CHAPTER 33.274
RADIO FREQUENCY TRANSMISSION FACILITIES

(Amended by: Ord. No. 166920, effective 10/1/93; Ord. No. 165376, effective 5/29/92; Ord. No. 171718, effective 11/29/97; Ord. No. 174263, effective 4/15/00; Ord. No.178480, effective 6/18/04; Ord. No 179980, effective 4/22/06; Ord. No. 182429, effective 1/16/09; Ord. No. 185915, effective 5/1/13.)

Sections:

33.274.010 Purpose
33.274.020 When the Regulations Apply
33.274.025 When a Conditional Use Review is Required
33.274.030 Facilities Exempt from This Chapter
33.274.035 Facilities Allowed Without a Conditional Use Review
33.274.040 Development Standards
33.274.050 Procedures for Conditional Use Review
33.274.060 Registration of Existing Facilities
33.274.070 Measurements
33.274.080 Review of Radio Frequency Transmission Facility Regulations

33.274.010 Purpose

Radio Frequency Transmission Facilities are regulated to:

- Protect the health and safety of citizens from the adverse impacts of radio frequency emissions;
- Reduce the number of towers that are built in or near residential and open space zones;
- Ensure that towers in or near residential or open space zones are only sited when alternative locations or building mounts are not feasible;
- Preserve the quality of living in residential areas which are in close proximity to Radio Frequency Transmission Facilities; and
- Preserve the opportunity for continued and growing service from the radio frequency transmission industries.

33.274.020 When the Regulations Apply

Except as exempted in 33.274.030 below, this chapter applies to all radio frequency emitting devices with a frequency range between 100 Kilohertz (KHz) and 300 Gigahertz (GHz), and to all associated accessory structures, including transmitters, antennas, towers, masts, and poles. Facilities within the Healy Heights Plan District are also subject to the regulations of Chapter 33.533.

33.274.025 When a Conditional Use Review is Required

Unless exempted by 33.274.030 or 33.274.035 below, all new Radio Frequency Transmission Facilities require a conditional use review. Approval criteria for these reviews are stated in Chapter 33.815, Conditional Uses.

33.274.030 Facilities Exempt from this Chapter

All of the following are allowed without a conditional use and are exempt from the regulations of this chapter:

A. Emergency or routine repairs, reconstruction, or routine maintenance of previously approved facilities;

B. Replacement of transmitters, antennas, or other components of previously approved facilities, provided that these actions:

1. Do not create a significant change in visual impact;

2. Do not result in an increase in radio frequency emission levels above 1,000 watts ERP; and

3. Do not cause the facility to go out of conformance with the standards of 33.274.040.C.5 and C.6;

C. Industrial, scientific, and medical equipment operating at frequencies designated for that purpose by the Federal Communications Commission;

D. Military and civilian radars, operating within the regulated frequency ranges, for the purpose of defense or aircraft safety;

E. Point-to-point microwave facilities, provided that:

1. Any new tower meets the height requirements of the base zone or is less than 50 feet in height, whichever is less; and

2. Any new tower is more than 2,000 feet from any other Radio Frequency Transmission Facility that is supported by a tower;

F. Amateur and citizen band transmitters and antennas;

G. Two-way communication transmitters used on a temporary basis by "911" emergency services, including fire, police, and emergency aid or ambulance service;

H. Radio transceivers normally hand-held or installed in moving vehicles, such as automobiles, watercraft, or aircraft. This includes celular phones;

I. Towers, masts, poles, or other supporting structures accessory to a residential use, with a transmitter output power of 1,500 watts or less;

J. Transmitters operating at a frequency less than 1 GHz and at less than 7 watts transmitter power output, provided that any new tower, pole, or mast meets the height requirements of the base zone or is less than 50 feet in height, whichever is less;

K. Radio frequency machines which:

1. Have an effective radiated power (ERP) of 7 watts or less; or

2. Are designated and marketed as consumer products, such as microwave ovens and remote control toys; or

3. Are in storage, shipment, or on display for sale, provided such machines are not operated; and

L. Facilities operating at 1,000 watts ERP or less, locating on any existing radio transmission tower that has been approved as a conditional use or allowed under Section 33.274.035, below. Triangular "top hat" style antenna mounts are prohibited. Antennas must be mounted to a tower either on davit arms that are no longer than 5 feet, flush with the tower, or within a unicell style top cylinder.

33.274.035 Facilities Allowed Without a Conditional Use Review
All of the following are allowed without a conditional use but are subject to the development standards in this chapter:

A. Facilities in C, E, or I zones operating at 1,000 watts ERP or less, mounted on an existing building or other non-broadcast structure provided that the facility is more than 50 feet from an R zone.

B. Facilities in C, E, or I zones operating at 1,000 watts ERP or less, supported by a new tower provided that:

1. The tower is more than 50 feet from an R zone;

2. The tower meets the height requirement for buildings in the base zone; and

3. The tower is more than 2,000 feet from any other facility that is supported by a tower not operated by the applicant.

33.274.040 Development Standards

A. Purpose. The development standards:
- Ensure that Radio Frequency Transmission Facilities will be compatible with adjacent uses;
- Reduce the visual impact of towers and accessory equipment in residential and open space zones whenever possible;
- Protect adjacent populated areas from excessive radio frequency emission levels; and
- Protect adjacent property from tower failure, falling ice, and other safety hazards.

B. When standards apply. Unless exempted by 33.274.030, above, the development standards of this section apply to all Radio Frequency Transmission Facilities. Applications to modify existing facilities regulated by this chapter are only required to meet the standards of Paragraphs C. 3, C.4, C.5, C.6, and C.9, below, in addition to any previous conditions of approval. Increasing the height of a tower is not considered modification of an existing facility.

C. General requirements

1. Tower sharing. Where technically feasible, new facilities must co-locate on existing towers or other structures to avoid construction of new towers. Requests for a new tower must be accompanied by evidence that application was made to locate on existing towers or other structures, with no success; or that location on an existing tower or other structure is infeasible.

2. Grouping of towers. The grouping of towers that support facilities operating at 1,000 watts ERP or more on a site is encouraged where technically feasible. However, tower grouping may not result in radio frequency emission levels exceeding the standards of this chapter.

3. Tower finish. For towers not regulated by the Oregon Aeronautics Division or Federal Aviation Administration, a finish (paint/surface) must be provided that reduces the visibility of the structure.

4. Tower illumination. Towers must not be illuminated except as required for the Oregon State Aeronautics Division or the Federal Aviation Administration.

5. Radio frequency emission levels. All existing and proposed Radio Frequency Transmission Facilities are prohibited from exceeding or causing other facilities to exceed the radio frequency emission standards specified in Table 274-1, except as superseded by Part 1, Practice and Procedure, Title 47 of the Code of Federal Regulations, Section 1.1310, Radio Frequency Radiation Exposure Limits.

Table 274-1
Radio Frequency Emission Standards [1]

Frequency Range	Mean Squared Electric (E^2) Field Strength (V^2/m^2) [2]·		Mean Squared Magnetic (H^2) Field Strength (A^2/m^2) [3]·	Equivalent Plane-Wave Power Density (mW/cm^2) [4]
100 KHz – 3 MHz	80,000		0.5	20
3 MHz – 30 MHz	4,000	($180/f^2$) [5]	0.025 ($180/f^2$)	$180/f^2$
30 MHz – 300 MHz	800		0.005	0.2
300 MHz – 1500 MHz	4,000	(f/1500)	0.025 (f/1500)	f/1500
1500 MHz – 300 GHz	4,000		0.025	1.0

Notes:
[1] All standards refer to root mean square (rms) measurements gathered by an approved method.
[2] V^2/m^2 = Volts squared per meter squared.
[3] A^2/m^2 = Amperes squared per meter squared.
[4] mW/cm^2 = Milliwatts per centimeter squared.
[5] f = Frequency in megahertz (MHz).

6. Antenna requirements.

   a. Generally. The antenna on any tower or support structure must meet the minimum siting distances to habitable areas of structures shown in Table 274-2. Measurements are made from points A and B on the antenna to the nearest habitable area of a structure normally occupied on a regular basis by someone other than the immediate family or employees of the owner/operator of the antenna. Point A is measured from the highest point of the antenna (not the tower) to the structure, and Point B is measured from the closest point of the antenna to the structure.

   b. Exceptions. The antenna on any tower or support structure does not have to meet the minimum siting distance from Point A to the habitable areas of structures shown in Table 274-2 if the applicant submits a letter from a qualified licensed engineer showing that the placement of the antennas will not cause any habitable area of a structure to exceed the Federal Communication Commission's (FCC's) limits for human exposure to radio frequency electromagnetic fields.

7. Setbacks. All towers must be set back at least a distance equal to 20 percent of the height of the tower or 15 feet, whichever is greater, from all abutting R and OS zoned property and public streets. Accessory equipment or structures must meet the base zone setback standards.

8. Guy anchor setback. Tower guy anchors must meet the main building setback requirements of the base zone.

Table 274-2
Distance Between Antenna and Habitable Area of Structure
(Where f is frequency in megahertz.)

Effective Radiated Power	Frequency (MHz)	Point A: Minimum Distance From Highest Point of Antenna To Habitable Area of Structure (feet)	Point B: Minimum Distance From Closest Portion Of Antenna To Habitable Area of Structure (feet)
< 100 watts		10	3
100 watts to 999 watts		15	6
1,000 watts to 9.999 Kw	< 7	11	5
	7 - 30	f/0.67	f/1.5
	30 - 300	45	20
	300 - 1500	780/vf	364/vf
	> 1500	20	10
10 Kw plus	< 7	17.5	8
	7 - 30	f/0.4	f/0.91
	30 - 300	75	33
	300 - 1500	1300/vf	572/vf
	1500	34	15

9. Landscaping and screening. The base of a tower and all accessory equipment or structures located at grade must be fully screened from the street and any abutting sites as follows:

   a. In C, E or I zones more than 50 feet from an R zone. A tower and all accessory equipment or structures located in the C, E, or I zones more than 50 feet from an R zone must meet the following landscape standard:

      (1) Generally. Except as provided in (2), below, a landscaped area that is at least 5 feet deep and meets the L3 standard must be provided around the base of a tower and all accessory equipment or structures.

      (2) Exception. If the base of the tower and any accessory equipment or structures are screened by an existing building or fence, then some or all of the required landscaping may be relocated subject to all of the following standards.

         - The building or fence must be on the site;

- The fence must be at least six feet in height and be totally sight-obscuring;
- The relocated landscaping must meet the L2 standard. The relocated landscaping cannot substitute for any other landscaping required by this Title; and
- If any part of the base of the tower or accessory equipment is not screened by a building or fence, 5 feet of L3 landscaping must be provided.

b. In OS or R zones or within 50 feet of an R zone. A tower and all accessory equipment or structures located in an OS or R zone or within 50 feet of an R zoned site must meet the following landscape standards:

(1) Tower landscaping. A landscaped area that is at least 15 feet deep and meets the L3 standard must be provided around the base of the tower.

(2) Accessory equipment and structures. A landscaped area that is at least 10 feet deep and meets the L3 standard must be provided around the base of all accessory equipment or structures located at grade.

c. In all zones, equipment cabinets or shelters located on private property that are associated with Radio Transmission Facilities mounted in a right-of-way must be screened from the street and any adjacent properties by walls, fences or vegetation. Screening must comply with at least the L3 or F2 standards of Chapter 33.248, Landscaping and Screening, and be tall enough to screen the equipment.

10. Tower design.

a. For a tower accommodating a Radio Frequency Transmission Facility of 100,000 watts or more, the tower must be designed to support at least two additional transmitter/antenna systems of equal or greater power to that proposed by the applicant and one microwave facility, and at least three two-way antennas for every 40 feet of tower over 200 feet of height above ground.

b. For any other tower, the design must accommodate at least three two-way antennas for every 40 feet of tower, or at least one two-way antenna for every 20 feet of tower and one microwave facility.

c. The requirements of Subparagraphs a. and b. above may be modified by the City to provide the maximum number of compatible users within the radio frequency emission levels.

11. Mounting device. The device or structure used to mount facilities operating at 1,000 watts ERP or less to an existing building or other non-broadcast structure may not project more than 10 feet above the roof of the building or other non-broadcast structure.

12. Abandoned facilities. A tower erected to support one or more Federal Communication Commission licensed Radio Frequency Transmission Facilities must be removed from a site if no facility on the tower has been in use for more than six months.

D. Additional requirements in OS, R, C, and EX zones and EG and I zones within 50 feet of an R zone.

1. Purpose. These additional regulations are intended to ensure that facilities operating at 1,000 watts ERP or less have few visual impacts. The requirements encourage facilities that look clean and uncluttered.

2. Standards. In addition to the regulations in Subsection C., above, facilities operating at 1,000 watts ERP or less located in OS, R, C, or EX zones or EG or I zones within 50 feet of an R zone must meet all of the following standards:

   a. Antennas mounted on towers. Triangular "top hat" style antenna mounts are prohibited. Antennas must be mounted to a tower either on davit arms that are no longer than 5 feet, flush with the tower, within a unicell style top cylinder, or other similar mounting technique that minimizes visual impact.

   b. Antennas mounted on existing buildings or other non-broadcast structures. This standard only applies to facilities located in OS or R zones or within 50 feet of an R zone. The visual impact of antennas that are mounted to existing buildings or other non-broadcast structures must be minimized. For instance, on a pitched roof, an antenna may be hidden behind a false dormer, mounted flush to the facade of the building and painted to match; mounted on a structure designed with minimal bulk and painted to fade into the background; or mounted by other technique that equally minimizes the visual impact of the antenna. The specific technique will be determined by the conditional use review.

   c. Lattice. Lattice towers are not allowed.

E. Additional requirements in R zones. The minimum site area required for a tower in an R zone is 40,000 square feet. This regulation must be met in addition to the regulations in Subsections C. and D., above.

33.274.050 Procedures for Conditional Use Review

Unless exempted by 33.274.030 or 33.274.035, above, all Radio Frequency Transmission Facilities are reviewed through the procedures stated below.

A. Type Ix procedure. In all zones, requests for equipment cabinets or shelters located on private property associated with Radio Transmission Facilities mounted in a right-of-way are processed through a Type Ix procedure.

B. Type II procedure. Requests for Radio Frequency Transmission Facilities operating at 1,000 watts ERP or less to be located on an existing building or other non-broadcast structure in an OS or R zone or C or E zone within 50 feet of an R zone are reviewed through a Type II procedure.

C. Type III procedure. All other requests for Radio Frequency Transmission Facilities are reviewed through a Type III procedure.

33.274.060 Registration of Existing Facilities
All Radio Frequency Transmission Facilities subject to this chapter and existing as of September 19, 1987 must complete and submit the Radio Frequency Transmission Facility registration form available from the City.

33.274.070 Measurements

A. Measurements by engineer. All measurements required in this chapter must be made by a qualified licensed engineer with a Federal Communications Commission First Class or General Radio-Telephone License or under the supervision of a registered professional electrical engineer.

B. Method of measurement. Measurements are to be made in accord with the latest version of American National Standards Institute's (ANSI) Standard C95.3 *Techniques and Instrumentation for the Measurement of Potentially Hazardous Electromagnetic Radiation at Microwave Frequencies*, or by similar methods considered appropriate by the engineer.

C. Instrument calibration. For all measurements made to ensure compliance with this chapter, evidence must be submitted showing that the instrument or instruments used were calibrated within the manufacturer's suggested periodic calibration interval, and that the calibration is by methods traceable to the National Bureau of Standards. A letter must also be submitted stating that the measurements were made in accordance with good engineering practices and verifying the accuracy of the results of the measurements.

33.274.080 Review of Radio Frequency Transmission Facility Regulations

A. Review of City regulations. The standards in this chapter and the Radio Frequency Transmission Facility conditional use requirements will be reviewed by the City of Portland in 2003 to determine their adequacy relative to public health.

B. New federal or state standards. In the event that either the federal or state government adopts mandatory or advisory standards more stringent than those described in this chapter, the Planning staff will prepare a report and recommendation on any necessary revisions to the City's adopted standards. The Council will endeavor to bring the City standards into compliance with those standards within 30 days of the date the new standards become effective.

C. Significant new information. The Bureau of Planning and Sustainability, upon learning of significant new information regarding the relationship between non-ionizing radiation and human health, will prepare a report and recommendation to the Planning and Sustainability Commission, detailing any necessary revisions to the City's adopted standards.