

Standards for the Establishment of Telecommunications and Broadcasting Towers



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1. Legal Basis

In accordance with Section 51(2) of the Information, Communications and Media Act of Bhutan 2018 (“the Act”), the Bhutan InfoComm and Media Authority (“the Authority”) hereby issues this Standard for the Establishment of the Telecommunications and Broadcasting Towers.

2. Title and Commencement

This standard shall be called as the Standard for the Establishment of the Telecommunications and Broadcasting Towers and shall come into force on the corresponding to the month of the BhutaneseYear.

3. Scope of Application

The rapid development of wireless services and networks require the construction of network infrastructures such as telecommunication Base Transceiver Station (BTS) stations, broadcasting towers, repeaters and monopole stations to cater the growth in demand of telecommunication and broadcasting services. However, such infrastructure establishments require to comply with certain technical standards and location compliance. Therefore, this standard shall apply to all licensed ICT Facility and Service Providers who plan to build new telecommunications BTS, broadcasting transmitters, towers, repeaters and monopole stations and is aimed at:

- Protecting the general public from exposure to Radio Frequency (RF) electromagnetic fields (EMF)
- Providing a clear guidance on the compliance requirements of establishing any such telecommunication infrastructures
- Ensuring structural safety and minimise aesthetic and environmental impacts
- Ensuring that relevant agencies are informed and consulted before such infrastructures are deployed

4. Amendment

This standard is an amendment of “Standard for the Establishment of the Telecommunications Towers 2018”. And any amendment hereafter to this Standard shall be made according to the change in technologies, national priorities, policies and industry trends.

5. Definition

Unless the context otherwise requires, the following words and terms used in this Standard shall have the following meanings assigned to them:

Antenna: means any structure or device used to receive or radiate electromagnetic waves for transmitting or receiving radio or television waves. Antennas may consist of metal, carbon fibre, or other electronically conductive rods or elements. It includes, but is not limited to

personal wireless service, microwave, radio and television broadcasting and transmitting and receiving and short wave radio equipment.

Camouflaged Tower: means a tower constructed to simulate a natural feature, such as a tree, thereby reducing the aesthetic impact to the surrounding area.

Co-Location: means locating one or more cellular antennas for more than one provider on a single cellular antenna tower or alternative cellular antenna tower structure on a single lot.

Residential area: means a land use in which housing predominates, as opposed to industrial and commercial areas.

Tower: means a structure intended to support wireless communications equipment used to receive and/or transmit electromagnetic waves.

Tower Accessory Structure: means a structure located at the base of the tower housing base receiving/transmitting equipment.

Electromagnetic Waves: refers to the waves (or their quanta, photons) of the electromagnetic field, propagating (radiating) through space time, carrying electromagnetic radiant energy. It includes radio waves, microwaves, infrared, (visible light), Ultraviolet, X-rays and Gamma rays.

International Commission on Non-Ionizing Radiation Protection (ICNIRP): is an independent scientific body which has produced an international set of Procedures and Standards for public exposure to radio frequency waves.

Site: means a prepared facility where Telecommunications and Broadcasting Equipment is located. It includes the Tower, Equipment Space, and a secure boundary.

Telecommunications Equipment: means a passive or active equipment used to provide cellular mobile services, including transmission devices, outside receivers for wireless devices, and transmitting antennas.

Broadcasting Equipment: means a passive or active equipment used to provide broadcasting services, including transmission devices and antennas.

6. General Provision

1. Any installation or construction of telecommunication and broadcasting infrastructure in Bhutan shall be in compliance to this standard.
2. For the installation or construction of such telecommunication and broadcasting infrastructure in the government/public land, the operators shall consult the relevant agencies for location clearance of installation.
3. Any proposed telecommunications and broadcasting tower near the airports shall be installed or constructed only after obtaining prior approval from Bhutan Civil Aviation Authority.
4. In order to encourage the infrastructure sharing, the sharing of a common tower infrastructure should be explored, as far as possible, especially when there is a need to install multiple transmitter sites at a specific locality.

7. Locations of Installations

1. In commercial areas, the installation of telecommunications towers shall be encouraged to be carried out on the rooftop of the existing buildings, rather than creating new installations/sites on the ground.
2. In keeping with the international recognition of public perception concerns, no telecommunication and broadcasting tower including the monopole towers shall be installed or constructed in public-sensitive areas such as public recreational parks, children's parks, schools, nurseries, stadiums and hospitals. The minimum distance between such places and the tower shall not be less than 30 meters.
3. No telecommunication and broadcasting towers except for monopoles shall be constructed less than 15 meters from any nearby residential building.
4. Any monopoles construction should be at least 4 meters away from the nearby building.
5. The sector antennas mounted on any monopole tower shall not face directly to the residential building if it is less than 4 meters away from the building. And any sector antennas (within the height or less than building height) with less than 15m distance from building should not directly face a building.
6. The scale, massing and height of a proposed site should be considered in relation to that of adjoining buildings, the topography, the general pattern of heights in the area, views and landmarks so as to minimize the contrast between any radio equipment and the surrounding environment.

7. Installation of Base Station Antennas and broadcasting antennas in narrow lanes should be avoided in order to reduce the risks caused by any earthquake or wind related disaster.
8. The telecommunications and broadcasting towers shall not be installed in close proximity to the High Voltage (11KV and above) of electrical power transmission lines. The nearest distance of the tower to a high voltage transmission line shall not be less than 120% of the height of the tower.

8. Design Standards

1. An appropriate demarcation of indelible or refectories marking line on the floor for rooftop installation or fencing of the telecommunications stations shall be provided within the maximum safe distance (MSD) to avoid entry of unauthorized personnel.
2. To preserve the aesthetic value or beautification of the place, the visibility of the telecommunications and broadcasting equipment shall be minimized to the extent possible.
3. While designing the telecommunication and broadcasting infrastructure and tower, the facility and service providers shall ensure to follow the following general principles:
 - (i) Define high level technical criteria for construction of cellular and broadcast towers, sites and associated infrastructures that could be shared with other service providers
 - (ii) Healthy and safety criteria including limiting human exposure to radio frequency and electromagnetic fields as per the recommendation of International Commission on Non-Ionizing Radiation Protection (ICNIRP)
 - (iii) Environment criteria including preservation of aesthetic values
 - (iv) Tower loading based on wind, soil and seismic conditions. The wind load rating shall be based on the height of the tower, its location and any relevant local conditions; and
 - (v) Adequate power supply to meet its full operational capacity requirements including provision for power sharing with other service providers wanting to share the tower
 - (vi) Any civil structure in tower construction shall be as per the relevant construction standards of Bhutan.
4. The local pattern of streets and spaces, building's traditional aesthetic and ecology shall be taken into consideration while planning, designing and installation of the telecommunication and broadcasting tower.

5. The structural design, mounting, and installation of telecommunication and broadcasting towers including mounting of any antenna and support structure shall be in compliance with the manufacturer's specifications. The construction plans and design of any antenna shall be approved and certified by a professional engineer.
6. All telecommunications and broadcasting towers shall be designed to ensure protection against unauthorized climbing and enclosed by fences with strands of barbed wire at the top with a locked gate.
7. The telecommunication and broadcasting towers shall be equipped with appropriate warning lights in compliance with the Civil Aviation Regulation to facilitate identification to flying aircraft.
8. The height of the telecommunications tower except monopoles shall not be equivalent to the height of the buildings located in the proximity areas; the tower height to exceed the heights of the surrounding buildings.
9. The telecommunications towers shall be designed with sufficient space and loading capacity for co-location (infrastructure sharing) of at least one or two additional carriers of other service providers, depending on the height of the tower as follows:
 - (i) Structures of 15 metres: with provision to share with one service provider; and
 - (ii) Structures of 30 metres: with provision to be shared with two service providers
10. The minimum height of the telecommunication and broadcasting tower except for monopole shall be:
 - (i) 30 metres in urban and commercial areas
 - (ii) 15 metres in semi-urban and rural areas.

In the event of construction of telecommunications and broadcasting towers in the residential area, a minimum distance of 21 meters shall be maintained from the residential site if the height of the tower is more than 15 meters.
11. Any antenna mounted on a monopole tower shall not be less than 4 meters from the ground.
12. The design of the telecommunication and broadcasting tower shall ensure to keep a provision of minimum setback requirement for the area in which it is located. If the tower is located in a Heavy Industrial, Industrial or Commercial zone, then the tower shall have to meet a minimum setback equal to the height of the tower plus an additional 20 feet from the property line abutting that area.

9. Signage for Telecommunication and Broadcasting Infrastructures

1. Sign boards and warning signs shall be provided at sites which should be clearly visible and identifiable. A warning sign should be placed at the entrance of such zones.
2. The sign board shall provide the information on the name of the site, year of built, tower height etc.
3. The “Warning Sign” should discourage longer stay in the zone, even for the maintenance personnel. The sign board may contain the following text :

(i) Restricted Area!!! Do not enter

10. EMF Radiation Limits and Compliance

1. All telecommunication and broadcasting sites shall ensure compliance with the ICNIRP Procedures and Standards for general public exposure and take immediate actions to rectify any non-compliant Sites.
2. The antennas in all sites shall not emit the EMF radiation more than the standards shown in the table below:

Frequency Range	Electric Field-Strength (V/m)	
	General Public	Occupational
1 - 25Hz	1000	2000
0.025 - 0.82 KHz	$250/(10*f(KHz))$	$500/(10*f(KHz))$
0.82 - 3KHz	$250/(10*f(KHz))$	61
3 - 1000 KHz	8.7	61
1 - 10 MHz	$87/(10*f^{1/2})$ MHz	$610/(10*f)$ MHz
10 - 400 MHz	2.8	6.1
400 - 2000 MHz	$(1.375f^{1/2})$ MHz/10	$(3f^{1/2})$ MHz/10
2 - 300 GHz	6.1	13.7

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11. Prohibited Uses and Installation

1. No temporary mobile cell and broadcasting sites are permitted except in the case of equipment failure, equipment testing, or in the case of emergency situation as authorized by the Authority.

2. In the event, if temporary mobile cell and broadcasting sites are to be used for testing purposes then use of such sites shall be limited to a duration of twenty-four (24) hours. However the use of temporary mobile cell sites shall be permissible in the event of equipment failure or in the case of emergency situations for a period of thirty (30) days.

12. Installation Reporting and Certification by the Authority

1. The service provider shall ensure to provide the Authority with a database of the mobile cellular base stations and broadcasting transmitter sites including the power radiation and cell capacity and towers bi-annually in GIS or Excel sheet format, or both.
2. All telecommunication and broadcasting towers Located in Urban, commercial and public sensitive areas shall be inspected, verified and certified for the EMF radiation by the Authority.
3. Any violation of these Procedures and Standards will result in penalties imposed in accordance with the Information Communications and Media Act 2018.

13. Offences, Penalties, Appeals and Indemnification

13.1 Offences and Penalties

13.1.1 Any person installing the telecom towers and broadcasting infrastructures in Bhutan not in compliance to these standards shall be guilty of an offence and the Authority may impose a fine not exceeding three years daily minimum national wage rate along with other regulatory actions that may be imposed.

13.1.2 Any person who contravenes any provision of the Act, Rules and Regulations, licence terms and conditions and the directives for which no penalty is specifically provided shall be guilty of an offence and shall be liable for a fine not exceeding one year daily minimum national wage rate along with other regulatory actions that may be imposed.

13.2 Appeals

13.2.1 Any appeal against the decision of the Authority shall be made to the Alternative Dispute Resolution Center within ten (10) working days from the decision of the Authority.

13.3 Indemnification

13.3.1 Any person shall indemnify, defend and hold harmless the Authority and its officials, agents, attorneys and representatives against any and at all costs, damages, expenses, claims, suits and actions, including but not limited to expenses for legal fees, whether suit brought or not, and disbursement and liabilities incurred or assumed by the Authority in connection with:

(i) damage to persons or property, in any way arising out of its infrastructures, or through the acts or omissions of licensee, its officials, agents, attorneys, representatives or employees.

(ii) any or all claims arising out of failure to comply with the provisions of these Standards or any other law, or Rules applicable.