



**CIGNAL**

**Signal-owned Tower**  
**Sites**

**Tower Operations &**  
**Rigging Policy**

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## **1 Introduction**

This document contains the Cignal policy for tower operations including:

- Equipment addition or amendment applications
- Height Sharing
- Risk Assessments and Methods
- Rigging, cabling and earthing

This policy serves to:

- Promote a safe tower site
- Minimise the risk of damage to equipment, other parties' equipment and/or the tower site itself
- Promote a high standard of equipment installation and therefore future reliability
- Facilitate the operation of equipment belonging to multiple site users

**All works and any associated equipment amendments MUST comply with the terms of the licence which permits the works and the equipment.**

**All tower access MUST use the Fall Arrest System where one is installed.**

**NO free-climbing of a tower is permitted under any circumstances,**

**All works team members must be properly experienced, trained and qualified to carry out the intended access and works in a safe manner.**

**All access to Cignal-owned tower sites MUST be approved by Cignal as per the Cignal Access Policy.**

## **2 Process for Equipment Addition or Amendment**

The following is the Cignal process for the addition or amendment of telecommunications equipment on Cignal-owned infrastructure. Amendment of equipment covers relocation or replacement:

**Where a licensed operator plans to add to or amend equipment at a Cignal-owned tower site, an application in advance must be submitted to Cignal at [access@cignal.ie](mailto:access@cignal.ie).**

### **2.1 Application for Equipment Addition or Amendment**

Applications must include full details of the proposed equipment being relocated/added as well as detailed design drawings including plan and elevations (where relevant showing each tower face) of the proposed site changes.

Cignal may, at its discretion, accept photomontage descriptions and/or general arrangement drawings for minor antenna additions or relocations.

Cignal will, where requested, provide the applicant with a copy of the relevant Site Information Pack & Safety File. If required, site as-built drawings in AutoCAD format can also be provided.

Cignal will, depending on the nature of the works, also request additional information including, but not limited to:

- method statements
- structural certification (to be provided by the Cignal design consultant)

Applications must be submitted at least two weeks prior to planned works. Works may not proceed without prior written approval by Cignal.

Where necessary, approval will be subject to prior commercial agreement and, where necessary, an executed licence or Deed of Variation. Note that this process must be followed even in the case where the proposed addition/relocation is covered under an existing licence agreement.

### **2.2 Works Completion**

On works completion, the applicant must supply Cignal with completion documentation, to include:

- appropriate certification updates
- appropriate site hazard identification amendments
- red-lined mark-ups of the site as-built drawings

The applicant must also supply photographic approval in support of the red-lined as-built drawings.

Depending on the nature of the works, Signal may need to visit the site following works completion to validate the Site Information Pack and Safety File amendments – this site visit requirement will typically be confirmed as part of Signal works approval.

## **2.3 Antenna Height Sharing**

Where necessary, Signal will consider applications for antenna height-sharing by operators on Signal towers. However, it is important that the implementation of a height share does not create real technical problems for existing tower licensees and that the impact to the equipment and operations of existing licensees is minimised.

When a height share is requested, the above process is amended as follows:

1. The equipment addition/relocation application must include:
  - a. A detailed technical justification for the height share to include drawings which clearly demonstrate antenna proximities and azimuths.
  - b. A method statement which describes in detail how the height share will be implemented.
  - c. If required, a datasheet(s) which describes in detail the operation of the antenna(s) to be used in the height share together with details of the frequency at which they will be operated
2. The applicant must undertake to cover all rigging costs associated with the height share and indemnify Signal against any issues caused by the works to effect the height share or the height share itself.
3. Signal will review the height share application and, if this review is positive, will inform the existing operator of the application with accompanying drawings and technical justification. The existing operator will be invited to respond with any technical concerns which will be passed on to the applicant. The applicant will be required to address any reasonable technical concerns in a revised application to be approved by Signal.

## **2.4 Rigging & Steelwork**

Antennas and dishes must be positioned and rigged as per drawings agreed with Signal in advance. Only steelwork necessary for the placement of equipment must be rigged on the structure. It is prohibited to rig steelwork for any future use.

Where available, cable management systems must be used for all feeders (see below).

Signal-owned structures are designed to support multiple operators. All users should consider the needs, equipment and safety of other users when rigging and maintaining their equipment.

### **3 Tower Access - Risk Assessment & Method Statement**

All planned access and works at Signal-owned tower sites MUST be preceded by a risk assessment which takes into account:

- The nature of the works intended
- The specific location of the site
- The anticipated and possible weather and light-level conditions
- The fitness, experience and level of training and certification of the works team
- All relevant hazards, including but not limited to the hazards listed in the Hazard Identification in the Access section of the Signal website

All access and works must be controlled by an appropriate method statement which properly mitigates the above risk assessment.

## 4 Tower Equipment Rigging & Cabling

The following policies must be complied with for all works on Signal tower sites.

### 4.1 Cable Management Systems

Cable trays/ladders to carry antenna feeder cable shall be fitted where required. The capacity of new cable trays/ladders shall allow for cables to be fixed in a two deep arrangement with at least a 30% surplus capacity. Cable trays shall be galvanised in accordance with BS EN ISO 1461 Hot Dip Galvanized Coatings on Fabricated Iron and Steel Articles – Specifications and Test Methods. Cable ladder/tray sizes shall be specified in accordance with the cable requirement at the time of the preconstruction survey stage. Where possible full lengths of galvanised cable ladder/tray shall be used to minimise joints and cuts in the tray. All cuts in cable tray, and cable tray lid, shall have all burrs removed and cold galvanising spray shall be applied. Joints and bends shall be completed with proprietary hardware. All fixing hardware shall be of stainless steel of a minimum of grade A2. Where there is a danger of falling objects, horizontal runs on which people may walk, or where the tray is accessible to vandalism (as assessed at the MSV), the tray shall be fitted with a lid of the same gauge as the tray. For galvanised tray/ladder the lid shall be a depth of 110mm and be secured with stainless steel self-tapping screws of a minimum grade A2.

All galvanised cable tray joints shall be bonded using 25mm by 3mm copper earth tape with a PVC shield through drilled and bolted at each end. All galvanised cable tray and gantry poles shall be earthed to the tower/building earthing system to IS EN 62305.

Feeder cable fixing shall be via the correct size feeder clamps. For cable management, REM clamps or their equivalent shall be used to the cable manufacturer's requirements. The use of double feeder clamps is preferred (REM clamp/Spider clamp). Clamps to be stacked using threaded bar to maximise use of space.

**Cable ties are not to be used if at all possible** and there is no concessions given under this guideline.

Contractors are advised to ensure all cables are secured without the use of cable ties as Signal operate under a No Cable Tie Policy. In the instance where a cable is being attached to an angle bracing or leg, an angle adaptor with a clamp is to be used. When a cable must be attached to a pole a pole adapter with a clamp is to be used.

All cut steel work must be protected with rubber/plastic edging. Threaded bar and bolts extending beyond their nuts must be capped to reduce the risk of injury.

### 4.2 Labelling system

Feeders and cables shall be individually labelled at set points along the cable management system. All feeder labels must clearly include owner, height of equipment and azimuth.

- Exit from cabin, cabinets or equipment
- Transition from horizontal to vertical
- Termination point
- Connection to antenna or equipment

All labels used are to be Critchley cable markers or a similar type of cable marker.

All antenna and equipment to be labelled clearly identifying connection, owner and any/all safety or RF information required.

In the event of additional feeders/antennas being installed, or works being carried out which involve re-orientation of the antennas or antenna mounting structure, all equipment shall be re-labelled, as necessary, so as to ensure compliance with this document. Cable label information shall be consistent throughout the cable length.

### **4.3 Feeders**

Installers will only use the cable specified in proposed design and/or survey. Feeders and/or their supports shall be designed and installed so as not to damage or otherwise compromise the fabric of any associated structure, roof etc. Where appropriate, feeders shall be installed in such a manner that minimises the associated wind loading. The main feeder cable shall terminate directly on the antenna connector, unless a MHA or diplexer is being used. Where a factory made antenna tail is used it shall be formed so as to prevent water migrating towards the point of entry into the antenna. Where necessary, a drip loop shall be incorporated. The feeder entry point into any accommodation shall be via a proprietary glanding system and shall be weatherproof. The feeder shall be formed prior to entry as appropriate to prevent water migrating towards the gland. The appropriately sized insert for the cable shall be used by the contractor.

### **4.4 Connector Support**

When forming jumper tails, support must be given to the connector, so that the forming starts to occur at a minimum distance of 30mm from the base of the connector. Where required, double clamps must be used to support the jumpers.

### **4.5 Connectors**

Any person undertaking termination or re-termination of cables shall be adequately trained and experienced in this type of work.

- All threaded termination components, including connectors shall be tightened to the torque specified by the manufacturer, using an appropriate calibrated torque spanner.
- All terminations shall be as specified and installed in accordance with manufacturer's instructions. No oil, grease, moisture, dust or swarf shall be allowed to contaminate the internals or threads of connectors etc.
- Joints in the length of a feeder run should be avoided.

- In accordance with manufacturers guidelines ensure that the correct form of waterproofing has been carried out. Contractors must ensure Plast has been used in accordance with specification, Plast is not required for internal use. If it is necessary to have a joint in the antenna feeder run, the joint shall be waterproofed in accordance with waterproofing guidelines.

## **4.6 Waterproofing**

Any break in the outer sheath of the feeder required for the fitting of connectors, cable joints, earthing kits, etc. shall be protected from moisture and dust ingress. Note: Antenna Port connectors must be waterproofed using methods outlined by manufacture unless Plast is being used. Self-amalgamating tape shall be wrapped (with a 50% overlap) in a diagonal manner over the full length of the break, +30mm at each end. The use of correctly sized cold shrink is also acceptable with +30mm overlap at each end.

**Treated or Denso type tape must not be used.**

## **4.7 Powered Units**

Tower Mounted Amplifiers (TMA), Mast Head Amplifiers (MHA), Out Door Units (ODU), Remote Radio Heads (RRH) and other powered units shall be installed as per the manufacturer's instructions. This will include all fitting, testing, earthing etc. Amplifiers must be installed as close to the antenna as possible and in such a way as to allow access at any time to facilitate ease of replacement if required. All units should be mounted at the same level as antennas to minimise impact on other tower users. Where specific design drawings or instructions are provided relating to the position of ancillary equipment, these must be followed.

All cables carrying power must be labelled and identified.

## **4.8 Testing**

All equipment, antenna and cables installed should be tested in accordance with manufacturer's specifications. All transmitting equipment and antenna must not interfere with or impede other equipment in any way.

Physical obstruction (or Clipping) must be avoided by design. Signal requires that all installations do not impede or obstruct other tenants on a structure.

Functionality of network and equipment remains the responsibility of each network or equipment owner.

All co-axial cables must be swept and tested for VSWR, loss and distance to fault where appropriate. All connectors must be torqued to manufacturer's recommendations. Faulty cables and or connections may interfere with other equipment and have potential health and safety implications.

## **5 Lightning Protection & Earthing**

The purpose of the lightning protection and earthing is to ensure that in case of lightning strike and/or a live component coming in contact with the structure that there is a direct path to ground to ensure the circuit and its components are protected and there is no risk to life from the live structure.

All metallic components must be connected to an earth ring (make up of earth rings discussed below).

Standards which have to be complied with as part of ETCI regulations are IS EN 62305, IS EN 50164 and IS EN 50310. All connections, cables and equipment used for lightning protection or earthing must be manufactured and tested to the above specifications.

### **5.1 Earthing Specification**

- The maximum value of earth resistance permitted shall be 10 ohms
- Testing procedure discussed below
- Complete earthing system is to be connected back to one common earth bar to ensure system is continuous

### **5.2 Earthing of feeder cable**

All earthing and lightning protection systems shall be installed and/or tested in accordance with the current IEE Regulations for Electrical Installations and IS EN 62305 and amendments as applicable. Installers shall verify the integrity of existing earthing systems, before any supplementary connection or bonding is carried out. The complete installation shall be documented for consideration and acceptance.

Feeders, IF and DC cables shall be bonded at the top and bottom of any vertical run to earth bars. Earthing shall only be carried out by the use of the grounding kit appropriate to the cable. It shall be installed in accordance with the manufacturers' instructions enclosed with each kit. The earth strap shall be placed in a position such that the ground wire travels in a downward direction towards the earth termination, i.e. in the direction of any possible lightning strike and is kept as straight as possible.

All feeders are to be connected the earthing system at the following locations:

- Peak of the structure to the earth bar in the closest proximity. Each sector will require an earth bar. All earth bars are to be interconnected.
- Base of the structure where feeders depart the structure.
- Entry to cabin.

There shall be a maximum two earth straps per earth point/bolt on the earth bar. Where bends in the earth strap cannot be avoided, they shall have as large a radius as possible, but in any case, shall not be less than the minimum bending radius of 203mm (8 inches), required for efficient current flow.

### 5.3 Earth Pits

Earth Pits will be located no more than 5m apart and shall be connected by earth tape.

Earth Tape can be the metals copper or aluminium and shall be covered by PVC. All exposed metal parts of the copper earth tape shall be covered by anti-oxidising paste to prevent corrosion. Aluminium tape requires twice the cross sectional area as that of copper conductors. Bare copper earth tape, without insulation should be used below ground level or in buried sections.

All Antenna Support Structures are to be bonded to an earth ring run around the perimeter of the foundation of the structure consisting of a minimum of 4 electrodes, one at each corner of the foundation run at a depth of 600mm below formation level and connected by an earth tape. All tower legs are to be bonded to this earth ring using earth tape at each leg.

Equipment cabins must be connected to four earth pits. In the case where upgrade works may occur and other steel structures are introduced, these structures must be connected to the existing earthing system using earth tape and tape to tape joiners, ensuring no two different metals are in contact with each other. The use of bi-metallic connectors is allowed in the case of two different metals being present in the circuit.

Outdoor Units must be connected to two earth pits at opposite sides of the unit.

### 5.4 Earth Bonding

All metal and equipment connected to a power source must be connected to the earthing system via a copper earth bar which will be mounted in the proximity of the equipment. In the case of a steel lattice tower the tower may act as the down conductor and be then connected the earthing system through the connections at the legs of the tower. This is termed as **Mechanical Bonding** and is allowed with conditions:

- The equipment must be bonded to the structure through the use of earth cable connecting the equipment to the earth bar that is connected directly to the steel of the structure, i.e. if the equipment is suspended from the tower or monopole with metal supports then these must be connected to the earth bar.
- Paint/galvanizing must not come between the two surfaces which are using Mechanical Bonding.
- Where direct connection is not available installers should use a Furse RWP bond, CS350 or similar. Only connections tested and approved to EN standards should be used.

In a situation where the earth tape cannot be connected to the legs of the tower down conductors must be used. **A minimum of two down conductors is advised.** Examples of where this may occur is if the legs of the steel lattice tower have been painted, preventing the continuous mechanical bonding from being used.

In the case of a steel monopole structure at least two connections must be made to the earth ring on the monopole. The monopole may act as a down conductor provided it meets the above conditions.

For a concrete Monopole a down conductor must be installed from the earth bars at the top of the structure to the earth bars at the bottom of the structure which will be connected to the earth ring.

All installations should use separate earth connections where possible. All earths must pass to ground first. No transition earthing or passing of earths from tower or structures into equipment rooms. Equipment installed in equipment rooms should be earthed separately to building earth.

## **5.5 Lightning Protection**

The peak of the tower requires a lightning finial to be mounted as to allow the voltage to find the quickest way to earth without damaging equipment mounted on the structure. As expressed previously, use guidelines when considering the use of a down conductor for lightning protection.

All metal components are to be bonded to the complete lightning protection earthing system. This includes all cable tray, cable ladder and fencing around the compound to ensure no danger to life.

## **5.6 Earth Resistance Testing**

An Earth certificate must be provided illustrating the value of the earth resistance at each site.

Where poor soil conditions or the standard of the existing earthing system mean that it is not possible to achieve a resistance reading of 10 ohms or less a report of such must be delivered to the customer.

Where upgrade or new site works involve the reinstatement or reconfiguration of the earthing system a new test of the earthing system shall be carried out in conjunction with completion of the electrical test certificate. Where minor site works only involve the disconnection then subsequent reconnection of existing bonds/joints, then it is only necessary to test the new wiring plus the reconnected bond/joint.

In the situation where the earth spikes cannot be used to measure the resistivity of the soil. A test on the connected earth system should be used. With this test method, two clamps are placed around the earth rod or the connecting cable and each are connected to the tester. A known voltage is induced by one clamp, and the current is measured using the second clamp. The tester automatically determines the ground loop resistance at this earth rod.