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UT Technology

TELECOMMUNICATION DESIGN GUIDELINES

Main Contents

UT Technology Telecommunications Design Guidelines V 7.2

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Utt Design Guidelines For Fiber To The Home Requirements In New Buildings

1.1. INTRODUCTION:

Telecommunications is now an integral part of the social, economic and political issue of the world. Networks of the future will be digital and intelligent and will offer high transmission capacity and flexible bandwidth in addition, they will be easily accessed and connected while its services will be personal and tailored to individual needs. They will allow us to interact in ways previously not possible - available at any time and any place. In addition to providing entertainment and business services, networks of the future will provide education, health and other public services.

Major advances in communications technology have substantially widened the range of services carried by the network. Satellites, microwave radio, optical cable links, digital switching and transmission, offer a potential for the improvement of quality and for the extension of access to the most remote areas. The pace of technological change is increasing while the magnitude of demands the future will make on our creativity and capacity to adapt is great. Customers will demand more than just state-of-the-art technology; they will want convenience and increased control over their lives that easy and affordable information access can provide while businesses will look for total telecommunications solutions that will not only enable them to remain productive and compete globally but will also give them a competitive edge.

Ubiquitous Telecommunication Technology (UTT) can be well-placed to meet these challenges ahead and meet the varied needs of our local and international customers and pave the way for the region's new dynamism in the telecommunications industry well into the 21st Century.

As the technology and mode of transport are changing fast, a broad approach to suit all future type of services will have to be born in mind, while designing the infrastructures for the buildings. A properly designed building with clear Access path supports the triple play services (viz) telephony, data and Video services. Also, supports future advanced services, warranting higher speeds and higher bandwidth, planned to be available in near future, for faster provision of services.

The present booklet is to provide guidelines for consultants, contractors the details on the in-building facilities required to be considered at the design stage.

The details provided are a general insight and the minimum requirements of UTT for the new buildings, primarily to develop and deploy FTTH (Fiber to Home).

1.2. INTRODUCTION TO FTTH (Fiber To The Home)

The FTTH is simply the 100 percent deployment of optical fiber in the access network. It is commonly deployed in two specific configurations, as below:

- ***Point-to point. (PTP) network*** - Fiber is dedicated to each user in the access network. PTP networks are characterized by the use of one fiber and laser per user. A dedicated fiber is terminated at the subscriber and active devices at the central office (CO) for a telecommunications provider.

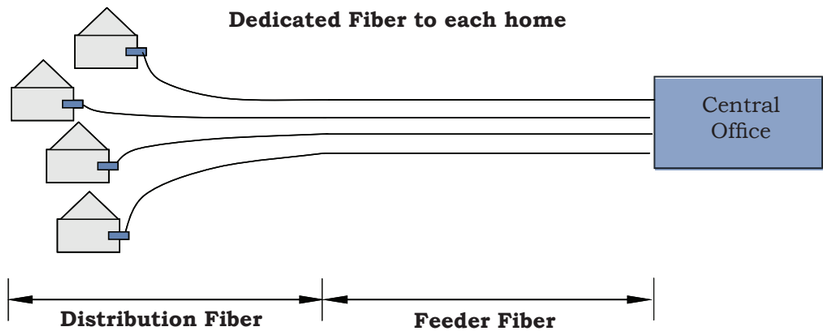

Fig.1 (Point to point (PTP) network)

- ***Passive optical network (PON)*** - A single fiber is shared (via a splitter) among a set number of users, typically thirty-two.

PONs are characterized by the “splitting” of the same optical fiber along the way, resulting in the sharing of the optical fiber among multiple users
The fiber in a PON is designed to share between 2 to 128 users, depending upon the availability of splitters.

A PON will have less optical reach than a PTP network, which does not use splitters. Typically a PON is capable of reaching subscribers 20 kilometers (km) from the OLT, which will cover most of the population.

GPON promises 2.5/1.25 Gbps asymmetrical operation. GPON supports ATM, Ethernet and WDM using a superset multi-protocol layer.
GPON requires supporting a multiple protocols through translation to the native Generic Encapsulation Method (GEM) transport layer that through emulation provides support for ATM, Ethernet and WDM protocols.
The important characteristics of each PON technology are defined by two important standards bodies, the IEEE and the ITU.

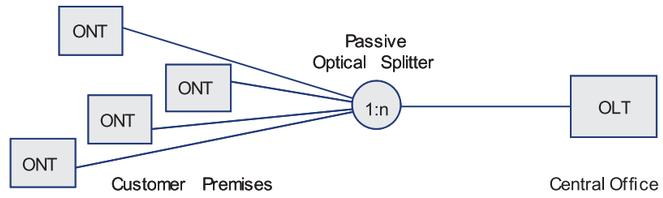

Fig.2 (Principle layout of passive optical network)

2.0 BUILDING CONTRACTIOR GUIDELINES

2.1 GENERAL TELECOMMUNICATION REQUIREMENTS

There are several types of buildings. The infrastructure for each type of building according to the function of the building for provision of Telecom & Smart services i.e. Commercial offices/buildings, Residential Towers, Ware houses, Medium High rise in a campus, Labor Camps, Mosque, Petrol Pump, hotels, private residential villas/multi tenant villas complexes and hospitals, internal concealed pipes and other associated requirements will vary accordingly.

The Architects/Consultants and Designers, Building Owners, Builders, Property Developers, and Contractors must liaise with UTT at the design stage and obtain UTT approval on the final design drawings. It is vital that the NOC process be adhered to in order for UTT to be able to provide subscribers with robust and reliable telecommunications services within their required timeframe.

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2.2 CIVIL REQUIREMENTS APPLICABLE FOR ALL TYPES OF BUILDINGS 2.2.1. ENTRY BOX:

Entry Box is an underground joint box built, exclusively to allow installation of UTT underground cable network to the customer□s premises.

- The Entry Box is a reinforced concrete structure, with a heavy duty Ductile Iron Frame and Cover of rating Grade „A□. The cover shall have marking as “Telephones”.
- The location of the entry box depends on the location of existing/Proposed UTT External Line Plant.
- The Entry box shall be constructed at a maximum distance of 1 meter from plot line. Within the plot (customer premise) if it is not practical, then outside the plot, touching with the boundary wall.
- Due to the variables involved, it is essential to consult UTT at the design stage, to decide the location of the Entry Box and Entry Pipe. The Consultants/Contractors shall not deviate from the stipulated location
- An earth rod must be provided at the Entry Box. The required earth resistance should not exceed 5 Ohms.
- For Entry Box size details please refer to Table No. 1

2.2.2. ENTRY PIPES: (Lead-in ducts)

The entry pipes are uPVC ducts. These ducts are to be extended from the entry box towards UTT line plant location. Two lead in ducts to be provided in separate route for main and redundancy cables.

- Entry pipes should be laid at a depth of 60 cm from the proposed finished paving level. The Entry pipe shall be protected with concrete, to prevent damages.
- Entry pipe should be extended to the entry box and beyond to the nearest existing UTT plant location.
- The Entry pipe should be of uPVC material and of black color.
- The open ends of the entry pipe shall be properly sealed, to prevent entry of sub soil materials and ingress of water.
- Location of Entry pipes, shall be clearly marked, above ground for easy location
- Building contractors shall be responsible to locate the installed entry pipes on site, if requested by UTT.
- No right-angled sharp bends shall be installed through out the duct length, except one wide-angle, long radius bend (factory mavided.
- Cable trays may be provided in the basement from location of lead in ducts entering the basement to main telecom room of the building for both main & redundancy route. End of the ducts should be properly sealed to prevent ingress of water.
- Cable trays should be 600mm x 50mm with heavy duty return flange (HDRF) type. Minimum clearance of 2.4m should be maintained from the floor level. Cable trays should be provided through common areas & should not pass through any utility room, pump room, stores and etc…
- Entry pipes shall be assigned, exclusively for UTT Telecommunication & Smart Services.
- Entry pipes shall be provided with a draw rope made of nylon of minimum 6 mm diameter
- For the number and size of entry pipes, for the various types of buildings, please refer to Table 1.

2.2.3. MAIN TELECOMMUNICATION ROOM (MTR):

Main Telecom room shall be a dedicated room. This is to be provided either on the ground floor or basement or in the first floor or Mezzanine floor of the building for the purpose of terminating Telecommunication Cables and to house the present & future Telecom/Smart equipments.
The room shall be exclusively for UTT use.

- The room must be easily accessible to UTT Personnel 24 Hr / Day, (all days including weekends). The room must be clean, dry, and free from dust and secured from unauthorized entry.
- Adequate lighting should be provided.
- The room must have an anti-static “raised floor” of minimum 30 cm.
- The room must be provided with a good earth of not more than 5 Ohms.
- The door opening for the room shall swing outwards having the size of 900mm x 2200mm labeled as UTT Main Telecommunication Room
- The floor, roof and surrounding wall of the Telecom room, shall be free of any concealed water/drainage pipes, high pressure water pipes, FCU, BUS bars and air-conditioning ducts passing through.
- The room must be provided with an emergency light, a smoke detector and a fire alarm.
- The room must be equipped with FM200 fire fighting
- If the Telecom room is proposed in the basement, an automatic sump draining system shall be provided to handle water seepages.
- The Duct entry to building shall be sealed air and water tight
- For the main telecom room size, please refer Table No. 1
- Layout of the room shall be submitted to UTT showing the overhead (ladder type cable trays) and under raised floor cable trays. The installation of the cable trays shall be the responsibility of the contractor upon obtaining UTT□s approval for the room layout.

MEP Requirements:

- 1. 2 Units of 6-way AC Power Distribution Board having 160 Amps MCCB Incomer as Mains incomer, Surface mounting, TP + N & E, rated 415 volts AC supply fed from essential building power.
- Each DB having:
- A) 160 amps, TP incomer MCCB – (Adjustable from 125 to 160A)
- (TP + N + E) – 1 No.
- Note: Proposed Incomer cable should be minimum 70sq.mm XLPE 4 core with Separate Earth.
- B) TP outgoing MCCB rating 63 Amps – 4 Nos.(Adjustable from 63 to 100A)
- C) SP outgoing MCCB rating 10, 20, 30 Amps – 2 Nos. each
- (MAKE: Square D, Merlin Gerin or Equivalent)
- (Plug in type MCCB preferred e.g. I Line Square D)
- 2. Electric Power sockets fed from normal Building supply on spurs with dedicated circuit breakers rated at 20A.
- Twin electric AC sockets 13A – 4 Nos.
- 3. Grounding earth bar
- Dedicated AC clean earth & DC clean Earth bar – 2 Nos. each
- 4. Air-conditioning
- Dedicated Air-conditioning system required to maintain room temperature at 21°C ± 1°C as per the room layout/space.

2.2.4. SECONDARY TELECOMMUNICATION ROOMS (STR) / GSM ROOMS:

- Buildings with more than 20 stories must have a Secondary Telecom Room at each 10th floor. This requirement is essential to overcome the distance limitations for the purpose of terminating Telecommunication Cables and to house the Telecom/Smart equipments.
- The Secondary Telecommunication Room at each 10th floor must be easily accessible to UTT Personnel 24hr/day, (all days including weekends). The room must be clean, dry, and free from dust and secured from unauthorized entry.
- Adequate should be provided.
- The room must have an anti-static “raised floor” of minimum 30 cm.
- The room must be provided with a good earth of not more than 5 Ohms.

- The door opening for the room shall swing outwards having the size of 900mm x 2200mm labeled as UTT Secondary Telecommunication Room
- The floor, roof and surrounding wall of the Telecom room, shall be free of any concealed water/ drainage pipes, high pressure water pipes, FCU, BUS bars and air-conditioning ducts passing through.
- The room must be provided with an emergency light, a smoke detector and a fire alarm.
- The room must be equipped with FM200 fire fighting
- The size of the room is 3 (L) x 4 (W) x 3 (H) Meters.
- The room should be close to the floor telecom room with 2 no of (300mm x 50mm) of cable trays to be provided for the interconnection with the Floor Telecommunication Room and the Main Telecommunication Room

MEP Requirements:

- 1. 2 Units of 4 way AC power Distribution Board having 63 Amps RCD Incomer as Mains incomer, Surface mounting, TP + N & E, rated 415 volts AC supply fed from essential building power
- Each DB having:
- A) 63 amps, TP incomer RCD 300 mA – 1 No
- B) TP outgoing MCB rating 32 Amps – 2 No
- C) SP Outgoing MCB rating 10, 20, 30 Amps – 2 No each
- (MAKE: Square D, Merlin Gerin or Equivalent)
- 2. Electric Power sockets fed from normal Building supply on spurs with dedicated circuit breakers rated at 20A.
- Twin electric AC sockets 13A – 4 No
- 3. Grounding earth bar
- Dedicated AC clean earth & DC clean Earth bar – 2 No each
- 4. Air-conditioning
- Dedicated Air-conditioning system required to maintain room temperature at 21°C ± 1°C

2.2.5. FLOOR TELECOMMUNICATION ROOM (FTR):

Floor Telecommunication Room is a dedicated room and required on each floor for the purpose of accommodating internal conduit from every flat termination, routing or terminating Telecommunication Cables and to accommodate the Telecom equipments, if required. Floor telecommunication room shall be located close to the risers. This room should be exclusively for the use of UTT.

- All floor telecommunication rooms shall be vertically aligned
- If floor telecommunication room cannot be provided directly above the Main telecommunication room, then the distance between the floor telecommunication room and the main telecommunication room shall not exceed 10m
- Adequate lighting and minimum of two 13 Amp 240 volt AC Mains outlet should be provided.
- 1 set of 2x40 W Fluorescent lamps are to be provided.
- The room must readily be accessible to UTT Personnel and equipment 24hr/day, all the days, round the clock and the room, clean dry, and free from dust and secured from unauthorized entry.
- The room must be air-conditioned
- The floor, roof and surrounding wall of the Telecom room, shall be free of any concealed water/drainage pipes, high pressure water pipes, FCU, BUS bars and air-conditioning ducts passing through.
- The floor Telecom room should be provided with good earth of not more than 5 Ohms.
- The floor telecom room, shall not be linked to or serve any other floor of the building and any other ELV cables are prohibited to be in the FTR.
- A handheld fire fighting extinguisher must be available 24hr/day in the room
- A Single conduit of at least 50mm (2 inch) internal dia., black and of uPVC material should be provided from each floor telecom room to the Indoor equipment cabinet of each office, residence, flat and other independent areas in the same floor.
- The door opening for the room shall swing outwards having the size of 900mm x 2200mm labeled as UTT Floor Telecommunication Room
- UTT should be consulted to enhance the requirements, if the building is designed for commercial use.
- For the floor telecom room size, please refer Table No. 1

2.2.6. ROOF TOP TELECOMMUNICATION ROOM (RTR):

Roof Top Telecommunication room is a dedicated room to be provided on the roof top of the proposed Multi-stories buildings, exclusively for UTT use and secured from unauthorized entry. The minimum Roof Top Telecommunication room size shall be 3(L) x 3(W) x 3(H) Meter.

- The floor loading of this area must be maximum possible, to support future installation of Telecommunications equipment.
- An opening of size 60x40 cm to be provided on the wall of the room, facing the Terrace, 50 cm below the room ceiling.
- The location of the Room, shall be within the vertical structure of the building, with due considerations for load safety provisions and to extend related facilities required such as Air-conditioning, 3-phase power (Distribution Board) D.B, earthling less than 5 Ohms, adequate lighting, one 13 Amp 240V AC power socket and one telephone socket.
- The room must have an anti-static “raised floor” of minimum 30 cm
- The floor, roof and surrounding wall of the Telecom room, shall be free of any concealed water/ drainage pipes, high pressure water pipes, FCU, BUS bars and air-conditioning ducts passing through.
- The room must be equipped with FM200 fire fighting
- The room must be provided with an emergency light, a smoke detector and a fire alarm.
- The room must readily be accessible to UTT personnel and equipment 24hr/day, all the days, round the clock and the room must be clean, dry and free from dust.

MEP Requirements:

1. 2 Units of 4 way AC power Distribution Board having 63 Amps RCD Incomer as Mains incomer, Surface mounting, TP + N & E, rated 415 volts AC supply fed from essential building power

Each DB having:

D) 63 amps, TP incomer RCD 300 mA – 1 No

E) TP outgoing MCB rating 32 Amps – 2 No

F) SP Outgoing MCB rating 10, 20, 30 Amps – 2 No each

(MAKE: Square D, Merlin Gerin or Equivalent)

- 2. Electric Power sockets fed from normal Building supply on spurs with dedicated circuit breakers rated at 20A.
- Twin electric AC sockets 13A – 4 No
- 3. Grounding earth bar
- Dedicated AC clean earth & DC clean Earth bar – 2 No each
- 4. Air-conditioning
- Dedicated Air-conditioning system required to maintain room temperature at 21°C ± 1°C

2.2.7. POINT OF PRESENCE ROOM (POP room):

- POP room is to be provided in addition to MTR and shall be required in all the buildings having more than 40 floors in total located preferably in the Ground Floor area or 1st basement.
- POP room shall be a dedicated room exclusive use of UTT. All MEP requirements mentioned below should be provided. For POP room size refer to table 2.

A) Air Conditioning System :

- Basic cooling demand for the POP room shall not be less than 1500 watts/sqm, however this will be revisited based on the proposed Telecom equipment heat dissipation. The temperature to be maintained between 20°C ± 1°C and relative humidity shall be 50 – 55%.
- Close Control Air Handling units (could be chilled water system based (or) DX split type), preferably down air discharge type.
- N + 1 operational philosophy of the A/C equipment to be configured.
- Dual source of power supply to feed the A/C units ensuring redundancy in case of mains power.
- DC or UPS equipment must be segregated from Telecom equipment as the above cooling demand limited to telecom equipment only.
- Additional cooling for DC and UPS room to be provided if separate DC and UPS rooms are considered and to maintain a temperature between 20°C ± 2°C and relative humidity shall be 50 – 55% with N+1 configuration.

B) Power Requirement :

1. Dedicated space/room shall be allocated to install DC plant / UPS equipment. Size of room shall be decided based on equipment requirement.
2. Floor loading of the above room/space shall not be less than 3000 kg/sq.m.
3. Main AC Input Dist. Board shall be provided with 2x200 Amp MCCB as incomers in case of 1200 Ampere DC plant and 2x400 Amp. MCCB as incomers in case of 2400 Ampere DC plant, as applicable based on Telecom equipment load demand.

4. Dual source of power supply to feed the above DC plant AC Input DB, as one feeder from the mains power section and other feeder from standby generator board section of the Main LV Switch Board.

5. DC plant room temperature to be maintained in between 20 to 22°C and relative humidity shall be 50 to 55% and the cooling demand based on the DC plant (Batteries & Rectifiers) is 750 watts/m2. If UPS equipment is to be installed in the same room then the cooling requirement is 1000 watts/m2.

6. 2 Nos. earth terminal conductors shall be provided and connected to separate earth pits with less than 1Ω resistance. This arrangement is applicable for both POP room & DC plant room. The copper earth bar dimensions: 500mm x 50mm x 10mm, mounted on standard insulator assembly with 10 Nos. 10mm pre-drilled holes.

7. 5 Nos. 13 Amps. Twin switch socket outlets (with neon indicators) to be provided in the DC plant room and POP room combined.

8. One Telephone outlet to be provided in POP room.

9. Required cable openings shall be provided between DC plant room & POP room as mentioned below with fire sealant:
   Option A : 450 x 250mm wall/ceiling opening (OR)
   Option B : 6 Nos. 200mm UPVC ducts between the rooms.
   All other openings in and out of the POP/DC rooms shall be sealed with approved material by civil defense.

10. Suitable hot dipped galvanized iron cable ladders shall be provided for Power and fiber cable entry opening/point at ceiling level to floor bottom vertically. Proper floor sealant "Cable boots/cable seals" shall be provided to prevent air leak to space.

11. Necessary G.I heavy duty cable trays shall be provided in POP room below the Raised floor for DC power distribution and it shall match with the telecom equipment/ racks layout.

12. The size of the cable tray is 450mm x 50mm.

13. Dedicated cable trays (450mm x 50mm) shall be provided for Fiber Optic cables below Raised floor in coordination with telecom equipment / racks layout.

C) Mains Power /Distributions :

Main LV Switchboard of the building/tower/project which is feeding UTT POP room & DC plant room should have two sections with common Bus bar and interlocking facility and Section-1 shall be fed from Service Authority (M/s. ADDC, DEWA, SEWA & FEWA, etc.) power source and Section-2 by Standby generator respectively. In case of mains power failure standby generator will be able to start automatically and provide backup power to the connected "Electrical and HVAC" loads of the related to POP & DC plant rooms.

D) Fire Detection & Fire Protection System :

POP room & DC plant room should be protected by "Double knock" Fire Detection System interfaced with Auto Fire Protection/Suppression Systems.

The above fire services control panel shall be interfaced with the Mechanical equipment controllers/control panels (Air Conditioning equipment, Motorized Fire dampers, Ventilation Fans, etc.) and as well as with Building Management System/ existing fire alarm control panel, as applicable.

E) Raised Flooring System :

a) POP room shall be provided with non combustible modular type CaSO4 / CaSi3 Raised access flooring system with antistatic 2mm thick PVC top covering ranges between 500mm and 1000mm high depending on the size of POP with adequate perforate tiles to allow the cold air distribution. The perforated tiles shall be arranged in parallel to the cold air flow to achieve the Cold Aisle / Hot Aisle configuration.

b) DC plant room shall be provided with antistatic fire retardant PVC flooring.

F) Water Leak Detection System :

POP room shall be provided with Intelligent Water Leak Detection system and associated control panel. The system shall be provided below Raised floor. Also the water leak detection system shall be interconnected to Building Management System or remote sounder at watchman area as applicable for monitoring/ alarming.

It shall be ensured by all concerned that the POP room & DC plant room shall be properly protected against any water leakage / seepage prior to equipment installation.

G) Doors & Floors Loading :

POP room & DC plant rooms entrance doors shall have a clear opening of 2200mm (width) x 2700mm (height) having the labels as UTT POP Room

Floor loading for the POP room shall be 1000 kg/m2 & DC plant room shall be 3000 kg/m2.

H) Door Access Control System:

Access doors for the POP room & DC plant rooms shall be provided with Security Systems (Access Control and CCTV) at the Entry doors, gates, etc. to restrict the entry to authorized personnel only and adequate CCTV cameras shall be provided to monitor the activities in and around the rooms. The Access Control & CCTV systems shall be connected to Etisalat Enterprise solution System Platform and shall be dually monitored by central Monitoring Station(s) and local Region Monitoring Station and/or BMS in the same building-if any-]

Adequate internal and external lighting shall be provided to allow for CCTV system to have clear vision of the inside and outside area surrounding the POP Room.

I) Lighting :

Adequate lighting (Minimum 300Lux) shall be provided inside POP & DC plant rooms. Also sufficient Emergency version fittings (provided with self contained battery pack suitable for 3 hours duration) shall be provided. Maintained 3 hours Exit lights shall also be provided at the exit doors of the POP & DC plant rooms.

2.2.8. PEST CONTROL

All Telecommunication rooms and pathways must be pest controlled using the best available practices to prevent rodents damaging the cables & equipment. Special care should be taken to prevent rodents from entering the telecommunication rooms & pathways. All cable entries should be properly sealed before & after laying cables. Cable trays may be provided with removable covers & sealing the ends.

2.2.9. RISERS FROM MAIN TELECOM ROOM THROUGH FLOOR TELEPHONE ROOMS

The risers are required in all kinds of buildings for the installation of Telecom Fiber Optic cables from Main Telecom Room to other floors, as detailed below:

- Galvanized slotted iron cable trays as specified in table-1 of HDRF (heavy duty, return flange) shall be provided from the main telephone room, to each floor telephone room and extended up to the Roof telephone room.
- The risers to each floor shall be symmetrical and vertically in line from the Main Telecom Room. However, where the Main Telecom Room, Floor telephone closet/ Room and roof telecom rooms are not located one below the other in vertical line, a continuous cable trays/conduits to be provided with pull boxes/access panels at every turning point and at interval of 15 meters each, up to the Main Telecom Room. Right angle or sharp bends are to be avoided.
- If a building consists of more than one tower, all the above specified requirements are required in each tower. The towers must be inter-connected at the Main Telecom Room, by separate cable trays of minimum 1 x (600mm x 50mm)or through floor raceways passing through a common area between the two buildings. The size of the floor raceways to be decided at the design stage by UTT. The same requirements also apply to Mezzanine and Penthouse floors. The telecom cable trays should have adequate separation from electrical cable trays. Electrical cable trays should not cross the Telecom cable trays.

2.2.10. FLOOR DISTRIBUTION BOX (PULL BOX):

Pull Boxes are metallic boxes, concealed, located on the wall, where the internal conduit from every Flat is terminated. These empty boxes shall be located close to the risers and the cabinet and can be more than one, depending upon the number of floors and conduits proposed to be terminated. These distribution boxes facilitate, to route the Fiber Optic cables to the premises direct and the number of cables corresponds to the number of flats/premises

- The Distribution Boxes shall be of size not less than 30(L) X 30(H) X 15(D) cm flush mounted on wall and shall be fixed inside the Floor Telecom room of each floor. A suitable hinged cover shall be provided.
- It should be installed at a height of 120cms above the finished floor level.
- The conduits leading from the floor distribution Box towards each flat shall not be less than 50 mm diameter.
- Adequate safe working space is to be provided around each location.

The Distribution Boxes location should never be near any Electrical Junction Box or bus bars. Adequate safe working space should be provided in front of each Box.

A Single conduit of at least 50mm internal dia, black and of uPVC material should be provided from each floor Distribution Box to the Indoor equipment cabinet of each flat/office and other independent areas in the same floor.

Wall-Mountable Connector Housings provide interconnect or cross-connect capabilities between the outside plant, riser, distribution cables and the optical cables to the premises.

UTT should be consulted to enhance the requirements, if the building is designed for commercial use.

2.2.11. DISTRIBUTION INSIDE THE FLATS: (From ONU enclosure)

An ONU enclosure shall be of minimum size 24 U and width 600mm and depth 150mm (from the approved vendors of UTT) to house the Optical network unit (ONU), power sockets and patch panel. The cabinet shall be flush mounted on wall in an easily accessible location for technicians.

The cabinet shall be dedicated per each office/residential flat and to be sited in a secured place.

The location of the cabinet shall be at a common point, where all the internal conduits meet and the structured cabling system (SCS) on a star topology can be installed. However, the farthest socket shall not exceed 90 M from the Cabinet.

Two 13Amp power sockets are required, inside ONU enclosure, for powering the Optical Network Unit and Installed active equipment.

The ONU enclosure location should not be adjacent to any electrical distribution or bus bars but it should have an access to it through a duct pipe.

The ONU enclosure should be installed at a height of 100 cm above the finished floor level.

All Internal conduits shall be of diameter not less 2 of 25mm (1 inch) to extend the structured cables from ONU to SCS each dual Socket locations.

For duplex flats, ONU enclosure will be provided at lower level & a junction box at the upper levels. All conduits of the upper levels to be connected with ONU enclosure through a minimum of 2 numbers of PVC conduits, each of 50mm diameters.

2.2.12. DISTRIBUTION IN VILLAS: (From ONU enclosure)

- An ONU enclosure shall be of minimum size 24 U and width 600mm and depth 150mm (from the approved vendors of UTT) to house the Optical network unit (ONU), power sockets and patch panel. The cabinet shall be flush mounted on wall in an easily accessible location for technicians.
- A secured Pull Box of size 30 (L) x 30 (H) x 15 (W) cm flush mounted on wall is required in every floor of the villa, for distributing SCS, from the ONU enclosure.
- The pull box should be kept at a convenient and easily accessible location where the floor distribution conduits are terminated. It should be installed at a height between 40 cm and 120 cm above the finished floor level.
- The pull boxes on different floors of a villa should be connected through a minimum 2 numbers of PVC conduits, each 50mm diameter.
- The pull box should have one 50 mm (2-inch) conduit to the Rooftop of the villa, from the cabinet or from the telephone entry duct location, in order to provide access to cables from the antenna.
- Adequate lighting and minimum of four 20 Amp and 240 Volt A.C. Mains outlet from a dedicated circuit breaker should be provided.
- 3.0 INSTALLATION OF IN BUILDING FIBRE CABLES
- 3.1 HIGH RAISE BUILDINGS:
- The building owner/Developer shall install a minimum of 2 core Single Mode (SM) Fiber cable G657-B – ITU-T standard as specified in the structure cabling guideline, from Indoor Cabinet location of each flat/premises to the Floor telecom room on each floor And from Floor telecom room on each floor to Main telecom in ground floor multicore indoor single mode fiber cable should be provided. Size of the cable from main telecom room to floor telecom room on each floor should be equal to double the number of flats/premises on the floor plus 2 fibers for smart solutions plus 25% extra for maintenance & unforeseen demand.
- For open space offices minimum of 2 Fibers shall be considered per 50 square meters plus 2 fibers for smart solutions plus 25% extra for maintenance & unforeseen demand.
- 1 ONU shall be installed for every 50 sqm
- For open space retails minimum of 2 Fibers shall be considered per 100 square meters plus 2 fibers for smart solutions plus 25% extra for maintenance & unforeseen demand.
- 1 ONU shall be installed for every 100 sqm

All the fiber cables in the Main Telecommunication rooms, Floor Telecommunication rooms and Secondary telecommunication rooms shall be terminated on 19" fiber patch panels.
The single mode fiber shall have maximum attenuation of 0.5 dB/km @ 1310 nm and 0.45 dB/km @ 1550 nm in line with ANSI/TIA/EIA-568B1 FO attenuation limits.

Number of apartments/ ONU on the floor	No. of fibers required in each FTR	Fibers for others	Additional 25%	Total Fibers required	Size of the FO for each FTR	Size of the FO Cable for each STR
2	4	2	2	8	8F	8F
3	6	2	2	10	12F	8F
4	8	2	3	13	16F	8F
5	10	2	3	15	16F	8F
6	12	2	4	18	24F	8F
7	14	2	4	20	24F	8F
8	16	2	5	23	24F	8F
9	18	2	5	25	36F	8F
10	20	2	6	28	36F	8F
11	22	2	6	30	36F	8F
12	24	2	7	33	36F	8F
13	26	2	7	35	36F	8F
14	28	2	8	38	48F	8F
16	32	2	9	43	48F	8F

Table 1 (Size of Fiber Optic cables from MTR to each FTR and STR according to the number of flats)

Termination of these fibers shall be done by the Installer in the wall mounted cabinets and in the ODF cabinets. The Installer must keep an extra length of 5 M of cable either end for terminations. The cables shall be suitably labeled. The supplier must get the approval from UTT before starting the work and test results of installed cables shall be submitted for final approval.
Additional 8 Fibers cables to be provided from ODF in main telecom room to each Secondary telecom room and the roof telecom room for GSM. Fiber termination box to be provided in these rooms and cables should be terminated at both ends with pigtails.
The building owner/developer shall provide 42U Cabinets with standard 19" rack and pre-connected patch panels with SC/APC pigtails in main telecom room for termination of main incoming cables to the building and termination of building distribution cables. Termination of incoming cable from POP shall be by UTT. The number of terminations shall be considered the same as the number of cables terminated for the building distribution. Termination of all other fiber cables shall be by owner/installer
Separate cabinets should be provided for UTT incoming fiber cables and building riser fiber cables.

3.2 OFFICE/RETAIL AREAS WITH SHELL & CORE

If the office / Retail area is a shell and core, an undertaking letter from the owner is required stating that all necessary conduits/cable trays/ONU enclosures/wall sockets & structured cabling shall be provided by the tenant as per UTT guidelines. It will be the owner's responsibility to ensure that the tenant obtains UTT approval prior to installation.

3.3 SINGLE VILLAS

In the case of single villas, UTT shall extend and terminate the F O cable, to the termination box inside the villa and from the termination box to the ONU by the owner.
In all other cases, the fiber cables should be extended to the ODF location in the Telecom Room, by the owner.

4.0 UTT TELECOM REQUIREMENTS

The tables below, gives details of the different requirements for the various types of buildings and types.

	SINGLE VILLA	COMPLEX OF VILLAS	BUILDINGS UP TO (G+20)	BUILDINGS MORE THAN (G+20)
Entry Box	Size: 60x60x80cm. Location: Within the compound and at Max 1 M from compound wall line	Size: JRC-12 Joint Box (Etisalat standard) Location: Depends upon the layout	Size: JRC 12 Joint Box (Etisalat standard) Primary and redundant Location: Within the property, near plot line. Additional Boxes at all turning points of lead-in	Size: JRC 14 Joint Box (Etisalat standard) Primary and Redundant Location: Within the property, near plot line. Additional Boxes at all turning points of lead-in
Entry Pipes / Duct	2X4 inches (D54) pipes/duct towards the villa & 2 x (2") inches pipes/ducts to be extended outside the plot line towards UTT Network	2x4" inches (D54) from EB toward villa 2xD54 pipes/ ducts from EB to towards main telecom room and 2xD54 be extended outside the plot line towards UTT Network. Internal Distribution within plot to be in accordance to UTT advise	2xD54 (4") inches pipes/ ducts towards the building and 2xD54 Primary and Redundant pipes/ ducts towards the UTT Network	4xD54 pipes/ ducts towards the building and 4xD54 Primary and redundant pipes/ ducts towards the UTT Network
Main Telecom room Distribution Cabinet std 19 "Rack	Not required	42U(H)x 800mm (W) X 800mm (D) Stand alone type19"equipme-nt Cabinet	42U(H)x 800mm (W) X 800mm (D) Stand alone type19"equipme-nt Cabinet	42U(H)x 800mm (W) X 800mm (D) Stand alone type19"equipme-nt Cabinet
Floor Telecom room Distribution Cabinet 19 " Rack	Not required	Not required	12U (H) x 600 mm (W) X 500 mm (D) Wall mounted type 19" equipment Cabinet	12U (H) x 600 mm (W) X 500 mm (D) Wall mounted type 19" equipment Cabinet
Secondary / GSM / Roof Top Telecom room Distribution Cabinet 19 " Rack	Not required	Not required	12U (H) x 600 mm (W) X 500 mm (D) Wall mounted type 19" equipment Cabinet	12U (H) x 600 mm (W) X 500 mm (D) Wall mounted type 19" equipment Cabinet
ONU Enclosure (By approved UTT Vendors)	24U (H) x 600mm (W) X 150mm (D) flush mounted	24U (H) x 600mm (W) X 150mm (D) flush mounted on wall	24U (H) x 600mm (W) X 150mm (D) flush mounted on wall	24U (H) x 600mm (W) X 150mm (D) flush mounted on wall

	SHOPPING MALLS	PALACES, HOSPITALS & HOTELS	GROUP OF SHOPS & SHEDS
Entry Box	Size: JRC 14 Joint Box (Etisalat standard) Location: Depending on the layout	Size: JRC 14 Joint Box (Etisalat standard) Location: Depending on the layout	Size: JRC-12 Joint Box (Etisalat standard) Position: Within Land plot where lead-in branching to other blocks end at turning points
Entry Pipes / Duct	4xD54pipes/ducts Towards the building and 4x D54 Primary and Redundant pipes/ ducts towards the UTT Network	4xD54 pipes/ ducts towards the building and 4xD54 Primary and Redundant pipes/ducts towards the UTT Network	2xD54 pipes/ducts towards the building and 2xD54 pipes/ducts towards the UTT Network
Main Telecom room Distribution Cabinet std 19 "Rack	42U (H) x 800mm (W) X 800mm (D) Stand alone type 19" equipment Cabinet	42U(H)x 800mm (W) X 800mm (D) Stand alone type19"equipme-nt Cabinet	42U(H)x 800mm (W) X 800mm (D) Stand alone type19"equipme-nt Cabinet
Floor Telecom room Distribution Cabinet 19 " Rack	12U (H) x 600 mm (W) X 500 mm (D) Wall mounted type 19" equipment Cabinet	12U (H) x 600 mm (W) X 500 mm (D) Wall mounted type 19" equipment Cabinet	12U (H) x 600 mm (W) X 500 mm (D) Wall mounted type 19" equipment Cabinet
Secondary / GSM / Roof Top Telecom room Distribution Cabinet 19 " Rack	Not required	12U (H) x 600 mm (W) X 500 mm (D) Wall mounted type 19" equipment Cabinet	No requirement
ONU nclosure (By approved vendors from UTT)	24U (H) x 600mm (W) X 150mm (D) flush mounted on wall	24U (H) x 600mm (W) X 150mm (D) flush mounted on wall	24U (H) x 600mm (W) X 150mm (D) flush mounted on wall

	SINGLE VILLA	COMPLEX OF VILLAS		BUILDINGS MORE THAN (G+20)
Junction Box (Floor Pull Box size)	Size: One 30 x 30 x 15cm box Recessed inside the wall for each floor. Convenient location with 1 meter free wall space around and at a height between 40 -120 cm above finished floor level.	Size: Per each single villa. Size: One 30 x 30 x 15cm box recessed inside the wall for each floor. Location: Convenient location with one meter free wall space around and at a height between 40 -120 cm above finished floor level.	Size: 30 x 30 x 15cm box recessed inside the wall for each floor. Location: Convenient location with one 1m free wall space around and at a height 120 cm above finished floor level with 200mm cable tray extended to main cable tray	Size: 30 x 30 x 15cm box recessed inside the wall for each floor. Location: Convenient location with one 1m free wall space around and at a height 120 cm above finished floor level with 200mm cable tray extended to main cable tray
POP Room	No requirements	No requirements	No requirements	BLDGS MORE THAN (G+40) 10x12x4 (LxWxH) In addition to a battery room along the POP room with size of 6x5x4 (LxWxH)
Main Telecom Room size	No requirements	Size: 3x4x3 (LxWxH) meters for villas more than 10 numbers	Size: 3x4x3 (LxWxH) meters Location: In the ground floor common area. and every 10 floors	Size BLDGS UP TO (G+40) 5x4x3 (LxWxH) BLDGS MORE THAN (G+40) 9X8X3 (LxWxH) Location: In the ground floor common area. and every 10 floors
Floor Telecom Room size	No requirements	No requirements	Size: 2.3 x 2.3 x 3m (LxWxH) Location: Close to the main vertical structural core the multi-story Bldg.	Size: 2.3 x 2.3 x 3m (LxWxH) Location: Close to the main vertical structural core of the multi-story Bldg.

Number of apartments/ ONU on the floor	No. of fibers required in each FTR	Fibers for others	Additional 25%	Total Fibers required	Size of the FO for each FTR	Size of the FO Cable for each STR
2	4	2	2	8	8F	8F
3	6	2	2	10	12F	8F
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7	14	2	4	20	24F	8F
8	16	2	5	23	24F	8F
9	18	2	5	25	36F	8F
10	20	2	6	28	36F	8F
11	22	2	6	30	36F	8F
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Table 1 (Size of Fiber Optic cables from MTR to each FTR and STR according to the number of flats)

Termination of these fibers shall be done by the Installer in the wall mounted cabinets and in the ODF cabinets. The Installer must keep an extra length of 5 M of cable either end for terminations. The cables shall be suitably labeled. The supplier must get the approval from UTT before starting the work and test results of installed cables shall be submitted for final approval.

Additional 8 Fibers cables to be provided from ODF in main telecom room to each Secondary telecom room and the roof telecom room for GSM. Fiber termination box to be provided in these rooms and cables should be terminated at both ends with pigtails.

The building owner/developer shall provide 42U Cabinets with standard 19" rack and pre-connected patch panels with SC/APC pigtails in main telecom room for termination of main incoming cables to the building and termination of building distribution cables. Termination of incoming cable from POP shall be by UTT. The number of terminations shall be considered the same as the number of cables terminated for the building distribution. Termination of all other fiber cables shall be by owner/installer

Separate cabinets should be provided for UTT incoming fiber cables and building riser fiber cables.

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3.3 SINGLE VILLAS

In the case of single villas, UTT shall extend and terminate the F O cable, to the termination box inside the villa and from the termination box to the ONU by the owner.
In all other cases, the fiber cables should be extended to the ODF location in the Telecom Room, by the owner.

4.0 UTT TELECOM REQUIREMENTS

The tables below, gives details of the different requirements for the various types of buildings and types.

	SINGLE VILLA	COMPLEX OF VILLAS	BUILDINGS UP TO (G+20)	BUILDINGS MORE THAN (G+20)
Entry Box	Size: 60x60x80cm. Location: Within the compound and at Max 1 M from compound wall line	Size: JRC-12 Joint Box (Etisalat standard) Location: Depends upon the layout	Size: JRC 12 Joint Box (Etisalat standard) Primary and redundant Location: Within the roperty, near plot line. Additional Boxes at all turning points of lead-in	Size: JRC 14 Joint Box (Etisalat standard) Primary and Redundant Location: Within the roperty, near plot line. Additional Boxes at all turning points of lead-in
Entry Pipes / Duct	2X4 inches (D54) pipes/duct towards the villa & 2 x (2") inches pipes/ducts to be extended outside the plot line towards UTT Network	2x4" inches (D54) from EB toward villa 2xD54 pipes/ducts from EB to towards main telecom room and 2xD54 be extended outside the plot line towards UTT Network. Internal Distribution within plot to be in accordance to UTT advise	2xD54 (4") inches pipes/ducts towards the building and 2xD54 Primary and Redundant pipes/ ducts towards the UTT Network	4xD54 pipes/ ducts towards the building and 4xD54 Primary and redundant pipes/ ducts towards the UTT Network
Main Telecom room Distribution Cabinet std 19 " Rack	No requirements	42U(H)x 800mm (W) X 800mm (D) Stand alone type19"equipme-nt Cabinet	42U(H)x 800mm (W) X 800mm (D) Stand alone type19"equipme-nt Cabinet	42U(H)x 800mm (W) X 800mm (D) Stand alone type19" equipme-nt Cabinet
Secondary / GSM / Roof Top Telecom room Distribution Cabinet 19 " Rack	No requirements	No requirements	12U (H) x 600 mm (W) X 500 mm (D) Wall mounted type 19" equipment Cabinet	12U (H) x 600 mm (W) X 500 mm (D) Wall mounted type 19" equipment Cabinet
ONU Enclosure (By approved UTT Vendors)	24U (H) x 600mm (W) X 150mm (D) flush mounted	24U (H) x 600mm (W) X 150mm (D) flush mounted on wall	24U (H) x 600mm (W) X 150mm (D) flush mounted on wall	24U (H) x 600mm (W) X 150mm (D) flush mounted on wall

	SHOPPING MALLS	PALACES, HOSPITALS & HOTELS	GROUP OF SHOPS & HEDS
Entry Box	Size: JRC 14 Joint Box (Etisalat standard) Location: Depending on the layout	Size: JRC 14 Joint Box (Etisalat standard) Location: Depending on the layout	Size: JRC-12 Joint Box (Etisalat standard) Position: Within Land plot where lead-in branching to other blocks end at turning points
Entry Pipes / Duct	4xD54pipes/ducts Towards the building and 4x D54 Primary and Redundant pipes/ducts towards the UTT Network	4xD54 pipes/ ducts towards the building and 4xD54 Primary and Redundant pipes/ducts towards the UTT Network	2xD54 pipes/ducts towards the uilding and 2xD54 pipes/ ducts towards the UTT Network
Main Telecom room Distribution Cabinet std 19 " Rack	42U (H) x 800mm (W) X 800mm (D) Stand alone type 19" equipment Cabinet	42U(H)x 800mm (W) X 800mm (D) Stand alone type19"equipme-nt Cabinet	42U(H)x 800mm (W) X 800mm (D) Stand alone type19"equipme-nt Cabinet
Floor Telecom room Distribution Cabinet 19 " Rack	12U (H) x 600 mm (W) X 500 mm (D) Wall mounted type 19" equipment Cabinet	12U (H) x 600 mm (W) X 500 mm (D) Wall mounted type 19" equipment Cabinet	12U (H) x 600 mm (W) X 500 mm (D) Wall mounted type 19" equipment Cabinet
Secondary / GSM / Roof Top Telecom room Distribution Cabinet 19 " Rack	No requirement	12U (H) x 600 mm (W) X 500 mm (D) Wall mounted type 19" equipment Cabinet	No requirement
ONU Enclosure (By approved vendors from UTT)	24U (H) x 600mm (W) X 150mm (D) flush mounted on wall	24U (H) x 600mm (W) X 150mm (D) flush mounted on wall	24U (H) x 600mm (W) X 150mm (D) flush mounted on wall

	SINGLE VILLA	COMPLEX OF VILLAS	BUILDINGS UP TO (G+20)	BUILDINGS MORE THAN (G+20)
Junction Box (Floor Pull Box size)	Size: One 30 x 30 x 15cm box Recessed inside the wall for each floor. Convenient location with 1 meter free wall space around and at a height between 40 -120 cm above finished floor level.	Size: Per each single villa. Size: One 30 x 30 x 15cm box recessed inside the wall for each floor. Location: Convenient location with one meter free wall space around and at a height between 40 -120 cm above finished floor level.	Size: 30 x 30 x 15cm box recessed inside the wall for each floor. Location: Convenient location with one 1m free wall space around and at a height 120 cm above finished floor level with 200mm cable tray extended to main cable tray	Size: 30 x 30 x 15cm box recessed inside the wall for each floor. Location: Convenient location with one 1m free wall space around and at a height 120 cm above finished floor level with 200mm cable tray extended to main cable tray
POP Room	No requirements	No requirements	No requirements	BLDGS MORE THAN (G+40) 10x12x4 (LxWxH) In addition to a battery room along the POP room with size of 6x5x4 (LxWxH)
Main Telecom Room size	No requirements	Size: 3x4x3 (LxWxH) meters for villas more than 10 numbers	Size: 3x4x3 (LxWxH) meters Location: In the ground floor common area. and every 10 floors	Size BLDGS UP TO (G+40) 5x4x3 (LxWxH) BLDGS MORE THAN (G+40) 9X8X3 (LxWxH) Location: In the ground floor common area. and every 10 floors
Floor Telecom Room size	No requirements	No requirements	Size: 2.3 x 2.3 x 3m (LxWxH) Location: Close to the main vertical structural core the multi-story Bldg.	Size: 2.3 x 2.3 x 3m (LxWxH) Location: Close to the main vertical structural core of the multi-story Bldg.

Secondary / GSM Telecom room Size	No requirements	No requirements	Size: 3x4x3m (LxWxH) Location: Close to FTR
Entry Pipes / Duct	No requirements	Size: 3x4x3m (LxWxH) Location: Close to the main vertical structural core the multi-story Bldg.	Size: 3x4x3m (LxWxH) Location: Close to the main vertical structural core the multi-story Bldg.
Riser Cable trays	No requirements	(1x) 60x5 cm + (1x) 150x5 cm cable trays	(2x) 60x5 cm + (1x) 300x5 cm cable trays

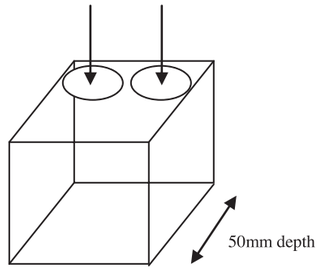
	SHOPPING MALLS	**PALACES, HOSPITALS & HOTELS**	**GROUP OF SHOPS & SHEDS**
Floor Pull Box size	Size: One 30 x 30 x 15cm box Recessed inside the wall for each floor. Convenient location with 1 meter free wall space around and at a height between 40 -120 cm above finished floor level	Size: One 30 x 30 x 15cm box Recessed inside the wall for each floor. Convenient location with 1 meter free wall space around and at a height between 40 -120 cm above finished floor level	Size: One 30 x 30 x 15cm box Recessed inside the wall for each floor. Convenient location with 1 meter free wall space around and at a height between 40 -120 cm above finished floor level
POP Room	No requirements	BLDGS MORE THAN (G+40) 10x12x4 (LxWxH) In addition to a battery room along the POP room with size of 6x5x4 (LxWxH)	No requirements
Main Telecom Room size	Size: 4x5x3 (LxWxH) meters Location: In the ground floor common area	Size: 4x5x3 LxWxH) meters Location: In the ground floor common area.	Size: 4x5x3 (LxWxH) meters Location: In the ground floor common area.
Floor Telecom Room size	Size: 2.3 x 2.3 x 3 (LxWxH) Location: Close to the main vertical structural core of the shopping mall.	Size: (2.3 x 2.3 x 3 (LxWxH) Location: In common areas	Size: (2.3 x 2.3 x 3 (LxWxH) Location: In common areas
Secondary /GSM Telecom room Size	No requirements	Size: 3x4x3m (LxWxH) Location: Close to FTR if more than 10 floors	No requirements
Roof Top Telecom room	No requirements	Size: 3x4x3m (LxWxH) Location: Close to FTR if more than 10 floors	No requirements
Riser Cable trays	No requirements	(1x) 60x5 cm + (1x) 150x5 cm cable trays	(2x) 60x5 cm + (1x) 300x5 cm cable trays

Table 2 (UTT Telecommunication Requirements)

5.0 CIVIL WORKS REQUIRED BY THE CONTRACTOR

5.1 BACK BOXES FOR ALL TELCOMUNICATION OUTLETS

All back boxes for the Telecommunication sockets must have a min of 50mm depth with the entrance of the cable from the top back side of the box as in the picture below.



5.2 HORIZANTAL PATHWAYS:

- Horizontal Pathways (conduits, Sleeves, Cable trays etc) are used for taking the cables from the ONU cabinet to the Telecommunications outlets in the apartment.
- A variety of methods are available and the choice of selection of method shall depend on the purpose of the floor area to be served (i.e. general office spaces, apartment dwellings, etc.)

CONDUITS:

- All conduits within the flat shall be installed in a star topology method (point to point) from ONU enclosure to each individual outlet.
- The use of conduits as a horizontal raceway system should only be considered when the outlet locations are permanent, the device densities are low and flexibility is not required.
- The minimum size of a conduit pipe used as a horizontal pathway from the ONU cabinet to the Telecommunications Outlet should 2 x 25mm (1 inch).
- Each conduit installed shall not have more that 2 bends of 90°
- For the conduits, the inside bending radius should always be at least 10 times the internal diameter.
- Minimum of one nylon draw wire 6 mm at least must be installed in a conduit.
- Pull boxes should be located such that they are readily accessible at all times. Pull boxes to be spaced at a maximum of 15 M apart to minimize cable stress during installation and to provide serviceability in the future.
- Conduits must be free from sharp edges, to prevent cable damage during and subsequent to pulling.
- Conduits protruding through a floor should be terminated a minimum of 50 mm from the floor to prevent water or other liquids from flowing into the conduits.

5.3 CONTAINMENT FOR GSM CABLES:

All necessary containments / cable trays (width 30cm) shall be provided to facilitate antenna cable routing including basement and podiums. UTT will provide GSM design drawings showing the location of Antennas & cable routing.

6.0 STRUCTURED CABLING SYSTEM (SCS)

- To deliver state of the art services from the ONU, a SCS System on star topology is required. The minimum requirement is standard CAT 6A F/FTP cable with Shielded RJ45 connectivity that supports 10GbE in compliance with the TIA/EIA-568-B.2-10 or ISO 11801:2002/Amd 2:2010 standards.
- In addition one RG6 socket shall be provided for the television purposes in every room for the TV connectivity.
- The SCS design shall be discussed and approved by UTT engineering team.
- However, the following are the general minimum requirements of structured cabling Systems, for provision of service.

6.1 CABLING & TERMINATION:

- The Cables used for these wiring must comply with minimum CAT 6A for Broad band services & for telephone standards.
- Horizontal cabling system shall be based on Cat 6A FTP LSZH Shielded as per the design drawings and UTT structure cabling guidelines.
- All the components in the link (Cable, Connectors and cable assemblies) must be shielded in line with this document.
- The SCS cable planned shall meet the designed service requirements within the particular flat level and should have built-in flexibility, to meet growing needs of the tenants.
- All SCS cables shall be properly labeled and terminated, in the RJ45 sockets and in Patch panel or in CAT 6A by the system integrator appointed by the developer.
- Building Owner is responsible for replacement of in-building cables and other fixtures, if these become faulty.
- Cable diagrams must be submitted to UTT for approval at the design stage and as-built is required on completion
- The whole SCS cabling (end to end Fiber and Copper) should be purchased from one of the vendors approved by UTT. Mix and match of different brands of cables is prohibited.
- Completed SCS shall be subject to acceptance by UTT. However, the design and performance of the SCS system shall be the responsibility of the installer / Owner
- Any upgrading required in the in–building facility, Telecommunication cables, due to either enhanced demand, change in building status or damage shall be provided by building Owner.
- The supply and termination of F/FTP cables on Patch panel and sockets locations shall be the responsibility of the system integrator appointed by the developer.

- All the components in the link (Cable, Connectors and cable assemblies) must be shielded in line with this document.
- The SCS cable planned shall meet the designed service requirements within the particular flat level and should have built-in flexibility, to meet growing needs of the tenants.
- All SCS cables shall be properly labeled and terminated, in the RJ45 sockets and in Patch panel or in CAT 6A by the system integrator appointed by the developer.
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- Any upgrading required in the in–building facility, Telecommunication cables, due to either enhanced demand, change in building status or damage shall be provided by building Owner.
- The supply and termination of F/FTP cables on Patch panel and sockets locations shall be the responsibility of the system integrator appointed by the developer.

6.2 TELECOMMUNICATION SOCKET:

- All outlets should be Category 6A performance, in a double gang white faceplate. All RJ45 outlets should be fitted with shutters to prevent the ingress of dirt and dust.
- Provision of two dual Sockets for Telecommunication services should be installed in every room and one dual for the kitchen and maids room. Conduit with not less than 2 x 25mm (1 inch) shall be connected between each socket locations and the ONU enclosure.
- All sockets should have 2 x angled CAT 6A shielded connectors
- Every socket must be connected with a minimum of 2 x four pair SCS Cat 6A cable, following star topology with RJ45 all kinds of buildings, the provision of Telecommunication socket should also be extended to the bathrooms in case of hotels.

Telecommunication sockets, cables and associated facilities within the various rooms and premises are to be provided by the building Owner.

6.3 TELEVISION CABLING, TERMINATION & SOCKETS:

- The Cables used for these wiring must comply with minimum RG 6 coaxial cable for Broad band services & Television standards.
- Single coaxial cable shall be laid from the ONU enclosure to each Socket in each room of the flat.
- The connector of the socket shall be F-connector.
- Any upgrading required in the in–building facility, Television cables, due to either enhanced demand, change in building status or damage shall be provided by building Owner.
- The modules for coaxial cable shall be individual snap-in style female-to-female bulkhead adapters, and shall fit all other installed telecommunications wall plates, Outlets and field-configurable patch panels and patch blocks. Bulkhead modules shall be available in multiple colors to match the housings or provide unique color-coding for port I.D. Modules shall be UL listed. All plastics used in construction of the module bodies shall be fire-retardant with a UL flammability rating of 94V-0.
- Minimum coaxial cables with an 18 AWG center conductor and 75 ohm characteristic impedance, the center conductor is ordinarily solid copper, the shielding shall be much heavier (typically aluminum foil/95% copper braid), and tolerances are more tightly controlled, to improve impedance stability.

6.4 MODULAR RG6 JACKS

- Modular jacks shall be F-connector meeting the minimum requirements for T.V connection.
- The outlets shall be distributed as single outlets in each room in the flat including the maid's room.

6.5 MODULAR JACKS CATEGORY 6A SHIELDED RJ45

- Modular jacks shall be Category 6A RJ45 meeting the minimum requirements of TIA/EIA 568 B-2.10and ISO 11801:2002/Amd 2:2010. Modular jacks shall be wired to the T568B wiring pattern.
- Category 6A modular Jacks FTP Shielded shall be third party component verified for compliance with ANSI/ TIA/EIA 568-B.2-10 or ISO11801:2002/Amd 2:2010 category 6A transmission performance Standard.
- All accessory plates should be Dual. The use of any special faceplate, which may be specific to any other manufacturer's product range, such as brass finish etc should be reviewed.

- The back boxes dedicated for the CAT 6A sockets shall be 50mm deep as per the drawing shown in the civil requirement.

6.6 HORIZONTALSUBSYSTEM (FF/FTP CABLE):

- All conductors in each cable should be connected to a single RJ45 connector at the work area outlets and patch panel. Each cable should be terminated to maintain the twists in each pair within 5mm of the termination. Proper strain relief should be provided for the cable at the outlets and patch panel, avoiding strain on the conductors.

Color coding for the termination should be as per the following table.

Pair	Tip	Ring
1	White	Blue
2	White	Orange
3	White	Green
4	White	Brown

6.7 HORIZANTAL CABLING:

- The physical topology of the horizontal cabling shall be configured as a star topology with each outlet connected directly to a flat / Apartment Distribution Box inside the Flat or Apartment. No looping of cables from outlet to outlet is permitted.
- The horizontal cabling is to be provided to single, dual, triple and quad outlets throughout.
- The length of cable between the farthest Telecommunications Outlet and the Distribution Box shall not exceed 90m (295 ft.)
- A minimum of two Telecommunications Outlets shall be provided for each individual room / work area.

6..88 CABLE CAPACITIES IN CABLE TRAYS / CONDUITS

- When the internal cable trays, risers and Ladders etc, are designed, supplied and installed by others, the maximum number of F/FTP cables shall not exceed 75% of the tray , However this need to be reduced in the case of bends and crossovers.
- Where an FO Cable block wiring is considered, a very careful consideration must be taken, while designing the system .The owner shall be responsible for the design, supply and maintenance of all related items.

6.9 PATCHING:

- The design of patch frame layouts is critical to create a high level of manageability within a compact cabinet, whilst maintaining effective operations when used by the customer.
- We recommend all horizontal FTP cabling should be terminated in 24 port Patch panel, placed inside the cabinet.
- SCS CONTRACTOR shall provide Category 6A LSZH cable assemblies at the ONT and at the Wall Outlets.
- SCS CONTRACTOR shall provide 50% of the total number of Horizontal Outlets as per the below length
- - For Wall Outlet, the cable assembly shall be 3m
- - For the ONT the cable assembly shall be 1m
- Category 6A cable assemblies shall be 4-pair RJ45/RJ45 FTP Shielded horizontal cabling, and must be factory terminated.
- Fielded Terminated Cable assemblies are not accepted.
- SCS CONTRACTOR shall provide detailed of FO patching schedule as per the table attached in the last section of the guidelines.

6.10 LABELING:

LABELE LEMENTS

All floor outlets, patch frames and horizontal cables should be labeled. A typewritten standard labeling system is recommended. The labeling scheme shall submitted by the contractor for UTT approval.

Horizontal Cable Labels

Label all horizontal cables at both ends using a self-laminating, wrap around label.
User Outlet Labels Each RJ45 user outlet should be labeled with a unique identifier, typically using the agreed scheme.

6.11 UNDER FLOOR SYSTEMS

For general office spaces, an under floor raceway system should be used for maximum flexibility
In multi-channel layouts, separate raceways must be used for telecommunications and electrical power to reduce electromagnetic interference. The dividers for separation of compartments in the raceway should be bonded to ground.

6.11.1 MAIN ELEMENTS OF UNDER FLOOR RACE WAY SYSTEMS:

1. DISTRIBUTION RACEWAY:

Distribution raceway provides a pathway for the cables from the feeder raceway to the work areas. The minimum size of the Distribution raceway should be 30mm height.
60mm width of cross sectional area. The same size must be used for every (multi-channel) layout.

2. FEEDER RACE WAY:

Feeder raceway provides a pathway for the cables from the Distribution Box in the Floor Telecommunications Room to the Distribution raceways. The minimum size of the Feeder raceway should be 40mm height x 200mm width of cross-sectional area. The same size must be used for every (multi-channel) layout.
The feeder raceways starting point in the Floor Telecommunications Room must be adjacent to the Distribution Box. The Feeder raceway should end at the last distribution raceway it is serving.

3. ACCESS UNIT:

The access unit provides access at the point of intersection of the Feeder and the Distribution raceways.

6.12 CABLE TRAYS:

- Cable trays are mostly used for floors with raised tiles or raise floorings.
- As a general guideline, Cable trays that intersect must be provided with a transitional bend radius of 150mm in all directions.
- Exposed sheet metal edges must be provided with bushings or other means of protection such that cables will not be damaged during or after installation. Since Cable trays are usually metallic, all sharp edges, burrs and screw tips that may come into contact with cabling should be removed.
- The minimum access space between the sub-floor and the underside of the floor tile shall be minimum 150mm (6 in).
- UTT should be consulted in the initial design stage to decide on the requirements if the building is designed for office use.

6.13 INDOOR CABINETS SPECIFICATION

Depending upon the termination and Patch panel requirement, and to accommodate other active and passive equipments, a Cabinet with standard 19” rack is required, generally complying with the following:-

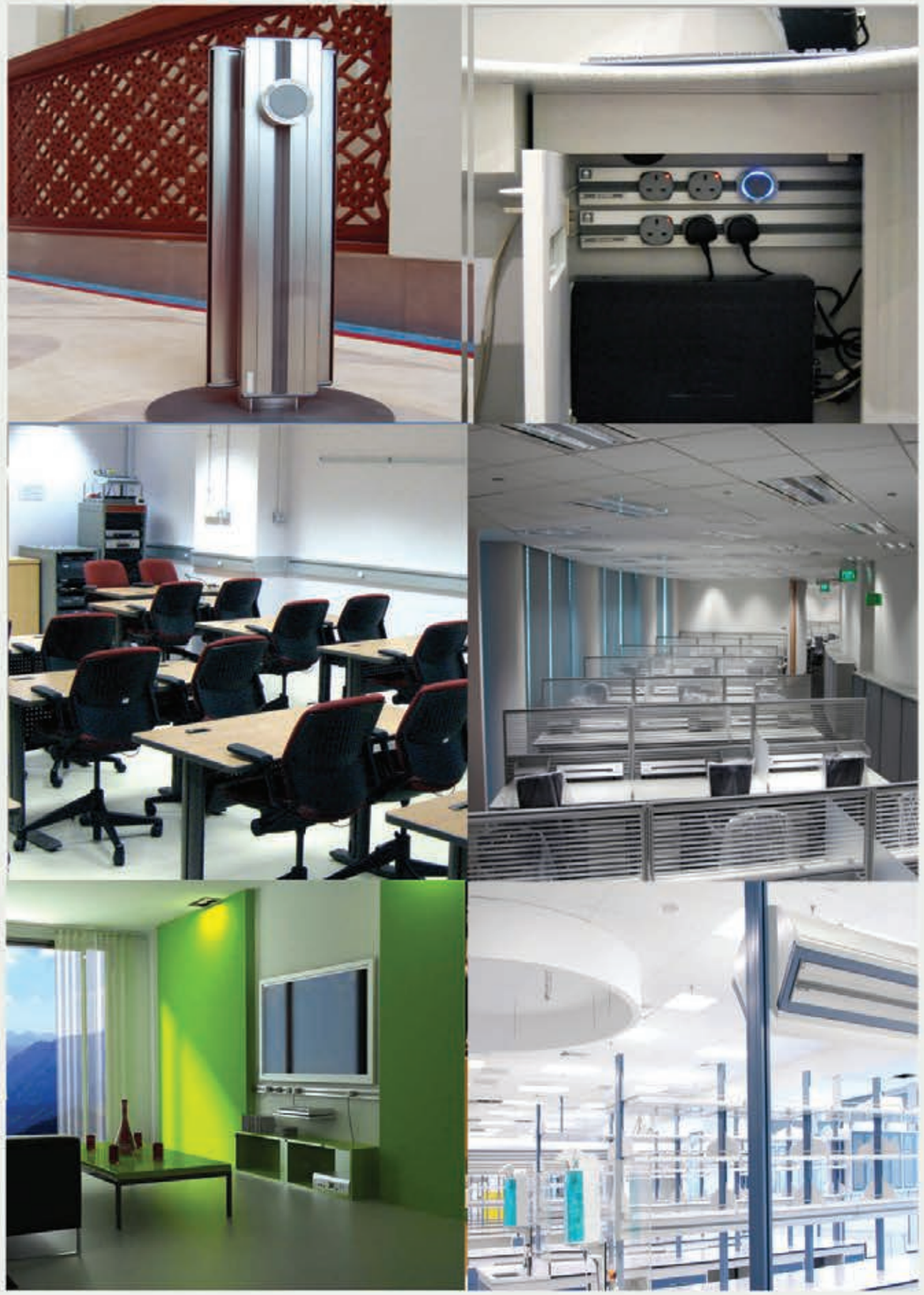
A) FREE STANDING TYPES

The free standing types are used in high rise buildings, shopping malls, Hospitals, Airports, Large commercial establishments in Main Telecommunication Rooms.
42U 800mm wide x 800mm deep 19” equipment cabinet

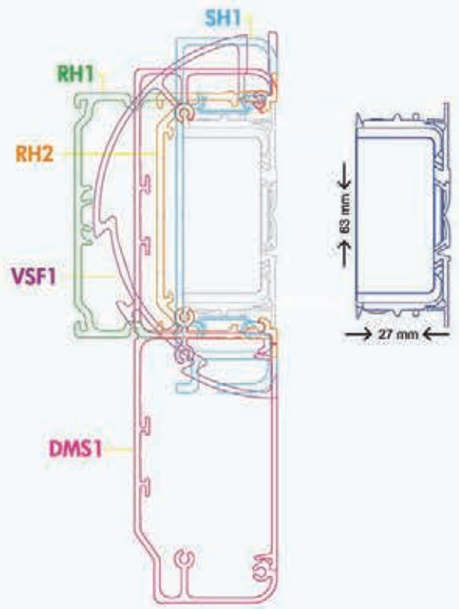
- Glass front door
- Steel doors
- Air Circulation inside the cabinet
- Openings for cable entry on the top and bottom of the cabinet
- Jacking Feet
- Horizontal cable management
- Vertical cable management
- Bonded to a local earth point

B) WALLMOUNTED TYPECABINETS

The wall mounted cabinets shall be installed in the Floor Telecommunication Rooms and the Secondary / GSM Telecommunication Rooms
12U (H) x 600mm wide x 500mm deep 19” equipment Cabinet



SFC2 MODULAR TRACK



Eubiq introduces the modular SFC2 GSS System Track. SFC2 is specifically designed for integration into specialised housing for customised applications. SFC2 is ultra safe and ultra compact.

GSS System is the world's first and only integrated platform for multi-systems of power, data, lighting and accessories.

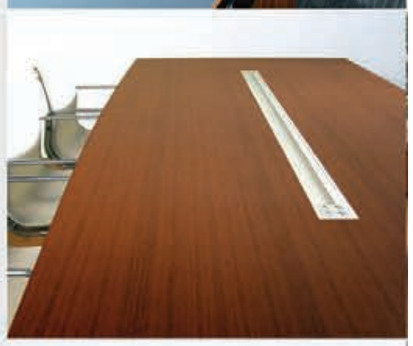
GSS System adaptors and devices are fully mobile and maybe moved anytime to anywhere with just a simple turn.

GSS System is a new global standard.

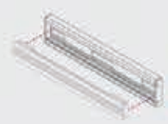
SFC2
AN EXAMPLE OF A CUSTOMISED SYSTEM FURNITURE PROFILE

VSF1-MB
POWER AND DATA TRACK

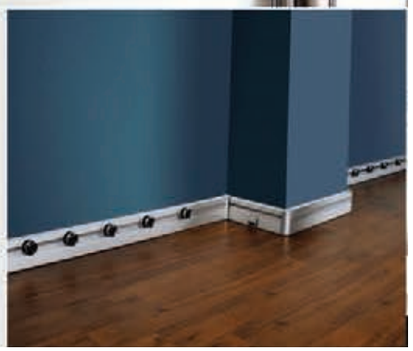
RH1
RECESS POWER AND CABLE MANAGEMENT TRACK



SH1
POWER AND CABLE MANAGEMENT TRACK



DMS1
POWER AND CABLE MANAGEMENT TRACK



SMAP
MULTI FUNCTION WORK CENTER

SC2
SURFACE COMPACT TRACK

V3
3-POST

V3
3-WAY POWER AND CABLE MANAGEMENT TRACK

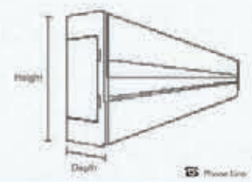
HP2
MODULAR BED HEAD PANEL

SFC2 MODULAR TRACK

Rated Voltage	:	125V a.c.
Single-phase	:	250V a.c. Single-phase
Rated Current	:	40Amp Maximum
Frequency	:	50Hz / 60Hz
Length	:	Up to 3600mm (11.81ft) per track
Height	:	63mm (2.48")
Depth	:	27mm (1.06")

The SFC2 Modular Track is a standard power track designed for easy integration into specialised housings. It is compact and easily snaps on to housings via a mounting bracket. Choose from our standard range of housings that are specially designed for easy installation in offices, meeting rooms, pantries and lecture halls.

Track housings can be easily customised for integration into any system furnitures, tables, panels or partitions.



Phone Line | Network

Model	Height (mm)	Depth (mm)	Network	Phone Line
VSF-1 MB	95.3	89.6	●	●
VSF-1 MC	140.6	91	●	●
RH-1	80	57	●	●
RH-2	80	33.8	●	●
SH-1	100	28.5	●	●
DMS-1	150	40	●	●
SMAP	140	30	●	●
SC-2	70	28.8	●	●

● Network and Phone Line Jacks are not included
For HP-2 & V3 profiles, please contact us for more customised application.
* Available in MSB & TAS Jacks

Create a smarter and safer environment with the GSS System by Eubiq.

ADAPTORS

PREMIUM SERIES

BS3 Premium British
GS3 Premium German
JE3 Premium Japan-Euro
JP3 Premium Japan
US3 Premium United States
FR3/FL3 Premium France
ITA3 Premium Italian

IS3-16 Premium India
IS3-RD16 Premium South Africa Dedicated Red
AU3 Premium Australian
USB3 Premium USB Charger
SP3 Premium Surge Protector
ITL3 Premium International Traveller
IN3 Premium India Combo

COMPACT SERIES

BS2 British Compact
GS2 German Compact
JE2 Japan-Euro Compact
JP2 Japan Compact
US2 United States Compact
FR2/FL2 France Compact
ITA2 Italian Compact

ITL2 International Traveller Compact
AU2 Australian Compact

ACCESSORIES

WS13 Wall Socket
DS1 Datacom Socket Housing
DS2 Dual Gang Socket Housing
DS3 Datacom Socket Housing
DS4 Datacom Socket Housing
TR50-MS Motion Sensor Lightholder
TR50-TS Toggle Switch Lightholder

CCS5 Coiled Cordset
CCS7 Coiled Cordset
CCS13 Coiled Cordset
PLT13 Rewirable Plug Fused
PLT16 Rewirable Plug Non-Fused
COBRA LED Tasklight

MULTIMEDIA CONNECTORS

VGA 15-pin Connector (DE15F)
USB Type A Connector
Serial 9-pin Connector (Male)
Stereo Audio 3.5mm Connector
Stereo Audio Connector
F Coupler Connector
TV-Radio Co-axial Connector
BNC Coupler Connector
BNC Dual Connector

Audio Video (AV) Connector
RCA Audio Connector
RCA Audio Connector
ON/OFF Switch (Red) 230V, 5A
ON/OFF Switch (Blue) 230V, 5A
Mounting Frame with Blank Faceplate
S-Video Mini-Din 4-pin Connector
PS/2 Mini-Din 6-pin Connector

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EMAIL info@eubiqme.com
www.eubiqme.com

www.GssSystem.com

THE WORLD'S MOST FLEXIBLE POWER & DATA OUTLET SYSTEM

GSS™ SYSTEM

Eubiq introduces the world's first Ground Sentry Shutter (GSS) System that totally revolutionize the electrical outlets in terms of flexibility, safety and utility.

It is the world's first electrical power outlet system that allows you to add, remove and re-position the power outlet anywhere along the track. The worldwide patented GSS System effectively grounds all conductive objects that come into contact with the power track, making it exceptionally safe.

Our products are tested/certified to comply to the highest safety standards by the world's most reputable laboratories.

GSS System offers unparallel advantages to manufacturers and product integrators. It has emerged as a new global standard.

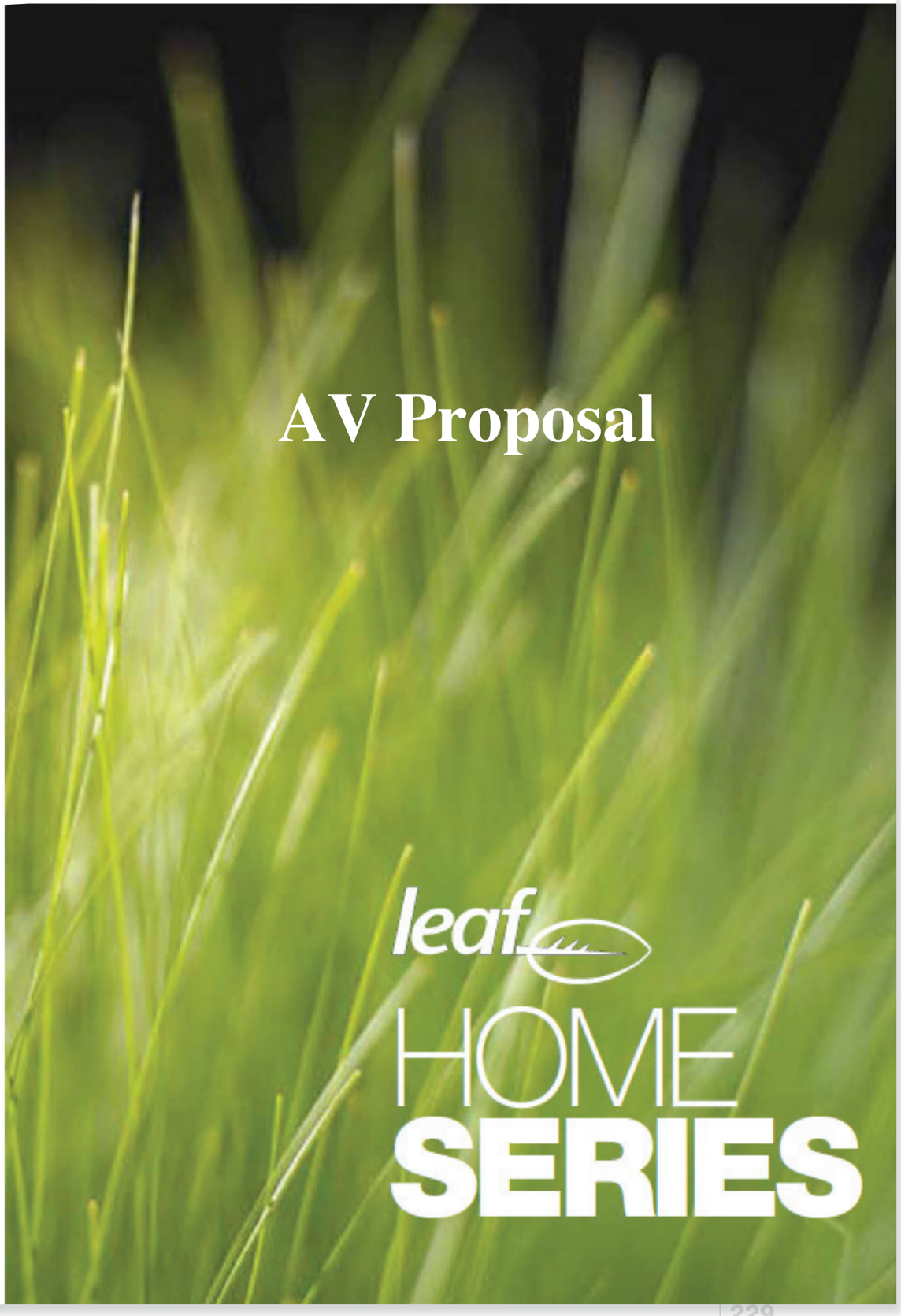
Intertek ktl JET cULus

Each test laboratory or certification body may be testing/certifying only an selected range of products according to specific requirements.

RECENT AWARDS

NeoCon Gold winner — gold award — Technology Support

APICTA Asia Pacific ICT Awards — WINNER — Industrial Applications


AV Proposal
leaf
HOME
SERIES

Features

- 4 Source, 4 Zone Multiroom system
- Fully Matrixed
- IR Routing
- Multi Function Learning Remote Controls x 4
- Requiring Only Single Cat 5 Cabling
- Discrete IR Targetting
- Stylish Architecture
- Simple To Use

Wherever you want to be you can watch or listen to your favourites. With the ease of a remote Leaf Full House Entertainment makes it all possible.

Cable TV in the kids room, DVD in the bedroom or CD anywhere.

High quality A/V entertainment is no longer stuck in just the family room.

Leaf is multi source, multi zone home entertainment that is easy to use.
Our Leaf Full House Entertainment Systems extend the reach of your A/V equipment throughout your home.

By interfacing your equipment into the system, it is possible from any area or zone in your home to play, watch and listen to any material you wish from any of your A/V components.

Altair

Leaf Altair Remote control

Leaf Altair Remote control is smarter than most.

Not only does it control all of your Leaf products with it's dedicated Leaf mode, it is a fully fledged 8 Source Learning Remote. Essentially capable of taking the place of 9 remotes you will wish you bought one earlier.

Check out the features:

- 8 Sources
- Time and Date (12/24 hour)
- Dedicated Leaf Master Source
- Auto Back-Light
- Learning Function for each Source
- Battery Indicator
- 50 Year Code Storage (without battery)

Home System

Multi Room made Easy

The Home System is a fantastic one box, 4 Source, 4 Zone multi room solution.

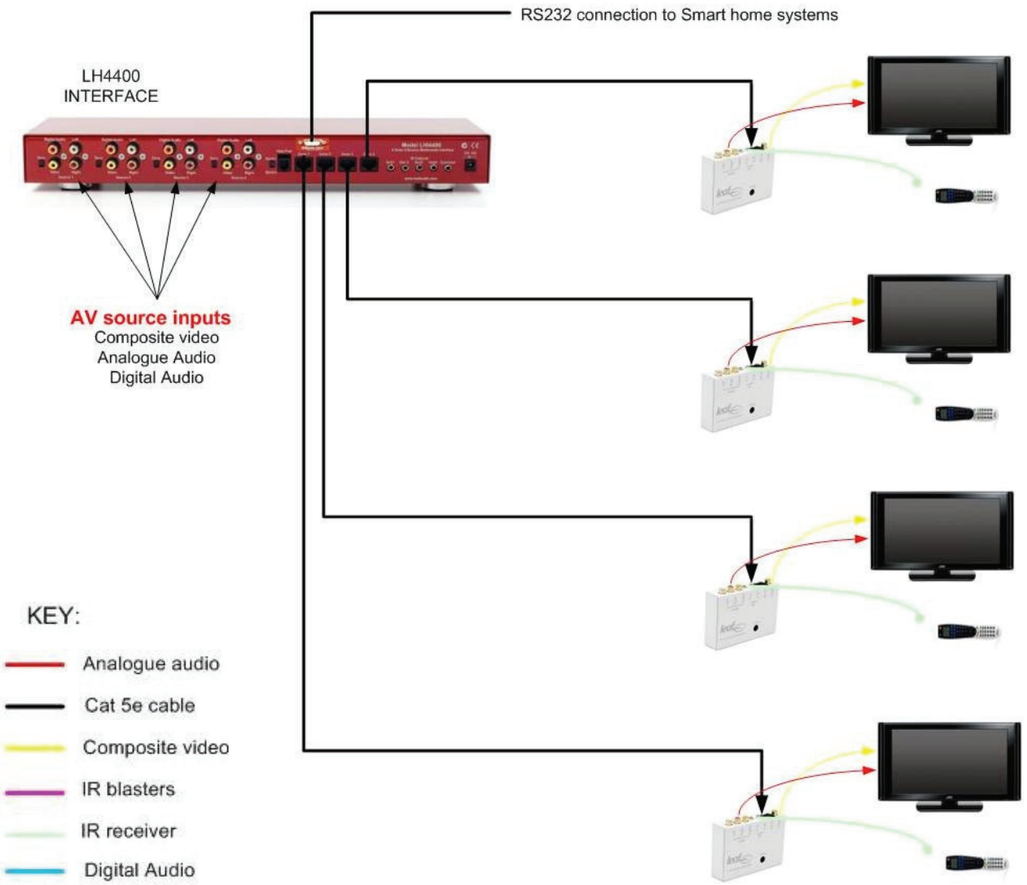
The Home System is fully matrixed complete with IR routing. It is very easy to use and comes complete with 4 learning remotes, IR Targets and blasters. The only requirement is a single Cat5 cable. It has RS232 control function and can be coupled with our Matrix range to upgrade to true High Definition multi room standard.

Specifications LHI4400

Parameter	Specification
Control	Leaf IR or Serial
Display	4 x Blue Zone LEDs, 1 x Green Standby LED
Number of Sources	4
Number of Zones	4
Video	SD composite PAL or NTSC
Audio	Stereo Analog and Digital
Video Input	RCA Socket
Analog Audio Input	Dual RCA Sockets
Digital Audio Input	RCA Socket
IR Blaster Output	3.5mm Stereo Phono Socket
Zone Cabling	CAT5 to TIA/EIA-568-A wiring
RS232 Remote Control	DB9 Female, wired DCE
Baud Rate	9600 Baud
Format	8, N, 1
Data format RS232	Byte Non-Inverted
Power Requirements	12V dc, 3 Amp
Power Connector	2.1mm DC socket, centre positive
Dimensions (W x D x H)	424 x 188 x 44
Weight	

Specifications LHB

Parameter	Specification
Video Output	RCA Socket
Analog Audio Output	Dual RCA Sockets
Digital Audio Output	RCA Socket
IR Input	3.5mm Stereo Phono Socket

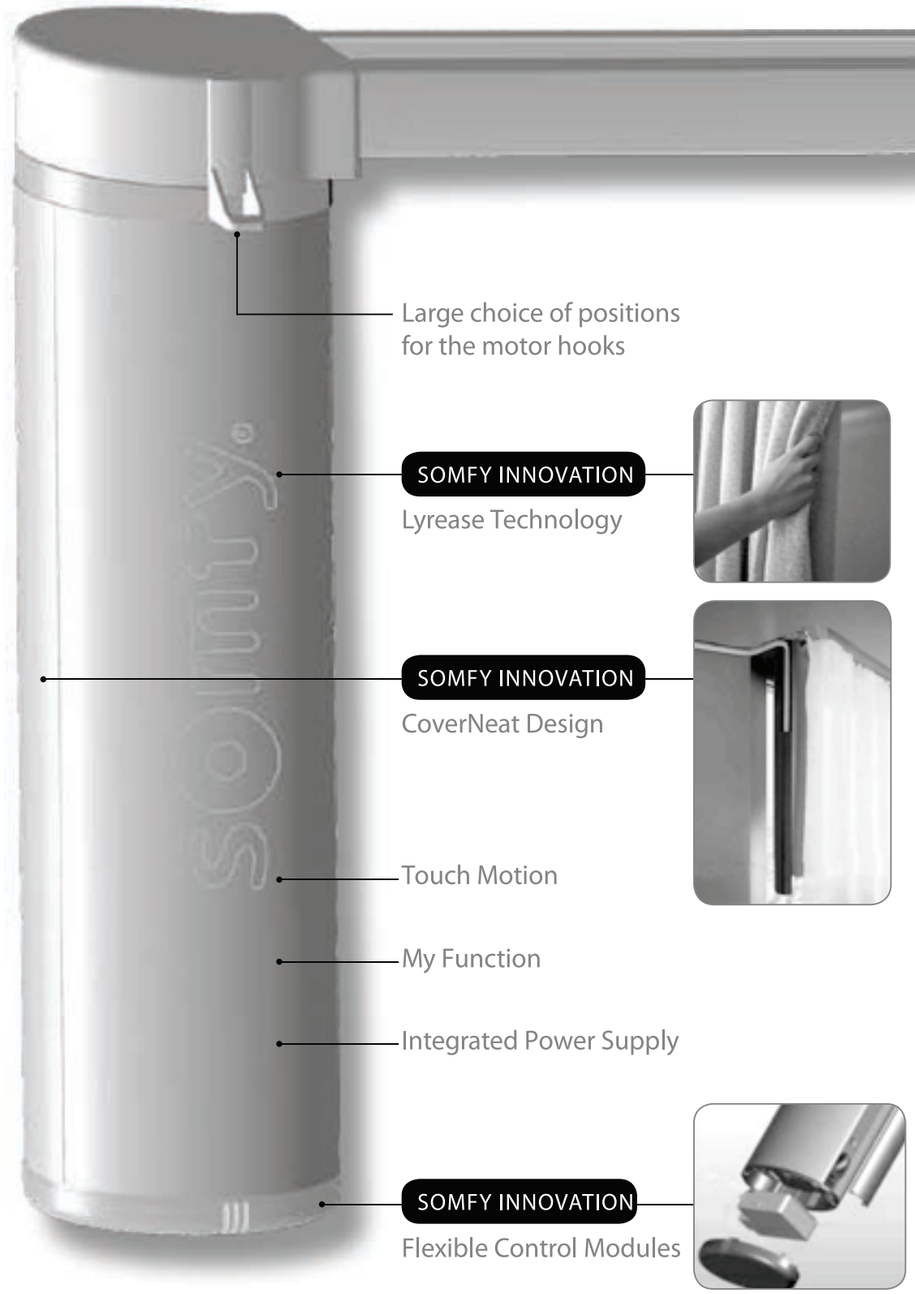


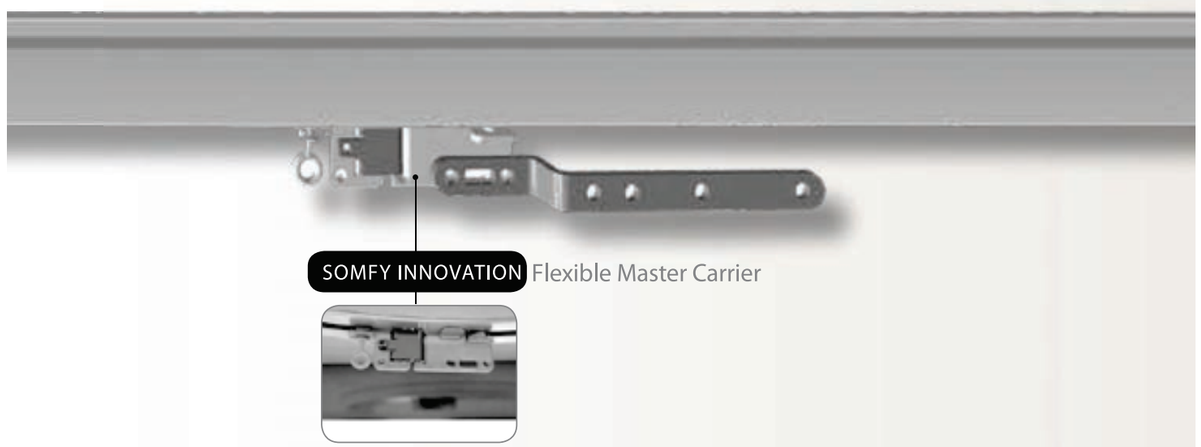
CONTROL OPTIONS

IR remote control

RS232 port for serial interfacing

SOMFY


Large choice of positions
for the motor hooks
SOMFY INNOVATION
Lyrease Technology
SOMFY INNOVATION
CoverNeat Design
Touch Motion
My Function
Integrated Power Supply
SOMFY INNOVATION
Flexible Control Modules



Glydea ™, the difference is in the detail

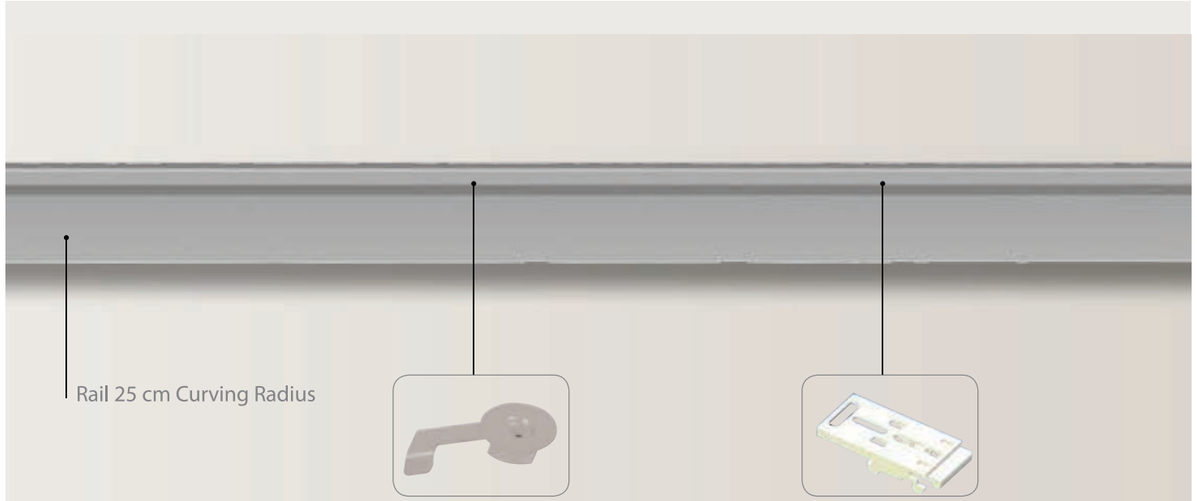
The sophistication of Glydea™ reflected in the simple forms and sleek lines of the motor and the rail.

Aesthetic

- **Somfy Innovation:** Patented cover neat design hides the cabling and protects the connectors and the control modules inside the motor.
- Reduced gap light thanks to the rail design and the swivel ceiling bracket.
- Adjustable limits, to allow the curtain to fall nicely.

Flexibility

- Somfy Innovation: Patented flexible master carrier follows the rail curves, reduces the frictions, and can be adapted to different types of curtains.
- Somfy Innovation: Plug in modules for a large range of control systems.

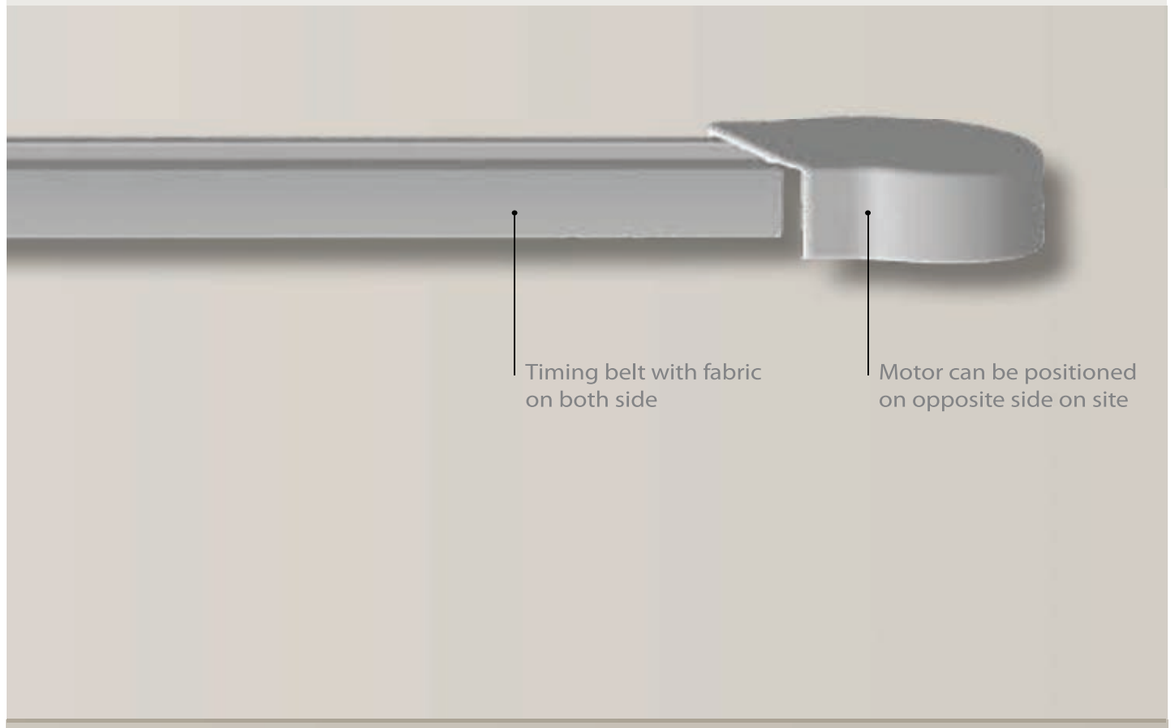


Quiet

- Low noise level of the motorized track (<50 DdB(A)), thanks to the motor design and the use of a timing belt.
- Soft start and soft stop.

Efficiency

- Touch Motion feature, to open and close the curtain simply by pulling on the fabric.
- My Function, to automatically control the curtain to a preferred position.
- High Speed: 20cm/s.



Robust Design

- Somfy Innovation: Lyrease mechanical systemwhich disengages automatically the motor drive shaft for manual operation preserving the fabric.
- Setting buttons and cabling not accessible to the end user.
- No maintenance necessary after installation.

Glydea ™, Somfy quality

Tested for 15 years of operation.
5 years international warranty.
International certifications.

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