Label Size	25x75 mm	Polyvinyl / Thermal self-laminating
2	Manhole/ Hand Hole installation	PCC at Bottom	M20 Grade, 100mm thick	Steel Wire mesh of SWG 14 shall be embedded in middle of PCC for manhole base
		PCC on Top	M20 Grade, 100mm thick	MH top and PCC to be flush with road/ground surface

Miscellaneous Works (Common to UB/IB Paths)				
Sr. No.	Activity	Parameter to Check		Remarks
3	Fibre Splicing	Splice Loss	< 0.02 dB	As per splice m/c reading
		OTDR Value	Trace	Trace shall be available
4	Link Testing	LSPM Data	≤ (-)25dB	
5	As-Built	Installation and Testing Records	Available in GIS/NE/REIMS	Hard Copy for HOTO to be made ready

15.1.2 Optical Acceptance Norms

Network shall be accepted as per following threshold optical loss values:

Sr. No.	Distance, km	Splitter Count	Splice Count	Link Budget, dB	Assumptions
1	1	2	2	23.35	a. Wavelength 1550nm b. No Attenuator considered/ provided c. Testing is done on passive network i.e. no active gains to be considered
2	2	2	3	23.65	
3	3	2	3	23.9	
4	4	2	4	24.2	
5	5	2	5	24.5	

15.2 Optical Testing of Network

Completed network can be tested by any one of the following methods as per deployment scenario.

a) FDP to FAT End to End Testing

This method is appropriate for Single Dwelling Unit (SDU) type of deployment (refer Figure -1)

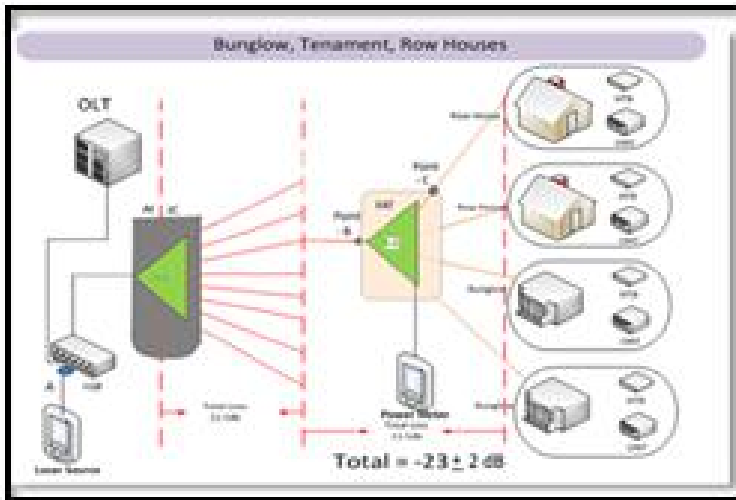


Figure-1

Sr. No.	Testing Span	Testing Method
1	Point A to B	LSPM ^[1]
2	Point A to B	OTDR ^[2]

Note:

1. In case SI is located inside Joint Closure, LSPM testing shall be performed from FDP to FAT.
2. FDP OTDR shall be used to capture a event like Losses from Point A to Point B.

b) OLT to OTB End to End Testing

This is an alternate testing method is also suitable for Single Dwelling Unit (SDU) type of deployment (refer Figure – 2).

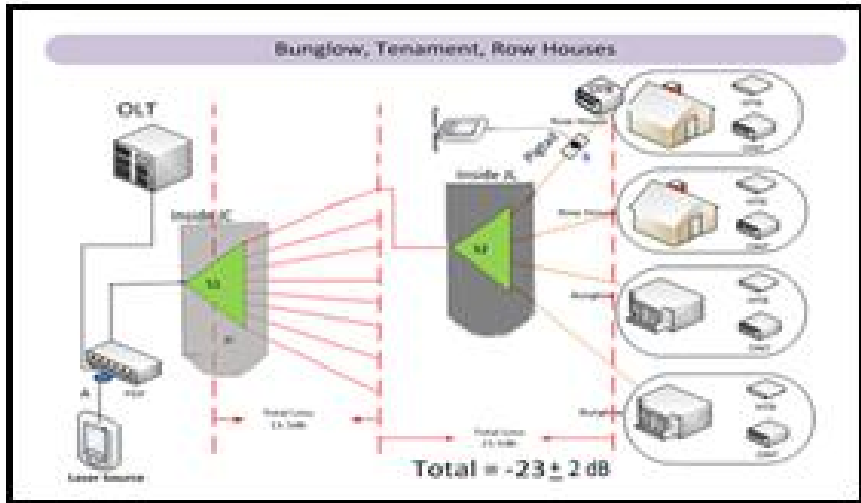


Figure-2

Sr. No.	Testing Span	Testing Method
1	Point A to B	LSPM ^[1]
2	Point A to B	OTDR ^[2]

Note:

1. In case S1 and S2 splitters are located inside Joint Closure, LSPM testing shall be performed from PDP to OTB.
2. POW OTDR shall be used to capture event related losses from Point A to Point B.

c) FDP To S2 Testing

This method is suitable for standalone Multiple Dwelling Unit (MDU) type of deployment (refer Figure – 3).

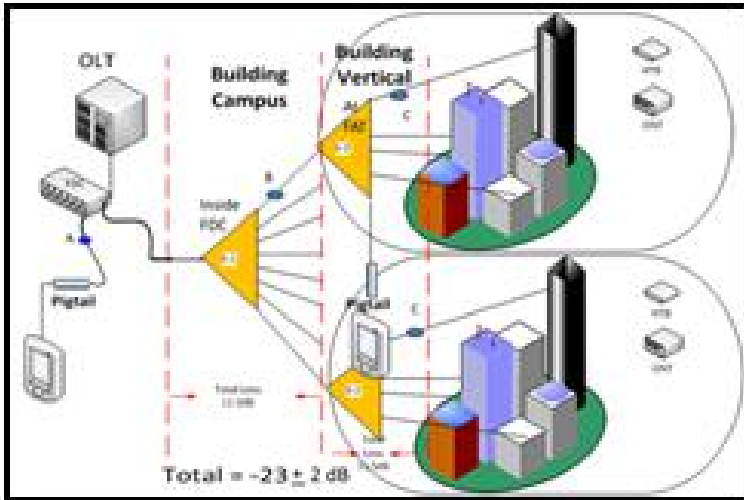


Figure-3

Sr. No.	Testing Span	Testing Method
1	Point A to B	LSPM ^[1]
2	Point A to C	LSPM ^[2]
3	Point A to C	OTDR ^[3]

Note:

1. LSPM testing shall be performed from FDP to FDC and FDC to PNT.
2. FDN OTDR shall be used to capture event related losses from Point A to Point C.

d) FDP To S2 Testing in JC

This method is suitable for Single Dwelling Unit (SDU) where OTB is not installed and both S1 and S2 are installed in JC.

For HOTO, we will be splicing Extra Pigtail at output of S2 splitter in JC as shown in fig-4 , same can be used for testing purpose

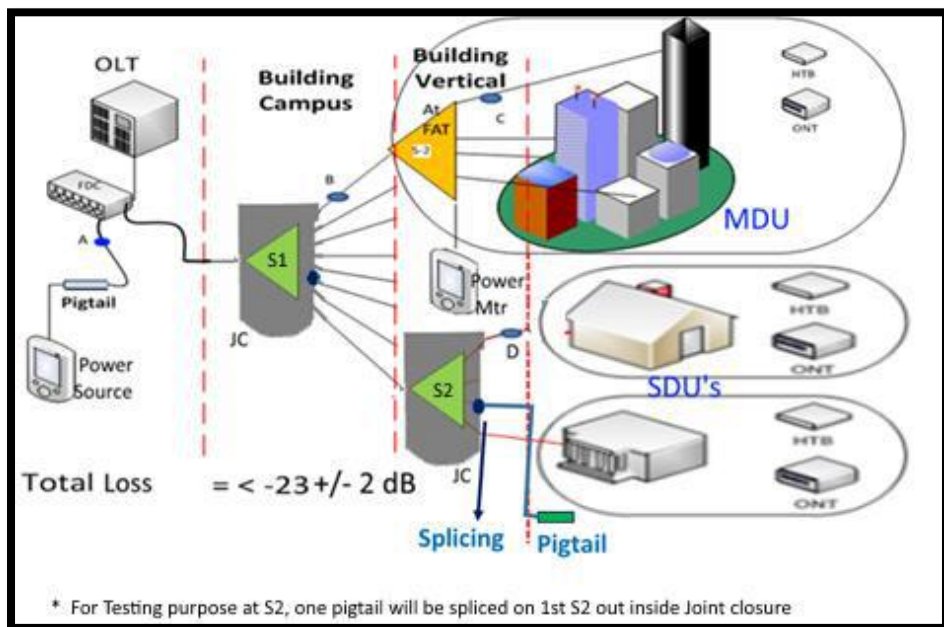


Figure -4

Sl. No.	Testing Span	Testing Method
1	Point A to D (pigtail spliced with S2 output)	LSPM

15.3 Test Procedures

a) LSPM:

Testing to be done after all required splicing and terminations are completed at S1/S2/FDC/FAT/OTB as applicable.

- Connect laser source (LS) at start end (OLT/FDC as applicable) and Power Meter (PM) at the other end (OTB/FDC/FAT as applicable).
- Verify the testing equipment for 1550 nm wavelength. Refer manufacturer's procedure for details.
- Perform testing at 1550 nm wavelength.
- Record the results in format # **R4G-71-FBC-FMT-PR-003**. Threshold acceptance limit is $\leq -23(+2\text{dB})$ power.

b) OTDR Testing:

- OTDR testing shall be carried as defined in document no. R4G-80-FBR-OMG-PR-002 i.e. guidelines for FTTX Testing & Acceptance Criterion.
- Results shall be recorded in format # **R4G-71-FBC-FMT-PR-005**

16 HOTO Process

HOTO process for FTTx shall be applicable for handing over of OFC network between OLT and Splitter 2 (S 2) including Splitter 1 in between.

Below Document shall be applicable during handing over network to O&M.
(Reference Document :- R4G-80-PLG-OMP-PR-005)

Sr. No.	Documents	Data management platform	Format No.
1	Statutory documents like public/ private ROW(Feeder and Distribution).	Portal/ Hard copy	R4G-80-COM-CHK-PR-004 & R4G-80-FBR-FMT-PR-016
2	As built drawings/ SLD	GIS/ Hardcopy/ Measurement book	R4G-71-FBC-FMT-PR-002
3	Exception/ deviation signed by competent authority, if applicable.	Hardcopy/Soft	R4G-71-FBC-FMT-PR-010
4	Undertaking certificate (Stating that all third party damages claim during construction has been settled)	Hardcopy/Soft	R4G-80-FBR-FMT-PR-014
5	Aerial installation check list (If applicable)	Hardcopy/Soft	R4G-71-FBC-FMT-PR-007
6	Access Chamber checklist	Hardcopy/Soft	R4G-71-FBC-FMT-PR-008
7	Splicing plan/ Schematic for OLT Grid and S 1 Grid.	Hardcopy/Soft	NA
8	Testing reports OTDR, LS-PM as applicable.	Hardcopy/Soft	R4G-71-FBC-FMT-PR-003 R4G-71-FBC-FMT-PR-005
9	ODN Check list	Hardcopy/Soft	R4G-71-FBC-FMT-PR-006
10	Handover Asset Summary	Hardcopy/Soft	NA
11	Checklist for Splicing and testing	Hardcopy/Soft	R4G-80-FBR-CHK-PR-007
12	HOTO-Observation format	Hardcopy/Soft	R4G-71-FBC-FMT-PR-012
13	Check list - ABD for NE update	Hardcopy/Soft	R4G-71-FBC-FMT-PR-013
14	Construction completion & HOTO certificate	Hardcopy/Soft	R4G-71-FBC-FMT-PR-011

***Note: Sr. No. 1 and 4 is required only for OSP**

17 RFS Definition

The definition of RFS as based on various scenarios is as described below:

a) Consumer (Residential) Connectivity

- **Construction Ready @ ZMH (zero manhole):** These buildings which are Primarily MDUs and SDU gated communities wherein the S1 and S2 are to be placed inside the building/society but due to the

unavailability of permission the construction team has kept fiber loop inside the manhole near the building/society. Once the permission is received, the construction team will deploy the network as per IBD plan.

- **Near RFS** : The Network ready till the S1 splitter and FAT is not installed inside the society/building or the FAT (with S2) is shared among buildings/Society within a DSA. (BOTH for MDU/SDU scenario)
- **Direct RFS** : Network is ready and tested till S2.

b) Enterprise Connectivity

- **Construction Ready @ ZMH (zero manhole)**: These are the buildings where S1 and S2 is to be placed inside the enterprise building but due to unavailability of permissions the construction team has kept fiber loop inside the manhole near the building. Once the permission is received the construction team will deploy the network as per IBD plan.
- **Enterprise bldg. RFS**: Network is deployed till termination of box (yet to be decided) at the customer premises. The box will have one L3 Switch & 2ONTs.

18 Deviation Approval Process

Sometime, it is difficult to execute the work as planned due to unavoidable site conditions. In such cases, approval for deviation should be obtained before execution.

Some possible deviations could be:

- Route change (due to permissions issue/other site constraints)
- Low Depth (due to presence of utilities/other site conditions)

- Deviation to specifications
- Other internal / external factors

Some of these deviations can be **Temporary** in nature and would be rectified in due course and thus require approval on timeline for regularization purpose.

Other deviations can be **Permanent** in nature and would require formal approval and thus proper justification need to be provided for deviation.

18.1 Approval Hierarchy

Following table gives approving hierarchy based on the category (major/minor) of deviation. Major deviations are those which will impact cost and Network Quality.

Deviation Type	Category	Approval at Jio Centre	
		Level -1	Level-2
Change of Route	Major	√	√
Fiber drop / Splice change	Minor	√	
NE Position Change	Minor	√	
No. of Network Elements / Capacity Changed	Major (no cost impact)	√	
Increase in BOM > 25%	Major	√	√

Level - 1 : FTTx Jio Centre Lead

Level - 2 : City FTTx Construction manager / State FTTX Lead

19 Escalation Matrix

Sr. No.	Route Section (UB/IB)	Issue/Reason for Escalation	Team Name	Primary Contact Person	Secondary Contact Person
1	IB	Delayed permission by RWA	Business	Jio Centre Acquisition Lead	Jio Centre Manager
		Work stopped by RWA / Resident(s)			
		Additional requirements imposed by RWA			
2	UB	Objection by Municipal Corporation	SCO (Row Team)	ROW Lead & FTTx Jio Centre Lead	State SCO / State Fttx Lead
		Objection by Local public / authority			
		Authority confiscated Material /Equipment			
3	IB/UB	Route Change requiring re-planning	NP&E	Jio Centre Planning lead	FTTx Jio Centre Lead
4	UB/IB	Long Pending Unresolved Issues	FTTx PMO	War Room Executive	State Fttx Lead& NHQ, FTTx PMO
		Consistent Low Productivity by Team Members / Contractors			
5	UB/IB	Material Shortage intimation	SCM		SCM team

Sr. No.	Route Section (UB/IB)	Issue/Reason for Escalation	Team Name	Primary Contact Person	Secondary Contact Person
		Expediting Material Delivery		Material Coordinator	
		Material Reconciliation and Reverse Logistic			
6	IB/UB	Unethical Practices		Jio Centre lead / Fttx City const. Manager	State Fttx Lead

Note: Immediate efforts must be made in resolving the issues instead of waiting for review meetings or escalations for unresolved issues.

20 FTTx Document Repository (REIMS)

All documents generated during planning, design, procurement, construction, HOTO and subsequently during operation are stored in Company's central repository REIMS or Reliance Enterprise Information Management System.

A list of such documents and their storage is provided in the tables below.

Sr.No	Name Of Records	Folder Name	Nomenclature	Example	REIMS Path	Details
1	MB sheet	MB sheet	R4G-71-MBS-City Name-JCnumber-FSA Number-Building ID's (max 3building)-MB sheet R4G-71-MBS-City Name-JCnumber-FSA Number-Streach ID / Span ID's (max 5 span ID's) -MB	R4G-71-MBS-MU-JC02-MUMB0001-MUMBBD0014331-MUMBBD0014332- R4G-71-MBS-MU-JC02-MUMB0001-FS0071-FS0072-FS0073-DS0074-	Cabinets/R4G/71-FTTx Implementation/Quality Management System/Record/MB Sheet	MBS:Measurement Book Sheet
2	As built drawing (Civil)	As Built	R4G-71-ABD-city code-JCnumber-FSA Number-UB-OSP Span ID (max 5 span ID's) -Civil R4G-71-ABD-city code-JCnumber-FSAnumber-IB-Building RJID's (max 3building)-Civil	R4G-71-ABD-MU-JC02-MUMB0001-UB-FS0071-FS0072-FS0073-DS0074- R4G-71-ABD-MU-JC02-MUMB0001-IB-MUMBBD0014331-MUMBBD0014332-MUMBBD0014333-Civil	Cabinets/R4G/71-FTTx Implementation/Quality Management System/Records/ABD	UB - Applicable for OSP IB - Distribution & inbuilding ABD- As Build
3	As built drawing (Optical)	As Built	R4G-71-ABD-city code-JCnumber-FSA Number-UB-Ring Number-Optical R4G-71-ABD-city code-JCnumber-FSA Number-UB-OSP Stretch ID-Optical R4G-71-ABD-city code-JCnumber-FSA Number-IB-Building RJID-Optical	R4G-71-ABD-MU-JC02-MUMB0001-UB-Ring1-S1 number's (3Max)-Optical R4G-71-ABD-MU-JC02-MUMB0001-UB-FS0026-Optical R4G-71-ABD-MU-JC02-MUMB0001-IB-MUMBBD0115984-Optical	Cabinets/R4G/71-FTTx Implementation/Quality Management System/Records/ABD	UB - Applicable for OSP IB - Distribution & inbuilding ABD- As Build
4	OTDR Reports	QHS/OTDR	R4G-71-QHS-City Name-JCnumber-FSA Number-OTD-6 digit Element Number	R4G-71-QHS-MU-JC02-MUMB0001-OTD-FM0001	Cabinets/R4G/71-FTTx Implementation/Quality Management System/Record/QHS	FM:FDMS port
5	LSPM reports	QHS/LSPM	R4G-71-QHS-City code-JCnumber-FSA Number-Building ID-LSP-6 digit FDC/ JC Element Number R4G-71-QHS-City code-JCnumber-FSA Number-Span ID-LSP-6 digit FDC/ JC Element Number	1. R4G-71-QHS-MU-JC02-MUMB0001-MUMBBD0014330-LSP-FT0006 2. R4G-71-QHS-MU-JC02-MUMB0001-MUMBBD0014330-LSP-FD0006 1. R4G-71-QHS-MU-JC02-MUMB0001-DS0045-LSP-FT0006 2. R4G-71-QHS-MU-JC02-MUMB0001-DS0045-LSP-FD0006	Cabinets/R4G/71-FTTx Implementation/Quality Management System/Record/QHS	FT:FAT FD:FDC JC:Joint Closure etc

Sr.No	Name Of Records	Folder Name	Nomenclature	Example	REIMS Path	Details
6	ODN Installation Checklist	ODN	R4G-71-ODN-City code-JC Number-FSA Number- Building ID-CHK- Ring number R4G-71-ODN-City code- JC Number-FSA Number- Span ID(max 5 ID's)-CHK- Ring number	R4G-71-ODN-MU- JC02- MUMB0001- MUMBBD0014330- CHK-FC001 R4G-71-ODN-MU- JC02- MUMB0001- DS0001-DS0002- DS0003-DS0004- DS0005-CHK-FC001	Cabinets/R4G/71-FTTx Implementation/Quality Management System/Record/ODN	one ODN checklist can cover multiple NE's
7	Access Chamber Checklist	Access Chamber	R4G-71-ACH-City code-JC Number-FSA Number- Ring Number-Span ID- CHK-6 digit Chamber ID's (max 5 ID's)	R4G-71-ACH-MU- JC02-MUMB0001- Ring1-FD0005-CHK- CM0001-CM0002- CM0003-CM0004- CM0005	Cabinets/R4G/71-FTTx Implementation/Quality Management System/Record/ACH	ACH : Access Chamber;Access chamber ID to be mentioned
8	Aerial Cabling Checklist	Aerial Cabling	R4G-71-ACL-City code-JC Number-FSA Number- CHK-6 digit stretch ID(max 5 ID's)	R4G-71-ACL-MU- JC02-MUMB0001- CHK-FS001-DS002- DS003-DS004-DS005	Cabinets/R4G/71-FTTx Implementation/Quality Management System/Record/ACL	ACL- Aerial Cabling ;6 digit StretchID needs to mentioned
9	ABD Checklist prior to NE update	NE Update Checklist	R4G-71-NEU-City code- JC Number-FSA Number- CHK- NE update Checklist number.	R4G-71-NEU-MU- JC02-MUMB0001- CHK- 0001	Cabinets/R4G/71-FTTx Implementation/Quality Management System/Record/NEU	NEU- NE update, CHK -Checklist
10	Construction Completion & HOTO Certificate	HTO	R4G-71-HTO-City code-JC Number-FSA Number- CER-Ring Number	R4G-71-HTO-MU- JC02-MUMB0001- CER-Ring1	Cabinets/R4G/71-FTTx Implementation/Quality Management System/Record/HTO/CER	HTO - Handover Takeover,
			R4G-71-HTO-City code-JC Number-FSA Number- CER-Ring number-Span ID's (max 5 span ID's)	R4G-71-HTO-MU- JC02-MUMB0001- CER-Ring1-FS001- DS002-DS003-DS004- DS005		
			R4G-71-HTO-City code-JC Number-FSA Number- CER- Building ID's (max 3building)	R4G-71-HTO-MU- JC02-MUMB0001- CER- MUMBBD0039751- MUMBBD0039752- MUMBBD0039753		
11	HOTO: Network Observation Sheet	HTO	R4G-71-HTO-City code-JC Number-FSA Number- HOR- Building ID	R4G-71-HTO-MU- JC02-MUMB0001- HOR- MUMBBD0039752	Cabinets/R4G/71-FTTx Implementation/Quality Management System/Record/HOTO/HOR	HTO - Handover Takeover,

Sr.No	Name Of Records	Folder Name	Nomenclature	Example	REIMS Path	Details
12	HSE Photos/UB Work	HSE Photos	R4G-71-HSE-City code-JCnumber-FSA Number-PHT-UB-Stretch id - Photo ID	R4G-71-HSE-MU-JC02- MUMB0001-PHT-UB- FS0026-PHT001	Cabinets/R4G/71-FTTx Implementation/Quality Management System/Records/HSE Photos	PHT:Photo FS:Feeder Route
13	HSE Photos/Inbuilding	HSE Photos	R4G-71-HSE-City code-JCnumber-FSA Number-PHT-IB-Building RJIID- Photo ID	R4G-71-HSE-MU-JC02- MUMB0001-PHT-IB- MUMBDD0115984-PHT001	Cabinets/R4G/71-FTTx Implementation/Quality Management System/Records/HSE Photos	DS:Distribution Route
14	Customer Feedback	Customer Feedback	R4G-71-CFB-City code-JC Number-FSA Number-Buildind ID	R4G-71-CFB-MU-JC02-MUMB0001-MUMBDD0115984	Cabinets/R4G/71-FTTx Implementation/Quality Management System/Record/CFB	CFB-Customer Feedback
15	Deviation Approval Notes(Permanent & Temporary)	Deviation	R4G-71-DEV-City Name-JCnumber-FSA Number-PER deviation note number	R4G-71-DEV-MU-JC02- MUMB0001-PER001	Cabinets/R4G/71 - FTTx Implementation/Quality Management System/Records /Deviation	PER: Permanent TEM: Temporary DEV: Deviations
			R4G-71-DEV-City code-JCnumber-FSA Number-TEM deviation note number	R4G-71-DEV-MU-JC02- MUMB0001-TEM001		
16	HSE Checklist	HSE Audit	R4G-71-HSE-City code-JC Number-FSA Number-CHK-UB-six digit stretch id	R4G-71-HSE-MU-JC02- MUMB0001-CHK-UB-DS0001	Cabinets/R4G/71-FTTx Implementation/Quality Management System/Record/HSE	CHK : Checklist For IB - 13 digit RJID needs to update, where as for UB - 6 digit stretch id needs to be mentioned
			R4G-71-HSE-City code-JC Number-FSA Number-CHK-IB-Building RJID	R4G-71-HSE-MU-JC02- MUMB0001-CHK-IB- MUMBDD0115984		
17	HSE Audit Observation Report	HSE Audit	R4G-71-HSE-City code-JC Number-FSA Number-AOR-UB-six digit stretch id	R4G-71-HSE-MU-JC02- MUMB0001-AOR-UB-DS0001	Cabinets/R4G/71-FTTx Implementation/Quality Management System/Record/HSE	AOR : Audit Observation Report, For IB - 13 digit RJID needs to update, where as for UB - 6 digit stretch id needs to be mentioned
			R4G-71-HSE-City code-JC Number-FSA Number-AOR-IB-Building RJID	R4G-71-HSE-MU-JC02-MUMB0001-AOR-IB- MUMBDD0115984		

Sr.No	Name Of Records	Folder Name	Nomenclature	Example	REIMS Path	Details
18	QC Audit Observation reports	Quality AT	1) R4G-71-QAT-City code-JCnumber-FSA Number-AOR-IB-Building RJID 2) R4G-71-QAT-City code-JCnumber-FSA Number-AOR-UB-six digit stretch id	1) R4G-71-QAT-MU-JC02- MUMB0001-AOR-IB-MUMBBD0115984 2) R4G-71-QAT-MU-JC02- MUMB0001-AOR-UB-DS0001	Cabinets/R4G/71-FTTx Implementation/Quality management System /Records/Quality AT	For IB - 13 digit RJID needs to update, where as for UB - 6 digit stretch id needs to be mentioned,AOR-Audit Observation report
19	Qulaity Non-Conformance Report	NCR	1) R4G-71-NCR-City Code-JCnumber-FSA Number-IB-Building RJID 2) R4G-71-NCR-City Code-JCnumber-FSA Number-UB-six digit stretch id	1) R4G-71-NCR-MU-JC02- MUMB0001-IB-MUMBBD0115984 2) R4G-71-NCR-MU-JC02- MUMB0001-UB-DS0001	Cabinets/R4G/71-FTTx Implementation/Quality management System /Records/NCR	NCR- Non Conformance Report
20	Qulaity Field Observation Report	FOR	1)-R4G-71-FOR-City code-JCnumber-FSA Number-IB-Building RJID 2)-R4G-71-FOR-City Code-JCnumber-FSA Number-UB-six digit stretch id	1) R4G-71-FOR-MU-JC02- MUMB0001-IB-MUMBBD0115984 2) R4G-71-FOR-MU-JC02- MUMB0001-UB-DS0001	Cabinets/R4G/71-FTTx Implementation/Quality management System /Records/FOR	FOR - Field Observation Report
21	Training Documents	Attendance Sheet	R4G-71-TRG-ATS-City code-Date	R4G-71-TRG-ATS-MU-16.01.2015	Cabinets/R4G/71-FTTx Implementation/Quality Management System/Record/TRG	TRG - Training, ATS - Attendance Sheet
		Feedback form	R4G-71-TRG-FBD-City code-Date	R4G-71-TRG-FBD-Mumbai-02.12.15	Cabinets/R4G/71-FTTx Implementation/Quality Management System/Record/TRG	FBD-Feedback Form
22	Calibration Reports	Calibration Reports	R4G-71-FBC-CER-Cal-Equipment Type - Equipment Serial number	R4G-71-FBC-CER-Cal-OTDR-1234567	Cabinets/R4G/71-FTTx Implementation/Quality Management System/Record/Certificates/Calibration	CER-Certificates
23	Product Issues Register	Product Register	R4G-71-FBC-NCR-PIR-Month-year	R4G-71-FBC-NCR-PIR-NOV-2014	Cabinets/R4G/71-FTTx Implementation/Quality Management System/Record/NCR/PIR	PIR- Product issues Register
24	ISO Audit Observation Report	QUA	R4G-71-QUA-City code-JC Number-AOR-Date	R4G-71-QUA-MU-JC02-AOR-31.12.2014	Cabinets/R4G/71-FTTx Implementation/Quality Management System/Record/QUA	AOR- Audit Observation Report
25	ISO Audit Compliance report	QUA	R4G-71-QUA-City code-JC Number-ACR-Date	R4G-71-QUA-MU-JC02-ACR-31.12.2014	Cabinets/R4G/71-FTTx Implementation/Quality Management System/Record/QUA	ACR - Audit compliance Report
26	Survey Report	SUR	R4G-71-FBC-SUR-Circle code-City code-JC Number-FSA ID	R4G-71-FBC-SUR-MU-MUMB-MUMBJC24-MUMB0002	Cabinets/R4G/71-FTTx Implementation/Quality Management System/Record/SUR/Circle/City Name/	SUR- Survey Report

21 Responsibility Matrix for Document Upload

It is the responsibility of various stake holders to ensure that the documents are stored in repository for future references. The table below gives responsibility for uploading and verification of documents.

Sr.No	Name Of Records	Responsibility for REIMS Upload
1	As built drawing	Fiber Engineer
2	Deviation Approval Notes(Permanent & Temporary)	Fiber Engineer
3	MB sheet	Fiber Engineer
4	Approved ROW permission letter with DWG	Fiber Engineer
5	LSPM reports	Fiber Engineer
6	OTDR Reports	Fiber Engineer
7	HSE Photos/UB Work	Fiber Engineer
8	HSE Photos/In building	Fiber Engineer
9	ODN Installation Checklist	Fiber Engineer
10	QA Audit Observation reports	QA Engineer
11	HSE Checklist	Jio Centre FTTx Const. Lead
12	HSE Audit Observation Report	QA Engineer

Sr.No	Name Of Records	Responsibility for REIMS Upload
13	HSE Compliance Report	QA Engineer
14	Access Chamber Checklist	Fiber Engineer
15	Aerial Cabling Checklist	Fiber Engineer
16	ISO Audit Observation Report	NHQ Team
17	ISO Audit Compliance report	Fiber Engineer

22 Training, Certification & Process Awareness

To make construction team aware with all processes and standards, it is recommended to provide training and Certification prior to field deployments. During training following should be briefed

- Network Topology and Terminology
- Awareness about Health and Safety norms
- Standard Operating Procedures
- Hands on Experience on various FTTx products
- As-built documentation and Record keeping
- Escalation Matrix
- Daily Progress Reporting
- Incident reporting

It is recommended to have two different Modules to educate

- On role Construction Team
- Partner's team

23 Reference Documents:

Sr. No.	Document Title	Document No.	Document Type
1	ODN checklist	R4G-71-FBC-FMT-PR-006	ITP
2	LSPM Testing	R4G-71-FBC-FMT-PR-003	Format
3	As built Format (Civil)	R4G-71-FBC-FMT-PR-002	Format
4	As built Format (Optical)	R4G-71-FBC-FMT-PR-019	Format
5	Quality Check observation report	R4G-71-FBC-FMT-PR-009	Format
6	OTDR Report Template	R4G-71-FBC-FMT-PR-005	Format
7	LSPM Testing Format – OTB	R4G-71-FBC-FMT-PR-004	Format
8	Aerial Cabling Checklist	R4G-71-FBC-FMT-PR-007	ITP
9	Access Chamber Checklist	R4G-71-FBC-FMT-PR-008	ITP
10	HSE Audit Checklist	R4G-71-HSE-FMT-PR-001	ITP
11	ABD check list prior to NE update	R4G-71-FBC-FMT-PR-013	Format
12	Measurement Sheet	R4G-71-FBC-FMT-PR-001	Format
13	Deviation Note	R4G-71-FBC-FMT-PR-010	Format

Sr. No.	Document Title	Document No.	Document Type
14	Service Partner Performance Evaluation Format	R4G-71-FBC-FMT-PR-018	Format
15	Customer Feedback Format	R4G-71-FBC-FMT-PR-014	Format
16	Construction Completion HOTO Certificate	R4G-71-FBC-FMT-PR-011	Format
17	HOTO: Network Observation Sheet	R4G-71-FBC-FMT-PR-012	Format

