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VER:2021

Fiber To The Antenna in the 5G Momentum

Connect together, Grow together

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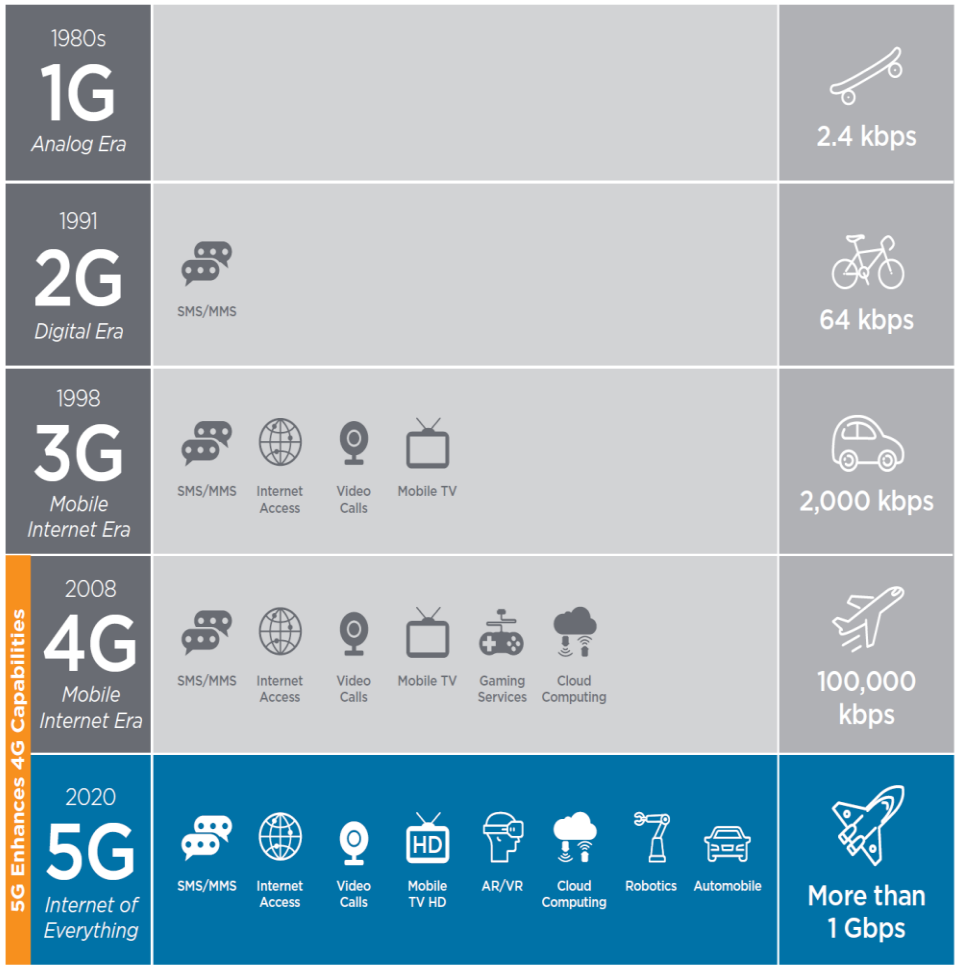
Evolution from 1G to 5G



5G infra-structures deployed by FTTA (Fiber To The Antenna) Driven by small cells, 5G cell density is projected to be four to six times that of 4G cell density

The rigorous developments around 5G suggest that leading mobile operators are prepared for **the commercial rollout of 5G by 2021** and mobile subscribers is estimated to **reach 5.9 billion by 2025**

5G network infrastructure in South Korea world's first nationwide 5G mobile network. deploy by Telephone poles, Cable ducts and fiber optic Passive networks network, which promises higher speeds of up to 100 times existing 4G LTE,

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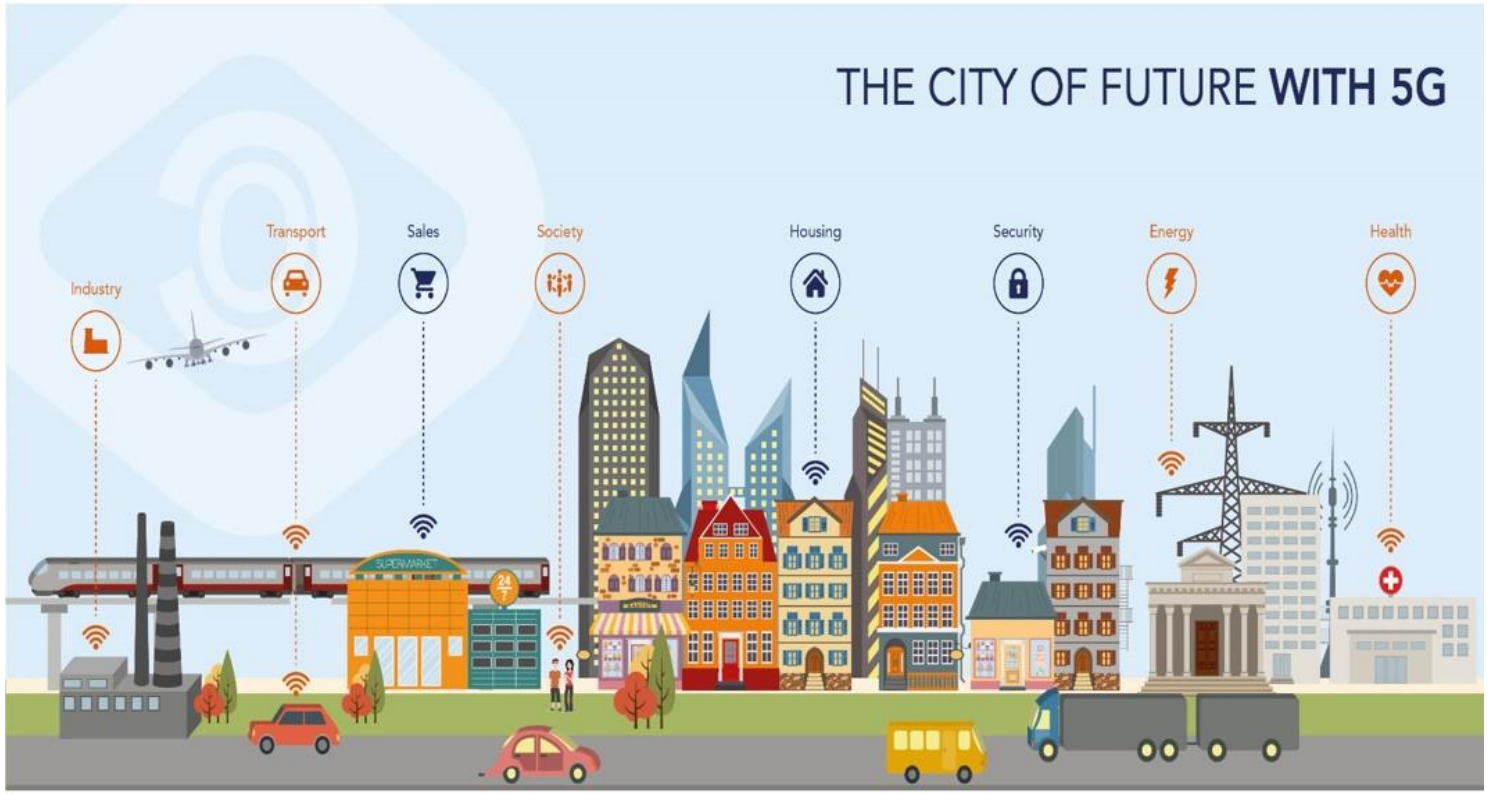
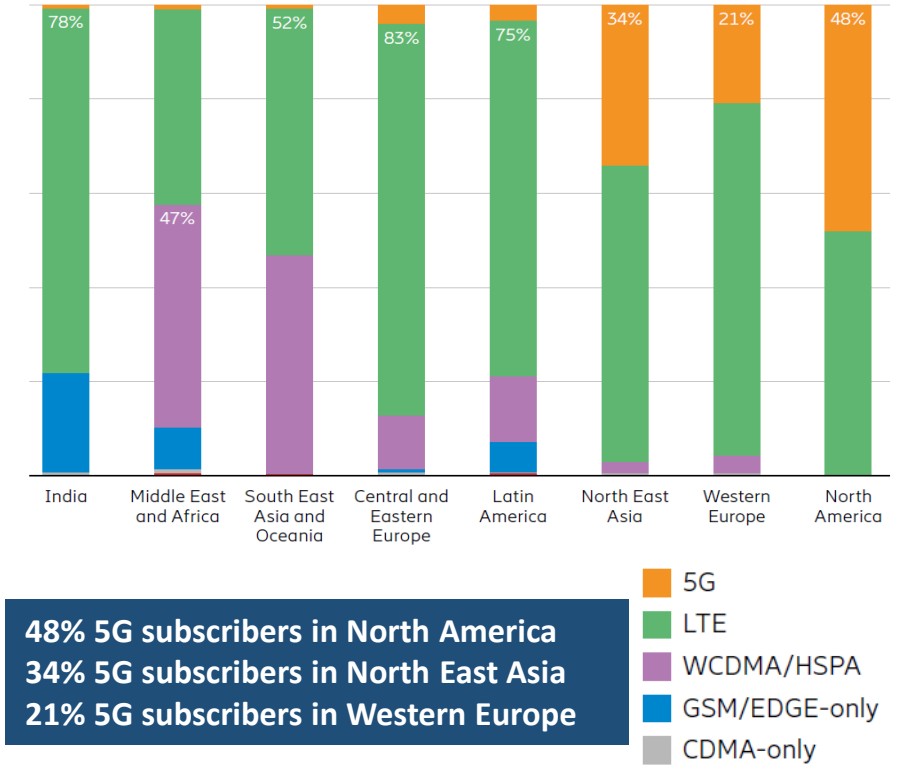
THE CITY OF FUTURES USES WITH 5G With the promise of extended coverage, an increase in speeds and optimization of power consumption, 5G technology is aimed at a wide range of sectors in the economic fabric: power, healthcare, media, industry and transport.



WORLDWIDE 5G SUBSCRIBERS IN 2023



48% 5G subscribers in North America
34% 5G subscribers in North East Asia
21% 5G subscribers in Western Europe

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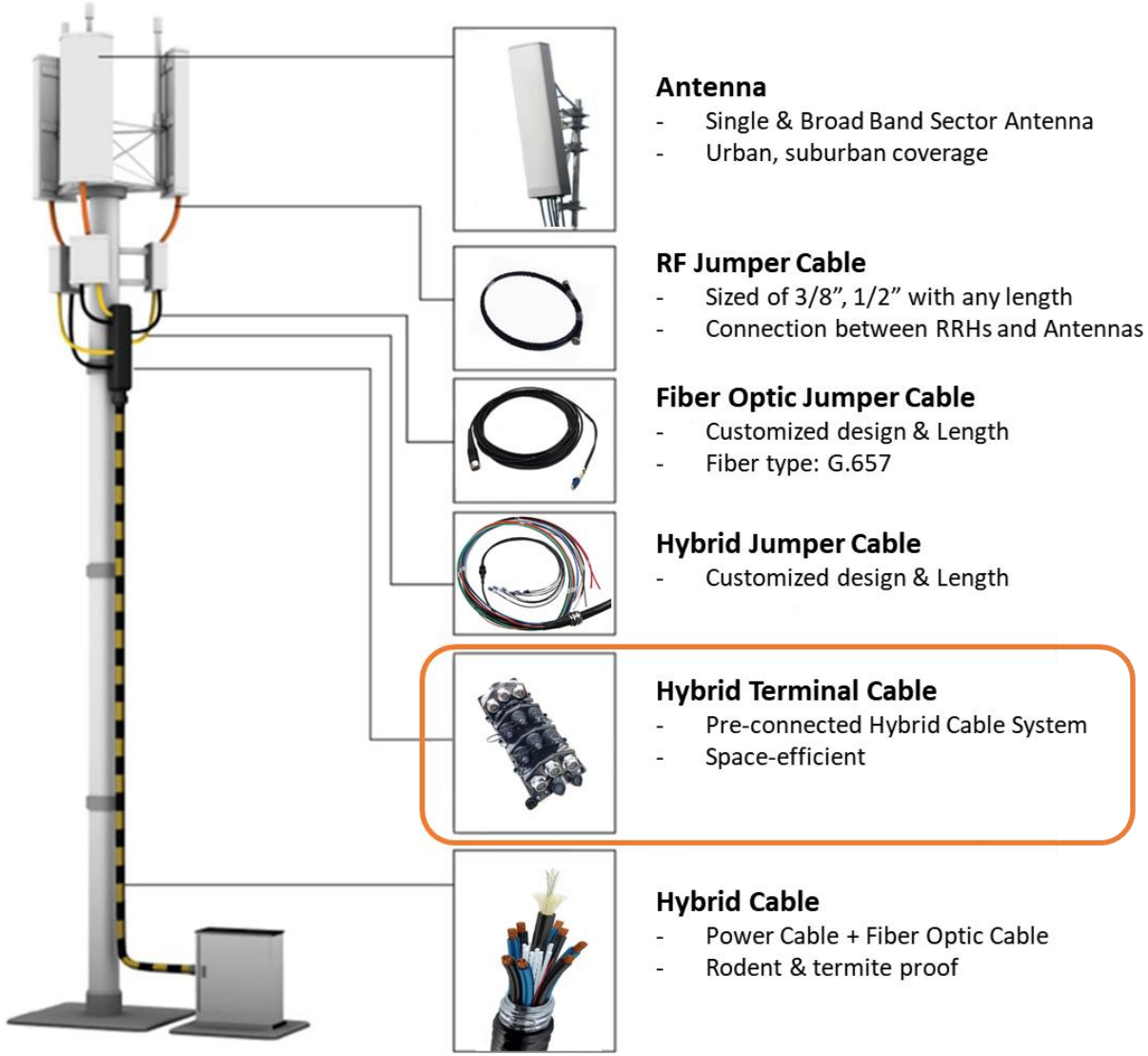
5G Tower Cabling Solution – A

Hybrid Terminal Cabling

- Combined Fiber and Power feeder cable for 3 to 4 RRHs through terminal

- **Hybrid Feeder Cable**
  - Outdoor type
  - Corrugated copper or aluminum Armored
  - Pre-assembled terminal in factory
  - Supports up to terminal covered 3 or 4 RRHs
  - Well mantel corrugated armored aluminum
  - 4, 6, 8, 10, 12 AWG with conductor pair depending on the power consumption of RRH and the associated voltage drop

- **Hybrid Connector Jumper Cable**
  - Hybrid Connector designed Plug & Play system
  - Combined fiber and power in a single construction
  - Factory terminated connectors
  - RRU CPRI interface vender specified connector
  - Fiber 1 or 2 pairs and conductor 1 pair
  - Power 8, 10, 12 AWG 1 pair
  - Corrugated armored aluminum



TOWER CABLING

Hybrid Terminal Cable

Features

- Pre-connectorised factory-sealed hybrid cable system for 3 and 6 RRHs.
- Modular plug & Play system compatible with fiber optic jumper and power jumpers
- Encapsulated IP 67 sealed connector head housing
- Robust pulling eye for cable lifting, no hoisting grips required, high cable strain relieve
- Space-efficient, low wind-load
- Easy mounting with adaptor plate, mast-pole, and wall mounting
- Optional protection cover for cable exits available

Parameter	LSFH™ hybrid cable (Global market)	UL listed hybrid cable (US market)
Jacket material	Thermoplastic, low smoke free of halogen	PVC
Standard	IEC 60502-1: 2004-04	UL 1277
Temperature range	-40℃ to +75℃	
Operating voltage	48 Vdc	
Rated voltage	0.6 kv/ 1kv (1.2kv)	
Conductors	Stranded copper class 2 IEC 60228: 2004	Stranded copper Class C
Drain wire	Stranded copper class 2 IEC 60228: 2004	Stranded copper Class B
Cable shielding	Copper foil 100% coverage (with drain wire)	
Fiber optic	5mm loose tube cable with up to 36 fibers single mode	
Halogen free	Yes	No
Flame retardant	IEC 60332-1-2: 2004	UL 1685 (UL 1581) vertical tray flame test (70000 BTU/hr)
UV resistant	IEC 68-2-5	UL 1581

HYBRID TERMINAL CABLE

Hybrid Jumper Cable
(1pair, 2pairs RRH-Cost Effective Ver)

Cable divider	Glued heat shrink	
Ingress protection	Connectors, cable and divider	IP 68
Cable head connectors (Radio end)	Fiber	RRH connector
	Power	Open end or Connectorised
Cable head connectors (Base station)	Fiber	LC duplex
	Power	Open ended
Breakout cables	Fiber	4.8mm
	Power	Shielded copper cables
Copper cross section	2x4mm^2, 2x6mm^2, or 2x10mm^2	
Cable diameter	Hybrid	15~20mm (depending cross section)
Temperature range	Service	-25℃ to +75℃
	Installation	-40℃ to +75℃
Tensile load	Fiber breakout cable	800 N
	Power breakout cable	1000 N
Salt mist	IEC 61300-2-26	96 h
Vibration	IEC 61300-2-1	10~500Hz/ 10g
shock	IEC 61300-2-9	100g

Tips:

- **Hybrid Connector can be replaced by PDLC , MPO, MTP etc..**
- **Hybrid cable diameter 1/2', 7/8 1-5/8'…**

HYBRID JUMPER CABLE

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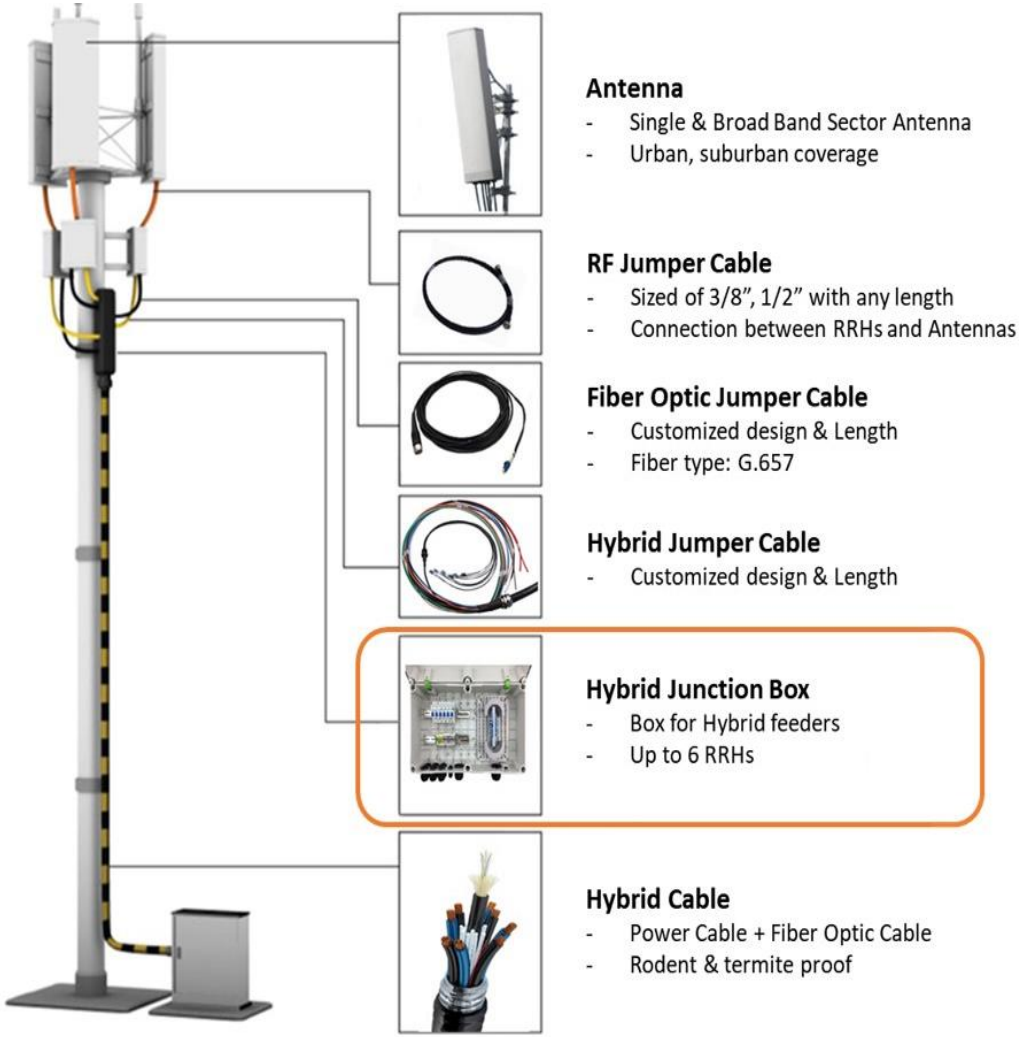
5G Tower Cabling Solution - B

Hybrid Junction Box Cabling

- Combined Fiber and Power feeder cable for 3 to 4 RRHs through junction box

- **Hybrid Feeder Cable**
  - Outdoor type
  - Corrugated copper or aluminum Armored
  - Top or bottom junction box
  - Fiber optic pre-terminated connections
  - Power Non Connector
  - 4, 6, 8, 10, 12 AWG with conductor pair depending on the power consumption of RRH and the associated voltage drop

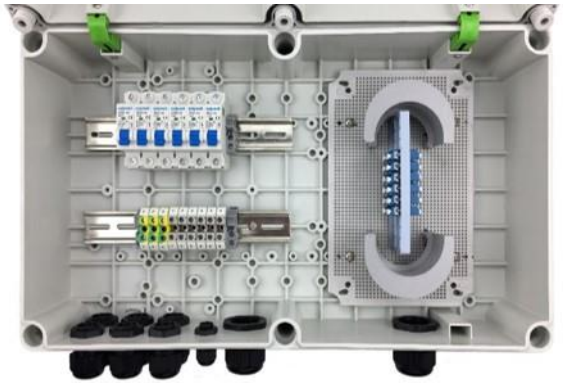
- **Hybrid Jumper Cable**
  - Jumper of Single trunk fiber and power connect to RRH
  - Fiber Optic 1 to 2 pairs
  - LC connector or vendor specified connector
  - Power 8, 10, 12 AWG 1 pair
  - Non Connector or RRH vendor specified connector



TOWER CABLING

Hybrid Junction Box

Features



- Material: Polycarbonate. UV resistant
- Outdoor type
- Poly mount / Wall mount type
- Pipe: 3” to 6”
- Color : Gray
- Screw terminal Block:
  - Isolate 4P & Non-isolated 4P (Option)
- Circuit Breaker 20A 4pcs (Option)
- Ground earth bar
- LC Adaptor Panel:
  - LC Duplex 8pcs (Option)
- Cable Entry:
  - Option A: Hybrid feeder 1 / Hybrid Jumper 4 / Ground 1 (Option)
  - Option B: Hybrid feeder 1 / Fiber Jumper 4 / Power Jumper 4 / Ground 1 (Option)

Power Junction Box

Features

- Material: Polycarbonate. UV resistant
- Indoor / Outdoor type
- Poly mount / Wall mount type
- Pipe: 3” to 6”
- Color : Gray
- Screw terminal Block:
  - Isolate 4P & Non-isolated 4P (Option)
- Circuit Breaker 20A 4pcs (Option)
- Ground earth bar
- Cable Entry:
  - Power feeder 1 / Power Jumper 4 / Ground 1 (Option)

Fiber Optic Junction Box

Features

- Indoor / Outdoor type
- Pole / Wall mount type
- Loop through cable can be installed
- Color : Gray
- PLC Splitter can be installed
- Swing panel design for easy installation and maintenance
- Interrelated splice and fiber management
- Distribution cables can be pre-terminated or spliced to pigtails

HYBRID JUNCTION BOX

5G Tower Cabling Solution - C

CWDM Wireless RU to DU Cabling

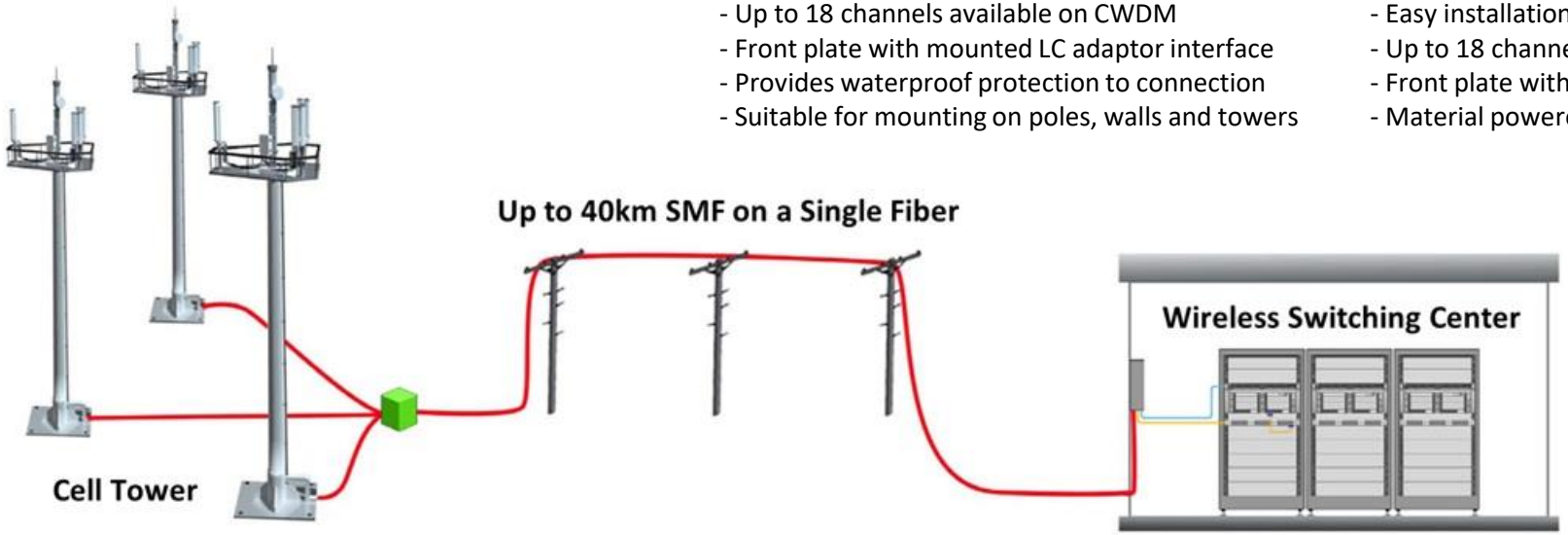
- Current radio systems mount the active RRH on the mast in order to save energy
- Reduction in high cost and labor intensive installation for coaxial cable
- Allows for quick fault finding and upgrading RRH

CWDM MUX + Junction Box

- CWDM MUX + Junction Box
  - 1270nm to 1610nm Tx & Rx transmission
  - CWDM MUX in outdoor junction box
  - Up to 18 channels available on CWDM
  - Front plate with mounted LC adaptor interface
  - Provides waperproof protection to connection
  - Suitable for mounting on poles, walls and towers

CWDM MUX + Shelf

- CWDM MUX + Shelf
  - 1270nm to 1610nm Tx & Rx transmission
  - CWDM MUX in 19” Shelf
  - Easy installation and removal type
  - Up to 18 channels available on CWDM
  - Front plate with mounted LC adaptor
  - Material powered coated aluminum



TOWER CABLING

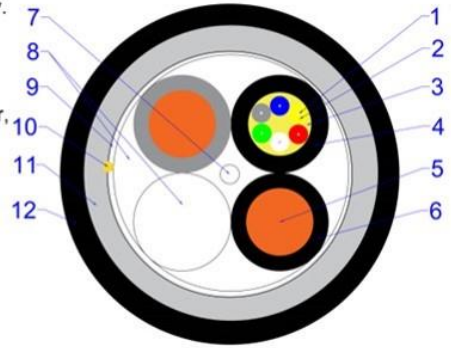
Mini Hybrid Cable

Features

- Pre-assembled “plug & Play” cabling
- Supports up to terminal covered 3 or 4 RRHs
- Well mantel corrugated armored aluminum
- 4, 6, 8, 10, 12 AWG with conductor pair depending on
- Ruggedized design with robust pulling tube
- Outdoor and indoor with high flame resistance
- Temperature range -40℃ up to +75℃
- Ingress protection IP 67 when installed
- Loose tube cables with up to 24 fibers, rodent protected and UV resistant
- LC Uniboot connectors
- Breakouts numbered for easy channel identification
- Easy and time-saving installation
- Easy system factory tested, Rodent resistant

Mini Hybrid Cable Specification

1. Fiber: Single-mode fiber (G.657A1, 9/125 μm)
2. Tight buffer: Blue, Yellow, Red, White, Green, Grey. Nylon or equivalent material.
3. Reinforcement: Aramid yarn, 25000 dtex.
4. Tube: Black LSOH, UV resistance.
5. Power cable conductor: Stranded copper conductor, 5.5mm^2.
6. Power cable insulation: Grey, black LSOH, UV resistance.
7. Reinforcement: FRP.
8. Filler: PP.
9. Wrap tape: PET.
10. Rip cord: Kevlar.
11. Armor: Corrugated aluminum tape.
12. Overall jacket: PE, diameter 16mm.



OPTICAL CABLE ASSEMBLY

Plug & Play Cable – A Type (LC to LC)

Features

- Pre-assembled “plug & Play” cabling system
- Ruggedized design with robust pulling tube
- Outdoor and indoor with high flame resistance
- Temperature range -40℃ up to +75℃
- Ingress protection IP 67 when installed
- Loose tube cables with up to 24 fibers, rodent protected and UV resistant
- LC Uniboot connectors
- Breakouts numbered for easy channel identifica
- Easy and time-saving installation
- Easy system factory tested
- Rodent resistant

Assemblies Specifications

Number of fibers	Up to 1152
Divider	Small or medium or large
Build-in hole dimension	15.6~16.4mm

Pulling tube with pulling eye

Outer diameter	36mm
Maximum tensile strength	1000 N
Crush resistance	250 N/cm
Ingress protection	IP 67

Glass-armored loose-tube cable

Jacket material		LSFH™
Cable diameter		8.5mm
Tensile strength during installation in service		3000 N
		1500 N
Crush resistance	Short term	400 N/cm
	Long term	200 N/cm
Temperature range installation service		-25℃ to +75℃
		-40℃ to +75℃
Flame resistance	IEC 60332-1	Passed
	IEC 60332-3-24	

OPTICAL CABLE ASSEMBLY

Plug & Play Cable – B Type (LC to Multi Connector Choice)

Features

- Pre-assembled plug & Play cabling system
- Terminate with Multi Connector extension or with RRH-specific interface
- Ruggedized design with robust breakout cables
- Robust pulling tube for cable lifting
- Outdoor and indoor with high flame resistance
- Temperature range -40℃ up to +75℃
- Loose tube cables with up to 24 fibers, rodent protected and UV resistant
- Fibers and connectors numbered for easy channel identification
- Easy and time-saving installation

Assemblies Specifications

Number of fibers	Up to 12	18 to 24
Number of RRHs	Up to 6	9 to 12
Build-in hole dimension	16.0mm	26.0mm
Tensile load on individual breakout cable	600 N	
Ingress protection with the connector	IP 67	
Maximum breakout lengths	4m	
Breakout cable diameter	5mm	

Glass-armored loose-tube cable

Jacket material		LSFH™
Cable diameter		8.5mm
Tensile strength	During installation	3000 N
	In service	1500 N
Crush resistance	Short term	400 N/cm
	Long term	200 N/cm
Temperature range	Installation	-25℃ to +75℃
	Service	-40℃ to +75℃
Flame resistance	IEC 60332-1	Passed
	IEC 60332-3-24	

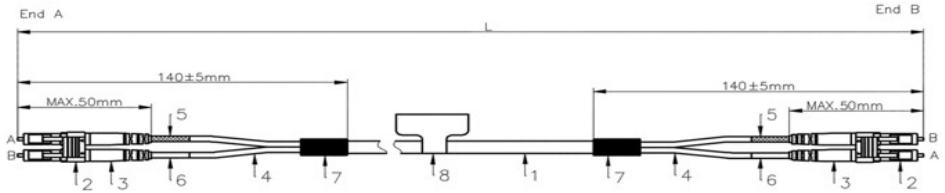
Major RRU Connector Series

OPTICAL CABLE ASSEMBLY

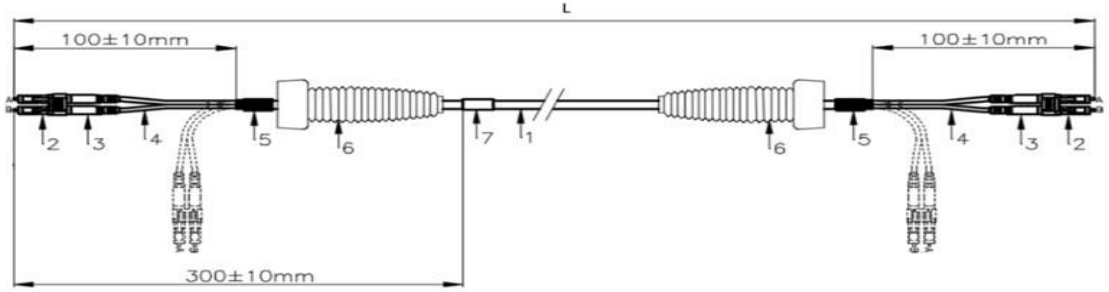
Multi Vender Jumper for RRHs

FTTA Fiber-To-The-Antenna

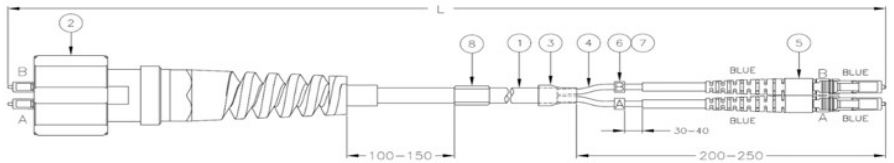
- LC Feeder with metal divider and ruggedized breakout, 4.8mm cable, Single mode bend insensitive fiber



- LC Feeder with 90^{O} boot, 5mm cable, OFNR, Multi mode fiber



- PDLC Feeder with 7mm, Single mode bend insensitive fiber, PDSC, IP 67



DLC-DLC

FDLC-DLC

FDLC-FDLC

PDLC-DLC

NDLC-NDLC

Mini Hybrid
FDLC-DLC

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RF Cabling and Connectivity Solution

RF Communication Cable

Mainly used in Broadcast and microwave telecommunication, military use, Aerospace, vessel or other circumstance where the RF is needed.

Advantages: Low attenuation, low standing wave, high shielding, flexible, high anti tensile strength.

RF Cabling Solution

RF Foam Cable

Leaky Foam Cable

Air Dielectric Cable

Leaky Form Cable

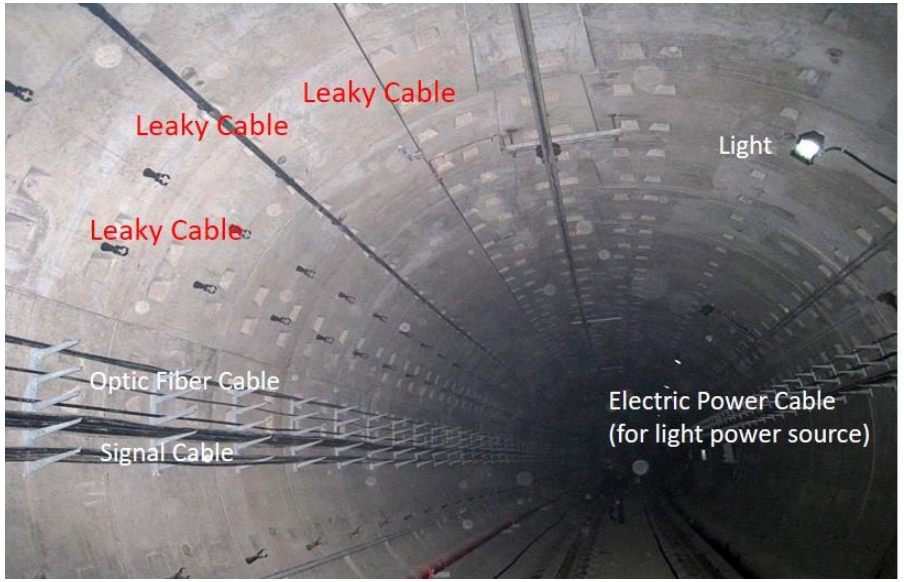
Leaky coaxial cable is mainly used in the long, narrow and enclosed areas that conventional antenna signals can not be effectively covered, for example, track traffic, tunnels, mines, buildings and large edifices, and so on.

HLRHTSMYZ-50-42
1-5/8” Leaky Coaxial Cable

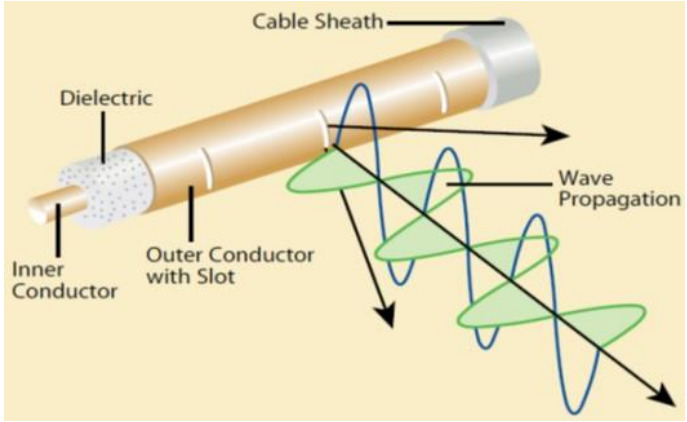
Characteristics impedance: 50±2Ω

Working bandwidth: 700~1000 MHz

Cut-off frequency: 1200--1400 MHz



Success Installation : Railway Tunnel



Transmit theory of leaky coaxial cable

RF Cabling Solution

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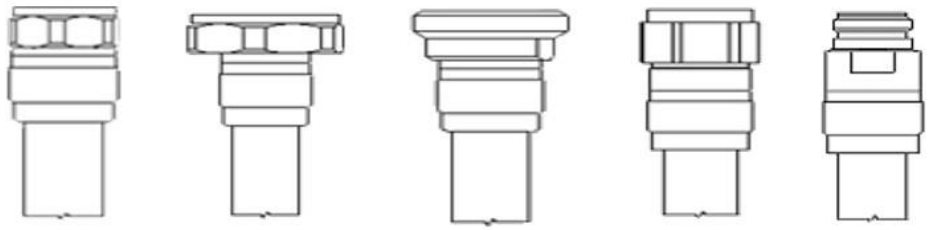
RF Cabling and Connectivity Solution

RF Jumper Cable

The lengths available on your request.

Size	Frequency	1.5 m	2.0 m	3.0 m	5.0 m
1/4"	450 MHz	0.14	0.19	0.28	0.47
	900 MHz	0.20	0.27	0.41	0.68
	1800 MHz	0.30	0.39	0.59	0.99
	2400 MHz	0.35	0.46	0.69	1.15
1/4" S	450 MHz	0.18	0.24	0.37	0.61
	900 MHz	0.26	0.35	0.53	0.88
	1800 MHz	0.39	0.51	0.77	1.29
	2400 MHz	0.45	0.60	0.90	1.50
3/8"	450 MHz	0.10	0.14	0.20	0.34
	900 MHz	0.15	0.20	0.29	0.49
	1800 MHz	0.21	0.29	0.43	0.71
	2400 MHz	0.25	0.33	0.50	0.84
3/8" S	450 MHz	0.14	0.18	0.27	0.46
	900 MHz	0.20	0.26	0.39	0.66
	1800 MHz	0.29	0.38	0.58	0.96
	2400 MHz	0.34	0.45	0.68	1.13
1/2"	450 MHz	0.07	0.09	0.14	0.24
	900 MHz	0.10	0.14	0.20	0.34
	1800 MHz	0.15	0.20	0.30	0.50
	2400 MHz	0.17	0.23	0.35	0.58
1/2" S	450 MHz	0.11	0.14	0.22	0.36
	900 MHz	0.16	0.21	0.32	0.53
	1800 MHz	0.23	0.31	0.47	0.78
	2400 MHz	0.27	0.36	0.54	0.91

4.3-10-M DIN-M DIN-F N-M N-F

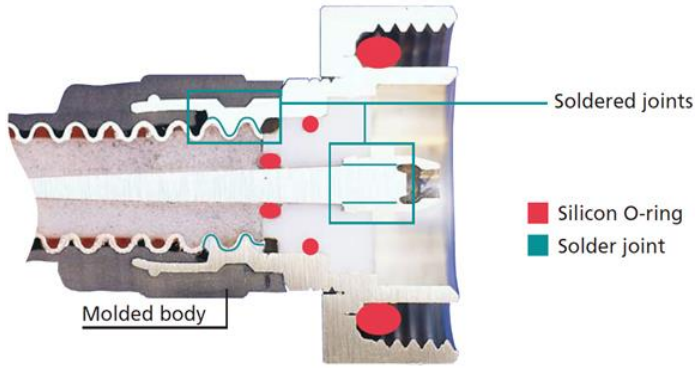


RF Cabling Solution

RF Cabling and Connectivity Solution

RF Connectors

Extremely robust and waterproof, typically used in mobile communication applications with demanding mechanical and electrical requirements.
Connectors have the following advantages: Low VSWR, Low Intermodulation, Easy Attachment and Water-proof.



Advantages:

1. Premium PIM
2. The Best Solid
3. Tight Waterproof
4. Logger Durability

Item \ Cable size		1/2"S	1/4"S	1/2"
Characteristic impedance(Ω)		50	50	50
Frequency range		1M~11GHz	0~18GHz	0~3GHz
Dielectric strength(Min at sea level)(V)		2500	500	1500
VSWR		⩽1.06(1M-3G) ⩽1.08(3G-11G)	⩽1.2(0-3G) ⩽1.4(3-18G)	⩽1.15(0-3G)
Contact resistance	Inner conductor(mΩ)	⩽0.8	⩽5	⩽5
	Outer conductor(mΩ)	⩽0.4	⩽2.5	⩽2.5
Insulated resistance(mΩ)		⩾5000	⩾5000	⩾5000
Insertion loss(dB)		⩽0.1	⩽0.1	⩽0.1
Center retentivity(N)		>0.6	>0.28	>0.57
Durability(cycles)		⩾500	⩾500	⩾500

RF Cabling Solution

RF Cabling and Connectivity Solution

RF Connectivity

Power Coupler

The entire frequency spectrum from PMR to 5G. As a result, DAS networks can now be completely assembled

RF Clamps

Feeder clamps are made of stainless steel and Anti-UV rubber, adopting special technic of coating, widely used in the fix of RF cables. Applied in different operation Temperature

Ground Kits

Various indoor & outdoor grounding kits are applied to the grounding protecting of various feeders, installation easily and performance reliable.

Feeder Cable Cutter

All stripping surfaces are manufactured to precise tolerances to assure clean, smooth strips

RF Cabling Solution

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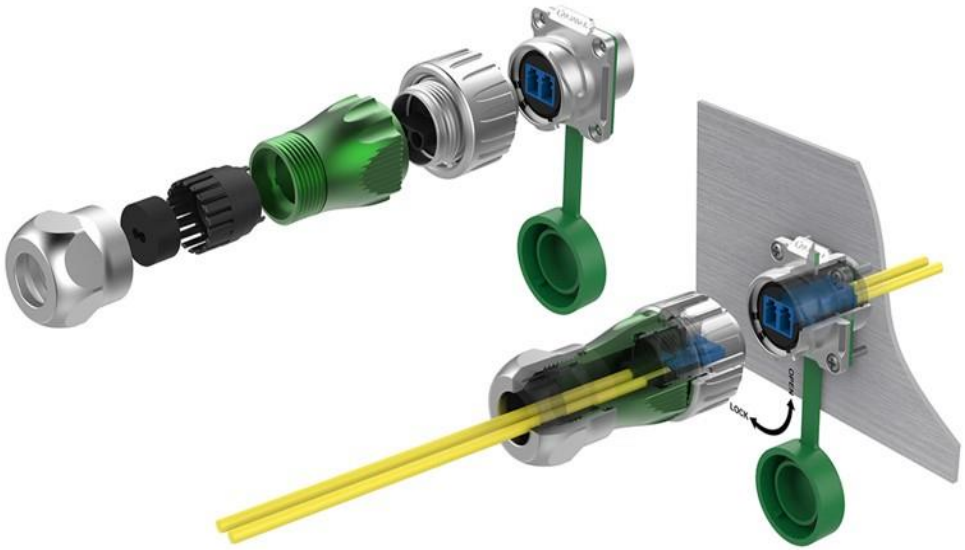
PREMIUM WEATHERPROOF

Hash Environment Connector (Bayonet Type) (VHEC24-BT)

Features

- Connecting mode: ¼ bayonet connect
- Protection level: IP65/IP67
- Line diameter scope: Ø5.5mm~Ø7mm
- Durability: ≥500 mating/Unmating Cycle
- **Temperature rating: -40~80℃**



Harsh Environment Connector (Plug & Play Type) (VHEC24-PPT)

Features

- Connecting mode: Plug/unplug
- Protection level: IP65/IP67
- Line diameter scope: Ø5.5mm~Ø7mm
- Durability: ≥500 mating/Unmating Cycle
- **Temperature rating: -40~80℃**

PREMIUM WEATHERPROOF

VERATECK delivers turn-key innovativecommercial and public safety coverage and capacity solutions thatgivenetworkoperators,facilities ownersand neutral hosts an edge over the competition

Designed for even the most challenging indoor and outdoor environments, VERATECK's modular and integrated solutions are designed to reduce capital and operating expenses, speed rollout of services and help improve coverage, signal quality and capacity

FTTH or Fiber To The Home, refers to fiber optic cable that replaces the standard copper wire of the local Telco. Fiber of this cable reaches the boundary of the living space, such as a box on the outside wall of a home.

5G FTTA Solution is the new generation of high- performance fiber-optic cables for high-speed data transfer from VERATECK. It secures your network connectivity today and in the future

For FTTH, FTTA, MTP PRODUCT INFORMATION, PLEASE VIST OUR WEB SITE
www.verateck.com

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