

TOWER SITE GUIDELINES

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TO ALL TENANTS: Please distribute this document to any and all personnel or subcontractors who will be performing work at the tower site, and ensure that these guidelines are followed. Any installation which does not comply with these guidelines or in any way does not follow good engineering practices will be required to be removed immediately at the tenant's expense and may result in termination of the lease.

GENERAL

1. All equipment, antenna, and feedline installations must be pre-approved and pre-scheduled with site manager. All post-installation tower work shall be pre-scheduled and pre-approved with site manager.
2. All work at tower site must be done in compliance with OSHA, ANSI, and FCC standards. Exposure to non-ionizing RF radiation levels in excess of ANSI and FCC standards for controlled access must be coordinated with other tenants such that downtime or power reductions may be scheduled accordingly.
3. A copy of the station license(s) must be posted on the outside of the station equipment cabinet. A copy of the station license(s) shall be given to the site manager. Subsequent license updates and renewals shall likewise be posted on the cabinet and provided to the site manager. Installations which are not in compliance with the station license(s) will not be permitted, nor those not properly licensed or having expired licenses. Stations with expired licenses will be disconnected from utility power and antenna until a valid license is posted and provided. Any changes in operating parameters such as power, frequency, emission, etc. shall be properly licensed and such modifications shall be reviewed and approved by tower management and lease modified prior to any such changes.
4. In addition to the posting of the station license, the name and 24-hour telephone and pager numbers for a minimum of two contact persons responsible for the equipment in question is to be posted on the equipment cabinet. The tenant is responsible for ensuring that the contact information sheet is kept current. Should there exist a problem attributable to the operation of the equipment and the contact persons are unreachable, the site manager is authorized to remove power and feedlines from the equipment as explicitly prescribed in the site lease agreement.
5. Interference between site tenants shall be resolved under the terms of the lease agreement, with primary responsibility for alleviating the interference and costs associated with the same to be born by the most-recently-installed system owner/operator/licensee involved in the interference condition.
6. Only tenant's personnel and previously-authorized contractors may have keys, security codes, and other access devices for the tower site. Subcontractors that have not been previously authorized who are performing work on behalf of a tenant are required to be supervised at all times by tenant's authorized personnel directly while on site, or by the site manager at the tenant's expense. Subcontractors shall not be given keys, security codes, or other access devices to the site. All maintenance personnel are required to sign in on the tower site access log where appropriate. Any personnel found on site without proper authorization or supervision will be subject to arrest for trespassing and may serve as grounds for cancellation of lease.
7. Tenant's personnel or subcontractors performing work at site under the direction of tenant shall in no way tamper with any equipment, feedlines, antennae, or other devices not owned by tenant. Any such tampering will be prosecuted at the local and federal level.
8. All surplus feedline, scrap material, packing materials, cable spools, antenna shipping tubes, and other trash shall be removed from site by tenant and/or tenant's subcontractors immediately upon completion of any work. Any trash left on site shall be disposed of at the tenant's expense.

9. Do not transmit using handheld radios while in proximity to radio equipment, alarm panels, or other electronic devices located within in the shelter.

FEEDLINES

1. All feedlines shall be attached to tower using appropriate hangers and adapters. Feedlines may not be attached to the tower using nylon tie-wraps, copper, copper-clad, or steel wire (bare or insulated), rope, or any other fasteners other than approved cable hangers. Feedline attachment shall be made at intervals no greater than four feet or less if so prescribed by the manufacturer.
2. Feedlines shall not be bundled nor to attached to other feedlines unless specified by, and approved by, tower management.
3. All feedlines shall be run up the outside face or leg of the tower where designed by site manager. Feedlines shall not be run inside tower, nor on climbing legs, climbing faces, or climbing ladders.
4. Feedlines shall be run as to not obstruct side markers or beacons.
5. Feedlines shall be bonded to tower at the top end of the feedline run, at the bottom of the feedline run above the horizontal bend, and at intervals no greater than 200' using feedline grounding kits. If an entrance ground panel or ice bridge is used, the feedline shall be grounded at the point of entrance or the end of the ice bridge, whichever is further from the tower. Grounding attachments shall be made using round member or angle adapters as appropriate where no direct ground lug attachment bolt/stud is available. Copper or plated grounding lugs shall not make direct contact with tower members; stainless steel adapters or shims must be used.
6. Feedlines are to enter transmitter building only through the provided cable entrance ports. Under no circumstance is a tenant to drill or otherwise make new holes through the shelter wall to facilitate routing cables.
7. On painted towers, feedlines shall be painted during scheduled tower painting.
8. Only copper, corrugated-shield, jacketed feedline of ½" or larger outside diameter may be used on the tower (Helix-type cable). No braided cables or unjacketed cables may be used. High-power broadcast operations may utilize rigid feedlines if authorized under the terms of the lease.
9. Vertical feedline runs are to be run straight and plumb up the tower. Only antenna pigtail jumpers may span across a face or in any direction other than in the vertical plane on the tower.
10. Jumpers between feedlines and antennae shall be only as long as necessary to transition to a horizontal span and reach the antenna feedpoint. Jumpers shall be attached to the tower using 12 gauge solid-conductor jacketed "tie wires". Vinyl electrical tape, ty-wraps, metal "band-it" wraps, hose clamps, and other attachment means are not permitted.
11. All feedlines shall be tagged with bands of colored marking tape at the top of the run, bottom of the run at the point of horizontal transition, and inside the shelter as specified in the tenant's lease agreement.

ANTENNAE AND MOUNTS

1. Antennae shall be placed only at the height, face or leg location, and azimuth as so described in the lease or by the site manager. Antennae may not be relocated without prior consent and lease modification if required.
2. All antenna mounts shall be commercially manufactured brackets recommended by the antenna manufacturer or those having specifications demonstrating that they are capable of supporting the antenna's weight, windload, and torque moments. Antenna mounts fabricated "on site" or those for which manufacturer's specifications are not available are not permitted.

3. Antenna mounts shall utilize galvanized steel or stainless steel hardware only. Zinc-plated or un-plated steel is not permitted. Antenna mounts shall be painted during normal tower painting.
4. Antenna mounts shall be attached to the tower using the manufacturer's specified mounting hardware appropriate for the specific tower's geometry.
5. All fiberglass omnidirectional antennae whose length is greater than twice the distance between the antenna and the closest tower member or other appurtenance are required to utilize a fiberglass outrigger assembly ("stiff arm") to prevent the antenna from contacting the tower or other appurtenances due to wind-induced flexing.
6. Only commercial-grade antennae of known quality and documented specifications are permitted. Amateur-grade, consumer-grade, or home-made antennae are not permitted.
7. Antennae shall be located on tower such that they do not obstruct side-marker or beacons.
8. Antennae shall not be mounted inside the tower.
9. Antenna mounts shall be attached to tower legs only. Mounts shall not be attached to diagonal or horizontal cross members, other antenna's mounts, lighting conduit, or other structural or appurtenance hardware.
10. Receive-only Ku-band and VSAT satellite dishes shall be mounted to the equipment shelter or transmitter building using mounting hardware specified by site manager.. Satellite dishes shall not be attached to tower, ice bridge posts, or any other structure unless so prescribed by site manager.
11. Under no circumstance is an antenna to be installed within the shelter, even for temporary use. This includes cellular base stations which utilize a test transceiver/antenna.

EQUIPMENT

1. Equipment must be contained within an equipment cabinet or rack as specified in the terms of the lease, or as prescribed by the site manager. Equipment, supplies, manuals, and other items may not be stacked atop a cabinet, placed on the floor, on shelves, or in any other location other than inside the prescribed cabinet unless so prescribed. Any equipment or materials not stored within the equipment cabinet will be considered trash and disposed of at tenant's expense.
2. Equipment cabinets must be kept locked.
3. Equipment cabinets are to be bolted to the floor to prevent tipping utilizing hardware prescribed by the site manager.
4. Equipment cabinets shall be properly bonded to the tower ground and electrical ground as prescribed by the site manager.
5. Lightning suppression devices, such as coaxial in-line arrestors ("Polyphasers"), shorted stubs, AC transient suppressors, etc. shall be grounded to the tower ground and/or electrical ground as prescribed by the site manager. Coaxial arrestors are to be installed on every antenna feedline as close as practical to the point where the cable enters the shelter.
6. AC utility power connections shall be made to only the outlet(s) designed by the site manager.
7. All RF, telephone, and ancillary cabling is to be neatly dressed with no excess cabling coiled up or otherwise left exposed outside the equipment cabinet. At sites which have cable trays or cable ladders installed, cabling is to be properly and neatly laced or ty-wrapped.
8. Equipment cabinets shall be placed in compliance with lease terms and/or at the location prescribed by site manager.
9. All equipment must comply with FCC and ANSI regulations.
10. Non-type accepted equipment is not permitted. Equipment operating outside of the license parameters or FCC regulations will be disconnected and may result in cancellation of lease.

11. All equipment must be modern, properly-operating, and properly-maintained commercial equipment. Mobile radios, portable radios, "home-brewed" equipment, or any other equipment not type accepted for use as base station equipment under the terms of the station license are not permitted.
12. "Sharing" of antennae, feedlines, combiners, multicouplers, cross-band couplers, or other devices among tenants is not permitted unless so prescribed or required under the terms of the lease.
13. UPS or backup batteries must be located in an approved, explosion-proof battery case. The battery case shall be located within the tenant's equipment cabinet or at a floor location as prescribed in the lease. Expired batteries shall be removed from site and disposed of appropriately immediately after replacement.

INTERFERENCE PREVENTION

1. Repeaters, paging stations, and base stations on VHF highband, UHF, and 800/900 MHz frequencies utilizing a single antenna (including duplex repeaters) or dual antennae (repeaters with separate transmit and receive antennae) must utilize a minimum of a single-stage ferrite isolator followed by a bandpass cavity and harmonic filter on each transmitter. If a bandpass-type duplexer is utilized, the bandpass cavity requirement is waived.
2. Trunked repeaters, conventional repeaters, paging stations, and base stations operating on VHF highband, UHF, and 800/900 MHz transmitting on a common antenna utilizing a ferrite-cavity combiner must provide adequate isolation to attenuate all transmitter mix products and harmonics a minimum of 80 dB below the carrier level of the lowest-power transmitter as measured at the output of the combiner.
3. Trunked repeaters, conventional repeaters, paging stations, and base stations operating on VHF highband, UHF, and 800/900 MHz transmitting on a combined antenna utilizing a hybrid-ferrite combiner must utilize a minimum of one pass cavity at the output of the transmitter (before the combiner). The combiner must provide adequate isolation to attenuate all transmitter mix products and harmonics a minimum of 80 dB below the carrier level of the lowest-power transmitter as measured at the output of the combiner.
4. All lowband VHF base stations, paging stations, and repeaters must utilize at least one bandpass cavity on the transmitter.
5. Cellular and PCS base stations must utilize, at a minimum, the standard filtering components designed into the system as utilized when the system was type-accepted.
6. Complaints of interference to receivers located on site will receive no cooperation from site management if inadequate filtering, or a complete lack of filtering, is used on the complainant's receiver(s).
7. All interconnection cables between the tenant's cabinet and the feedline entry point/surge suppressor are to utilize solid-shield cable (Helix or equivalent, including "Superflex" varieties).
8. All interconnect cables within tenant's cabinet that carry transmitter power must utilize double-shielded coaxial cable or solid-shield cable (Helix or equivalent, including "Superflex" varieties).
9. The above requirements are MINIMUMS. If interference conditions arise, those tenants affected by, or contributing to, the interference may be required to provide and install additional filtering at their own expense.

RIGGING

1. All riggers are required to have current proof of insurance on file with tower owner and site manager prior to beginning any work. All workers at tower site must be covered by the tenant's or subcontractor's insurance as appropriate. Tower owner and management assume no liability for rigger's, tenant's or subcontractor's personnel while on site.

2. Steps shall be taken to avoid the possibility of damage to any other tenant's antennae, feedlines, or other appurtenances during installation. This includes using proper rigging slings, blocks, guides, and other hardware that will ensure that rigging lines and hoisting cables will not come in contact with any of the aforementioned hardware.
3. Capstan or "cat head" winches temporarily mounted to the tower for the purposes of pulling load lines must be attached such that they do not cause damage to the tower itself. Chain-based clamps shall be padded or shimmed to prevent damaging the surface galvanizing of the tower.
4. All rigging is to be done in compliance with OSHA regulations.
5. Under no circumstances shall personnel ride the load line unless the hoist is OSHA-certified for lifting personnel. Riding capstan winch lines is strictly forbidden.
6. All riggers and other personnel on site must wear an approved hard-hat while tower work is being performed.
7. Nothing shall be thrown or dropped from the tower at any time.

EMERGENCY OPERATION

1. In the event of damage to antennae, feedlines, or station equipment that will require temporary equipment be installed, tenant must coordinate such installation with site manager. Permission to install temporary equipment under such an emergency is at the discretion of the tower owner and management, and may be done so only on a temporary basis for as short a duration as possible not to exceed 30 days. The costs associated with coordination and oversight for emergency installations may be charged to tenant.
2. Under no circumstances will any tenant utilize the antenna or feedline of any other tenant without prior approval of the affected tenant and tower management.
3. In the event of power failure, tenant shall notify both the electrical utility company as well as the site manager of the outage.
4. In the event of failure of telephone or data services that require telephone company personnel to perform work on site, tenant shall oversee telephone company personnel directly under the same terms as a subcontractor.
5. Electric generators are not permitted on site unless so prescribed in the lease agreement or at the discretion of the tower owner or manager in the event of an emergency.

INSPECTIONS AND MAINTENANCE

1. Tenant shall inspect station equipment, antennae, and feedlines at regular intervals not to exceed to FCC regulations or lease requirements.
2. Tenant shall make repairs or perform maintenance immediately upon notification by tower owner or site manager of any out-of-tolerance condition or mechanical problem with antennae or feedlines.
3. Tenant's equipment may be inspected at any time by site manager, tower owner, or federal authorities.

REMOVAL

1. Antennae, feedlines, equipment cabinets, and other devices must be properly removed and disposed of by tenants upon termination of lease. Any equipment left abandoned by tenant will be removed and disposed of at tenant's expense.

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2. Antennae, feedline, and equipment removal shall be coordinated by site manager under the same terms as equipment installation.