

Tower 1 (To be placed in mountain area)

1) Part name: Lightning Arrestor

Mesh name: Blip 1, Lightning Arrestor and other meshes

Information to display:

Name of the part

Lightning Arrestor with RF Omni Antenna (often inside a radome)

Position – where it is and why

- Installed at the **absolute top of the tower**
- This is the highest point so it can:
 - Intercept lightning strikes before they hit sensitive equipment
 - Provide maximum, unobstructed signal coverage if it is an omni antenna

Purpose

- **Lightning protection:** Safely directs lightning energy into the tower grounding system
- **Radio communication (if antenna):** Used for low-power links such as monitoring, control, or backup communication

Material used

- Lightning rod: Copper or copper-clad steel
- Antenna elements: Aluminum or copper
- Outer cover (radome): UV-resistant fiberglass or plastic
- Internal grounding parts: Copper

2) Part name: Sector Panel Antennas

Mesh name: Blip 2, Metal side supports, Red side supports

Information to display:

Name of the part

Sector Panel Antennas (Multi-Band Cellular Antenna Array)

Position – where it should be and why

- Installed **near the top of the mobile tower**, below the lightning protection system
- Mounted on **multiple sides of the tower** to create sectors (typically $3 \times 120^\circ$ coverage)
- Positioned at high elevation to:
 - Maximize coverage area
 - Minimize signal obstruction from buildings, trees, and terrain
 - Ensure clear radio propagation and sector isolation

Purpose

- Primary interface between the mobile network and user devices
- Transmits radio signals from the network to mobile phones (downlink)
- Receives signals from mobile phones (uplink)
- Supports multiple technologies and frequency bands such as:

- 2G (GSM)
- 3G (UMTS)
- 4G (LTE)
- 5G (NR)
- Multiple panels allow:
 - Directional coverage (sectorization)
 - Higher user capacity
 - Reduced interference between sectors

Material Used

- **Radome (outer cover):**
 - Fiberglass-reinforced plastic (FRP) or RF-transparent polymer
 - UV-resistant and weatherproof
- **Internal antenna elements:**
 - Copper or aluminum radiating elements
 - Aluminum reflectors
- **Mounting and support hardware:**
 - Hot-dip galvanized steel or stainless steel brackets
 - Corrosion-resistant fasteners

3) Part name: Microwave Dish Antennas

Mesh name: Blip 3, Cloth covers, main antenna

Information to display:

Name of the part

Microwave Point-to-Point Dish Antenna

Position – where it is and why

- Mounted **high on the tower**, below the lightning protection zone
- Needs clear **line-of-sight** to another tower for long-distance communication
- Positioned away from other antennas to reduce interference

Purpose

- Provides **backhaul connectivity**
- Carries large volumes of data between towers or from tower to core network
- Used where fiber optic cable is unavailable

Material used

- Dish: Aluminum or steel
- Mounting brackets: Galvanized steel
- Feed horn and waveguide: Aluminum or brass
- Protective coating: Weather-resistant paint or powder coating

Tower 2 (To be placed above some building)

4) Part name: Massive MIMO Antenna Cluster

Mesh name: Blip 1, antenna2_metal1_0

Information to display:

Name of the part

Small Cell Antennas / Massive MIMO Antenna Array (5G)

Position – where it should be and why

- Mounted **near the very top of the monopole**, just below the crown
 - Installed in a **circular arrangement** to provide uniform 360° coverage
 - Positioned high to:
 - Support dense urban 5G coverage
 - Reduce obstruction and multipath interference
 - Serve high-capacity, short-range users efficiently
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Purpose

- Supports **5G New Radio (NR)**, especially mid-band frequencies
- Uses **Massive MIMO** to:
 - Serve many users simultaneously
 - Perform beamforming for higher data rates
- Designed for **high-capacity, short-to-medium range coverage**

What material is it made of

- Radome: RF-transparent composite plastic or fiberglass
- Internal antenna elements: Copper or aluminum
- Mounting brackets: Galvanized steel or aluminum
- Cabling: Shielded copper RF cables and fiber optic cables

5) Part name: Antenna Mounting Platform

Mesh name: Blip 2, antenna2_alum2_0

Information to display:

Name of the part

Antenna Mounting Platform / Maintenance Platform with RF Safety Fence

Position – where it should be and why

- Installed **around the monopole at antenna height**, below or between active antenna arrays
- Encircles the tower to provide **360° access**
- Positioned at this level to:
 - Support multiple antennas and radio units
 - Maintain correct antenna spacing and orientation
 - Allow technicians safe access during installation and maintenance
 - Define controlled RF exposure zones around active antennas

Purpose

- Acts as a **structural support frame** for mounting antennas, RRUs, and cabling
- Provides a **stable working platform** for tower maintenance crews
- The surrounding mesh/fencing:
 - Limits accidental access into high RF exposure areas
 - Acts as a **visual and physical safety barrier**
 - Helps manage cable routing and equipment separation
- Enables **multi-operator deployments** on a single monopole

What material is it made of

- **Main platform structure:**
 - Hot-dip galvanized structural steel (angles, tubes, or channels)
- **Cross-bracing and support arms:**
 - Galvanized steel for rigidity and wind-load resistance
- **RF safety fence / mesh panels:**
 - Galvanized steel wire mesh or expanded metal
 - Designed to be RF-transparent while providing safety
- **Mounting clamps and fasteners:**
 - Stainless steel or galvanized steel bolts
- **Protective finish:**
 - Anti-corrosion galvanization or epoxy coating

6) Part name: Power and Control Unit

Mesh name: Blip 3, antenna2_metal7_0

Information to display:

Name of the part

Base Transceiver Station (BTS) Cabinet / Power Supply Unit

Position – where it should be and why

- Installed **at the base of the tower**, mounted on a concrete foundation
 - Positioned at ground level to:
 - Allow easy maintenance and monitoring
 - Reduce weight load on the tower
 - Improve safety and accessibility
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Purpose

- Houses **baseband units (BBU)**
- Contains **power systems**, including:
 - AC/DC converters
 - Battery backup
 - Surge and lightning protection
- Connects tower equipment to:
 - Fiber optic backhaul
 - Network core infrastructure

What material is it made of

- Cabinet enclosure: Powder-coated steel or aluminum
- Internal racks: Galvanized steel
- Cooling system: Aluminum heat sinks and fans
- Base foundation: Reinforced concrete

Tower 3 (To be placed in open, flat land)

1. Part name: Sector Panel Antenna

Mesh name: Blip 1, Mesh023

Information to display:

Name of the part

Sector Panel Antennas (Multi-Band Cellular Antenna System)

Position – where it should be and why

- Installed at the **uppermost section of the lattice tower**
 - Mounted on multiple faces of the tower to create **sectorized coverage**
 - Positioned high to:
 - Maximize coverage radius
 - Reduce signal blockage from terrain and buildings
 - Maintain clear separation from microwave equipment below
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Purpose

- Main antennas that **communicate directly with mobile devices**
- Transmit and receive RF signals for:
 - 2G, 3G, 4G LTE, and 5G NR
- Sector arrangement allows:
 - Directional coverage (typically $3 \times 120^\circ$ or $6 \times 60^\circ$ sectors)

- Higher network capacity
- Reduced inter-cell interference

What material is it made of

- Radome: Fiberglass-reinforced plastic (RF-transparent)
- Internal radiating elements: Copper or aluminum
- Reflectors: Aluminum
- Mounting brackets: Hot-dip galvanized steel or stainless steel

2. Part name: Microwave Dish Antenna Cluster

Mesh name: Blip 2, Mesh023_5, Mesh023_6

Information to display:

Name of the part

Microwave Backhaul Dish Antennas

Position – where it should be and why

- Installed at the **mid-section of the tower**, below cellular antennas
- Oriented precisely toward other towers for **line-of-sight communication**
- Positioned lower to:
 - Reduce wind loading at the top
 - Maintain mechanical stability

- Avoid RF interference with sector antennas

Purpose

- Provides **high-capacity point-to-point data links**
- Carries aggregated mobile traffic from the tower to:
 - Another tower
 - Fiber access point
 - Core network
- Used where fiber connectivity is limited or unavailable

What material is it made of

- Dish reflector: Aluminum or steel
- Feed horn and waveguide: Aluminum or brass
- Mounting frames: Galvanized steel
- Protective coating: Weather-resistant paint or powder coating

3. Part name: Tower Base Platform

Mesh name: Blip 3, Mesh023_3, Mesh023_19

Information to display:

Name of the part

Tower Base Platform with Access Ladder and Safety Railings

Position – where it should be and why

- Located at the **base of the tower**, above the foundation
 - Positioned at ground level to:
 - Allow safe access for maintenance personnel
 - Support climbing and inspection activities
 - Provide transition between ground equipment and tower structure
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Purpose

- Serves as a **safe working and access area**
 - Supports:
 - Entry to climbing ladder or fall-arrest system
 - Inspection of structural members
 - Acts as a safety buffer between the tower and surrounding area
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What material is it made of

- Platform structure: Galvanized structural steel
- Handrails and guardrails: Galvanized steel pipes
- Flooring: Anti-slip steel grating
- Base support: Reinforced concrete foundation