Mapleton City Planning Commission Staff Report

Meeting Date: June 27, 2013

Item: 2
Applicant: Richard Harris
Location: 589 E 1400 S (Parcel #66:021:0001)
Prepared by: Sean Conroy, Community Development Director
Public Hearing Item: Yes
Zone: A-2

REQUEST

Consideration of a request to install an amateur radio tower approximately 72 feet tall on a property located at 589 E 1400 S in the A-2 zone.

BACKGROUND AND PROJECT DESCRIPTION

The project site is lot 1 of the Sierra View Estates subdivision and is 2.14 acres in size. The lot is developed with a single family residence and includes approximately one acre that is currently used as an alfalfa field. The applicant is proposing to install an amateur (ham) radio tower near the center of the property. The tower is retractable. When the tower is being used it will have a height of approximately 72 feet. However, when it is not in use it will have a height of approximately 25-30 feet (see attachment "1").

EVALUATION

Federal Law: The Federal Communications Commission (FCC) has adopted rules which impose a limited federal preemption on local zoning regulations affecting amateur radio antennas. "Amateur Radio Preemption, 101 FCC 2nd 952 (1985)," also known as PRB-1 (1985), is a "memorandum opinion and order" issued by the FCC, which requires that local regulations that involve placement, screening, or height of antennas based on health, safety or aesthetic considerations must reasonably accommodate amateur communications. Any conditions required by a jurisdiction must also represent the minimum practicable regulation to accomplish the local government's legitimate purpose (see attachment "3").

In other words, under the FCC rules, cities may not adopt local zoning regulations which would have the effect of precluding amateur radio communications. Local regulations must reflect an effort to reasonably accommodate amateur radio facilities.

State Code: State code Section 10-9a-515 (see attached) states that a city may not enact a code that does not comply with the Federal Communications Commission Preemption of 1985. State code further states that if a city adopts an ordinance involving the height, screening or placement of an antenna that the ordinance shall reasonably accommodate amateur radio communications. In other words, the height of a tower shall not be required to be lower than is reasonably necessary to operate an amateur radio.

City Code: The City does not have an ordinance that addresses amateur radio towers. However, the A-2 zone does establish minimum setback requirements that would apply to the proposed tower. The proposed location complies with the A-2 setbacks. The A-2 zone also establishes a maximum height for accessory structures of 35 feet. However, as outlined in the federal and state statutes, reasonable accommodations must be made for the height of a proposed amateur radio tower.

Proposed Height: The proposed tower is retractable and will have a minimum height of approximately 25 to 30 feet when not in use and a maximum height of 72 feet when in use. The applicant has supplied information regarding the use of amateur radio towers, suggested tower heights and a justification for the need for the proposed height of 72 feet (see attachment "1").

Staff also contacted the Utah Amateur Radio Club (UARC) to inquire about tower heights (see attachment "2"). The UARC indicated that necessary tower heights vary based on the goals of a particular radio user. However, 70-75 feet is what the UARC termed the "sweet spot" for amateur radio communications based on cost and effectiveness. The UARC's comments are consistent with the information submitted by the applicant.

Staff also examined various ordinances from other cities. Most of the ordinances that address antenna heights exempt amateur radio antennas all together. However, some jurisdictions, such as the City of Clearfield and Morgan County, require a conditional use permit for amateur radio towers that exceed 75 feet in height. Staff is assuming that the 75 foot height limitations established by these communities is based on similar evidence that the applicant and the UARC has provided that a tower in the 70 to 75 foot range is generally sufficient to provide effective communications for most users.

Tower location: The applicant is proposing that the tower be located near the center of the lot and at least 90 feet from the closest property line and approximately 200 feet to the nearest residence. While the tower will certainly be visible from many adjacent parcels, it appears that is sited in a location that will minimize the visual impacts to the extent possible. The fact that the tower is retractable and will most often be at its tallest during night-time hours should further help reduce visual impacts on neighboring properties.

Summary: Federal law requires the City to allow amateur radio towers at heights that are reasonable for effective communication. While the necessary height of a tower varies based on the goals of the user, 70 to 75 feet is generally accepted as a height that amateur radio towers may require for effective communications. The applicant's proposal falls within this 70 to 75 foot height range.

STAFF RECOMMENDATION

Approve the application for an amateur radio tower with the attached conditions.

SPECIAL CONDITIONS

1. The applicant shall obtain a building permit prior to installation of the tower.

2. The use shall be conducted in a manner consistent with the presentations and statements submitted in the application and at the hearing, and any change in the use which would alter the conditions adopted as part of this permit shall require approval of an amended permit by the Planning Commission.

ATTACHMENTS

1. Application Materials.
2. Correspondence.
3. Federal & State Law Citations.

Attachment "1"

Dear Mr. Conroy and Mapleton Planning Commission Members,

Thank you for considering my request for installation of a 72 foot antenna tower on my home property located at 589 East 1400 South in Mapleton. This installation will serve as the mounting structure for my amateur radio antenna. I am an Amateur Extra license holder (Callsign NI7F). A copy of my current license was submitted with my original building permit application. The tower I wish to install (US Towers heavy duty 72 foot adjustable) is one which I already own which was used at my primary residence when we lived in Provo. I wish to install this tower on my Mapleton property for use on the Amateur Radio allocated bands. The tower is adjustable with a maximum height of the tower of 72 feet (in reality it is several feet less than this for safety) and a minimum height on the order of 25-30 feet. I typically keep the tower lowered when not in use to lessen the likelihood of any damage to my tower or antenna in severe winds. With the installation I have proposed my tower will withstand winds in excess of 90-100 MPH when raised and significantly higher winds when the tower is not at maximum height. I will utilize this tower to communicate on all amateur authorized bands (70 cm through 80 meters) however the majority of my use will be on 10 meters through 80 meters. During daytime hours 10-20 meters is most effective. During nighttime hours 40-80 meters is most effective due to changes in atmospheric ionization due to the sun. In many cases the only frequencies that are of use at night are 40 meters and 80 meters. This necessitates a tower height sufficient for effective radio signal propagation at those frequencies. I have been an active amateur radio operator for approximately 20 years. I have made literally tens of thousands of contacts worldwide. My primary area of interest is in DX communication (long distance using the HF bands of 10 meters through 160 meters (28 MHz down to 1.8 MHz). These bands require an antenna on a tower at heights at least 1/2 wavelength off the ground for effective propagation. There have been a number of times I have used my amateur radio capabilities in emergency situations. I also maintain an AC generator to allow for communication during power outages.

I am attaching a PDF from the American Radio Relay League (ARRL of which I am a member) on antenna heights. This is a document for City Planners and Amateur Radio Operators. Basically this PDF and the Glen Martin link to antenna heights discuss recommendations for tower heights. My 72 foot tower is well within their recommendations and in reality it is considerably lower than what would be considered an ideal height for 40 meter and 80 meter wavelengths. In essence, antennas should be at least a half wavelength above ground for effective propagation and long distance communication. For antennas less than half wavelength above ground the signal take off angle becomes steeper which has significant reduction in long distance communication. For 40 meters the desired minimum height is at least 20 meters and for 80 meters the desired height would be on the order of 40 meters above ground. My 72 foot tower is a compromise. I have used it extensively in Provo and I have been able to communicate in most directions without too much difficulty. However, when I lower my tower the effectiveness is significantly degraded. I would prefer to have a tower on the order of 120 feet or higher but the costs are considerably higher. The 72 foot tower I currently own is a slight compromise in height for 40 meter and 80 meter wavelength communications (7 MHz and 3.5 MHz) but everything I have read and the attached PDF and link below both indicate that 72 foot height for 40 meters and 80 meters is actually less than recommended. However, I have been able to communicate on both of these bands with my

antenna at 72 feet. When the antenna is at 50-60 feet or less I have great difficulty communicating on 40 and 80 meters.

One additional factor to consider is that the likelihood of radio frequency (RF) interference to others is reduced when the antenna is higher off the ground. While all of the radio equipment I own meets or exceeds all applicable FCC standards for radio interference, other individuals may own equipment which does not meet FCC standards for receiving RF interference. By having the antenna higher off the ground the likelihood of RF interference is reduced significantly. In the 20+ years I lived in Provo I never had any complaints of RF interference and my neighbors were considerably closer to me in Provo than they are in Mapleton.

Here is a link to recommendations for antenna heights.
http://glenmartin.com/ham-radio-blog-amateur-radio/what-is-the-best-antenna-height

Here is a link to the FCC wireless services and PRB1 which states that communities must accommodate amateurs request for towers and antennas.
http://wireless.fcc.gov/services/index.htm?job=prb-1&id=amateur&page=1#Supporting%20Comments

Thank you very much for your kind consideration of my request. I look forward to meeting with you during the June 27th meeting of the Mapleton City Planning Commission. If you have any questions I can answer prior to that meeting please do not hesitate to contact me. My cell is 801-362-9339. My email is richard_harris@byu.edu.

Richard W. Harris, Ph.D.
Amateur Radio Operator - NI7F

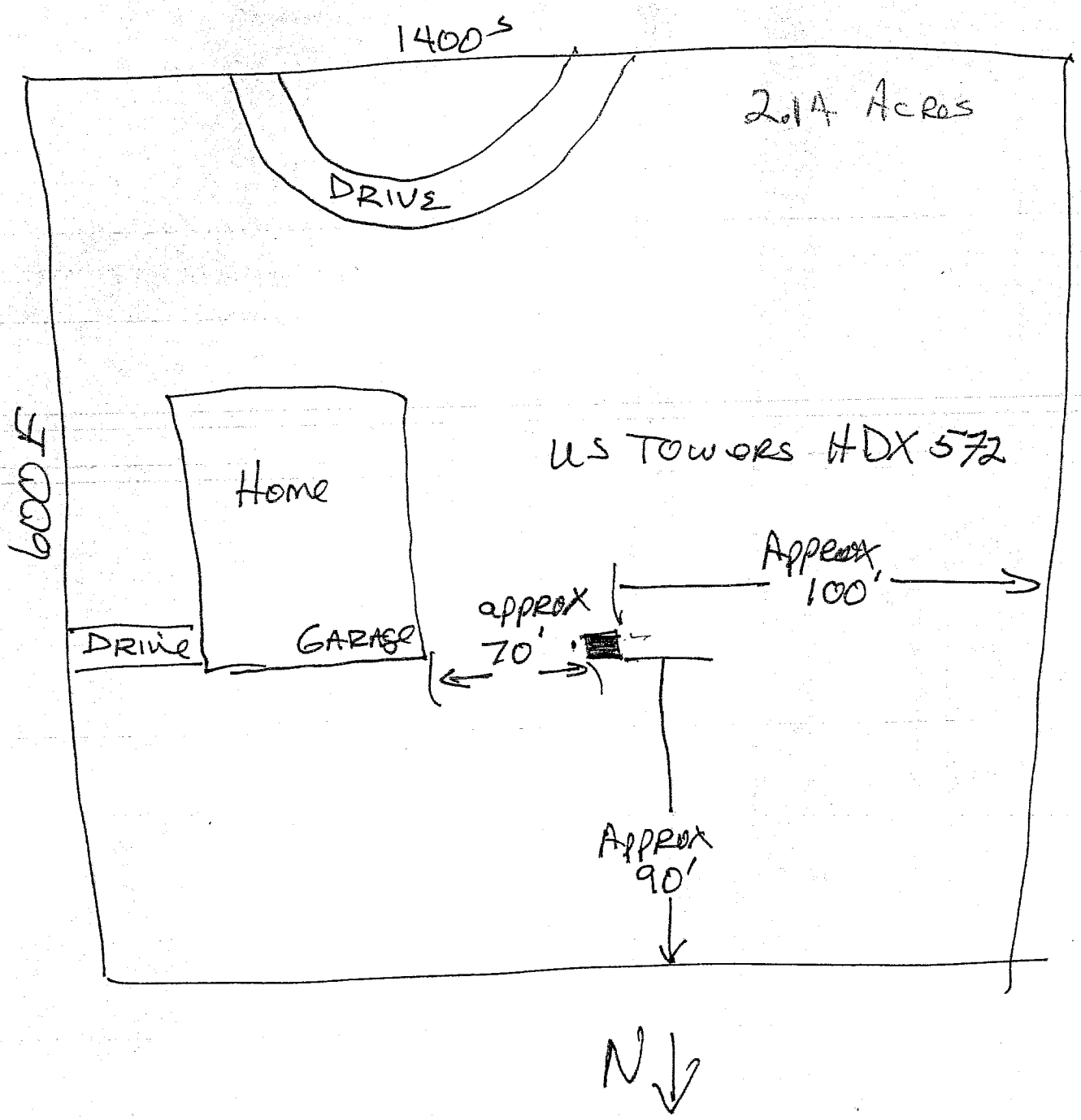
Proposed Tower (HAM) Location

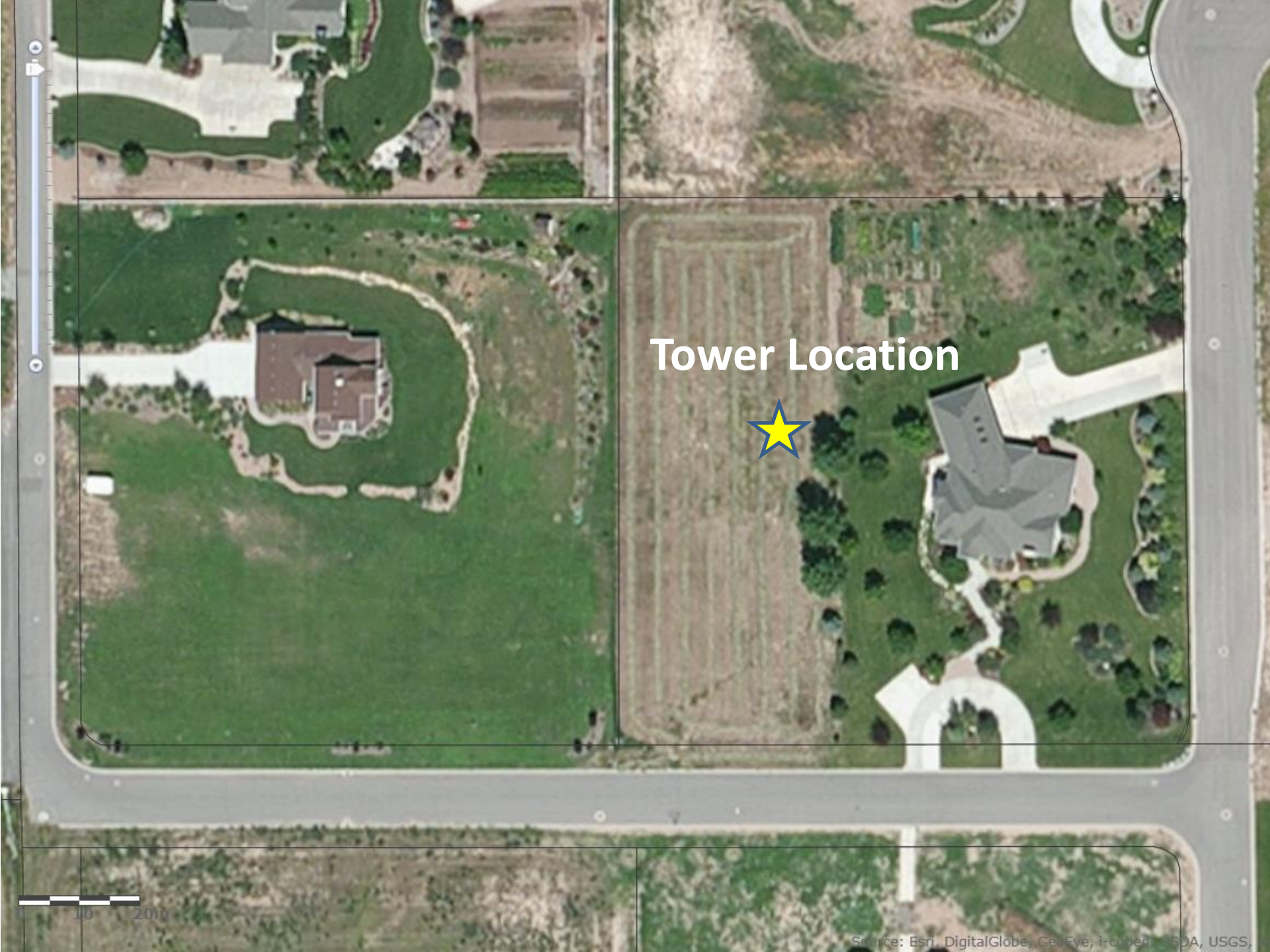
589 E 1400 S, Mapleton

Richard Harris

801-362-9339

HAM License NI7F




Tower Location
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Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS,

Antenna Height and Communications Effectiveness

Second Edition

A Guide for City Planners and Amateur Radio Operators

By R. Dean Straw, N6BV, and Gerald L. Hall, K1TD
Senior Assistant Technical Editor and Retired Associate Technical Editor

The American Radio Relay League, Inc.
225 Main Street
Newington, CT 06111

Executive Summary

Amateur radio operators, or “hams” as they are called, communicate with stations located all over the world. Some contacts may be local in nature, while others may be literally halfway around the world. Hams use a variety of internationally allocated frequencies to accomplish their communications.

Except for local contacts, which are primarily made on Very High and Ultra High Frequencies (VHF and UHF), communicating between any two points on the earth rely primarily on high-frequency (HF) signals propagating through the ionosphere. The earth’s ionosphere acts much like a mirror at heights of about 150 miles. The vertical angle of radiation of a signal launched from an antenna is one of the key factors determining effective communication distances. The ability to communicate over long distances generally requires a low radiation angle, meaning that an antenna must be placed high above the ground in terms of the wavelength of the radio wave being transmitted.

A beam type of antenna at a height of 70 feet or more will provide greatly superior performance over the same antenna at 35 feet, all other factors being equal. A height of 120 feet or even higher will provide even more advantages for long-distance communications. To a distant receiving station, a transmitting antenna at 120 feet will provide the effect of approximately 8 to 10 times more transmitting power than the same antenna at 35 feet. Depending on the level of noise and interference, this performance disparity is often enough to mean the difference between making distant radio contact with fairly reliable signals, and being unable to make distant contact at all.

Radio Amateurs have a well-deserved reputation for providing vital communications in emergency situations, such as in the aftermath of a severe icestorm, a hurricane or an earthquake. Short-range communications at VHF or UHF frequencies also require sufficient antenna heights above the local terrain to ensure that the antenna has a clear horizon.

In terms of safety and aesthetic considerations, it might seem intuitively reasonable for a planning board to want to restrict antenna installations to low heights. However, such height restrictions often prove very counterproductive and frustrating to all parties involved. If an amateur is restricted to low antenna heights, say 35 feet, he will suffer from poor transmission of his own signals as well as poor reception of distant signals. In an attempt to compensate on the transmitting side (he can’t do anything about the poor reception problem), he might boost his transmitted power, say from 150 watts to 1,500 watts, the maximum legal limit. This ten-fold increase in power will very significantly increase the *potential* for interference to telephones, televisions, VCRs and audio equipment in his neighborhood.

Instead, if the antenna can be moved farther away from neighboring electronic devices—putting it higher, in other words—this will greatly reduce the likelihood of interference, which decreases at the inverse square of the distance. For example, doubling the distance reduces the potential for interference by 75%. As a further benefit, a large antenna doesn’t look anywhere near as large at 120 feet as it does close-up at 35 feet.

As a not-so-inconsequential side benefit, moving an antenna higher will also greatly reduce the potential of exposure to electromagnetic fields for neighboring human and animals. Interference and RF exposure standards have been thoroughly covered in recently enacted Federal Regulations.

Antenna Height and Communications Effectiveness

By R. Dean Straw, N6BV, and Gerald L. Hall, K1TD
Senior Assistant Technical Editor and Retired Associate Technical Editor

The purpose of this paper is to provide general information about communications effectiveness as related to the physical height of antennas. The intended audience is amateur radio operators and the city and town Planning Boards before which a radio amateur must sometimes appear to obtain building permits for radio towers and antennas.

The performance of horizontally polarized antennas at heights of 35, 70 and 120 feet is examined in detail. Vertically polarized arrays are not considered here because at short-wave frequencies, over average terrain and at low radiation angles, they are usually less effective than horizontal antennas.

Ionospheric Propagation

Frequencies between 3 and 30 megahertz (abbreviated MHz) are often called the "short-wave" bands. In engineering terms this range of frequencies is defined as the *high-frequency* or *HF* portion of the radio spectrum. HF radio communications between two points that are separated by more than about 15 to 25 miles depend almost solely on propagation of radio signals through the *ionosphere*. The ionosphere is a region of the Earth's upper atmosphere that is ionized primarily by ultraviolet rays from the Sun.

The Earth's ionosphere has the property that it will refract or bend radio waves passing through it. The ionosphere is not a single "blanket" of ionization. Instead, for a number of complex reasons, a few discrete layers are formed at different heights above the earth. From the standpoint of radio propagation, each ionized layer has distinctive characteristics, related primarily to different amounts of ionization in the various layers. The ionized layer that is most useful for HF radio communication is called the *F layer*.

The F layer exists at heights varying from approximately 130 to 260 miles above the earth's surface. Both the layer height and the amount of ionization depend on the latitude from the equator, the time of day, the season of the year, and on the level of sunspot activity. Sunspot activity varies generally in cycles that are approximately 11 years in duration, although short-term bursts of activity may create changes in propagation conditions that last anywhere from a few minutes to several days. The ionosphere is not homogeneous, and is undergoing continual change. In fact, the exact state of the ionosphere at any one time is so variable that is best described in statistical terms.

The F layer disappears at night in periods of low and medium solar activity, as the ultraviolet energy required to sustain ionization is no longer received from the Sun. The amount that a passing radio wave will bend in an ionospheric layer is directly related to the intensity of ionization in that layer, and to the frequency of the radio wave.

A triangle may be used to portray the cross-sectional path of ionospheric radio-wave travel, as shown in **Fig 1**, a highly simplified picture of what happens in propagation of radio waves. The base of the triangle is the surface of the Earth between two distant points, and the apex of the triangle is the point representing refraction in the ionosphere. If all the necessary conditions are

met, the radio wave will travel from the first point on the Earth's surface to the ionosphere, where it will be bent (*refracted*) sufficiently to travel to the second point on the earth, many hundreds of miles away.

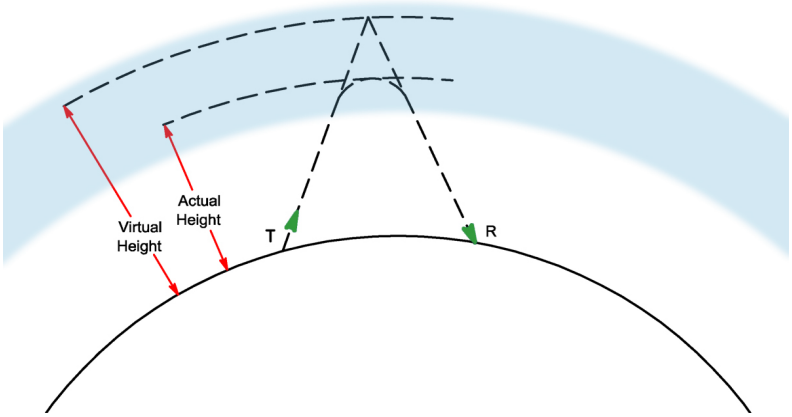

Fig 1—A simplified cross-sectional representation of ionospheric propagation. The simple triangle goes from the Transmitter T up to the virtual height and then back down to the Receiver R. Typically the F layer exists at a height of 150 miles above the Earth at mid-latitudes. The distance between T and R may range from a few miles to 2500 miles under normal propagation conditions.

Of course the Earth's surface is not a flat plane, but instead is curved. High-frequency radio waves behave in essentially the same manner as light waves—they tend to travel in straight lines, but with a slight amount of downward bending caused by refraction in the air. For this reason it is not possible to communicate by a direct path over distances greater than about 15 to 25 miles in this frequency range, slightly farther than the optical horizon. The curvature of the earth causes the surface to "fall away" from the path of the radio wave with greater distances. Therefore, it is the ionosphere that permits HF radio communications to be made between points separated by hundreds or even thousands of miles. The range of frequencies from 3 to 30 MHz is unique in this respect, as ionospheric propagation is not consistently supported for any frequencies outside this range.

One of the necessary conditions for ionospheric communications is that the radio wave must encounter the ionosphere at the correct angle. This is illustrated in **Fig 2**, another very simplified drawing of the geometry involved. Radio waves leaving the earth at high elevation angles above the horizon may receive only very slight bending due to refraction, and are then lost to outer space. For the same fixed frequency of operation, as the elevation angle is lowered toward the horizon, a point is reached where the bending of the wave is sufficient to return the wave to the Earth. At successively lower angles, the wave returns to the Earth at increasing distances.

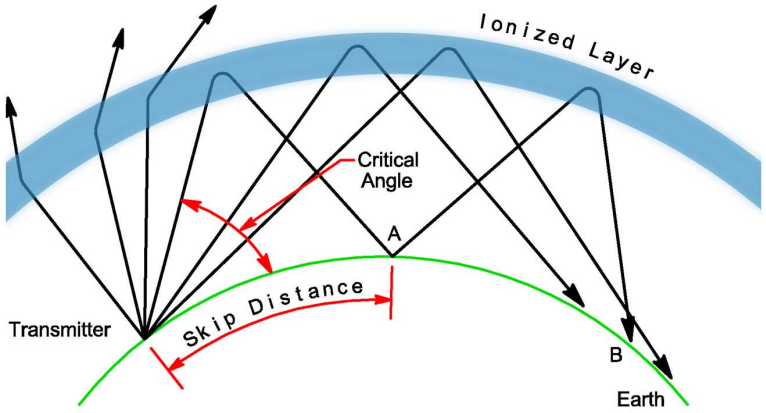

Fig 2—Behavior of radio waves encountering the ionosphere. Rays entering the ionized region at angles above the critical angle are not bent enough to return to Earth and are lost to space. Waves entering at angles below the critical angle reach the Earth at increasingly greater distances as the angle approaches the horizontal. The maximum distance that may normally be covered in a single hop is 2500 miles. Greater distances may be covered with multiple hops.

If the radio wave leaves the earth at an *elevation angle* of zero degrees, just toward the horizon (or just tangent to the earth's surface), the maximum distance that may be reached under usual ionospheric conditions is approximately 2,500 miles (4,000 kilometers). However, the Earth itself also acts as a reflector of radio waves coming down from the ionosphere. Quite often a radio signal will be reflected from the reception point on the Earth back into the ionosphere again, reaching the Earth a second time at a still more distant point.

As in the case of light waves, the angle of reflection is the same as the angle of incidence, so a wave striking the surface of the Earth at an angle of, say, 15º is reflected upward from the surface at the same angle. Thus, the distance to the second point of reception will be approximately twice the distance of the first. This effect is also illustrated in Fig 2, where the signal travels from the transmitter at the left of the drawing via the ionosphere to Point A, in the center of the drawing. From Point A the signal travels via the ionosphere again to Point B, at the right. A signal traveling from the Earth through the ionosphere and back to the Earth is called a *hop*. Under some conditions it is possible for as many as four or five signal hops to occur over a radio path, but no more than two or three hops is the norm. In this way, HF communications can be conducted over thousands of miles.

With regard to signal hopping, two important points should be recognized. First, a significant loss of signal occurs with each hop. Lower layers of the ionosphere absorb energy from the signals as they pass through, and the ionosphere tends to scatter the radio energy in various directions, rather than confining it to a tight bundle. The earth also scatters the energy at a reflection point. Thus, only a small fraction of the transmitted energy actually reaches a distant receiving point.

Again refer to Fig 2. Two radio paths are shown from the transmitter to Point B, a one-hop path and a two-hop path. Measurements indicate that although there can be great variation in the ratio of the two signal strengths in a situation such as this, the signal power received at Point B will generally be from five to ten times greater for the one-hop wave than for the two-hop wave. (The terrain at the mid-path reflection point for the two-hop wave, the angle at which the wave is reflected from the earth, and the condition of the ionosphere in the vicinity of all the refraction points are the primary factors in determining the signal-strength ratio.) Signal levels are generally compared in decibels, abbreviated dB. The decibel is a logarithmic unit. Three decibels difference in signal strengths is equivalent to a power ratio of 2:1; a difference of 10 dB equates to a power ratio of 10:1. Thus the signal loss for an additional hop is about 7 to 10 dB.

The additional loss per hop becomes significant at greater distances. For a simplified example, a distance of 4,000 miles can be covered in two hops of 2,000 miles each or in four hops of 1,000 miles each. For illustration, assume the loss for additional hops is 10 dB, or a 1/10 power ratio. Under such conditions, the four-hop signal will be received with only 1/100 the power or 20 dB below that received in two hops. The reason for this is that only 1/10 of the two-hop signal is received for the first additional (3^{rd}) hop, and only 1/10 of that 1/10 for the second additional (4^{th}) hop. It is for this reason that no more than four or five propagation hops are useful; the received signal eventually becomes too weak to be heard.

The second important point to be recognized in multihop propagation is that the geometry of the first hop establishes the geometry for all succeeding hops. And it is the elevation angle at the transmitter that sets up the geometry for the first hop.

It should be obvious from the preceding discussion that one needs a detailed knowledge of the range of elevation angles for effective communication in order to do a scientific evaluation of a possible communications circuit. The range of angles should be statistically valid over the full 11-year solar sunspot cycle, since the behavior of the Sun determines the changes in the nature of the Earth's ionosphere. ARRL did a very detailed computer study in the early 1990s to determine the angles needed for propagation throughout the world. The results of this study will be examined later, after we introduce the relationship between antenna height and the elevation pattern for an antenna.

Horizontal Antennas Over Flat Ground

A simple antenna that is commonly used for HF communications is the horizontal half-wave *dipole*. The dipole is a straight length of wire (or tubing) into which radio-frequency energy is fed at the center. Because of its simplicity, the dipole may be easily subjected to theoretical performance analyses. Further, the results of proper analyses are well borne out in practice. For these reasons, the half-wave dipole is a convenient performance standard against which other antenna systems can be compared.

Because the earth acts as a reflector for HF radio waves, the directive properties of any antenna are modified considerably by the ground underneath it. If a dipole antenna is placed horizontally above the ground, most of the energy radiated downward from the dipole is

reflected upward. The reflected waves combine with the direct waves (those radiated at angles above the horizontal) in various ways, depending on the height of the antenna, the frequency, and the electrical characteristics of the ground under and around the antenna.

At some vertical angles above the horizon, the direct and reflected waves may be exactly in phase—that is, the maximum signal or field strengths of both waves are reached at the same instant at some distant point. In this case the resultant field strength is equal to the sum of the two components. At other vertical angles the two waves may be completely out of phase at some distant point—that is, the fields are maximum at the same instant but the phase directions are opposite. The resultant field strength in this case is the difference between the two. At still other angles the resultant field will have intermediate values. Thus, the effect of the ground is to increase the intensity of radiation at some vertical angles and to decrease it at others. The elevation angles at which the maxima and minima occur depend primarily on the antenna height above ground. (The electrical characteristics of the ground have some slight effect too.)

For simplicity here, we consider the ground to be a perfectly conducting, perfectly flat reflector, so that straightforward trigonometric calculations can be made to determine the relative amount of radiation intensity at any vertical angle for any dipole height. Graphs from such calculations are often plotted on rectangular axes to show best resolution over particularly useful ranges of elevation angles, although they are also shown on polar plots so that both the front and back of the response can be examined easily. **Fig 3** shows an overlay of the polar elevation-pattern responses of two dipoles at different heights over perfectly conducting flat ground. The lower dipole is located a half wavelength above ground, while the higher dipole is located one wavelength above ground. The pattern of the lower antenna peaks at an elevation angle of about 30º, while the higher antenna has two main lobes, one peaking at 15º and the other at about 50º elevation angle.

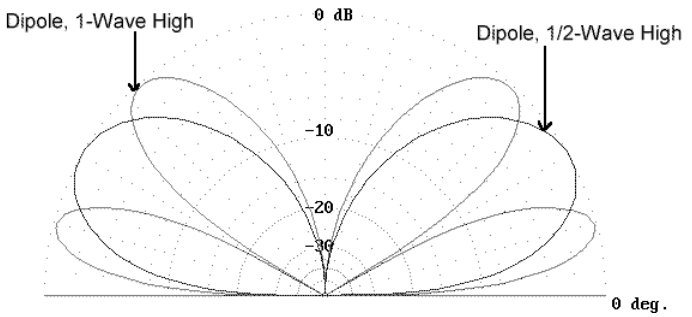

Fig 3–Comparison of elevation responses for two dipoles: one ½-wavelength high, and the other 1-wavelength high.

In the plots shown in Fig 3, the elevation angle above the horizon is represented in the same fashion that angles are measured on a protractor. The concentric circles are calibrated to represent ratios of field strengths, referenced to the strength represented by the outer circle. The circles are calibrated in decibels. Diminishing strengths are plotted toward the center.

You may have noted that antenna heights are often discussed in terms of *wavelengths*. The reason for this is that the length of a radio wave is inversely proportional to its frequency. Therefore a fixed physical height will represent different electrical heights at different radio frequencies. For example, a height of 70 feet represents one wavelength at a frequency of 14 MHz. But the same 70-foot height represents a half wavelength for a frequency of 7 MHz and only a quarter wavelength at 3.5 MHz. On the other hand, 70 feet is 2 wavelengths high at 28 MHz.

The lobes and nulls of the patterns shown in Fig 3 illustrate what was described earlier, that the effect of the ground beneath an antenna is to increase the intensity of radiation at some vertical elevation angles and to decrease it at others. At a height of a half wavelength, the radiated energy is strongest at a rather high elevation angle of 30º. This would represent the situation for a 14-MHz dipole 35 feet off the ground.

As the horizontal antenna is raised to greater heights, additional lobes are formed, and the lower ones move closer to the horizon. The maximum amplitude of each of the lobes is roughly equal. As may be seen in Fig 3, for an antenna height of one wavelength, the energy in the lowest lobe is strongest at 15º. This would represent the situation for a 14-MHz dipole 70 feet high.

The elevation angle of the lowest lobe for a horizontal antenna above perfectly conducting ground may be determined mathematically:

$$\theta = \sin^{-1}\left(\frac{0.25}{h}\right)$$

Where

θ = the wave or elevation angle
h = the antenna height above ground in wavelengths

In short, the higher the horizontal antenna, the lower is the lowest lobe of the pattern. As a very general rule of thumb, the higher an HF antenna can be placed above ground, the farther it will provide effective communications because of the resulting lower radiation angle. This is true for any horizontal antenna over real as well as theoretically perfect ground.

You should note that the *nulls* in the elevation pattern can play an important role in communications—or lack of communication. If a signal arrives at an angle where the antenna system exhibits a deep null, communication effectiveness will be greatly reduced. It is thus quite possible that an antenna can be *too high* for good communications efficiency on a particular frequency. Although this rarely arises as a significant problem on the amateur bands below 14 MHz, we'll discuss the subject of optimal height in more detail later.

Actual earth does not reflect all the radio-frequency energy striking it; some absorption takes place. Over real earth, therefore, the patterns will be slightly different than those shown in Fig 3, however the differences between theoretical and perfect earth ground are not significant for the range of elevation angles necessary for good HF communication. Modern computer programs can do accurate evaluations, taking all the significant ground-related factors into account.

Beam Antennas

For point-to-point communications, it is beneficial to concentrate the radiated energy into a beam that can be aimed toward a distant point. An analogy can be made by comparing the light

from a bare electric bulb to that from an automobile headlight, which incorporates a built-in focusing lens. For illuminating a distant point, the headlight is far more effective.

Antennas designed to concentrate the radiated energy into a beam are called, naturally enough, *beam antennas*. For a fixed amount of transmitter power fed to the transmitting antenna, beam antennas provide increased signal strength at a distant receiver. In radio communications, the use of a beam antenna is also beneficial during reception, because the antenna pattern for transmission is the same for reception. A beam antenna helps to reject signals from unwanted directions, and in effect boosts the strength of signals received from the desired direction.

The increase in signal or field strength a beam antenna offers is frequently referenced to a dipole antenna in free space (or to another theoretical antenna in free space called an *isotropic antenna*) by a term called *gain*. Gain is commonly expressed in decibels. The isotropic antenna is defined as being one that radiates equally well in all directions, much like the way a bare lightbulb radiates essentially equally in all directions.

One particularly well known type of beam antenna is called a *Yagi*, named after one of its Japanese inventors. Different varieties of Yagi antennas exist, each having somewhat different characteristics. Many television antennas are forms of multi-element Yagi beam antennas. In the next section of this paper, we will refer to a four-element Yagi, with a gain of 8.5 dBi in free space, exclusive of any influence due to ground.

This antenna has 8.5 dB more gain than an isotropic antenna in free space and it achieves that gain by squeezing the pattern in certain desired directions. Think of a normally round balloon and imagine squeezing that balloon to elongate it in one direction. The increased length in one direction comes at the expense of length in other directions. This is analogous to how an antenna achieves more signal strength in one direction, at the expense of signal strength in other directions.

The elevation pattern for a Yagi over flat ground will vary with the electrical height over ground in exactly the same manner as for a simpler dipole antenna. The Yagi is one of the most common antennas employed by radio amateurs, second in popularity only to the dipole.

Putting the Pieces Together

In **Fig 4**, the elevation angles necessary for communication from a particular transmitting site, in Boston, Massachusetts, to the continent of Europe using the 14-MHz amateur band are shown in the form of a bargraph. For each elevation angle from 1º to 30º, Fig 4 shows the percentage of time when the 14-MHz band is open at each elevation angle. For example, 5º is the elevation angle that occurs just over 12% of the time when the band is available for communication, while 11º occurs about 10% of the time when the band is open. The useful range of elevation angles that must accommodated by an amateur station wishing to talk to Europe from Boston is from 1º to 28º.

In addition to the bar-graph elevation-angle statistics shown in Fig 4, the elevation pattern responses for three Yagi antennas, located at three different heights above flat ground, are overlaid on the same graph. You can easily see that the 120-foot antenna is the best antenna to cover the most likely angles for this particular frequency, although it suffers at the higher elevation angles on this particular propagation path, beyond about 12°. If, however, you can accept somewhat lower gain at the lowest angles, the 70-foot antenna would arguably be the best overall choice to cover all the elevation angles.

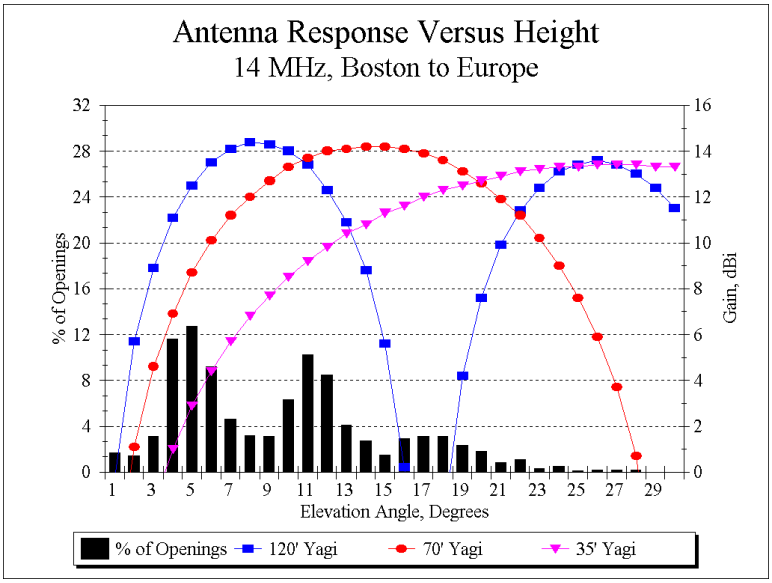

Fig 4—Elevation response patterns of three Yagis at 120, 70 and 35 feet, at 14 MHz over flat ground. The patterns are overlaid with the statistical elevation-angles for the path from Boston to continental Europe over the entire 11-year solar sunspot cycle. Clearly, the 120-foot antenna is the best choice to cover the low angles needed, but it suffers some at higher angles.

Other graphs are needed to show other target receiving areas around the world. For comparison, **Fig 5** is also for the 14-MHz band, but this time from Boston to Sydney, Australia. The peak angle for this very long path is about 2º, occurring 19% of the time when the band is actually open for communication. Here, even the 120-foot high antenna is not ideal. Nonetheless, at a moderate 5° elevation angle, the 120-foot antenna is still 10 dB better than the one at 35 feet.

Fig 4 and Fig 5 have portrayed the situation for the 14-MHz amateur band, the most popular and heavily utilized HF band used by radio amateurs. During medium to high levels of solar sunspot activity, the 21 and 28-MHz amateur bands are open during the daytime for long-distance communication. **Fig 6** illustrates the 28-MHz elevation-angle statistics, compared to the elevation patterns for the same three antenna heights shown in Fig 5. Clearly, the elevation response for the 120-foot antenna has a severe (and undesirable) null at 8°. The 120-foot antenna is almost 3.4 wavelengths high on 28 MHz (whereas it is 1.7 wavelengths high on 14 MHz.) For many launch angles, the 120-foot high Yagi on 28 MHz would simply be too high.

The radio amateur who must operate on a variety of frequencies might require two or more towers at different heights to maintain essential elevation coverage on all the authorized bands. Antennas can sometimes be mounted at different heights on a single supporting tower, although it is more difficult to rotate antennas that are “vertically stacked” around the tower to point in all the needed directions. Further, closely spaced antennas tuned to different frequencies usually interact electrically with each other, often causing severe performance degradation.

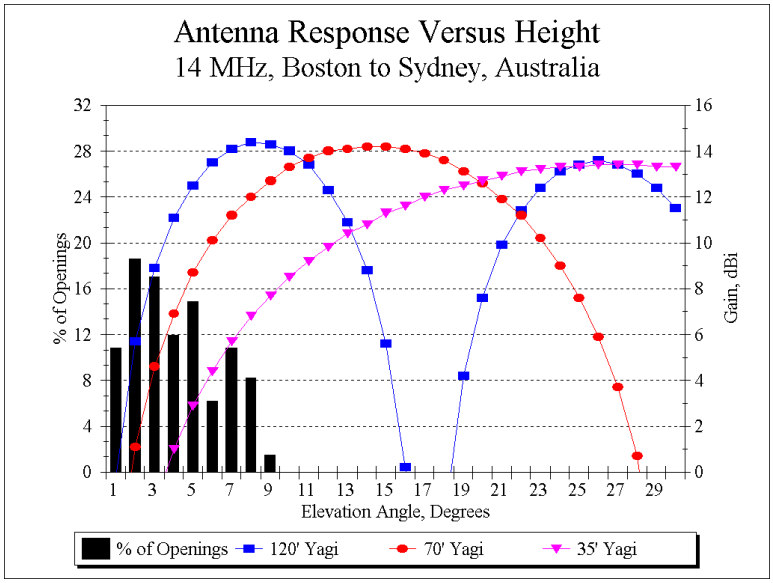

Fig 5—Elevation responses for same antennas as Fig 4, but for a longer-range path from Boston to Sydney, Australia. Note that the prevailing elevation angles are very low.

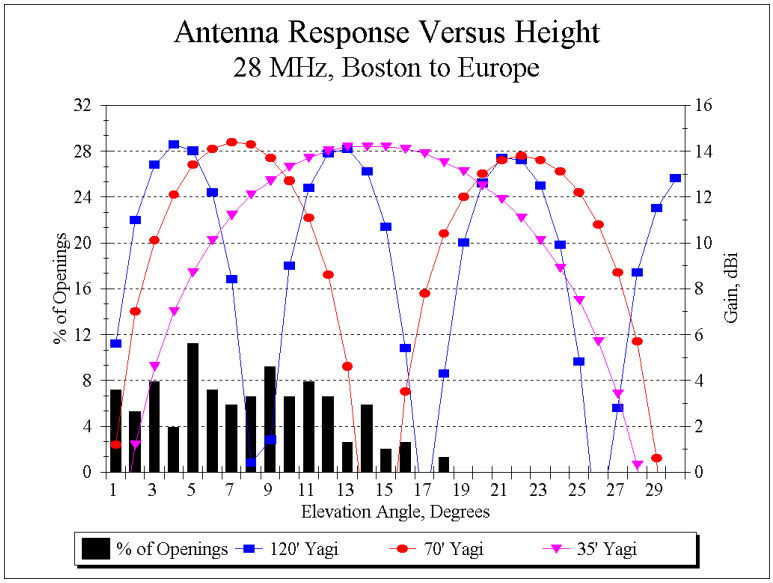

Fig 6—Elevation angles compared to antenna responses for 28-MHz path from Boston to Europe. The 70-foot antenna is probably the best overall choice on this path.

During periods of low to moderate sunspot activity (about 50% of the 11-year solar cycle), the 14-MHz band closes down for propagation in the early evening. A radio amateur wishing to continue communication must shift to a lower frequency band. The next most highly used band below the 14-MHz band is the 7-MHz amateur band. **Fig 7** portrays a 7-MHz case for another transmitting site, this time from San Francisco, California, to the European continent. Now, the range of necessary elevation angles is from about 1° to 16°, with a peak statistical likelihood of about 16% occurring at an elevation of 3°. At this low elevation angle, a 7-MHz antenna must be *very* high in the air to be effective. Even the 120-foot antenna is hardly optimal for the peak angle of 3°. The 200-foot antenna shown would be far better than a 120-foot antenna. Further, the 35-foot high antenna is *greatly* inferior to the other antennas on this path and would provide far less capabilities, on both receiving and transmitting.

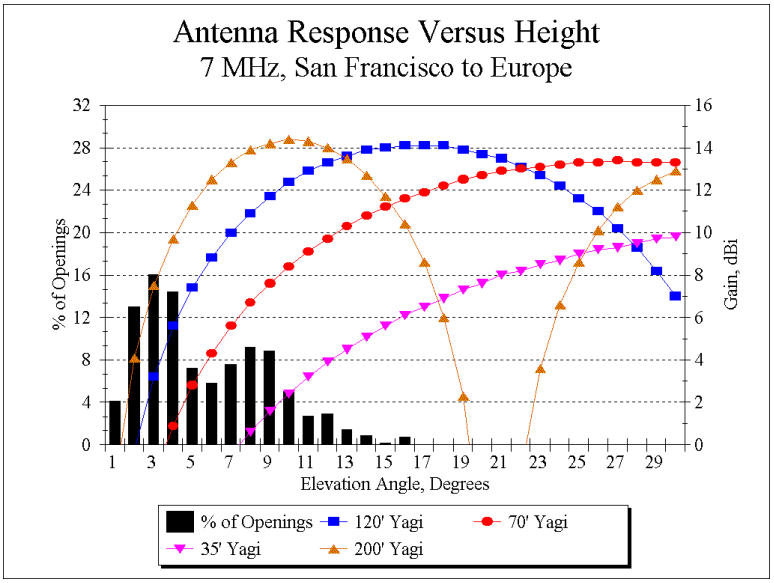

Fig 7—Comparison of antenna responses for another propagation path: from San Francisco to Europe on 7 MHz. Here, even a 120-foot high antenna is hardly optimal for the very low elevation angles required on this very long path. In fact, the 200-foot high antenna is far better suited for this path.

What If the Ground Isn't Flat?

In the preceding discussion, antenna radiation patterns were computed for antennas located over *flat ground*. Things get much more complicated when the exact local terrain surrounding a tower and antenna are taken into account. In the last few years, sophisticated ray-tracing computer models have become available that can calculate the effect that local terrain has on the elevation patterns for real-world HF installations—and *each* real-world situation is indeed different.

For simplicity, first consider an antenna on the top of a hill with a constant slope downward. The general effect is to lower the effective elevation angle by an amount equal to the downslope of the hill. For example, if the downslope is –3° for a long distance away from the tower and the flat-ground peak elevation angle is 10° (due to the height of the antenna), then the net result will be 10° – 3° = 7° peak angle. However, if the local terrain is rough, with many bumps and valleys in the desired direction, the response can be modified considerably. **Fig 8** shows the fairly complicated terrain profile for Jan Carman, K5MA, in the direction of Japan. Jan is located on one of the tallest hills in West Falmouth, Massachusetts. Within 500 feet of his tower is a small hill with a water tower on the top, and then the ground quickly falls away, so that at a distance of about 3000 feet from the tower base, the elevation has fallen to sea level, at 0 feet.

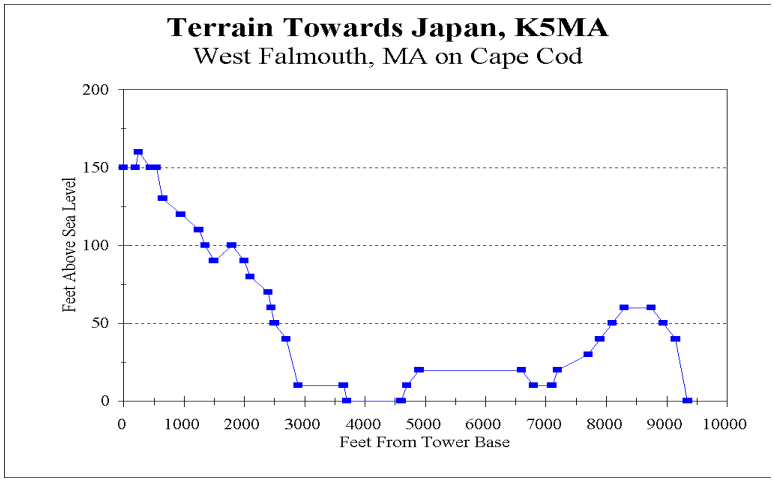

Fig 8—Terrain profile from location of K5MA, Jan Carman, in West Falmouth, MA, towards Japan. This is a moderately complicated real-world terrain on one of the highest hills on Cape Cod.

The computed responses toward Japan from this location, using a 120- and a 70-foot high Yagi, are shown in **Fig 9**, overlaid for comparison with the response for a 120-foot Yagi over flat ground. Over this particular terrain, the elevation pattern for the 70-foot antenna is actually better than that of the 120-foot antenna for angles below about 3°, but not for medium angles! The responses for each height oscillate around the pattern for flat ground — all due to the complex reflections and diffractions occurring off the terrain.

At an elevation angle of 5°, the situation reverses itself and the gain is now higher for the 120-foot-high antenna than for the 70-foot antenna. A pair of antennas on one tower would be required to cover all the angles properly. To avoid any electrical interactions between similar antennas on one tower, two towers would be much better. Compared to the flat-ground situation, the responses of real-world antenna can be very complicated due to the interactions with the local terrain.

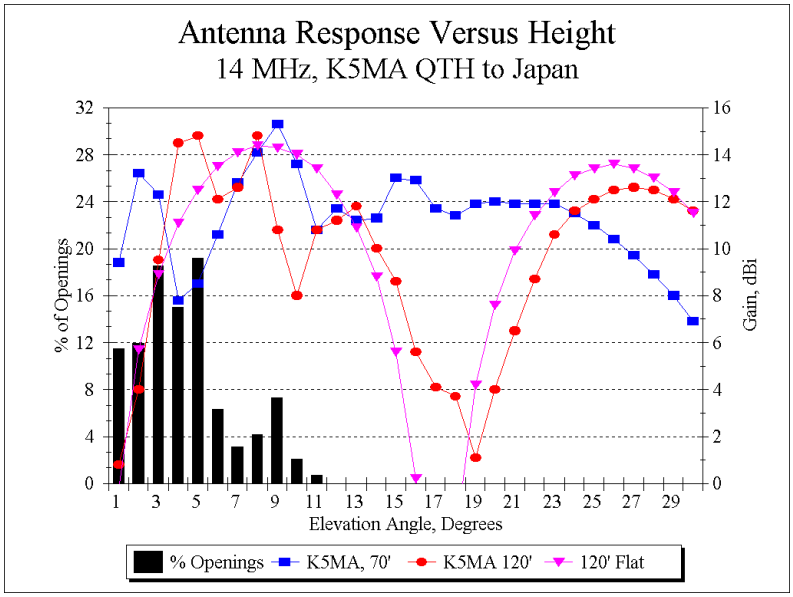

Fig 9—Computed elevation responses of 120- and 70-foot high Yagis, at the K5MA location on Cape Cod, in the direction of Japan and over flat ground, for comparison. The elevation response of the real-world antenna has been significantly modified by the local terrain.

Fig 10 shows the situation for the same Cape Cod location, but now for 7 MHz. Again, it is clear that the 120-foot high Yagi is superior by at least 3 dB (equivalent to twice the power) to the 70-foot high antenna at the statistical elevation angle of 6°. However, the response of the real-world 120-foot high antenna is still up some 2 dB from the response for an identical antenna over flat ground at this angle. On this frequency, the local terrain has helped boost the gain at the medium angles more than a similar antenna 120 feet over flat ground. The gain is even greater at lower angles, say at 1° elevation, where most signals take off, statistically speaking. Putting the antenna up higher, say 150 feet, will help the situation at this location, as would adding an additional Yagi at the 70-foot level and feeding both antennas in phase as a vertical stack.

Although the preceding discussion has been in terms of the transmitting antenna, the same principles apply when the antenna is used for reception. A high antenna will receive low-angle signals more effectively than will a low antenna. Indeed, amateur operators know very well that "If you can't hear them, you can't talk to them." Stations with tall towers can usually hear far better than their counterparts with low installations.

The situation becomes even more difficult for the next lowest amateur band at 3.5 MHz, where optimal antenna heights for effective long-range communication become truly heroic! Towers that exceed 120 feet are commonplace among amateurs wishing to do serious 3.5-MHz long-distance work.

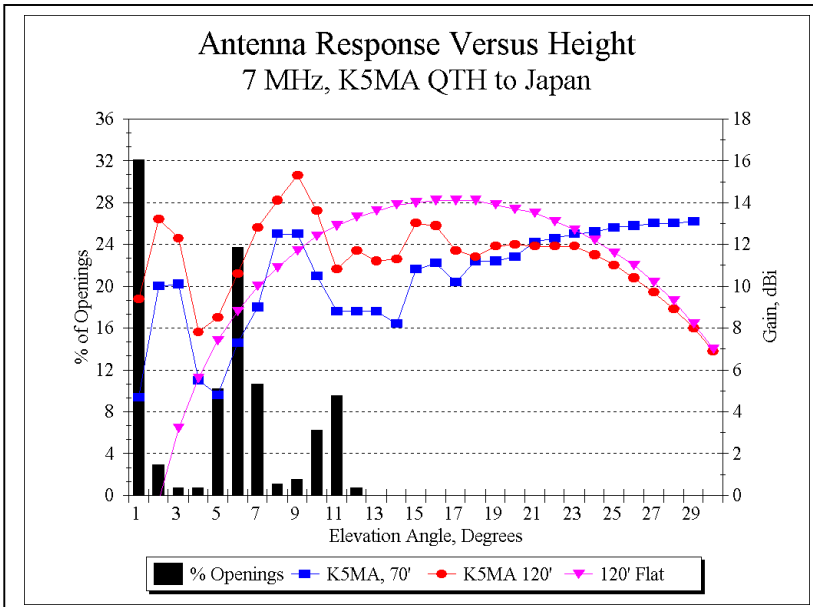

Fig 10—Elevation response on 7 MHz from K5MA location towards Japan on 7 MHz. The 120-foot high Yagi is definitely superior to the one only 70-feet high.

The 3.5 and 7-MHz amateur bands are, however, not always used strictly for long-range work. Both bands are crucial for providing communications throughout a local area, such as might be necessary in times of a local emergency. For example, earthquakes, tornadoes and hurricanes have often disrupted local communications—because telephone and power lines are down and because local police and fire-department VHF/UHF repeaters are thus knocked out of action. Radio amateurs often will use the 3.5 and 7-MHz bands to provide communications out beyond the local area affected by the disaster, perhaps into the next county or the next metropolitan area. For example, an earthquake in San Francisco might see amateurs using emergency power providing communications through amateurs in Oakland across the San Francisco Bay, or even as far away as Los Angeles or Sacramento. These places are where commercial power and telephone lines are still intact, while most power and telephones might be down in San Francisco itself. Similarly, a hurricane that selectively destroys certain towns on Cape Cod might find amateurs in these towns using 3.5 or 7.0 MHz to contact their counterparts in Boston or New York.

However, in order to get the emergency messages through, amateurs must have effective antennas. Most such relatively local emergency situations require towers of moderate height, less than about 100 feet tall typically.

Antenna Height and Interference

Extensive Federal Regulations cover the subject of interference to home electronic devices. It is an unfortunate fact of life, however, that many home electronic devices (such as stereos, TVs, telephones and VCRs) do not meet the Federal standards. They are simply inadequately designed to be resistant to RF energy in their vicinity. Thus, a perfectly legal amateur-radio transmitter may cause interference to a neighbor's VCR or TV because cost-saving shortcuts were taken in

the design and manufacture of these home entertainment devices. Unfortunately, it is difficult to explain to an irate neighbor why his brand-new $1000 stereo is receiving the perfectly legitimate transmissions by a nearby radio operator.

The potential for interference to any receiving device is a function of the transmitter power, transmitter frequency, receiver frequency, and most important of all, the proximity of the transmitter to the potential receiver. The transmitted field intensity decreases as the inverse square of the distance. This means that doubling the height of an antenna from 35 to 70 feet will reduce the potential for interference by 75%. Doubling the height again to 140 feet high would reduce the potential another 75%. Higher is better to prevent interference in the first place!

Recently enacted Federal Regulations address the potential for harm to humans because of exposure to electromagnetic fields. Amateur-radio stations rarely have problems in this area, because they use relatively low transmitting power levels and intermittent duty cycles compared to commercial operations, such as TV or FM broadcast stations. Nevertheless, the potential for RF exposure is again directly related to the distance separating the transmitting antenna and the human beings around it. Again, doubling the height will reduce potential exposure by 75%. The higher the antenna, the less there will any potential for significant RF exposure.

THE WORLD IS A VERY COMPLICATED PLACE

It should be pretty clear by now that designing scientifically valid communication systems is an enormously complex subject. The main complications come from the vagaries of the medium itself, the Earth's ionosphere. However, local terrain can considerably complicate the analysis also.

The main points of this paper may be summarized briefly:

> **The radiation elevation angle is the key factor determining effective communication distances beyond line-of-sight. Antenna height is the primary variable under control of the station builder, since antenna height affects the angle of radiation.**
>
> **In general, placing an amateur antenna system higher in the air enhances communication capabilities and also reduces chances for electromagnetic interference with neighbors.**

KILO SEVEN UTAH

Federal, State and Local Law Regulating Amateur Radio Antenna Support Structures

Including additional information for amateur operators desiring to install an efficient and effective outdoor antenna system in the state of Utah.

Prepared by
Darryl Hazelgren, K7UT

Table of Contents

Overview

Purpose of the paper

Amateur radio operators (hams) in the state of Utah do, from time to time, face difficulties in obtaining building permits and conditional use permits to install suitable antenna systems. This paper provides information about the federal, state and local laws which determine how those systems are regulated by the various levels of government.

While the target audience is the amateur community, it is also so intended as a source of information for local government officials as they consider drafting or revising their codes and ordinances. An important purpose is to draw attention to the fact that there are significant differences in nature, character and purposes of antennas and their support structures between those intended for amateur radio use and commercial low power communications, personal communications services and wireless communications facilities. There are significant differences in federal law and regulating these two services. Amateurs have a right by federal law to install effective outdoor antennas and support structures "at reasonable heights and dimensions sufficient to accommodate amateur service communications."

In cities where no specific ordinance regulates amateur radio antennas, the ham is limited by the height allowed for a primary or accessory structure on a property in a particular zone as to what may be installed. Usually however, various types of structures including towers and antennas are exempted from these height limitations. Taller installations usually require a conditional use permit.

Hams who have purchased properties governed by Covenants, Conditions and Restrictions recorded against the property are, unfortunately, bound by those CC&Rs. The various laws cited herein do not apply to private land use.

Additional material, included in the appendix should be useful in preparing and defending applications for building permits and conditional use permits.

Methodology

This report has been compiled using the fine *Antenna Zoning* by Fred Hopengarden, K1VR, as a beginning point. Any amateur operator considering a support structure installation would be well advised to obtain a copy of this work.

I have drawn upon comments and information posted on the HamLaw and TowerTalk reflectors and other sources on the internet, and combined that with personal experience of the past fifty years in the hobby, and data gained from a survey of hams in the state conducted in November 2009.

Comments and useful criticism are welcomed.

Federal Law

The following are laws at the Federal, State County and Municipality levels which govern and regulate amateur radio and control the installation of Station antenna structures.

Communications Act of 1934

The Communications Act of 1934 was a United States federal law enacted as Public Law Number 416, Act of June 19, 1934, ch. 652, 48 Stat. 1064, by the 73rd Congress, codified as Chapter 5 of Title 47 of the United States Code, 47 U.S.C. § 151 et seq. The Act replaced the Federal Radio Commission with the Federal Communications Commission (FCC). It also transferred regulation of interstate telephone services from the Interstate Commerce Commission to the FCC.

The stated purposes of the Act are "regulating interstate and foreign commerce in communication by wire and radio so as to make available, so far as possible, to all the people of the United States a rapid, efficient, nationwide, and worldwide wire and radio communication service with adequate facilities at reasonable charges, for the purpose of the national defense, and for the purpose of securing a more effective execution of this policy by centralizing authority heretofore granted by law to several agencies and by granting additional authority with respect to interstate and foreign commerce in wire and radio communication, there is hereby created a commission to be known as the "Federal Communications Commission", which shall be constituted as hereinafter provided, and which shall execute and enforce the provisions of this Act."

On January 3, 1996, the 104th Congress of the United States amended or repealed sections of the Communications Act of 1934 with the new Telecommunications Act of 1996. It was the first major overhaul of American telecommunications policy in nearly 62 years. The Homeland Security Act of 2002 may override the Communications Act of 1934.

Title 47 §97

Subpart A--General Provisions

§97.1 Basis and purpose.

The rules and regulations in this Part are designed to provide an amateur radio service having a fundamental purpose as expressed in the following principles:

(a) Recognition and enhancement of the value of the amateur service to the public as a voluntary noncommercial communication service, particularly with respect to providing emergency communications.

(b) Continuation and extension of the amateur's proven ability to contribute to the advancement of the radio art.

(c) Encouragement and improvement of the amateur service through rules which provide for advancing skills in both the communications and technical phases of the art.

(d) Expansion of the existing reservoir within the amateur radio service of trained operators, technicians, and electronics experts.

(e) Continuation and extension of the amateur's unique ability to enhance international goodwill.

§97.15 Station antenna structures.

(a) Owners of certain antenna structures more than 60.96 meters (200 feet) above ground level at the site or located near or at a public use airport must notify the Federal Aviation Administration and register with the Commission as required by Part 17 of this chapter.

(b) Except as otherwise provided herein, a station antenna structure may be erected at heights and dimensions sufficient to accommodate amateur service communications. [State and local regulation of a station antenna structure must not preclude amateur service communications. Rather, it must reasonably accommodate such communications and must constitute the minimum practicable regulation to accomplish the state or local authority's legitimate purpose. See PRB-1, 101 FCC 2d 952 (1985) for details.]

§97.101 General standards.

(a) In all respects not specifically covered by FCC Rules each amateur station must be operated in accordance with good engineering and good amateur practice.

(b) Each station licensee and each control operator must cooperate in selecting transmitting channels and in making the most effective use of the amateur service frequencies. No frequency will be assigned for the exclusive use of any station.

(c) At all times and on all frequencies, each control operator must give priority to stations providing emergency communications, except to stations transmitting communications for training drills and tests in RACES.

(d) No amateur operator shall willfully or maliciously interfere with or cause interference to any radio communication or signal.

§97.103 Station licensee responsibilities.

(a) The station licensee is responsible for the proper operation of the station in accordance with the FCC Rules. When the control operator is a different amateur operator than the station licensee, both persons are equally responsible for proper operation of the station.

(b) The station licensee must designate the station control operator. The FCC will presume that the station licensee is also the control operator, unless documentation to the contrary is in the station records.

(c) The station licensee must make the station and the station records available for inspection upon request by an FCC representative. When deemed necessary by a District Director to assure compliance with the FCC Rules, the station licensee must maintain a record of station operations containing such items of information as the District Director may require in accord with § 0.314(x) of the FCC Rules.

§97.105 Control operator duties.

(a) The control operator must ensure the immediate proper operation of the station, regardless of the type of control.

(b) A station may only be operated in the manner and to the extent permitted by the privileges authorized for the class of operator license held by the control operator.

PRB-1 Document (101 FCC 2d 952 (1985))

Memorandum Opinion and Order in PRB-1

Before the

Federal Communications Commission FCC 85-506

Washington, DC 20554 36149

In the Matter of))

Federal preemption of state and PRB-1

local regulations pertaining)

to Amateur radio facilities.)

MEMORANDUM OPINION AND ORDER

Adopted: September 16, 1985 ;Released: September 19, 1985

By the Commission: Commissioner Rivera not participating.

Background

1. On July 16, 1984, the American Radio Relay League, Inc (ARRL) filed a Request for Issuance of a Declaratory Ruling asking us to delineate the limitations of local zoning and other local and state regulatory authority over Federally-licensed radio facilities. Specifically, the ARRL wanted an explicit statement that would preempt all local ordinances which probably preclude or significantly inhibit effective reliable amateur radio communications. The ARRL acknowledges that local authorities can regulate amateur installations to insure the safety and health of persons in the community, but believes that those regulations cannot be so restrictive that they preclude effective amateur communications.

2. Interested parties were advised that they could file comments in the matter.\fn 1/ With extension, comments were due on or before December 26, 1984,\fn 2/ with reply comments due on or before January 25, 1985 \fn 3/ Over sixteen hundred comments were filed.

Local Ordinances

3. Conflicts between amateur operators regarding radio antennas and local authorities regarding restrictive ordinances are common. The amateur operator is governed by the regulations contained in Part 97 of our rules. Those rules do not limit the height of an amateur antenna but they require, for aviation safety reasons, that certain FAA notification and FCC approval procedures must be followed for antennas which exceed 200 feet in height above ground level or antennas which are to be erected near airports. Thus, under FCC rules some antenna support structures require obstruction marking and lighting. On the other hand, local municipalities or governing bodies frequently enact regulations limiting antennas and their support structures in height and location, e.g. to side or rear yards, for health, safety or aesthetic considerations. These limiting regulations can result in conflict because the effectiveness of the communications that emanate from an amateur radio station are directly dependent upon the location and the height of the *antenna*. Amateur operators maintain that they are precluded from operating in certain bands allocated for their use if the height of their antennas is limited by a local ordinance.

4. Examples of restrictive local ordinances were submitted by several amateur operators in this proceeding. Stanley J. Cichy, San Diego, California, noted that in San Diego amateur radio antennas come under a structures ruling which limits building heights to 30 feet. Thus, antennas there are also limited to 30 feet. Alexander Vrenios, Mundelein, Illinois wrote that an ordinance or the Village of Mundelein provides that an antenna must be a distance from the property line that is equal to one and one-half times its height. In his case, he is limited to an antenna tower for his amateur station just over 53 feet in height.

5. John C. Chapman, an amateur living in Bloomington, Minnesota, commented that he was not able to obtain a building permit to install an amateur radio antenna exceeding 35 feet in height because the Bloomington city ordinance restricted "structures" heights to 35 feet. Mr. Chapman said that the ordinance, when written, undoubtedly applied to buildings but was now being applied to antennas in the absence of a specific ordinance regulating them. There were two options open to him if he wanted to engage in amateur communications. He could request a variance to the ordinance by way of hearing before the City Council, or he could obtain affidavits from his neighbors swearing that they had no objection to the proposed antenna installation. He got the building permit after obtaining the cooperation of his neighbors. His concern, however, is that he had to get permission from several people before he could effectively engage radio communications for which he had a valid FCC amateur license.

6. In addition to height restrictions, other limits are enacted by local jurisdictions--anti-climb devices on towers or fences around them; minimum distances from high voltage power lines; minimum distances of towers from property lines; and regulations pertaining to the structural soundness of the

antenna installation. By and large, amateurs do not find these safety precautions objectionable. What they do object to are the sometimes prohibitive, non-refundable application filing fees to obtain a permit to erect an antenna installation and those provisions in ordinances which regulate antennas for purely aesthetic reasons. The amateurs contend, almost universally, that "beauty is in the eye of the beholder." They assert that an antenna installation is not more aesthetically displeasing than other objects that people keep on their property, e.g. motor homes, trailers, pick-up trucks, solar collectors and gardening equipment.

Restrictive Covenants

7. Amateur operators also oppose restrictions on their amateur operations which are contained in the deeds for their homes or in their apartment leases. Since these restrictive covenants are contractual agreements between private parties, they are not generally a matter of concern to the Commission. However, since some amateurs who commented in this proceeding provided us with examples of restrictive covenants, they are included for information Mr. Eugene O. Thomas of Hollister, California included in his comments an extract of the Declaration of Covenants and Restrictions for Ridgemark Estates, County of San Benito, State of California. It provides:

> No antenna for transmission or reception of radio signals shall be erected outdoors for use by any dwelling unit except upon approval of the Directors. No radio or television signals or any other form of electromagnetic radiation shall be permitted to originate from any lot which may unreasonably interfere with the reception of television or radio signals upon any other lot.

Marshall Wilson, Jr. provided a copy of the restrictive covenant contained in deeds for the Bell Martin Addition #2, Irving, Texas. It is binding upon all of the owners or purchasers of the lots in the said addition, his or their heirs, executors, administrators or assigns. It reads:

> No antenna or tower shall be erected upon any lot for the purposes of radio operations.

William J. Hamilton resides in an apartment building in Gladstone, Missouri. He cites a clause in his lease prohibiting the erection of an antenna. He states that he has been forced to give up operation amateur radio equipment except a hand-held 2 meter (144-148 MHz) radio transceiver. He maintains that he should not be penalized just because he lives in an apartment.

Other restrictive covenants are less global in scope than those cited above. For example, Robert Webb purchased a home in Houston, Texas. His deed restriction prohibited "transmitting or receiving antennas extending above the roof line."

8. Amateur operators generally oppose restrictive covenants for several reasons. They maintain that such restrictions limit the places that they can reside if they want to pursue their hobby of amateur radio. Some state that they impinge on First Amendment rights of speech. Others believe that a constitutional right is being abridged because, in their view, everyone has a right to access the airwaves regardless of where they live.

9. The contrary belief held by housing subdivision communities and condominium or homeowner's associations is that amateur radio installations constitute safety hazards, cause interference to other electronic equipment which may be operated in the home (television, radio, stereos) or are eyesores that detract from the aesthetic and tasteful appearance of the housing development or apartment complex. To counteract these negative consequences, the subdivisions and associations include in their deeds, leases or by-laws, restrictions and limitations on the location and height of antennas or, in some cases, prohibit them altogether. The restrictive covenants are contained in the contractual agreement entered into at the time of the sale or lease of the property. Purchasers or lessees are free to choose whether they wish to reside where such restrictions on amateur antennas are in effect or settle elsewhere.

Supporting Comments

10. The Department of Defense (DOD) supported the ARRL and emphasized in its comments that continued success of existing national security and emergency preparedness telecommunications plans involving amateur stations would be severely diminished if state and local ordinances were allowed to prohibit the construction and usage of effective amateur transmission facilities. DOD utilizes volunteers in the Military Affiliate Radio Service (MARS), \fn 4/ Civil Air Patrol (CAP) and the Radio Amateur Civil Emergency Service (RACES). It points out that these volunteer communicators are operating radio equipment installed in their homes and that undue restrictions on antennas by local authorities adversely affect their efforts. DOD states that the responsiveness of these volunteer systems would be impaired if local ordinances interfere with the effectiveness of these important national telecommunication resources. DOD favors the issuance of a ruling that would set limits for local and state regulatory bodies when they are dealing with amateur stations.

11. Various chapters of the American Red Cross also came forward to support the ARRL's request for a preemptive ruling. The Red Cross works closely with amateur radio volunteers. It believes that without amateurs' dedicated support, disaster relief operations would significantly suffer and that its ability to serve disaster victims would be hampered. It feels that antenna height limitations that might be imposed by local bodies will negatively affect the service now rendered by the volunteers.

12. Cities and counties from various parts of the United States filed comments in support of the ARRL's request for a Federal preemption ruling. The comments from the Director of Civil Defense, Port Arthur, Texas are representative:

> The Amateur Radio Service plays a vital role with our Civil Defense program here in Port Arthur and the design of these antennas and towers lends greatly to our ability to communicate during times of disaster. We do not believe there should be any restrictions on the antennas and towers except for reasonable safety precautions. Tropical storms, hurricanes and tornadoes are a way of life here on the Texas Gulf Coast and good communications are absolutely essential when preparing for a hurricane and even more so during recovery operations after the hurricane has past.

13. The Quarter Century Wireless Association took a strong stand in favor of the Issuance of a declaratory ruling. It believes that Federal preemption is necessary so that there will be uniformity for all Amateur Radio installations on private property throughout the United States.

14. In its comments, the ARRL argued that the Commission has the jurisdiction to preempt certain local land use regulations which frustrate or prohibit amateur radio communications. It said that the appropriate standard in preemption cases is not the extent of state and local interest in a given regulation, but rather the impact of the regulation on Federal goals. Its position is that Federal preemption is warranted whenever local government regulations relate adversely to the operational aspects of amateur communication. The ARRL maintains that localities routinely employ a variety of land use devices to preclude the installation of effective amateur antennas, including height restrictions, conditional use permits, building setbacks and dimensional limitations on antennas. It sees a declaratory ruling of Federal preemption as necessary to cause municipalities to accommodate amateur operator needs in land use planning efforts.

15. James C. O'Connell, an attorney who has represented several amateurs before local zoning authorities, said that requiring amateurs to seek variances or special use approval to erect reasonable antennas unduly restricts the operation of amateur stations. He suggested that the Commission preempt zoning ordinances which impose antenna height limits of less than 65 feet. He said that this height would represent a reasonable accommodation of the communication needs of most amateurs and the legitimate concerns of local zoning authorities.

Opposing Comments

16. The City of La Mesa, California has a zoning regulation which controls amateur antennas. Its comments reflected an attempt to reach a balanced view.

> This regulation has neither the intent, nor the effect, of precluding or inhibiting effective and reliable communications. Such antennas may be built as long as their construction does not unreasonably block views or constitute eyesores. The reasonable assumption is that there are always alternatives at a given site for different placement, and/or methods for aesthetic treatment. Thus, both public objectives of controlling land use for the public health, safety, and convenience, and providing an effective communications network, can be satisfied. A blanket to completely set aside local control, or a ruling which recognizes control only for the purpose of safety of antenna construction, would be contrary to...legitimate local control.

17. Comments from the County of San Diego state:

> While we are aware of the benefits provided by amateur operators, we oppose the issuance of a preemption ruling which would elevate `antenna effectiveness' to a position above all other considerations. We must, however, argue that the local government must have the ability to place reasonable limitations upon the placement and configuration of amateur radio transmitting and receiving antennas. Such ability is necessary to assure that the local decision-makers have the authority to protect the public health, safety and welfare of all citizens.
>
> In conclusion, I would like to emphasize an important difference between your regulatory powers and that of local governments. Your Commission's approval of the preemptive requests would establish a "national policy." However, any regulation adopted by a local jurisdiction could be overturned by your Commission or a court if such regulation was determined to be unreasonable.

18. The City of Anderson, Indiana, summarized some of the problems that face local communities:

> I am sympathetic to the concerns of these antenna owners and I understand that to gain the maximum reception from their devices, optimal location is necessary. However, the preservation of residential zoning districts as "liveable" neighborhoods is jeopardized by placing these antennas in front yards of homes. Major problems of public safety have been encountered, particularly vision blockage for auto and pedestrian access. In addition, all communities are faced with various building lot sizes. Many building lots are so small that established setback requirements (in order to preserve adequate air and light) are vulnerable to the unregulated placement of antennas. ...the exercise of preemptive authority by the FCC in granting this request would not be in the best interest of the general public.

19. The National Association of Counties (NACO), the American Planning Association (APA) and the National League of Cities (NCL) all opposed the issuance of an antenna preemption ruling. NACO emphasized that federal and state power must be viewed in harmony and warns that Federal intrusion into local concerns of health, safety and welfare could weaken the traditional police power exercised by the state and unduly interfere with the legitimate activities of the states. NLC believed that both Federal and local interests can be accommodated without preempting local authority to regulate the installation of amateur radio antennas. The APA said that the FCC should continue to leave the issue of regulating amateur antennas with the local government and with the state and Federal courts.

Discussion

20. When considering preemption, we must begin with two constitutional provisions. The tenth amendment provides that any powers which the constitution either does not delegate to the United States or does not prohibit the states from exercising are reserved to the states. These are the police powers of the states. The Supremacy Clause, however, provides that the constitution and the laws of the United States shall supersede any state law to the contrary. Article III, Section 2. Given these basic premises, state laws may be preempted in three ways: First, Congress may expressly preempt the state law. See Jones v. Rath Packing Co., 430 U.S. 519, 525 (1977). Or, Congress may indicate its intent to completely occupy a given field so that any state law encompassed within that field would implicitly be preempted. Such intent to preempt could be found in a congressional regulatory scheme that was so pervasive that it would be reasonable to assume that Congress did not intend to permit the states to supplement it. See Fidelity Federal Savings & Loan Ass'n v. de la Cuesta, 458 U.S. 141, 153 (1982). Finally, preemption may be warranted when state law conflicts with federal law. Such conflicts may occur when "compliance with both Federal and state regulations is a physical impossibility," Florida Lime & Avocado Growers, Inc. v. Paul,

373 U.S. 132, 142, 143 (1963), or when state law "stands as an obstacle to the accomplishment and execution of the full purposes and objectives of Congress," Hines v. Davidowitz, 312 U.S. 52, 67 (1941). Furthermore, federal regulations have the same preemptive effect as federal statues, Fidelity Federal Savings & Loan Association v. de la Cuesta, supra.

21. The situation before us requires us to determine the extent to which state and local zoning regulations may conflict with federal policies concerning amateur radio operators.

22. Few matters coming before us present such a clear dichotomy of view point as does the instant issue. The cities, countries, local communities and housing associations see an obligation to all of their citizens and try to address their concerns. This is accomplished through regulations, ordinances or covenants oriented toward the health, safety and general welfare of those they regulate. At the opposite pole are the individual amateur operators and their support groups who are troubled by local regulations which may inhibit the use of amateur stations or, in some instances, totally preclude amateur communications. Aligned with the operators are such entities as the Department of Defense, the American Red Cross and local civil defense and emergency organizations who have found in Amateur Radio a pool of skilled radio operators and a readily available backup network. In this situation, we believe it is appropriate to strike a balance between the federal interest in promoting amateur operations and the legitimate interests of local governments in regulating local zoning matters. The cornerstone on which we will predicate our decision is that a reasonable accommodation may be made between the two sides.

23. Preemption is primarily a function of the extent of the conflict between federal and state and local regulation. Thus, in considering whether our regulations or policies can tolerate a state regulation, we may consider such factors as the severity of the conflict and the reasons underlying the state's regulations. In this regard, we have previously recognized the legitimate and important state interests reflected in local zoning regulations. For example, in Earth Satellite Communications, Inc., 95 FCC 2d 1223 (1983), we recognized that...countervailing state interests inhere in the present situation...For example, we do not wish to preclude a state or locality from exercising jurisdiction over certain elements of an SMATV operation that properly may fall within its authority, such as zoning or public safety and health, provided the regulation in question is not undertaken as a pretext for the actual purpose of frustrating achievement of the preeminent federal objective and so long as the non-federal regulation is applied in a nondiscriminatory manner.

24. Similarly, we recognize here that there are certain general state and local interests which may, in their even-handed application, legitimately affect amateur radio facilities. Nonetheless, there is also a strong federal interest in promoting amateur communications. Evidence of this interest may be found in the comprehensive set of rules that the Commission has adopted to regulate the amateur service. \fn 5/ Those rules set forth procedures for the licensing of stations and operators, frequency allocations, technical standards which amateur radio equipment must meet and operating practices which amateur operators must follow. We recognize the amateur radio service as a voluntary, noncommercial communication service, particularly with respect to providing emergency communications. Moreover, the amateur radio service provides a reservoir of trained operators, technicians and electronic experts who can be called on in times of national or local emergencies. By its nature, the Amateur Radio Service also provides the opportunity for individual operators to further international goodwill. Upon weighing these interests, we believe a limited preemption policy is warranted. State and local regulations that operate to preclude amateur communications in their communities are in direct conflict with federal objectives and must be preempted.

25. Because amateur station communications are only as effective as the antennas employed, antenna height restrictions directly affect the effectiveness of amateur communications. Some amateur antenna configurations require more substantial installations than others if they are to provide the amateur operator with the communications that he/she desires to engage in. For example, an antenna array for international amateur communications will differ from an antenna used to contact other amateur operators at shorter distances. We will not, however, specify any particular height limitation below which a local government may not regulate, nor will we suggest the precise language that must be contained in local ordinances, such as mechanisms for special exceptions, variances, or conditional use permits. Nevertheless, local regulations which involve placement, screening, or height of antennas based on health, safety, or aesthetic considerations must be crafted to accommodate reasonably amateur communications, and to represent the minimum practicable regulation to accomplish the local authority's legitimate purpose. \fn 6/

26. Obviously, we do not have the staff or financial resources to review all state and local laws that affect amateur operations. We are confident, however, that state and local governments will endeavor to legislate in a manner that affords appropriate recognition to the important federal interest at stake here and thereby avoid unnecessary conflicts with federal policy, as well as time-consuming and expensive litigation in this area. Amateur operators who believe that local or state governments have been overreaching and thereby have precluded accomplishment of their legitimate communications goals, may, in addition, use this document to bring our policies to the attention of local tribunals and forums.

Accordingly, the Request for Declaratory Ruling filed July 16, 1984, by the American Radio Relay League, Inc., IS GRANTED to the extent indicated herein and in all other respects, IS DENIED.

FEDERAL COMMUNICATIONS COMMISSION

William J. Tricarico

Secretary

PRB-1 Document 1999

Before the Federal Communications Commission Washington, D.C. 20554

In the Matter of)
Modification and Clarification of Policies and)
Procedures Governing Siting and Maintenance)
of Amateur Radio Antennas and Support)
Structures, and Amendment of Section 97.15)
of the Commission's Rules Governing the)
Amateur Radio Service.)

ORDER

Adopted: November 18, 1999

By the Deputy Chief, Wireless Telecommunications Bureau:

I. Introduction and Executive Summary

1. In this Order, we address a Petition for Rule Making (Petition), filed on February 7, 1996, by The American Radio Relay League, Inc. (ARRL or Petitioner), asking that the Commission review and modify its policies and procedures pertaining to the Commission's limited preemption of state and local regulations affecting amateur radio facilities. The Petitioner also requests that the Commission amend Section 97.15 of the Commission's Rules to clarify the Commission's preemptive intent with respect to such state and local regulations.[1] We have carefully reviewed the requests, and the supporting arguments, and conclude that the modifications and clarifications suggested by Petitioner would not serve the public interest, convenience and necessity. Therefore, the Petition is denied.

II. Background

2. In 1984, ARRL petitioned the Commission for a declaratory ruling that would limit local regulatory control of amateur stations.[2] It was believed that local building codes and zoning regulations had limited the communications ability of licensees in the amateur service.[3] An outdoor antenna is a necessary component for most types of amateur service communications.[4] Municipalities and local land use regulatory authorities regulated the heights, placement and dimensions of antennas.[5] In PRB-1, resolving the ARRL's declaratory ruling petition, the Commission noted that these regulations often result in conflict because the effectiveness of the communications that emanate from an amateur radio station is directly dependent upon the location and the height of the antenna.[6] Consequently in PRB-1, the Commission enunciated the ARRL Petition for Rule Making, filed February 7, 1996, at i (RM-8763). ARRL Request for Issuance of a Declaratory Ruling, filed July 16, 1984. Petition at 3. Id.Id. Federal preemption of state and local regulations pertaining to amateur radio DA 99-facilities.

3. In the MO&O, the Commission declared a limited preemption of state and local regulations governing amateur station facilities, including antennas and support structures.[8] The Commission determined that there was a strong Federal interest in promoting amateur service communications, and that state and local regulations that preclude amateur service communications are in direct conflict with Federal objectives and must be preempted.[9] Furthermore, the Commission stated that a local ordinance or zoning regulation must make reasonable accommodation for amateur communications and must constitute the minimum practicable regulation to accomplish the local authority's legitimate purpose.[10] However, the Commission did not extend the limited preemption to covenants, conditions and restrictions (CC&Rs) in deeds and in condominium by-laws because they are contractual agreements between private parties.[11] Petitioner, inter alia, requests the extension of the limited preemption to such CC&Rs.[12]

4. Petitioner also requests other clarifications to PRB-1, as follows: (a) that local governments must make a reasonable accommodation for amateur radio antennas, rather than balancing their own local interests against the Federal interest in amateur radio; (b) that local governments could not specify a lower height maximum than sixty to seventy feet for an amateur radio antennna structure; (c) that overly burdensome conditions in land use authorizations or imposition of excessive costs is preempted; (d) that denial of a particular use permit or special exception does not relieve a local government from having to make a reasonable accommodation for amateur communications; (e) that conditional use permit procedures can be used to regulate amateur radio antennas, but only as an adjunct to a reasonable height restriction; and, (f) that land use restrictions pertaining to safety that limit the overall height of an amateur radio antenna structure, or restrict installation of an antenna altogether, are invalid unless there is no other alternative available that is less burdensome and still accomplishes the same purpose.[13] The Commission sought comment on the Petition on February 21, 1996.[14]

5. Since the adoption of the Commission's limited premption policy in PRB-1, Congress enacted Section 704 of the Telecommunications Act of [1996,15] concerning the siting of personal wireless service facilities. We note that Section 704 of the Telecom Act encompasses commercial mobile radio services, unlicensed wireless services and common carrier wireless exchange access services.[16] Thus, Section 704 of the Telecom Act, which, among other things, bars state or local regulations that prohibit or have the effect of prohibiting the provision of personal wireless services, does not apply to stations or facilities in the amateur radio service.

III. Discussion

6. The Commission's policy with respect to restrictive covenants is clearly stated in the MO&O establishing a limited preemption of state and local regulations. In the MO&O, the Commission stated that PRB-1 does not reach restrictive covenants in private contractual agreements.[17] The Petitioner argues that enforcement of a covenant by the court constitutes "state action", thus converting what otherwise would be a private matter into a matter of state regulation and, thus, subject to the Commission's limited preemption policy.[18] Notwithstanding the clear policy statement that was set forth in PRB-1 excluding restrictive covenants in private contractual agreements as being outside the reach of our limited preemption,[19] we nevertheless strongly encourage associations of homeowners and private contracting parties to follow the principle of reasonable accommodation and to apply it to any and all instances of amateur service communications where they may be involved. Although we do not hesitate to offer such encouragement, we are not persuaded by the Petition or the comments in support thereof that specific rule provisions bringing the private restrictive covenants within the ambit of PRB-1 are necessary or appropriate at this time. Having reached this conclusion, we need not resolve the issue of whether, or under what circumstances, judicial enforcement of private covenants would constitute "state action."

7. Petitioner further requests a clarification of PRB-1 that local authorities must not engage in balancing their enactments against the interest that the Federal Government has in amateur radio, but rather must reasonably accommodate amateur communications.[20] We do not believe a clarification is necessary because the PRB-1 decision precisely stated the principle of "reasonable accommodation". In PRB-1, the Commission stated: "Nevertheless, local regulations which involve placement, screening, or height of antennas based on health, safety, or aesthetic considerations must be crafted to accommodate reasonably amateur communications, and to represent the minimum practicable regulation to accomplish the local authority's legitimate purpose."[21] Given this express Commission language, it is clear that a "balancing of interests" approach is not appropriate in this context.

8. Petitioner also requests establishment of sixty or seventy feet as the minimum height in a metropolitan area for an amateur antenna structure so that local authorities could not specify a lower height maximum for an amateur antenna.[22] Petitioner argues that such a minimum height would minimize interaction between amateur stations and home electronic equipment and provide reasonable antenna efficiency at different amateur frequencies, MF through UHF and beyond.[23] Petitioner also contends that structures of that height and above can be so located as to minimize the visual impact, and that retractable antennas could be used to address unusual aesthetic situations, such as in historic or scenic zones.[24] We do not believe that it would be prudent or that it is appropriate to set such a standard for amateur antennas and their supporting structures because of varying circumstances that may occur when a particular antenna configuration is under consideration, such as terrain or man-made obstructions. We believe that the policy enunciated in PRB-1 is sound.

PRB-1 did not specify a particular height limitation below which a local government may not regulate.[25] The Commission did not want to mandate specific provisions that a local authority must include in a zoning ordinance.[26] We continue to believe that the standards the Commission set, that is, "reasonable accommodation" and "minimum practicable regulation", have worked relatively well. Therefore, we are not persuaded that changes to the Commission's policy of leaving the specifics of zoning regulations to the local authority, including provisions concerning the height of an amateur antenna, are necessary at this time.

9. Petitioner further requests that the Commission specifically preempt overly burdensome conditions and excessive costs levied by a local authority in connection with engineering certifications or issuance of antenna permits.[27] Specifically, Petitioner argues that assessment of unusual costs for processing an antenna permit application cannot be used by the local authority as a means of indirectly prohibiting the antenna.[28] Petitioner states that the same argument is true of conditional use permits that require an amateur antenna to be screened from view by the installation of mature vegetation.29 According to the ARRL, if full vegetative screening cannot be accomplished in a cost- effective manner, a condition requiring such screening is a de facto prohibition.[30] Although Petitioner concedes that a municipality may require amateur operators to pay reasonable expenses to obtain amateur permits, the Petitioner objects to the imposition of unreasonable expenses because such expenses would discourage or prohibit the installation of amateur antennas.[31] Petitioner also requests that the Commission declare as invalid certain land use restrictions based on safety considerations, such as setbacks on the property where the antenna is to be erected, unless there are no other alternatives that would accomplish the same purpose.[32] Finally, Petitioner requests that the Commission specify that, if a local authority denies a conditional use permit or a special exception request, it still has the obligation to make a reasonable accommodation for amateur communications.[33] We return once again to the position that we have stated earlier in this Order, that is, that the standards of "reasonable accommodation" and "minimum practicable regulation" are sufficiently efficacious as guideposts for state, local and municipal authorities. We believe that the effectiveness of these guidelines or standards can be gauged by the fact that a local zoning authority would recognize at the outset, when crafting zoning regulations, the potential impact that high antenna towers in heavily-populated urban or suburban locales could have and, thus, would draft their regulations accordingly. In addition, we believe that PRB-1's guidelines brings to a local zoning board's awareness that the very least regulation necessary for the welfare of the community must be the aim of its regulations so that such regulations will not impinge on the needs of amateur operators to engage in amateur communications.

IV. Conclusion

10. In our view, Petitioner has not demonstrated that the clarifications requested are necessary. Accordingly, we conclude that the public interest would best be served by denying the ARRL request for modification and clarification of Commission policies and procedures concerning the limited preemption of state and local regulations that affect amateur service radio facilities.

V. Ordering Clause

11. Accordingly, IT IS ORDERED that, pursuant to Sections 4(i) and 303(r) of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i) and 303(r), the petition for rule making, RM-8763, filed by The American Radio Relay League, Inc. on February 7, 1996, IS HEREBY DENIED. This action is taken under the delegated authority contained in Sections 0.131 and 0.331 of the Commission's Rules, 47 C.F.R. §§ 0.131 and 0.331.

Federal Communications Commission

Kathleen O'Brien Ham

Deputy Chief, Wireless Telecommunications

Reasonable Accommodation

Stating again the language from PRB-1,

> ”Some amateur antenna configurations require more substantial installations than others if they are to provide the amateur operator *with the communications that he/she desires to engage in.*” (Italics added)

It should be noted that this is not a “Reasonable Man” test, and it is not a “Reasonable Ham” test. It is very important to understand that this is a subjective test. The amateur determines the communications desired. After the amateur operator has determined that, regulation *“must constitute the minimum practicable regulation”* 47 CFR Sec. 97.15.(b). *Furthermore, the law requires that such regulation “will not impinge on the needs”* FCC DA 99-2569. (Italics added)

Lindon City Findings in Application for David Banner, N7BAN

In a letter to Mr. Adam Cowie on November 5, 2009, attorney Brian Haws wrote, “There is no case law on the issue from Utah, but case law from other states makes it clear that there must be a case by case analysis in determining what is a reasonable limit on height. The cases consistently place the burden on the city to show why it is justified in limiting the antenna and in doing so require the city to identify site specific concerns, not just general aesthetic or safety issues. (i.e. the tower location is too close to utility lines, it blocks a specific view, it doesn’t have a sufficient wind rating for the location, it imposes an unreasonable threat of damage to third parties, or the location would block the view of a specific neighbor or mar the view of a historic building or location.)”

“Also,one other point that came out in the case law is that cities cannot rely on their building/structural height restrictions to limit an antenna. The courts have held that federal preemption statues bar the application of these limitations to towers, because such an application does not provide sufficient analysis on what is the minimum practical restriction necessary to address site specific concerns.”

“In conclusion, in considering the current application for an amateur radio antenna, the City is going to be required to show why the proposed tower height and location creates either an unreasonable health or safety issue or a specific aesthetics problem. If such issues are not clearly established, the city will be limited in its ability to restrict the size of the tower.”

Mr. Banners application was approved for a 75 foot tower on his property in Lindon.

Utah County findings in Application for Mark Richardson, W7HPW

In minutes recorded for October 2008 Utah County Board of Adjustments addressing Mr. Richardson’s application Mr. Moore, counsel to the board “referred to section 17-27-107 of the Utah State Code dealing with ham radio antenna regulations, noted that in 1985 the FCC was requested to issue a legal opinion with respect to local authorities regulating amateur radio tower antennas. Essentially what they did was a limited preemption, which means that an entity cannot prohibit a radio antenna. The only thing you can do is to regulate the height of the structure. He explained that the county ordinance does not even discuss a radio antenna, except for the height issue, which is the subject of this appeal. In the legal opinion handed down, they suggested that the authority has to be pretty reasonable before they restrict the height. Mr. Moore advised the board that their ability to restrict the height in this appeal was very limited, based on FCC opinion as they do not specify the height that would be appropriate. If the antenna is not workable, they will have to show why it is not workable in their findings.”

Mr. Richardson’s application was approved for an array of four 90 foot vertical antenna elements to be erected in addition to the 75 foot tower already existing on his five acre property in Payson.

Reasonable Accommodation of Amateur Radio Communications by Zoning Authorities: The FCC’s PRB-1 Preemption

Written by Brennan T. Price is an excellent resource discussing the application of this statute and many cases tried.

Cases enforcing FFC rulings

The Applicant wishes to call attention to Federal law that preempts certain elements of regulation by a municipality. Federal Communications Commission Order PRB-1, 101 FCC 2d 952, 50 Fed. Reg. 38813 (September 25, 1985), declares in pertinent part:

> Local regulations which involve placement, screening, or height of antennas based on health, safety or aesthetic considerations must be crafted to accommodate reasonably amateur communications, and to represent the minimum practicable regulation to accomplish the local authority's legitimate purpose. (Emphasis added)

The above order has subsequently become part of the Code of Federal Regulations, as 47 C.F.R. §97.15 (b):

> Except as otherwise provided, a station antenna structure may be erected at heights and dimensions sufficient to accommodate amateur service communications. State and local regulation of a station antenna structure must not preclude amateur service communications. Rather, it must reasonably accommodate such communications and must constitute the minimum practicable regulation to accomplish the state or local authority's legitimate purpose. (Emphasis added)

Finally, in its Order of November 18, 1999, the FCC added:

> PRB-1's guidelines bring[ ] to a local zoning board's awareness that the very least regulation necessary for the welfare of the community must be the aim of its regulations so that such regulations will not impinge on the needs of amateur operators to engage in amateur communications.

The Courts have routinely enforced these FCC rulings, which have the power of Federal law.

See:

> Bodony v. Sands Point, NY, 681 F. Supp. 1009 (E.D. NY 1987), http://www.qsl.net/k3qk/bodony.html. Ordinance with 25' height limit. Tower: 86'. Summary judgment for ham; settled with permit granted and $60,000 in legal fees to ham on §1983 claim because town was seeking ways to deny his rights (soliciting opinion of counsel on how to deny, without regard to merits).
>
> Izzo v. River Edge, NJ, 843 F.2d 765 (3d Cir. 1988). Upholds preemptive effect of PRB-1 on 35' height limitation. "The effectiveness of radio communication depends on the height of antennas." At 768. Holds that Court need not abstain. Court awarded fees of $10,000.
>
> Brower v. Indian River County Code Enforcement Board, FL, No. 91-0456 CA-25 (June 23, 1993), 1993 WL 228785 (Fla.Cir.Ct.). Tower 68.88 feet, plus antenna to total of 95.6 feet; 72.4 feet from neighbor's property line. Absolute prohibition on towers > 70'. Ham erected without first attempting to obtain a permit. Court held that any application for a permit would have been futile ("a circular dead-end"). Ordinance facially void as an unvarying maximum height: "We agree with the Evans court's adoption of prior rulings in that case which concluded that flat prohibitions of this nature are not permitted, Evans, at 976" [Refers to Evans I]
>
> Pentel v. Mendota Heights, MN, 13 F3d 1261 (8th Cir., 1994) http://www.qsl.net/k3qk/pentel.html. Ham applied for 68' antenna (crank-up 30-68' and two Yagis). Absolute 25' height limit in ordinance preempted. Rejects balancing test; FCC did the balancing. Accepts 56.5' as ineffective.
>
> Palmer v. Saratoga Springs, NY, 180 F. Supp. 2d 379 (N.D.N.Y. 2001), http://www.nysd.uscourts.gov/courtweb/pdf/D02NYNC/01-12259.pdf Absolute height limit of 20' in ordinance preempted. "(A)n unvarying height restriction on amateur radio antennas would be facially invalid in light of PRB-1." (Citing Pentel, Evans and Bulchis.) Commentary on bad faith of town. Request for info on RFI "unreasonable on (its) face. Grant of permit as applied for, at 47', without further proceedings. This, and Snook, are only cases that ever went to trial in a Federal District Court on PRB-1.
>
> Marchand v. Town of Hudson, NH, 788 A.2d 250, 147 N.H. 380 (N.H. 2001), http://www.courts.state.nh.us/supreme/opinions/2001/march221.htm Three, 100' tall antenna systems. Ruling that balancing not appropriate. "(T)o "reasonably accommodate" amateur radio communications . . . the ZBA may consider whether the particular height and number of towers are necessary to accommodate the particular ham operator's communication objectives. Remand to determine if three towers is a customary accessory use under NH law. [On remand, Hudson, NH Board held that three towers qualifies as a customary use.]
>
> Snook v. Missouri City, TX (USDC, SDTX, 2003, Hittner, J.) , http://users3.ev1.net/~osnook/34.pdf (the Order, 63 pp.), also http://users3.ev1.net/~osnook/35.pdf (the Final Judgment, 2 pp.). Original bylaw permitted 35', second bylaw permitted more by specific use permit. After grant of building permit under first bylaw (B/I recognized 35' was not legal), Ham built 114'. City cited Ham for repeated violations of second bylaw for failure to have specific use permit, which it declined to grant. City expert recommended 50-60' for 20 meter antenna, and just above treetops (60-80') for VHF/UHF, but ignored 40 and 80 meter antenna argument. For no special reason, City decided 65' as acceptable. "To conduct effective emergency communications, Snook must be able to achieve at least a 75 to 90 percent successful signal under the changing variables that impact emergency or other amateur radio communications." Findings of Fact 9. City Ordinance preempted. Order for City to issue permit (no remand) consistent with existing structure. Citing Younger v. Harris, Court declines to enjoin City, but receives assurances City will not further prosecute. "PRB-1 requires a site-specific, antenna-specific, array- specific, operations-specific, ordinance-specific, and city action-specific analysis. PRB-1 at p. 7." [Referring to PRB-1 paragraphs 24 and 25.]
>
> Chedester v. Town of Whately, MA Bylaw permitted 35'. Ham granted permit for 140' when Building Inspector decided bylaw was preempted. Planning Board appeals to ZBA. ZBA revokes permit. Superior Court rules town that misinterprets both state and federal preemption in holding that while the ordinance may permit antennas over 35', restrictions on antenna support structures are not similarly affected. Height limit of 35' found to

be "an absolute and unvarying height restriction" and preempted. "A 35' height restriction would effectively mean that no radio communications would be able to be transmitted." Building permit reinstated.

Senate Bill S.1048

Title: A bill to amend the Communications Act of 1934 to provide authorization of appropriations for the Federal Communications Commission, and for other purposes.

Sponsor: Sen Inouye, Daniel K. [HI] (introduced 4/21/1987) Cosponsors (3)

Related Bills: H.R.2961, S.CON.RES.127

Latest Major Action: 11/3/1988 Became Public Law No: 100-594.

SUMMARY AS OF:

10/7/1988--Passed Senate amended. (There are 2 other summaries)

(Measure passed Senate, amended)

Federal Communications Commission Authorization Act of 1988 - Amends the Communications Act of 1934 to authorize FY 1988 and 1989 appropriations for the Federal Communications Commission.

Extends through FY 1989 the authority for the Commission's travel reimbursement program.

Repeals the requirement for the Commission to submit an annual management report to the Congress.

Delays for one year the date by which the Commission must begin biennial reviews of its Schedule of Charges, adjusting it to reflect changes in the Consumer Price Index.

Authorizes the Commission, during FY 1988 and 1989, to make grants to and enter into cooperative agreements with private nonprofit organizations to employ older Americans to provide technical and administrative assistance on projects related to the implementation, promotion, or enforcement of Commission regulations. Requires the Commission and program participants to certify their compliance with various program prerequisites. Prohibits the employment of program participants in policymaking positions.

Exempts ex parte congressional communications with the Commission from regulations that restrict communications during the week prior to specified types of Commission proceedings.

Requires the Commission to issue an order concluding any hearing concerning the lawfulness of any new or revised charge, classification, regulation, or practice within 12 months of the item's effective date (15 months in very complex cases). Permits appeals of such orders. Establishes corresponding requirements in connection with Commission investigations of such questions. Requires the Commission to issue within 90 days of receipt an order granting or denying any petition for reconsideration of any order concluding such a hearing or investigation.

Authorizes the Commission to spend FY 1989 and 1990 appropriations to relocate the Hawaii Monitoring Station in Honolulu (Waipahu) to another site in Hawaii. Sets forth procedures and actions to be taken in connection with the sale of the present site as surplus property and with sale proceeds. Prohibits the Commission and the General Services Administration from taking action until their principals have prepared and submitted to specified congressional committees a detailed plan concerning the relocation.

Expresses the sense of the Congress: (1) encouraging and supporting the Amateur Radio Service and its emergency communications efforts; and (2) urging Government agencies to take into account the valuable contributions of amateur radio operators when considering actions that affect the Amateur Radio Service.

Public Law 103-408--Joint Resolution of Congress

Public Law 103-408
103d Congress
Joint Resolution

To recognize the achievements of radio amateurs, and to establish support for such amateurs as national policy.

Whereas Congress has expressed its determination in section 1 of the Communications Act of 1934 (47 U.S.C. 151) to promote safety of life and property through the use of radio communication;

Whereas Congress, in section 7 of the Communications Act of 1934 (47 U.S.C. 157), established a policy to encourage the provision of new technologies and services;

Whereas Congress, in section 3 of the Communications Act of 1934, defined radio stations to include amateur stations operated by persons interested in radio technique without pecuniary interest;

Whereas the Federal Communications Commission has created an effective regulatory framework through which the amateur radio service has been able to achieve the goals of the service;

Whereas these regulations, set forth in Part 97 of title 47 of the Code of Federal Regulations clarify and extend the purposes of the amateur radio service as a--

(1) voluntary noncommercial communication service, particularly with respect to providing emergency communications;

(2) contributing service to the advancement of the telecommunications infrastructure;

(3) service which encourages improvement of an individual's technical and operating skills;

(4) service providing a national reservoir of trained operators, technicians and electronics experts; and

(5) service enhancing international good will;

Whereas Congress finds that members of the amateur radio service community has provided invaluable emergency communications services following such disasters as Hurricanes Hugo, Andrew, and Iniki, the Mt. St. Helens Eruption, the Loma Prieta earthquake, tornadoes, floods, wild fires, and industrial accidents in great number and variety across the Nation; and

Whereas Congress finds that the amateur radio service has made a contribution to our Nation's communications by its crafting, in 1961, of the first Earth satellite licensed by the Federal Communications Commission, by its proof-of-concept for search rescue satellites, by its continued exploration of the low Earth orbit in particular pointing the way to commercial use thereof in the 1990s, by its pioneering of communications using reflections from meteor trails, a technique now used for certain government and commercial communications, and by its leading role in development of low-cost, practical data transmission by radio which increasingly is being put to extensive use in, for instance, the land mobile service: Now, therefore, be it

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. FINDINGS AND DECLARATIONS OF CONGRESS

Congress finds and declares that--

(1) radio amateurs are hereby commended for their contributions to technical progress in electronics, and for their emergency radio communications in times of disaster;

(2) the Federal Communications Commission is urged to continue and enhance the development of the amateur radio service as a public benefit by adopting rules and regulations which encourage the use of new technologies within the amateur radio service; and

(3) reasonable accommodation should be made for the effective operation of amateur radio from residences, private vehicles and public areas, and that regulation at all levels of government should facilitate and encourage amateur radio operation as a public benefit.

Approved October 22, 1994.

House Bill H. R. 2160

To promote and encourage the valuable public service, disaster relief, and emergency communications provided on a volunteer basis by licensees of the Federal Communications Commission in the Amateur Radio Service, by undertaking a study of the uses of amateur radio for emergency and disaster relief communications, by identifying unnecessary or unreasonable impediments to the deployment of Amateur Radio emergency and disaster relief communications, and by making recommendations for relief of such unreasonable restrictions so as to expand the uses of amateur radio communications in Homeland Security planning and response.

IN THE HOUSE OF REPRESENTATIVES

APRIL 29, 2009

Ms. JACKSON-LEE of Texas (for herself, Ms. BORDALLO, Mr. LUETKEMEYER, Ms. KILROY, Ms. ZOE LOFGREN of California, and Mr. THOMPSON of Mississippi) introduced the following bill; which was referred to the Committee on Energy and Commerce

A BILL

To promote and encourage the valuable public service, disaster relief, and emergency communications provided on a volunteer basis by licensees of the Federal Communications Commission in the Amateur Radio Service, by undertaking a study of the uses of amateur radio for emergency and disaster relief communications, by identifying unnecessary or unreasonable impediments to the deployment of Amateur Radio emergency and disaster relief communications, and by making recommendations for relief of such unreasonable restrictions so as to expand the uses of amateur radio communications in Homeland Security planning and response.

1 Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

3 SECTION 1. SHORT TITLE. 4 This Act may be cited as the ''Amateur Radio Emergency Communications Enhancement Act of 2009''.

6 SEC. 2. FINDINGS.

The Congress finds the following:

(1) Nearly 700,000 amateurs radio operators in the United States are licensed by the Federal Communications Commission in the Amateur Radio Service.

(2) Amateur Radio operators provide, on a volunteer basis, a valuable public service to their communities, their States, and to the Nation, especially in the area of national and international disaster communications.

(3) Emergency and disaster relief communications services by volunteer Amateur Radio operators have consistently and reliably been provided before, during, and after floods, hurricanes, tornadoes, forest fires, earthquakes, blizzards, train accidents, chemical spills, and other disasters. These communications services include services in connection with significant examples, such as hurricanes Katrina, Rita, Hugo, and Andrew; the relief effort at the World Trade Center, and the Pentagon following the 2001 terrorist attacks; and the Oklahoma City bombing in April 1995.

(4) Amateur Radio has formal agreements for the provision of volunteer emergency communications activities with the Department of Homeland Security, the Federal Emergency Management Agency, the National Weather Service, the National Communications System, and the Association of Public Safety Communications Officials, as well as with disaster relief agencies, including the American National Red Cross and the Salvation Army.

(5) The Congress passed Public Law 103–408 which was signed by the President on October 22, 1994. This included in Section 1 the following find- ing of Congress: ''Reasonable accommodation should be made for the effective operation of amateur radio from residences, private vehicles and public areas, and the regulation at all levels of government should facilitate and encourage amateur radio operation as a public benefit.''

(6) The Congress passed Public Law 109–295 which was signed by the President on October 4, 2006. This included a provision in the Department of Homeland Security Appropriations legislation for fiscal year 2007 that directed the Department's Regional Emergency Communications Coordinating Working Group to coordinate their activities with ''ham and amateur radio operators'' among the eleven other emergency organizations such as ambulance services, law enforcement, and others.

(7) Amateur Radio, at no cost to taxpayers, provides a fertile ground for technical self-training in modern telecommunications, electronic technology, and emergency communications techniques and protocols.

(8) There is a strong Federal interest in the effective performance of Amateur Radio stations, and that performance must be given support at all levels of government and given protection against unreasonable regulation and impediments to the provision of these valuable communications.

SEC. 3. STUDY OF ENHANCED USES OF AMATEUR RADIO IN EMERGENCY AND DISASTER RELIEF COMMUNICATION, AND FOR RELIEF OF RESTRICTIONS.

(a) AUTHORITY.—The Secretary of Homeland Security— shall undertake a study on the uses and capabilities of Amateur Radio communications in emergencies and disaster relief; and

(2) shall report its findings to Congress not later than 180 days after the date of enactment of this Act.

(3) (b) SCOPE OF THE STUDY.—The study required by this section shall— (1) include recommendations—

(A) for enhancements in the voluntary deployment of Amateur Radio licensees in disaster and emergency communications and disaster relief efforts; and

(B) for improved integration of Amateur Radio operators in planning and in furtherance of the Department of Homeland Security initiatives;

(2)(A) identify unreasonable or unnecessary impediments to enhanced Amateur Radio communications, such as the effects of private land use regulations on residential antenna installations; and make recommendations regarding such impediments; and

(3)(A) include an evaluation of section 207 of the Telecommunications Act of 1996 (Public Law 104–104, 110 Stat. 56 (1996)); and make a recommendation whether that section should be modified to prevent unreasonable private land use restrictions that impair the ability of an amateur radio operator licensed by the Federal Communications Commission to conduct, or prepare to conduct, emergency communications by means of effective outdoor antennas and support structures at reasonable heights and dimensions for the purpose, in residential areas.

(c) USE OF EXPERTISE AND INFORMATION.—In conducting the study required by this section, the Secretary of Homeland Security shall—

(1) utilize the expertise of the American Radio Relay League, representing the National Amateur Radio community; and

(2) seek information from private and public sectors for the study.

Senate Bill S 1755 -- The Amateur Radio Emergency Communications Enhancement Act of 2009

On Monday, December 14, S 1755 -- The Amateur Radio Emergency Communications Enhancement Act of 2009 -- passed the Senate by unanimous consent; the bill now goes to the House of Representatives for consideration. Sponsored by Senator Joe Lieberman (ID-CT), and Senator Susan Collins (R-ME), S 1755, if passed, would direct the Department of Homeland Security (DHS) to undertake a study on emergency communications. S 1755 points out that "There is a strong Federal interest in the effective performance of Amateur Radio Service stations, and that performance must be given -- (A) support at all levels of government; and (B) protection against unreasonable regulation and impediments to the provision of the valuable communications provided by such stations."

Members of the Senate Homeland Security and Governmental Affairs Committee considered S 1755 on December 10. After it passed through Committee, it was placed on the Senate's calendar to be voted on. "We are grateful to Committee Chairman Lieberman and Ranking Member Collins for sponsoring the bill and arranging for its swift consideration and passage by the Senate," said ARRL Chief Executive Officer David Sumner, K1ZZ.

Similar in language to HR 2160 (also called The Amateur Radio Emergency Communications Enhancement Act of 2009 that was introduced this past April by Representative Sheila Jackson-Lee [D-TX-18]), S 1755 calls on DHS to undertake a study on the uses and capabilitie˜s of Amateur Radio Service communications in emergencies and disaster relief and then to submit a report to Congress no more than 180 days after the bill becomes law. The study shall:

- Include a review of the importance of Amateur Radio emergency communications in furtherance of homeland security missions relating to disasters, severe weather and other threats to lives and property in the United States, as well as recommendations for enhancements in the voluntary deployment of Amateur Radio licensees in disaster and emergency communications and disaster relief efforts and improved integration of Amateur Radio operators in planning and furtherance of the Department of Homeland Security initiatives.

- Identify impediments to enhanced Amateur Radio Service communications, such as the effects of unreasonable or unnecessary private land use regulations on residential antenna installations; and make recommendations regarding such impediments for consideration by other federal departments, agencies and Congress.

In conducting the study, S 1755 directs the Secretary of Homeland Security to "utilize the expertise of stakeholder entities and organizations, including the Amateur Radio, emergency response and disaster communications communities."

S 1755 makes note of the fact that Section 1 of the Joint Resolution entitled Joint Resolution to Recognize the Achievements of Radio Amateurs, and To Establish Support for Such Amateurs as National Policy -- approved October 22, 1994 (Public Law 103-408) -- included a finding that stated: "Reasonable accommodation should be made for the effective operation of Amateur Radio from residences, private vehicles and public areas, and the regulation at all levels of government should facilitate and encourage amateur radio operations as a public benefit." The bill also pointed out that Section 1805(c) of the Homeland Security Act of 2002 (6 U.S.C. 757(c)) directs the Regional Emergency Communications Coordinating Working Group of the Department of Homeland Security to coordinate their activities with ham and Amateur Radio operators among the 11 other emergency organizations, such as ambulance services, law enforcement and others.

ARRL Requests Support for Senate Bill 1755

March 16, 2010, Senate Bill 1755 — The Amateur Radio Emergency Communications Enhancement Act of 2009 introduced in October 2009 by Senators Joe Lieberman (ID-CT) and Susan Collins (R-ME) -- has unanimously passed the US Senate and has been sent to the US House of Representatives for consideration and now sits in the House Committee on Energy and Commerce. The ARRL is asking its membership to contact the leadership of the Energy and Commerce committee, requesting support and action on moving S 1755 through the committee. S 1755 accomplishes the same things as HR 2160; HR 2160 was introduced in April 2009 by Rep Sheila Jackson Lee (D-TX-18). Since S 1755 has already been approved by the Senate, moving it forward in the House will simplify the process.

S 1755 points out that "[t]here is a strong Federal interest in the effective performance of Amateur Radio Service stations, and that performance must be given -- (A) support at all levels of government; and (B) protection against unreasonable regulation and impediments to the provision of the valuable communications provided by such stations."

If enacted into law, S 1755 would instruct the Secretary of Homeland Security (DHS) to undertake a study -- and report its findings to Congress within 180 days -- on the uses and capabilities of Amateur Radio communications in emergencies and disaster relief.

The study shall:

Include recommendations for enhancements in the voluntary deployment of Amateur Radio licensees in disaster and emergency communications and disaster relief efforts.

Include recommendations for improved integration of Amateur Radio operators in planning and in furtherance of the Department of Homeland Security initiatives.

Identify unreasonable or unnecessary impediments to enhanced Amateur Radio communications, such as the effects of private land use regulations on residential antenna installations, and make recommendations regarding such impediments.

Include an evaluation of Section 207 of the Telecommunications Act of 1996 (Public Law 104-104, 110 Stat. 56 (1996)).

Recommend whether Section 207 should be modified to prevent unreasonable private land use restrictions that impair the ability of amateurs to conduct, or prepare to conduct, emergency communications by means of effective outdoor antennas and support structures at reasonable heights and dimensions for the purpose, in residential areas. The Secretary of Homeland Security shall utilize the expertise of stakeholder entities and organizations, including Amateur Radio, emergency response and disaster communications.

Please contact Committee Chairman Henry Waxman (D-CA-30) and Ranking Member Joe Barton (R-TX-6), urging them to send this bipartisan bill to the House floor for adoption. A sample letter can be found here. Send your letters urging consideration of S 1755 by the House Committee on Energy and Commerce to Rep Waxman via fax at 202-225-2525, and to Rep Barton via fax at 202-225-1919. Also, please fax a copy of your letters to the ARRL's Washington representative, Chwat & Co at 703-684-7594.

For more information on S 1755, please visit the ARRL Government Relations Web page.

States with PRB-1 Statutes

Alaska, California, Florida, Kansas, Idaho, Indiana, Louisiana, Maine, Massachusetts, Mississippi, Missouri, Nevada, New Hampshire, New Mexico, North Carolina, Oklahoma, Oregon, Tennessee, Texas, Vermont, Virginia, Washington, West Virginia, Wisconsin, Wyoming have all adopted state statutes which codify PRB-1.

Five states specify heights below which local government may not regulate: Alaska (75-200'), Wyoming (70'), Virginia (75'), North Carolina (90') and Oregon (70')

Utah State Law

Utah State Code for Counties

17-27a-514. Regulation of amateur radio antennas.

(1) A county may not enact or enforce an ordinance that does not comply with the ruling of the Federal Communications Commission in "Amateur Radio Preemption, 101 FCC 2nd 952 (1985)" or a regulation related to amateur radio service adopted under 47 C.F.R. Part 97.

(2) If a county adopts an ordinance involving the placement, screening, or height of an amateur radio antenna based on health, safety, or aesthetic conditions, the ordinance shall:

(a) reasonably accommodate amateur radio communications; and

(b) represent the minimal practicable regulation to accomplish the county's purpose.

Renumbered and Amended by Chapter 254, 2005 General Session

Utah State Code for Municipalities

10-9a-515. Regulation of amateur radio antennas.

(1) A municipality may not enact or enforce an ordinance that does not comply with the ruling of the Federal Communications Commission in "Amateur Radio Preemption, 101 FCC 2nd 952 (1985)" or a regulation related to amateur radio service adopted under 47 C.F.R. Part 97.

(2) If a municipality adopts an ordinance involving the placement, screening, or height of an amateur radio antenna based on health, safety, or aesthetic conditions, the ordinance shall:

(a) reasonably accommodate amateur radio communications; and

(b) represent the minimal practicable regulation to accomplish the municipality's purpose.

Renumbered and Amended by Chapter 254, 2005 General Session

County Law

Davis County Code

Title 15 LAND USE AND DEVELOPMENT MANAGEMENT ORDINANCE

Chapter 15.20.630 Regulation of amateur radio antennas.

It is the intent of this chapter to:

A. Comply with the ruling of the Federal Communications Commission in "Amateur Radio Preemption, 101 FCC 2nd 952 (1985)" or a regulation related to amateur radio service adopted under 47 C.F.R. Part 97; and

B. For regulations involving the placement, screening, or height of an amateur radio antenna based on health, safety, or aesthetic conditions:

1. reasonably accommodate amateur radio communications; and
2. represent the minimal practicable regulation to accomplish the purpose of this title.

(Ord. 13-2007B, Add, 09/25/2007)

Salt Lake County Code

Chapter 19.83 Wireless Telecommunications Facilities

Chapter19.76.190 specifies height limitations and exceptions for buildings.

Neither section mentions amateur radio structures.

Utah County Code

Each zoning description mentions height requirements for structures but, none mentions amateur radio. Maximum height is forty (40) feet for any structure. Exception 1 allows for "An antenna of a 'stealth telecommunications transmission facility' which is attached to an existing pole of an electrical (or other utility) line...

Tooele County Code

Chapter 29 Siting of Wireless Telecommunications Facilities. No mention of amateur radio.

City Codes

Portions of the city ordinances are presented below. Those parts which apply to amateur radio structures have been italicized and bolded by the author.

Cedar City

Tower. Any structure that is designed and constructed primarily for the purpose of supporting one or more antennas, including self-supporting lattice towers, guy towers, or monopole towers. The term encompasses commercial personal wireless facilities including radio and television transmission towers, commercial microwave towers, commercial common-carrier towers, commercial cellular telephone towers or commercial personal communications services towers, alternative commercial tower structures, and the like. *This term does not encompass structures designed and constructed primarily for the purpose of supporting non-commercial antennas.*

(9) Antenna Non-commercial: (Ch. 26 - I - 2)

a. A transmitting or receiving device designed to radiate or capture communication signals consisting of electromagnetic or microwave radiation, for private, noncommercial recreational use. "*Non-commercial Antenna*" *includes, but is not limited to, radio and television antennas, satellite antennas, amateur radio antennas,* and antennas used for individual delivery of low power radio communication service.

Antennas associated with commercial or manufacturing structures for the purpose of transmitting or receiving signals are Non-commercial Antennas, if the use of the antenna is incidental to the primary use of the structure. This includes, but is not limited to, antennas for individual delivery of low power radio communication service incidental to the primary use of the structure.

26-IV-15. Electronic Communications Facilities

(A) Other Types of Antennas or Equipment: Antennas, communications facilities, or communications equipment not defined by this chapter shall be governed under the most restrictive provisions.

(B) General Provisions Applicable to Electronic Communications Facilities: (1) Building Permit Required: No communication tower or other facility shall be constructed unless a building permit is obtained from the City.

(2) Engineering Review: Each application for a permit to construct a communication tower or other facility shall be certified by a licensed professional engineer that the design of the facility meets all applicable standards for the facility, including, but not limited to: electrical safety, material and design integrity, seismic safety, etc. For communication towers, the professional engineer shall also certify that the tower meets acceptable design criteria or standards to withstand wind and other weather damage. In all cases, the certification shall indicate whether or not the facility will interfere with any other communications service, including, but not limited to, low power radio communication service.

(3) Interference with Other Communications: No permit to construct a communication facility shall be approved if the operation of the facility will interfere with emergency or airport communications.

(4) Aircraft and Airport Safety: All communication facilities shall comply with applicable laws, regulations, and approvals regarding aircraft and airport operations.

(5) Project Review Board: All communication facilities shall be approved by Project Review Board.

(6) Height Restrictions:

a. The maximum allowable height for facilities with a single antenna is sixty (60) feet. The maximum allowable height for a facility co-located with two (2) or more antennas is one hundred (100) feet. “Maximum allowable height” shall be measured to the highest point of the antenna or tower, whichever is greater.

b. The maximum allowable height for roof and wall-mounted antennas, and noncommercial antennas shall be fifteen (15) feet above the maximum building height requirement for the zone.

(7) Lattice Towers: Lattice towers shall be located only in the rear yard of a lot. No lattice tower shall be located in any required landscaped area or parking area. Lattice towers shall comply with the setbacks required for the zoning district in which they are located.

(C) Permitted Locations:

(1) Commercial Facilities: Commercial facilities shall be allowed in Industrial and Manufacturing zones.

(2) Non-Commercial Antennas: Non-Commercial antennas shall be allowed in all zones.

(3) Location Restriction: No commercial communication facility shall be located within three hundred (300) feet of a residential zone. Commercial communication facilities may be considered as a Conditional Use on City-owned property within 250 feet of the center point of a Cedar City water tank, but in no event shall they be located within 100 feet of the outside wall of such water tank. A conditional use would be subject to obtaining a lease agreement with Cedar City subject to all terms and conditions set by the Cedar City Planning Commission and Council.

Cedar Hills

Chapter 10.5.28

D. Applicability: This section applies to both commercial and private low power radio services and facilities, such as "cellular" or PCS (personal communications system) communications, and paging systems. *This section shall not apply to the following types of communications devices, although they may be regulated by other city ordinances and policies:*

1. Amateur Radio: Any tower or antenna owned and operated by an amateur radio operator licensed by the federal communication commission.

2. Amateur T.V.: Any tower or antenna owned and operated by an amateur T.V. operator licensed by the federal communication commission.

3. Residential Rooftop Antenna: Any device designed for over the air reception of television broadcast signals, multichannel multipoint distribution service, internet service, or direct satellite service.

4. Cable: Any cable television head end or hub towers and antennas used solely for cable television services.

Clearfield

N. Amateur Radio Facilities; Towers And Equipment:

1. Amateur radio facilities are primarily governed by restrictions provided by the federal communications commission and this section shall defer to federal provisions for amateur radio operation with the exception of the following conditional uses: to comply with reasonable standards of federal law for the permitting of amateur radio tower equipment and facilities, a conditional use permit will be required if any of the following structures, buildings, facilities or equipment are to be constructed. Applicants must present evidence of ability to operate radio equipment by exhausting all other means of operation which shall be verified by the leadership of a reputable radio group as to be determined by the planning commission, before the following conditional uses may be permitted: (Ord. 96-18, 9-10-1996; amd. 2000 Code)

a. Height of support structure over seventy five feet (75') from ground level.

b. Equipment, tower or any accompanying structure or equipment placed in the front yard of any lot. (Ord. 96-18, 9-10-1996)

Amateur radio facilities and equipment in M-1 zones do not require conditional use permits. (Ord. 96-18, 9-10-1996; amd. Ord. 99-6, 3-9-1999)

Cottonwood Heights

19.83.030 Applicability;Exceptions.

A. Applicability.The requirements of this chapter apply to both commercial and private wireless telecommunications services such as “cellular” or “PCS” (personal communications services) communications and paging systems. All facilities shall comply with the following regulations and all other ordinances of the city and any pertinent regulations of the Federal Communications Commission (FCC) and the Federal Aviation Administration (FAA).

B. Exceptions. The following are exempt from the provisions of this chapter:

1. Emergency wireless telecommunication facilities for emergency communications by public officials.

2. Amateur (ham) radio stations licensed by the FCC.

3. Parabolic antenna less than seven (7) feet in diameter that is an accessory to the main use of the property.

4. Maintenance, repair or reconstruction of a wireless telecommunications facility and related equipment, provided that there is no increase in the height of the facility or other material change in the other dimensions or aspects of the facility.

5. An antenna that is an accessory use to a residential dwelling unit.

C. Other types of equipment. Antennas, communications facilities, or communications equipment not defined or regulated by this chapter are prohibited in all zones within the city.

Eagle Mountain

F. Building Height. No primary structures shall exceed 35 feet in height, measured from the average of the highest finished grade and the lowest finished grade of the structure to the highest point of the roof. Chimneys, television antennas, flagpoles, church towers or any ancillary structures not used for human occupancy shall be excluded when determining the height. No ancillary structure shall extend more than 10 feet above the primary structure without planning commission approval. No accessory structures shall exceed 50 feet in height.

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MEMORANDUM

TO: **Adam Cowie**
FROM: **Brian Haws**
DATE: **November 5, 2009**
RE: **Regulation of Amateur Radio Antennas**

As you requested, I have looked into the state statutes that define the scope of the City's ability to regulate amateur radio antennas and the federal regulations referred to in that code section.

The applicable code section , U.C.A. §10-9a-515, states as follows:

> A municipality may not enact or enforce an ordinance that does not comply with the ruling of the Federal Communications Commission in "Amateur Radio Preemption, 101 FCC 2nd 952 (1985)" or a regulation related to amateur radio service adopted under 47 C.F.R. Part 97.

In essence this code section requires that any conditions imposed on an amateur radio tower must be consistent with federal regulations. The federal regulations do not set out any specific height limitations or minimums that municipalities must allow, and they do allow for some regulation if it is based on a specific public health and safety concerns and even specific aesthetic concerns. However, the federal statutes only allow such limitations as long as they do not conflict with the intent of the federal law, which is to promote amateur radio communications to the fullest extent possible.

So what does that mean? It really means that each application had to be decided using a case by case analysis. The underlying question in this analysis is whether the proposed height and location of any given tower creates a specific concern for health, safety, or aesthetics. Again, there is no clear definition of what is too high in the federal regulations. In fact, under 47 CFR 97.15, the section in the federal regulations which controls amateur radio stations and

Motion by: _____ *Second by:* _____
No. voting aye: _____ *No. voting nay:* _____
Absent: _____

antennas, the FFC has no regulation of towers at all until they exceed more than 200 feet.

The Regulation reads as follows:

> (a) Owners of certain antenna structures more than 60.96 meters (200 feet) above ground level at the site or located near or at a public use airport must notify the Federal Aviation Administration and register with the Commission as required by part 17 of this chapter.
> (b) Except as otherwise provided herein, a station antenna structure may be erected at heights and dimensions sufficient to accommodate amateur service communications. (State and local regulation of a station antenna structure must not preclude amateur service communications. Rather, it must reasonably accommodate such communications and must constitute the minimum practicable regulation to accomplish the state or local authority's legitimate purpose. See PRB-1, 101 FCC 2d 952 (1985) for details.)

Several states have adopted statutes that prohibit municipalities from limiting the height of an antenna tower. These statutes generally allow the towers to be at least 70 to 90 feet and in some rural areas they cannot be limited below 200 feet. [1] Utah is not one of these states and so it falls on the City to decide what constitutes reasonable accommodation of the amateur radio towers. Currently, Lindon does not have a specific ordinance on amateur antennas or towers, but even if we did, there would still be the need for a site specific review.

There is no case law on the issue from Utah, but case law from other states makes it clear that there must be a case by case analysis in determining what is a reasonable limit on height. The cases consistently place the burden on the city to show why it is justified in limiting the antenna and in do so require the city to identify site specific concerns, not just general aesthetic or safety issues. (i.e. the tower location is too close to utility lines, it blocks a specific view, it doesn't have a sufficient wind rating for the location, it imposes an unreasonable threat of damage to property of third parties, or the location would block the view of a specific neighbor or mare the view of a historic building or location.)

Also, one other point that came out in the case law is that cities cannot rely on their building/structural height restrictions to limit an antenna. The courts have help that federal preemption statutes bar the application of these limitations to towers, because such an application does not provide a sufficient analysis on what is the minimum practical restriction necessary to address site specific concerns. In other words these building/structural restrictions are simply painted with too broad a stroke and applying them does not satisfy the required case by case analysis.

In conclusion, in considering the current application for an amateur radio antenna, the City is going to be required to show why the proposed tower height and location creates either an unreasonable health or safety issue or a specific aesthetics problem. If such issues are not clearly established, the city will be limited in its ability to restrict the size of the tower. [2]

---

[1] Alaska - 75 feet and 200 feet in rural areas; Virginia - 75 feet and 200 feet in rural area; North Carolina - 90 feet; Oregon – 70 feet; Wyoming – 70 feet; Idaho -70 feet.

[2] There were no cases I could find in which the courts found aesthetics alone constituted an acceptable basis for limiting or restricting a tower.

Motion by: _____ *Second by:* _____
No. voting aye: _____ *No. voting nay:* _____
Absent: _____

Logan City

9.36.020: RADIO BROADCAST OR RECEPTION INTERFERENCE:

It is unlawful for any person, firm or corporation to operate, use or maintain in the city any apparatus generating or causing high frequency oscillations or any electrical equipment which, when used, will cause electrical interference or disturbance with radio or television broadcast transmitting or receiving apparatus, except this section shall not apply to radio stations, either broadcast, commercial or amateur, which are licensed by the federal government, and/or who are employed in the interstate communication. (Prior code § 12-16-2)

Murray City

Murray City has no ordinance covering amateur radio towers. Bob Carter just inquired about a permit to erect a tower. He met with building and planning departments and was told he needed only the engineering drawings for the structure and would be granted a building permit. Tower height discussed was 55-72 feet.

Pleasant Grove

Current Ordinance

10-15-36: LOW POWER RADIO COMMUNICATION TOWERS AND ANTENNAS:

This section addresses planning issues resulting from the rapid growth in demand for low power radio services within the city. It distinguishes low power radio from other broadcasting type telecommunication technologies and establishes provisions relating to demand, visual mitigation, r-f noise, engineering, residential impact, health, safety and facility siting. The requirements of this section apply both to commercial and private low power radio services, such as cellular or PCS (personal communication system) communications and paging systems. All facilities shall comply with the following regulations and all other ordinances of the city and any pertinent regulations of the federal communications commission and the federal aviation administration. The placement of any cellular phone and other low power radio communication towers shall be allowed as a conditional use in the MD, A-1 and R-R (public or quasi-public property only) zones.

A. Wall Mounted Antennas: An antenna or series of individual antennas mounted against the vertical wall of a building.

1. Wall mounted antennas shall not extend above the roofline of the building more than four feet (4').

2. Antennas and all associated equipment shall be painted to match the color of the building.

3. Wall mounted antennas may have a maximum area of forty (40) square feet. The area is determined by drawing straight lines between the outer most portions of the antennas until enclosed.

4. All equipment associated with the operation of the antennas shall be located within the structure to which the antenna is attached, or screened from the public view.

5. If the associated equipment is located on the ground, it must be appropriately landscaped.

6. Antennas are encouraged to be mounted on existing structures where possible.

B. Roof Mounted Antennas: An antenna or series of individual antennas mounted on a flat roof, mechanical room or penthouse of a building.

1. Roof mounted towers can only be mounted on structures with flat roofs and shall be screened, constructed or colored to match the structure to which they are attached.

2. Antennas must be set back from the building edge one foot (1') for every one foot (1') of antenna height to a maximum of fifteen feet (15').

C. Monopole Structures: A single cylindrical steel or wooden pole that acts as the support structure for antennas.

1. All towers must be of a monopole construction (without guy cables). No lattice constructed towers of any kind shall be allowed.

2. All towers must be designed by a state certified engineer to allow for collocation and also for as many as three (3) separate users on a single pole. A letter must also be supplied stating that the owners of the tower will allow for collocation and that the structure has been constructed to allow for this, unless grid documentation is supplied by an independent consultant that collocation will create a hardship.

3. In the A-1 and R-R zones, no tower may be located higher than the maximum height allowed for all buildings and structures. In the MD zone, no tower may be located higher than one hundred twenty feet (120').

4. The agent must supply the city with a letter stating that, if technology renders the tower obsolete or the tower is vacated, the agent will remove the tower, all other apparatus associated with it, the top three feet (3') of the footing and restore the site to its original condition within ninety (90) days of the vacation of the tower.

5. Monopole with antennas and antenna support structure shall not be located in a required front setback, front landscaped area, buffer area or required parking area.

D. Additional Requirements:

1. Each cellular facility shall be considered as a separate use; and an annual business license shall be required for each such facility.

2. In addition to the conditional use standards outlined in section 10-2-4 of this title, the planning commission shall make the following findings:

a. The proposed structure is compatible with the height and mass of existing buildings and utility structures.

b. Collocation of the antenna on other existing structures in the same vicinity such as other towers, buildings, water towers, utility poles, etc., is possible without significantly impacting antenna transmission or reception of established users or facilities in the area.

c. The antenna location blends with existing vegetation, topography and buildings.

d. Location approval of monopoles will not create a detrimental impact to adjoining properties.

e. The location of cellular facility will not interfere with existing radio, satellite reception, telephone, microwave or television transmission signals.

f. Where unique circumstances are present, the applicant can petition the board of adjustment for a variance.

g. The owner or operator of the proposed antenna facilities shall produce a license from the FCC prior to the issuance of a building permit. (Ord. 2000-23, 7-18-2000)

ORDINANCE NO. 2010-7

AN ORDINANCE OF PLEASANT GROVE CITY, UTAH COUNTY, UTAH; AMENDING TEXT IN TITLE 10 CHAPTER 15 SECTION 36, ENTITLED LOW POWER RADIO COMMUNICATION TOWERS AND ANTENNAS; TO DIVIDE AMATEUR, PRIVATE, AND COMMERCIAL COMMUNICATIONS INTO THREE SEPARATE CATEGORIES; AND UPDATING THE CHAPTER TO COMPLY WITH CURRENT FEDERAL COMMUNICATIONS COMMISSION (FCC) REQUIREMENTS BY ALLOWING AMATEUR AND PRIVATE RADIO COMMUNICATIONS IN ALL ZONES, AND SPECIFYING WHEN A CONDITIONAL USE PERMIT IS REQUIRED; AND UPDATING HEIGHT, SETBACK, DESIGN GUIDELINES, AND DEFINITIONS; PLEASANT GROVE CITY STAFF (APPLICANT).

WHEREAS, the legislative body has previously adopted ordinances intended to regulate radio/telecommunication towers, antennas, related equipment within the City, as defined in the ordinance; and

WHEREAS, the legislative body has indicated a need for amendments to the said ordinance for communication towers, antennas and equipment, for the purpose dividing Amateur, Private, and Commercial communication standards into three separate categories, and

WHEREAS, the legislative body has indicated a need for amendments to the said ordinance to bring the City into compliance with the Federal guidelines as regulated by the Federal Communications Commission (FCC) by allowing amateur and private radio communications in all zones within a certain threshold, and establishing that a Conditional Use Permit shall be required when the threshold is exceeded; and with updates to height, setback, design guidelines, and definitions; and

WHEREAS, the State of Utah has also codified certain Federal law in 10-9a-515 U.C.A. wherein a municipality may not enact or enforce an ordinance that does not comply with the FCC ruling "Amateur Radio Preemption, 101 FCC 2nd 952 (1985)"; and

WHEREAS, on February 11, 2010 the Pleasant Grove City Planning Commission held a public hearing to consider the proposed amendments to the Pleasant Grove City Municipal Code; and

WHEREAS, at its public hearing the Planning Commission decided that the requested amendments to the Pleasant Grove Municipal Code are in the public's interest and consistent with the goals and policies of the General Plan; and

WHEREAS, the Pleasant Grove Planning Commission recommended to the Pleasant Grove City Council that the amendments to the Pleasant Grove Municipal Code be approved; and

WHEREAS, on March 2, 2010 the Pleasant Grove City Council held a public hearing to consider the request; and

WHEREAS, at its meeting the Pleasant Grove City Council was satisfied that the amendments to the Pleasant Grove Municipal Code are in the best interest of the public and consistent with the goals and policies of the General Plan.

NOW, THEREFORE, BE IT ORDAINED by the City Council of Pleasant Grove City, Utah County, State of Utah, as follows:

SECTION 1: Section 10-15-36, of the Pleasant Grove Municipal Code, is hereby amended to read as follows:

10-15-36: WIRELESS COMMUNICATIONS – AMATEUR/PRIVATE/AND COMMERCIAL TOWERS AND ANTENNAS:

PURPOSE AND OBJECTIVES: This section separates regulations governing amateur communications from the private/non-commercial radio communications and related equipment, and from the regulations of the commercial communication/business related equipment and facilities, and establishes provisions relating to demand, visual mitigation, r-f noise, engineering, residential impact, health, safety and facility siting. Such equipment may include, but is not limited to, cellular or PCS (personal communication system), paging and microwave systems, and associated antennas, dishes, mounting structures, and related equipment. All facilities shall comply with the following regulations and all other ordinances of the City and any pertinent regulations of the Federal Communications Commission (FCC) and the Federal Aviation Administration (FAA).

A. **Amateur Communications** : This section shall apply to Amateur Radio antennas and support structures. The equipment and facilities mentioned above shall be allowed in all zones within the City, and it is the City's intent to provide reasonable accommodation for such communications. These are regulated by the Federal Communications Commission (FCC); however, the following shall be required:

1. A building permit for an antenna support structure is to be submitted to the Community Development Department with the following items:

a. A site plan identifying the property boundary, location of existing buildings and structures, the proposed location for the support structure, and the distance relationship between these illustrated items;

b. Manufacturer's specifications for the antenna support structure, including details of footings, guy wires if required, and height; and

c. A copy of the applicant's Amateur Radio License.

2. Amateur antenna support structures; no more than one amateur support structure per lot may be installed, and shall be located in the rear or side yard, of a home or main structure. The following additional standards shall apply:

a. Minimum setbacks for all amateur support structures shall be twenty feet (20') from neighboring property lines and a minimum thirty feet (30') from the public right of way.

b. Height of support structures is permitted up to seventy-five feet (75'), measured from ground level.

c. Support structures shall be composed of non-reflective galvanized steel or aluminum, and shall not have obtrusive colors.

3. Antennas; operators may use various antennas depending upon their communications objective. Amateurs typically require both UHF/VHF and HF antennas to achieve local and long distance communications and to also provide emergency communications. Antennas are to be installed on a building or property in the least conspicuous location possible as viewed from the public street.

4. A Conditional Use Permit shall be required for the design of any Amateur antenna or support structure that exceeds or deviates from sub-item A2 – 3, and shall be subject to the following additional conditions:

a. Along with the submittal of a Conditional Use Permit application, the applicant is to include a letter documenting why a need to increase the height is necessary to achieve the communication capabilities desired. Support structures shall not exceed the height necessary to meet the technological requirements of installation.

b. An increase in the setback, from the base of the support structure to each affected property line, by one foot (1') for every additional foot in height above seventy-five feet (75');

c. No nuisance or hazard is created, subject to the review standards in Section 10-2-4 of the City code. The city, in considering the application, must apply the minimal practicable regulation necessary to achieve its goal of protecting the welfare of the community while ensuring the regulation will not impinge on the needs of the amateur operator to engage in amateur communications .

5. A building permit shall not be required for any amateur antenna support structure that is twelve feet (12') or less in height.

B. **Private/Non-Commercial Communications** :This section shall apply to the private installation and operation of wireless communication antennas, dishes and support structures, Over the Air Reception Devices (OTARD), two-way radio or other communication systems for non-commercial purposes. The equipment and facilities mentioned above shall be allowed in all zones within the City, and it is the City's intent to provide reasonable accommodation for such

communications. These are regulated by the Federal Communications Commission (FCC); however, the following shall be required:

1. The installation of any OTARD (antenna or satellite dish, etc) less than one meter (39.37") in diameter or support structure that is six feet (6') or less in height shall be exempt from these requirements.

2. If an over the air reception device exceeds the limits found above in Item B-1, then a building permit is to be submitted to the Community Development Department including the following items:

a. A site plan identifying the property boundary, location of existing buildings and structures, the proposed location for the device and/or support structure, and the distance relationship between these illustrated items;

b. Manufacturer's specifications for the antenna support structure, including details of footings, guy wires, and height; and

c. A copy of the applicant's license to operate.

3. Single-family properties; no more than one over the air reception device (antenna, dish, etc) per dwelling unit are permitted. These devices shall be enclosed within the dwelling unit or other structure compatible with the home. If technological or logistical justification would preclude the enclosure of the antenna or dish, then they may be placed on the building or property in the least conspicuous location possible, as viewed from a public street. Antennas shall not exceed an overall height of forty-five feet (45'). Satellite dishes shall not exceed three feet (3') in diameter.

4. Condominium/Town-home Associations/And Other Multi-family Cooperative Ownerships; as part of the Conditional Use Permit (CUP) review, these developments are required to have a central or common reception device (antenna) for the tenants within the development. If technological or logistical justification would preclude this limitation, then individual tenants may obtain a permit to install their reception device where they would have exclusive use, such as a balcony or patio; however are subject to the size requirements listed in this section.

5. Towers; no more than one private tower per lot shall be allowed, and shall be located in the rear or side yard of a home or main structure after having met the minimum setback requirement. The following additional standards shall apply:

a. Minimum setbacks for all private communication support towers shall be twenty feet (20') from neighboring property lines and a minimum fifty feet (50') from the public right of way.

b. Height of private communication support towers is subject to the overall maximum height limitation of forty-five feet (45') for an antenna.

c. Tower structures and related equipment shall be composed of non-reflective galvanized steel or aluminum with unobtrusive colors.

6. A Conditional Use Permit shall be required for the private installation of over the air reception devices or tower structures that deviate from items B3 – 5 in this subsection, and shall be subject to the following additional conditions:

a. Along with the submittal of a Conditional Use Permit application, the applicant is to include a letter documenting why they believe an increase in height is necessary to achieve the communication capabilities desired. Towers shall not exceed the height necessary to meet the technological requirements of installation.

b. An increase in the setback, from the base of the tower structure to each affected property line, by one foot (1') for every additional foot in height above forty-five feet (45');

c. No nuisance or hazard is created, subject to the review standards in Section 10-2-4 of the City code. The city, in considering the application, must apply the minimal practicable regulation necessary to achieve its goal of protecting the welfare of the community while ensuring the regulation will not impinge on the needs of the private operator to engage in over the air communications .

d. No over the air device shall impinge on historical preservation or any safety concerns that have been properly identified.

C. **Commercial Communications** : This section shall apply to all commercial and business related use of wireless communication equipment. Commercial antennas, towers, and related equipment shall be allowed in all commercial, industrial, and office zones with Conditional Use Permit approval granted by the Planning Commission at a public hearing. Installation of commercial communications equipment may be considered in a residential zone through the Conditional Use Permit process, on public property only, or property in conjunction with a quasi-public use, such as a school, church, public park or government building. The following regulations are to be complied with as outlined below:

1. Applicant is to submit a Conditional Use Permit application to the Community Development Department, as outlined in Section 10-2-4 of the municipal code.

2. Once the Conditional Use Permit has been approved, the applicant is to submit a building permit to the Community Development Department with the following items:

a. Copy of the approved site plan with supporting documents; and

b. Manufacturer's specifications for the antenna support structure, including details of footings, guy wires, and height.

c. A copy of the applicant's license to operate.

3. The following standards shall be required with the installation and use of antennas, dishes, or other related commercial communication equipment mounted on roofs or walls of commercial, office or industrial zones, and on buildings in a residential zone as allowed in this chapter:

a. Antennas, dishes, supports, and related equipment shall be mounted inside an enclosed decorative building or made stealth within a steeple, flag pole, utility pole or other stealth structure, unless adequate justification for a wall or roof mount can be provided. Antennas, dishes, supports and related equipment which cannot, because of technological reasons, be wall or roof mounted, mounted on or within an existing utility pole or enclosed within a stealth structure, or on a tower structure. Please see sub-item 4-c for tower height maximums.

b. Roof mounted antennas, dishes, and equipment shall not exceed ten feet (10') above the surface of the roof or the top of the lowest parapet screening wall;

c. Minimum setback shall be ten feet (10') from the edge of the roof;

d. Wall mounted antennas shall not extend more than eighteen inches (18") from the surface of the wall, of the building to which they are mounted. All antennas shall be made stealth so as to be incorporated as part of the building's architecture.

e. All ground equipment, associated with commercial antennas, shall be placed within a below grade vault or completely enclosed and screened from view within a six foot (6') solid decorative masonry wall or other suitable fence, to match the architectural theme of the vicinity or adjacent development, as determined by the Planning Commission or City Council. Ground equipment buildings shall not exceed six hundred (600) square feet, nor exceed ten feet (10') in height, and shall be secured. Expansion of the original ground equipment, site area, or enclosures shall require a Conditional Use Permit or a modification of the Conditional Use Permit if one already exists.

4. Communication towers; freestanding poles or lattice towers used for the purpose of facilitating communication equipment shall require Conditional Use Permit approval as outlined in Section 10-2-4, and are subject to the following standards:

a. Design; towers shall be composed of non-reflective galvanized steel or powder coated surfaces with unobtrusive colors. All ground equipment, associated with commercial towers, shall be placed within a below grade vault or completely enclosed and screened from view within a six foot (6') solid decorative masonry wall or other suitable fence, to match the architectural theme of the vicinity or adjacent development, as determined by the Planning Commission or City Council. Ground equipment buildings shall not exceed six hundred (600) square feet, nor exceed ten feet (10') in height, and shall be secured.

b. Location; towers are to be located in rear yard areas, and in areas least obtrusive on the public view and neighboring uses; see sub-item (d) for setbacks;

c. Height; tower structures shall not exceed one hundred feet (100') in height in all commercial, office and residential zones where allowed. A maximum of one hundred seventy-five feet (175') shall be considered in industrial zones.

d. Setbacks; tower structures shall have a minimum twenty-five feet (25') setback from an adjacent commercial, office or industrial zone, up to a height of 100 feet. For industrial zones that allow greater than 100 feet in height, one additional foot is to be added, to the setback,

for each foot above 100 feet. Tower structures on property adjacent to a residential use, shall be subject to the following setbacks:

Tower Height	Distance from residential property line
70 feet	
150 feet	
80 feet	
175 feet	
90 feet	
200 feet	
100 feet	
225 feet	

e. Multiple users; all towers are to be designed to accommodate three separate users. A letter must also be supplied stating that the owner(s) of the tower will allow for collocation and that the structure has been constructed to allow for this, unless grid documentation is supplied by an independent consultant that collocation will create a hardship. Only one Conditional Use Permit (CUP) approval shall be required, unless the tower or ground equipment is expanded, at which time the existing CUP is to be modified.

f. The City may require the owner of the communications facility to establish a $10,000 cash security fund or provide the City with an irrevocable letter of credit in the same amount to secure the cost of removing the communication equipment.

g. The property owner must supply the City with a letter stating that, if technology renders the tower obsolete or the tower is vacated, the owner will remove the tower, all other apparatus associated with it, the top three feet (3') of the footing, and restore the site to its original condition within ninety (90) days of the vacation of the tower.

h. Separation; commercial communication towers shall have a minimum separation requirement of a thousand feet (1000').

5. The following are additional standards to be considered with commercial communications:

a. Collocation of the antennas on other existing structures in the same vicinity, such as other towers, buildings, water towers, utility poles, etc., is possible without significantly impacting antenna transmission or reception of established users or facilities in the area;

b. Each communication facility shall be considered a separate use; and an annual business license shall be required for each such facility

c. The location of any tower will not create a detrimental impact to adjoining properties.

d. No commercial messages or signage shall be allowed on antenna supports (towers) or equipment, beyond safety warnings, and one identification sign which are not greater than four (4) square feet in size.

e. Technological justification, when requested, shall be provided by an independent third party wireless communications engineering firm, selected by the City and paid for by the applicant.

D. **Definitions**:

1. **Amateur Radio Antenna** ; antenna which is used for transmitting and receiving radio signals from a radio station controlled by an operator licensed by the Federal Communications Commission.

2. **Amateur Radio Antenna Support Structure** ; a lattice or pole structure which acts as a support to the Amateur radio antenna. Typical support structures are triangular or square in cross-section, crank-up, or guyed, and are constructed with galvanized steel or aluminum.

3. **Antenna** ; is a transducer, attached to a support structure, designed to transmit or receive electromagnetic waves.

4. **Commercial Communication Towers** ; tall structures designed to support antennas and dishes. Commercial towers are typically monopole in design, but may also be building structures, if stealth principles are used.

5. **OTARD** ;acronym for Over the Air Reception Devices (antenna, satellite dishes, etc.) installed for private reception.

6. **Stealth** ; the use of alternative support structures to blend or hide the communication equipment with the design, shape, or color of the structure. Examples of stealth are, but not limited to, field lights, clock towers, bell towers, water towers, flag poles, windmills, monuments, etc.

SECTION 2: **SEVERABILITY**. The sections, paragraphs, sentences, clauses, and phrases of this Ordinance are severable. If any such section, paragraph, sentence, clause, or phrase shall be declared invalid or unconstitutional by the valid judgment or decree of a Court of competent jurisdiction, such invalidity or unconstitutionality shall not affect the validity or constitutionality of any of the remaining sections, paragraphs, sentences, clauses, or phases of this Ordinance.

SECTION 3:EFFECTIVE DATE. This ordinance shall take effect immediately upon its passage and shall be posted or published as required by law.

SECTION 4: APPROVED AND ADOPTED AND MADE EFFECTIVE by the City Council of Pleasant Grove City, Utah County, Utah; this 2nd day of March, 2010.

ATTEST:

Bruce Call, Mayor

Kathy T. Kresser (SEAL)

City Recorder

Riverton

Section 1108—Amateur Radio Antennas

1) Purpose: The following requirements are provided in order to protect the public health and safety of City residents while providing and allowing reasonable accommodation for amateur radio communications, as provided by Section 10-9a-515 U.C.A. The following requirements for the location and operation of amateur radio antennas are hereby found by the City Council to be the minimal practical regulation necessary to achieve the purposes of this Section.

2) Conditional Use Application Required:

   a) A request to establish an amateur radio antenna shall be initiated by filing a conditional Use application with the City.

   b) The review of a Conditional Use application to establish an amateur radio antenna shall be reviewed and approved, approved with conditions, or denied by the Council by following the procedures and requirements for a Conditional Use Permit, as provided herein.

3) Location: No amateur radio antenna, or its associated support structure(s), shall be located within any required front yard, side yard, or rear yard of the lot on which the antenna is proposed, as required by the Zoning District in which the lot is located.

4) Height:

   a) No amateur radio antenna, or its associated support structure(s), shall be erected to a height greater than the distance measured from the base of the proposed amateur radio antenna to the closest property line of the lot or parcel on which the amateur radio antenna is located.

   b) The height of an amateur radio antenna shall be measured from the ground level immediately adjacent to the base of the antenna to the highest point of the amateur radio antenna.

5) Mounting: The amateur radio antenna, and its support structure(s), shall be designed to withstand a wind force of 80 miles per hour without the use of supporting guy wires or similar supporting structures.

6) Building Permit Required: The establishment of an amateur radio antenna shall require the approval of a building permit, as may be required by the adopted building codes.

7) Airport Zoning Regulations: All amateur radio antennas shall comply with all applicable provisions of the Airport Overlay regulations of Roy City, as applicable.

8) Reasonable Accommodations: As required by the Section 10-9a-515 U.C.A. and the ruling of the Federal Communications Commission in "Amateur Radio Preemption, 101 FCC 2nd 952 (1985)" or a regulation related to amateur radio service adopted under 47 C.F.R Part 97, the Council, in reviewing an application to establish an amateur radio, may to the extend necessary modify the requirements of this Section, if such modifications are necessary to make a reasonable accommodation to afford an Amateur Radio Operator amateur radio communications.

Salt Lake City

D. Amateur Radio Facilities With Surface Area Exceeding Ten Square Feet: Any antenna and antenna support having a combined surface area greater than ten (10) square feet or having any single dimension exceeding twelve feet (12') that is capable of transmitting as well as receiving signals and is licensed by the federal communications commission as an amateur radio facility shall be permitted as an accessory use, but only in compliance with the regulations set forth below:

1. Number Limited: No more than one such antenna or antenna support structure with a surface area greater than ten (10) square feet or any single dimension exceeding twelve feet (12') may be located on any lot.

2. Height Limited: No such antenna and its support structure shall, if ground mounted, exceed seventy five feet (75') in height or, if attached to a building pursuant to subsection D3 of this section, the height therein specified.

3. Attachment To Buildings Limited: No such antenna or its support structure shall be attached to a principal or accessory structure unless all of the following conditions are satisfied:

a. Height: The antenna and its support structure shall not extend more than twenty feet (20') above the highest point of the building on which it is mounted.

b. Mounting: The antenna and its support structure shall not be attached to or mounted upon any building appurtenance, such as a chimney. The antenna and its support structure shall not be mounted or attached to the front or corner side of any principal building facing a street, including any portion of the building roof facing any street. The antenna and its support structure shall be designed to withstand a wind force of eighty (80) miles per hour without the use of supporting guy wires.

c. Grounding: The antenna and its support structure shall be bonded to a grounding rod.

Other Standards: The antenna and its support structure shall satisfy such other design and construction standards as the zoning administrator determines are necessary to ensure safe construction and maintenance of the antenna and its support structure.

e. Special Exception For Increased Height: Any person desiring to erect an amateur ("ham") radio antenna in excess of seventy five feet (75') shall file an application for a special exception with the zoning administrator pursuant to chapter 21A.52 of this title. In addition to the other application regulations, the application shall specify the details and dimensions of the proposed antenna and its supporting structures and shall further specify why the applicant contends that such a design and height are necessary to accommodate reasonably amateur radio communication. The zoning administrator shall approve the proposed design and height unless the zoning administrator finds that a different design and height which is less violative of the city's demonstrated health, safety or aesthetic considerations also accommodates reasonably amateur radio communication and, further, that the alternative design and height are the minimum practicable regulation necessary to accomplish the city's actual and demonstrated legitimate purposes. The burden of proving the acceptability of the alternative design shall be on the city.

Sandy City

COMMUNITY DEVELOPMENT DEPARTMENT

August 30, 1988

MICHAEL G. COULAM,
DIRECTOR

Rick Seyboldt
195 Brent Cir.
Sandy, Utah 84070

Dear sir,

According to our newly adopted Sandy City Development Code there are currently no restrictions for amatuer radio towers in single family dwellings lots. No building permit is required.

Sincerely,

Ron Bullock
Chief Building Official

440 East 8680 South Sandy, Utah 84070 (801) 566-1561

Saratoga Springs

Policy Item #3
12-12-06

ORDINANCE NO. 06-21 (12-12-06)

AN ORDINANCE REGARDING AMATEUR RADIO ANTENNAS AND ANTENNA SUPPORT STRUCTURES WITHIN THE CITY OF SARATOGA SPRINGS.

WHEREAS, the Federal Communications Commission of the United States of America ("FCC") has established a rule preempting state and local regulations that preclude amateur radio communications. However, the FCC has not preempted local regulations involving placement, screening or height of amateur radio antennas so long as the regulation are based on health, safety or aesthetic considerations, represent a reasonable accommodation of amateur radio communications, and constitute the minimum practicable regulation necessary to accomplish the local agency's legitimate purpose; and

WHEREAS, amateur radio antennas differ from other antenna in terms of their size, shape, weight and foundation requirement, and these factors raise aesthetic, safety and welfare concerns that warrant special regulation; and

WHEREAS, amateur antennas, due to their height, size and overall appearance, have the potential to block or impair views of natural features of importance to the public and owners of property if left unregulated. The antennas, because of their height and unique appearance, tend to dominate the landscape and reduce visual open space. The overall appearance of amateur radio antennas may be inconsistent with the character and aesthetics of many of the existing residential, commercial and recreational areas within the City of Saratoga Springs and the proliferation of such antennas could significantly reduce the aesthetic integrity of those areas and reduce property values; and,

WHEREAS, the provisions of this Ordinance also protect the safety of persons living and working within Saratoga Springs in that free-standing amateur radio antennas do pose a threat to the safety of persons or property in the event an antenna collapsed. The provisions of this Ordinance will help insure that amateur radio antennas are installed in a manner that insures the safety and security of persons and property located nearby; and,

WHEREAS, the provisions of this Ordinance represent the minimum practical regulation necessary to satisfy the aesthetic, health, safety and welfare concerns that have prompted these minimal restrictions on amateur radio antennas; and

WHERAS, it is the intent of the City Council that this Ordinance be administered and interpreted to reasonably accommodate amateur radio communications, to constitute the minimum regulation necessary to accomplish the purpose of this Ordinance and not to impose unreasonable costs on the amateur radio operators.

NOW, THEREFORE, be it ordained by the Governing Body of the City of Saratoga Springs, Utah, as follows:

1. Definitions.

a. "Amateur Radio Antenna" shall mean any antenna which is used for the purpose of transmitting and receiving radio signals in conjunction with an amateur radio station licensed by the Federal Communication Commission.

b. "Antenna Support Structure" shall mean any structure, mast, pole, tripod or tower utilized for the purpose of supporting an amateur radio antenna.

c. "Antenna height" shall mean the overall vertical length of the antenna support structure and antenna above grade, or if such structure is located on a building, then the overall vertical length includes the height of the building upon which the structure is mounted.

2. Permitted Use.

Amateur radio antennas and structures are permitted as an accessory use in all zoning districts subject to the issuance of any appropriate permit.

3. Permit Required.

It shall be unlawful for any person to install, construct or increase the height of any antenna support structure without first obtaining a building permit, except that no permit shall be required if the height of the antenna support structure (excluding the height of any building to which the antenna support structure is attached) is less than 12 feet.

4. Permit Application.

Application for a building permit shall be made upon such forms requested by the city and shall have attached the following items:

a. A site plan identifying the site boundary, location of existing buildings or structures and the proposed location for the antenna support structure.

b. Manufacturer's specifications for the antenna support structure and details of footings, guys and braces.

c. A copy of the applicant's homeowner's or renter's insurance policy.

d. A permit fee of $22 or other fee adopted from time to time by the City Council.

e. Engineer's stamp certifying that he/she has reviewed the plans for the antenna and support structure.

f. A final inspection by a City building official after the antenna has been installed.

5. Electrical Requirements.

All antenna support structures, whether ground or roof mounted, shall be electrically grounded. Grounding shall be in accordance with the provisions of the National Electrical Code, 2005 Edition.

6. Restrictions.

a. Ground mounted antenna support structures, including guy wire anchors, may be erected, constructed or installed only in rear or side yards and must be located within the allowable building area. No antenna or antenna support structure will be permitted in the front setback area.

b. No more than one primary antenna support structure and appurtenances shall be permitted on any one lot or principal building.

7. Height Limitation.

a. Antenna support structures of amateur radio operators licensed by the Federal Communications Commission may have a height of 45 feet above grade, including the height of any building upon which the antenna support structure is mounted.

b. Where the height of an antenna support structure is to exceed the height otherwise permitted by this ordinance, the Planning Commission shall review the site plan, including detail of the proposed structures and such other information as may be submitted by the applicant and may impose reasonable conditions on the proposed construction necessary to protect the public health, safety and welfare, including but not limited to requiring the antenna support structure be completely enclosed by a fence at least 4 feet in height.

8. Appeal.

An applicant for an amateur radio permit may appeal to the City Council any decision made by the Planning Commission. The appeal must be filed within 10 days of the decision by the Planning Commission. The applicant shall submit a statement of reasons why strict conformance with the requirements set forth by the Planning Commission will unreasonably interfere with the operator's ability to receive or transmit signals or impose unreasonable costs on the amateur radio operator when viewed in light of the cost of the equipment.

9. Miscellaneous.

The permissible use of amateur radio antennas within the City shall not affect the limitations regarding other free-standing antennas or towers at set forth in Section 19.04.210.

10. This Ordinance shall become effective upon passage by the Governing Body and posting by the City Recorder as required by the Utah Code.

ADOPTED AND PASSED by the Governing Body of the City of Saratoga Springs, Utah, this 12 day of December, 2006.

CITY OF SARATOGA SPRINGS
A UTAH MUNICIPAL CORPORATION

BY: _____
Mayor

ATTEST:

_____
City Recorder

South Jordan

17.112.020: CONSUMER EQUIPMENT:

This section shall apply to consumer owned or operated wireless communications antennas and dishes related to HAM radio, TV, two- way radio or other communications systems owned or operated by private individuals or groups for noncommercial purposes. Consumer communications antennas which do not exceed a total overall height of forty five feet (45') or satellite dishes not exceeding three feet (3') in diameter are permitted in all zones as provided below. Other consumer communications equipment which does not meet the requirements of this section may be allowed with a conditional use permit.

A. No related equipment may be installed in public view.

B. No nuisance or hazard may be created.

C. No more than one antenna and dish per dwelling unit or main building may be installed.

D. Antennas shall be enclosed in a building or other structure such as a steeple or other architectural structure. If technological or logistical justification would preclude the enclosure of the antenna or dish, the antennas or dish may be placed on the building or property in the least conspicuous location possible as viewed from a public street.

E. The antennas or dishes do not create visual clutter or negatively impact the aesthetics of buildings and uses. (Ord. 2007-02, 1-16-2007)

Syracuse

Syracuse Utah code:

(C) *Exemptions. Non-commercial amateur radio antennas, ham radios, or citizens' band antenna-supporting structures,* satellite-dish antennas, government-owned wireless communications facilities (upon declaration of a state of emergency by federal, state, or local government), antenna-supporting structures, antennas, and/or antenna arrays for AM/FM/TV/HDTV broadcasting transmission facilities licensed by the FCC. (Ord. 04-20)

Summary of Ordinances in Utah Cities

In November 2009 members of the Utah DX Association residing throughout the state from Logan to St. George responded to a questionnaire regarding their installations. These members provided information about 52 tower installations. This is admittedly a small sample. There are over 8000 amateur licensees in the state, over 3100 licensees in Utah County and 358 licensees in Pleasant Grove. Most amateurs do not erect towers and antenna systems to accomplish international communications, but many of us do.

We inquired as to ordinances, building permits, and conditional use permits required for their installations. Of these installations only five are known to have been required to obtain a conditional use permit.

Regarding the ordinances in 27 cities where our members have towers installed:

Fifteen cities make no mention of amateur radio in their code

No city includes amateur radio installations in its ordinance for low power radio.

Five cities specifically exempt amateur radio from their low power radio ordinances:

Cedar City, Cedar Hills, Cottonwood Heights, Logan, Syracuse

Six cities have ordinances specifically for amateur radio.

Clearfield, Riverton, Roy, Salt Lake, Saratoga Springs, South Jordan

Their ordinances allow for installations up to a specified height with no conditional use permit required as follows:

Clearfield and Salt Lake City, 75 feet

Riverton, 65 feet

Saratoga Springs and South Jordan, 45 feet

Each of these cities provide for higher installations upon application for a conditional use permit.

Only 10 of our member's existing 52 towers were under 50 feet in height. The remaining 42 ranged from 50 to 100 feet in height. The typical tower also has one or more antennas mounted on a mast extending 10 or more feet above the tower.

Bountiful City

14.14.112 B covering primary structures excludes antennas and towers from height limitations.

Brigham

29.32 for Wireless installations does not mention amateur radio towers.

Centerville

Article 6 Chapter 12.67 for Wireless does not mention amateur radio towers.

Cedar City

In the ordinances 26-IV-15 covering wireless installations the definition of "Tower" excludes "Non-commercial Antennas" which include "amateur radio antennas from the ordinance."

Cedar Hills

Wireless ordinances in section 10.5.28 D (1) specifically exempt amateur radio antennas owned and operated by a ham licensed by the FCC.

Clearfield

Section 11.13.19 N addresses amateur radio and defers to federal code provisions. Installations allowed up to 75 feet in all zones and greater heights require conditional use permit. No conditional use permit for greater heights in M-1 zone.

Cottonwood Heights

Section 19.83 addresses Wireless installations and 19.83.030 exempts amateur (ham) radio stations licensed by the FCC exempted from the ordinance.

Draper City

Article 6 Chapter 9.41 for Wireless does not mention amateur radio towers.

Eagle Mountain

Section 13.10 for Telecommunication systems does not address amateur radio structures. Building structure height shall not exceed 35 feet. Accessory structures shall not exceed 50 ft. Section 17.25.110 (F) exempts antennas exempted from these limitations.

Holladay City

Has no current ordinance regulating amateur structures.

Kaysville

Title 11 for Wireless does not mention amateur radio towers.

Layton City

19.05.60 addresses Wireless and there is no mention of amateur radio.

Lindon

In a written opinion from their attorney agree that each case must be decided on a case by case basis. Cannot rely on building/structural heights to limit an antenna. No ordinance exits to deal with amateur radio structures. Permit just granted for a 72 ft. antenna support structure to David Banner in November 2009.

Logan City

RFI ordinance 9.36.020 specifically excludes amateur radio.

Morgan City

10-7-6: Wireless Telecommunications Equipment: addresses Wireless only and there is no mention of amateur radio.

Murray City

Has no ordinance. Bob Carter, WQ7R, just met with Building and Planning departments and was told he could apply for and receive a building permit for a tower 55-72 ft. in height with no conditional use permit required.

Payson City

Chapter 19.7 addresses Wireless and there is no mention of amateur radio.

Pleasant Grove

Current ordinance 10-15-36 does not address amateur radio. 10-15-9 (B) sets forth exceptions to height limitations for antennas among other structures.

Provo

14.34.420 is the ordinance for Wireless. No mention of amateur radio.

Riverton

Chapter 12.165.055 allows amateur radio towers to a height of 65 feet without approval of planning commission. Greater heights require conditional use permit.

Roy

Section 10.9a.515 addresses amateur radio towers. Height limited to the distance from the base of structure to nearest property line. Building permit and conditional use permit required. Specifically cites PRB-1 and says city must review applications and modify the requirements if necessary to make a reasonable accomodation.

Salt Lake City

21A.40.090: ANTENNA REGULATIONS: Section D: Height limited to 75 feet, Special Exception For Increased Height: Any person desiring to erect an amateur ("ham") radio antenna in excess of seventy five feet (75') shall file an application for a special exception with the zoning administrator pursuant to chapter 21A.52 of this title. In addition to the other application regulations, the application shall specify the details and dimensions of the proposed antenna and its supporting structures and shall further specify why the applicant contends that such a design and height are necessary to accommodate reasonably amateur radio communication. The zoning administrator shall approve the proposed design and height unless the zoning administrator finds that a different design and height which is less violative of the city's demonstrated health, safety or aesthetic considerations also accommodates reasonably amateur radio communication and, further, that the alternative design and height are the minimum practicable regulation necessary to accomplish the city's actual and demonstrated legitimate purposes. The burden of proving the acceptability of the alternative design shall be on the city.

Sandy City

Ordinance 15A-11-2. Wireless Telecommunications Facilities. No mention of amateur radio towers.

Saratoga Springs

Ordinance 06-21 Regarding Amateur Radio Antennas and Antenna Support Structures. Talks wrongly about the aesthetics in general. Allows for towers of up to 45 feet in height. Mentions amateur radio “permits”, describes the application process and allows for appeal if adhering to the ordinance places an unreasonable interference in ability to transmit or receive, or places an unreasonable financial burden on the applicant.

South Jordan

Title 17.112.020 regulates “Consumer Equipment”. This section shall apply to consumer owned or operated wireless communications antennas and dishes related to HAM radio, TV, two- way radio or other communications systems owned or operated by private individuals or groups for noncommercial purposes. Consumer communications antennas which do not exceed a total overall height of forty five feet (45') or satellite dishes not exceeding three feet (3') in diameter are permitted in all zones as provided below. Other consumer communications equipment which does not meet the requirements of this section may be allowed with a conditional use permit.

Syracuse

Amateur radio antennas exempted from city code.

West Jordan

13.16.02 Wireless communications regulated only. No amateur radio mentioned.

Appendix

Public Relations Talking Points

(As presented to State Legislators in lobbying for HB 79)

1. What is Amateur Radio?
    a. FCC information from its website
2. Federal recognition
    a. Public Law 103-408 Joint Resolution of Congress to Recognize the Achievements of Radio Amateurs and Public Policy
    b. HR 2160
    c. S1755
3. Amateur Radio Service continues to grow
4. The Amateur Radio Emergency Service Brochure
5. 9/11/01: "This is Not a Test"
6. NetGuard proposal

Information about Amateur Radio from the FCC

Wireless Telecommunications Bureau - Amateur Radio Information (FCC Website)

The amateur and amateur-satellite services are for qualified persons of any age who are interested in radio technique solely with a personal aim and without pecuniary interest. These services present an opportunity for self-training, intercommunication, and technical investigations. Twenty-seven small frequency bands throughout the spectrum are allocated to this service internationally. Some 1,300 digital, analog, pulse, and spread-spectrum emission types may be transmitted. Millions of amateur operators in all areas of the world communicate with each other directly or through ad hoc relay systems and amateur-satellites. They exchange messages by voice, teleprinting, telegraphy, facsimile, and television. In areas where the services are regulated by the FCC, an amateur operator must have an FCC or Canadian license. FCC-issued Reciprocal Permit for Alien Amateur Licensee are no longer needed. Reciprocal operation in the U.S. is now authorized by Section 47 C.F.R. § 97.107.

All frequencies are shared. No frequency is assigned for the exclusive use of any amateur station. Station control operators cooperate in selecting transmitting channels to make the most effective use of the frequencies. They design, construct, modify, and repair their stations. The FCC equipment authorization program does not generally apply to amateur station transmitters. Six classes of operator licenses, each authorizing varying levels of privileges, have been issued by the FCC. The class for which each examinee is qualified is determined by the degree of skill and knowledge in operating a station that the examinee demonstrates to volunteer examiners (VEs) in his or her community. Most new amateur operators start at the Technician Class and then advance to the General Class or Amateur Extra Class operator license. The VEs give examination credit for the license class currently held so that examinations required for that license need not be repeated. The VEs construct the written examinations from question pools that have been made public. Helpful study guides and training courses are widely available.

Public Service (FCC Website)

Traditionally, trained volunteer Amateur Radio operators have provided communication support services to government and private relief agencies in times of major local and national disaster. Amateur Radio operators are organized through two primary organizations: Amateur Radio Emergency Service (ARES), and Radio Amateur Civil Emergency Services (RACES).

The amateur community has entered into agreements written as Memoranda of Understanding between the national organization, the Amateur Radio Relay League, and the National Weather Service, American Red Cross, Federal Emergency Management Agency (FEMA), National Communications System, Association of Public Safety Communications Officers, National Association of Radio and Telecommunications Engineers, Salvation Army, Society of Broadcast Engineers, and REACT.

Service is also provided to The Office of Foreign Disaster Assistance (USAID), The National Disaster Medical Service, State and local emergency management organizations, Search and Rescue organizations, Police, Fire and Ambulance groups, Relief Organizations (NVOAD) and Civic organizations, road races and other local functions.

Section 1805(c) of the Homeland Security Act of 2002 (6 U.S.C. 757(c)) directs the Regional Emergency Communications Coordinating Working Group of the Department of Homeland Security to coordinate their activities with ham and Amateur Radio operators among the 11 other emergency organizations, such as ambulance services, law enforcement and others.

Advancement of the State of the Art (FCC Website)

Since the earliest days of radio, new technology and the activities of Amateur Radio operators have gone hand-in-hand. Driven by scientific curiosity and unconstrained by bureaucracy, self-funded amateur experimenters have found better ways to utilize the radio spectrum. In professional capacities in research organizations, Amateur Radio operators work as engineers and researchers, often motivated by their early enthusiasm as "hams."

Among their well-known contributions:

- Pioneers in early radio experimentation
- Promoted continuous wave modulation instead of "spark gap"
- Early explorers of ionospheric propagation for world wide radio
- Developed use of frequencies beyond the High Frequency bands
- Developed early mobile gear for automobiles and aircraft
- Experimented with Single Sideband mode
- Built first civilian communications satellite and pioneered use of inexpensive "microsats"
- Developed early packet radio networks (wireless LANs)
- Developed early linked repeaters (prototype for cellular phone)

- Early experiments in digital signal processing
- Developed new antenna configurations
- Explored new modes of VHF propagation including tropospheric refraction, sporadic-e, aurora and auroral-e, meteor scatter, tropospheric scatter and moonbounce.

Remarks by FCC official during an FCC hearing on Amateur Radio issues, 1990.

"When a disaster strikes...amateur systems assist with relief operations immediately. Often, it is from an amateur...that the world first learns of the disaster."

"Many of our engineers, scientists, astronauts, educators and technicians took their first steps toward their careers when they became amateur operators."

"The concept of broadcasting began when listeners overheard amateur stations exchanging weather reports and baseball scores. The first land mobile systems were built by amateurs. The first hand-held radios were built by amateurs."

"The first satellite station authorized by the FCC was an amateur station. Today, more than 30 [amateur] satellites have been launched."

"This service is ever at the forefront of communications technology."

The Spectrum Needs of Our Nation's First Responders (hearing on June 11, 2003, before the Subcommittee on Telecommunications and the Internet)

In a hearing on June 11, 2003, before the Subcommittee on Telecommunications and the Internet testimony included the following remarks:

Amateur Radio operators set up and operate organized communication networks locally for governmental and emergency officials, as well as non-commercial communication for private citizens affected by the disaster. Amateur Radio operators are most likely to be active after disasters that damage regular lines of communications due to power outages and destruction of telephone, cellular and other infrastructure-dependent systems."

"It [Amateur Radio] also produces capable, trained volunteer communicators in systems of emergency telecommunications that are impervious to disasters of all sorts. These volunteers are ready to respond—and do respond immediately—when all other systems of communications fail, including public safety communications when they 're overloaded, destroyed or lack interoperability.", said Mr. Haynie, President of the ARRL.

Many radio amateurs are active as communications volunteers with local public safety organizations. In addition, in some disasters, radio frequencies are not coordinated among relief officials and Amateur Radio operators step in to coordinate communication when radio towers and other elements in the communications infrastructure are damaged.

"Several witnesses testified that a lack of interoperability among public safety responder at disaster scenes—including the World Trade Center—prevented warning those in danger and resulted in a tragic loss of life."

"In the first hours following the attack of September 11, 2001, the only way we could coordinate the sharing of firefighting, medical examiner, health, and information technology resources with New York City officials was through the highly trained, volunteer Amateur Radio (ham) operators. "This irreplaceable resource must be protected from incursion by other interests.", said Norman Jacknis of the Westchester County, New York, Department of Information Technology.

Amateur Radio Is Recognized as a Resource by National Relief Organizations

Amateur Radio operators have informal and formal groups to coordinate communication during emergencies. At the local level, hams may participate in local emergency organizations, or organize local "traffic nets."At the state level, hams are often involved with state emergency management operations. In addition, hams operate at the national level through the Radio Amateur Civil Emergency Service (RACES), which is coordinated through the Federal Emergency Management Agency, and through the Amateur Radio Emergency Service (ARES), which is coordinated through the American Radio Relay League and its field volunteers.

Many national organizations have formal agreements with the Amateur Radio Emergency Service (ARES) and other Amateur Radio groups including:

Citizen Corps - Department of Homeland Security

Federal Emergency Management Agency

National Communications System

American Red Cross, Salvation Army

National Traffic System | (What is the NTS)

National Weather Service

National Oceanic & Atmospheric Administration

Association of Public Safety Communications Officials

ARES (pdf) | (website), RACES (.pdf), SATERN (.pdf) | (website), MARS - Army (.pdf) | (website), MARS - Air Force | (website), MARS - Navy | (website), SKYWARN (.pdf) | (website)

CNCS Grants Awarded

FOR IMMEDIATE RELEASE
Friday, July 19, 2003

ARRL receives homeland security training grant

The ARRL will receive a $181,900 homeland security grant from the US government to train Amateur Radio operators in emergency communication. The League was among sereral dozen nonprofit organizations designated to receive some $10.3 million in federal money to boost homeland defense volunteer programs. The grant, from the Corporation for National and Community Service special volunteer program, will provide free ARRL Amateur Radio Emergency Communications Course training to 5200 volunteers nationwide, starting in 2003.

FOR IMMEDIATE RELEASE
Friday, September 02, 2005

Volunteer Ham Radio Operators to Receive Grant To Enhance Emergency Communications in Hurricane Region

WASHINGTON, D.C. – The Corporation for National and Community Service today announced a supplemental grant of $100,000 to the American Radio Relay League (ARRL) to support volunteer emergency communication operators who are helping out in Gulf Coast states affected by Hurricane Katrina.

"With the breakdown of regular communication channels caused by the storm, the services provided by volunteer ham radio operators is vitally important, both to organizations and to individuals seeking to connect with loved ones," said David Eisner, CEO of the Corporation. "We're pleased to be able to provide this extra assistance at this critical time."

The grant will support AARL's "Ham Aid" program, which was established with a grant from the Corporation in 2002 to increase emergency certification training for ham radio operators. Corporation funds may also be used to help rebuild the emergency communications capabilities in Louisiana, Mississippi, and Alabama.

Since the storm hit, amateur radio operators with ARRL have been working side by side with volunteers from the Red Cross, the Salvation Army, and other relief organizations to help coordinate those groups' emergency communications activities. In the run-up to the Katrina's hitting the U.S. mainland, volunteer amateur radio operators also worked with the National Hurricane Center and the National Oceanic and Atmospheric Administration to monitor the storm and to help prepare the Gulf Coast for its arrival.

Approximately 500 ham operators currently are deployed in the Gulf area, and hundreds more are expected to arrive in teams over the next several weeks. Many currently are awaiting permission to enter the disaster areas to set up communications systems to transmit and receive messages both for relief organizations and for individuals wishing to get messages out to concerned families. While in the region, the radio operators will also be developing new relationships with local community groups, including faith-based organizations, food banks, and shelters.

The Ham Aid program was developed by ARRL, based in Newington, Conn., under a 2002 training grant from the Corporation. The three-year grant was one of 18 Special Volunteer Program Homeland Security Grants awarded by the agency in the wake of the September 11 terror attacks to engage volunteers in public safety, public health, and disaster preparedness and response activities. Thus far, the grant has enabled AARL to provide certification in emergency communications protocols to more than 5,400 volunteer amateur radio operators.

The Corporation for National and Community Service provides opportunities for Americans of all ages and backgrounds to serve their communities and country through three programs: Senior Corps, AmeriCorps, and Learn and Serve America. Together with USA Freedom Corps, the Corporation is working to foster a culture of citizenship, service, and responsibility in America. For more information, visit http://www.nationalservice.gov.

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2009 Sees Surge of New Amateur Radio Licensees

In 2009, the FCC issued more than 30,000 new Amateur Radio licenses -- an almost 3 percent increase in the number of new licenses issued in 2008. At the end of 2009, there were 17,084 Novices, 334,245 Technicians, 150,970 Generals, 60,795 Advanced and 119,403 Amateur Extra class licensees.

This past year was a banner year for new Amateur Radio licensees. According to ARRL VEC Manager Maria Somma, AB1FM, the FCC issued more than 30,000 new ham radio licenses. "In 2009, the demand for Amateur Radio exam sessions remained elevated and is still running at a higher rate than before the FCC's restructuring of the license requirements in 2007," Somma said. "This high level of exam session activity has produced an elevated influx of new applications, far outpacing recent years."

A total of 30,144 new licenses were granted in 2009, an increase of almost 7.5 percent from 2008. In 2005, 16,368 new hams joined Amateur Radio's ranks; just five years later, that number had increased by almost 14,000 -- a whopping 84 percent! The ARRL VEC is one of 14 VECs who administer Amateur Radio license exams.

"When looking at the statistics over the last 10 years, these are some the highest numbers we've seen," Somma explained. "Additionally, our total number of licensees across all three classes has grown each year." Currently there are 682,500 licensed Amateur Radio operators in the US, an almost 3 percent rise over 2008. In 2008, there were 663,500 licensed amateurs; there were 655,800 in 2007. Broken down by license class, at the end of 2009 there were 17,084 Novices, 334,245 Technicians, 150,970 Generals, 60,795 Advanced and 119,403 Amateur Extra licensees.

"The ARRL VEC has been busy meeting the needs of the Amateur Radio community by helping people to become radio amateurs or upgrade their existing licenses," Somma said. "In 2009, ARRL VEs administered 44,595 exam elements at 6369 ARRL VEC-sponsored exam sessions. The number of amateurs who want to be Volunteer Examiners and who want to teach Amateur Radio classes is also going up -- we've seen a spike in the number of applications from General and Extra class radio amateurs who want to give back to their community by serving as ARRL examiners and instructors."

Somma applauded all the volunteers whose "hard work and contribution of countless hours of time helps to ensure the future of Amateur Radio. The ARRL VEC thanks our 32,411 VEs from around the world whose dedication and service helped to contribute to the success of Amateur Radio. I am delighted by these important achievements. 2009 was a very good year for Amateur Radio and I am excited by the promise of 2010"

NEW FCC LICENSES
ISSUED 2005 THROUGH 2009

Year	2005	2006	2007	2008	2009
Jan	876	1,274	1,647	1,755	1,960
Feb	1,357	1,605	2,435	2,998	2,263
Mar	1,705	2,531	3,478	2,816	3,463
Apr	1,486	1,728	2,673	3,090	3,430
May	1,651	2,283	2,607	2,562	2,717
Jun	1,493	1,967	2,281	2,402	3,011
Jul	906	1,401	1,786	2,077	2,220
Aug	1,500	1,623	2,183	2,084	2,102
Sep	1,139	1,357	1,462	1,763	2,116
Oct	1,385	1,781	2,109	2,303	2,404
Nov	1,540	1,993	2,132	2,197	2,344
Dec	1,330	1,569	1,935	2,019	2,114
Totals	16,368	21,112	26,728	28,066	30,144

Differences in nature of services

Amateur and commercial services are regulated differently because they are fundamentally different services.

Commercial Services

Commercial low power radio services are regulated in federal law under Section 704 of the Act (47 U.S.C. 332(c)(7)(c)).

The types of antennas employed and structures upon which they are attached in these services, as well as the types of equipment and building structures required to house them, is substantially different in character than those used by amateur radio operators. Typical of installations are in this service are monopole towers with multiple antennas co-located for multiple licensees and antennas mounted on roofs or sides of large buildings. Equipment buildings which require gravel, security fencing and screening are normally associated with the towers.

Towers (tall structures (typically over 200 ft) used for Cellular, Paging and other radios services can support multiple antennas owned by various companies) and antennas located within 4 miles of a location may be found at the following web address: http://www.antennasearch.com/sitestart.asp)

Amateur Service

The amateur service established under the Communications Act of 1996, is regulated under Title 47 §97 of the federal codes as a voluntary noncommercial communication service, particularly with respect to providing emergency communications.

Amateur radio stations (equipment) are typically located inside residences in residential zones. Antenna support structures are typically triangular lattice type construction with 12-18" faces and are either guyed or self-supporting. Many self-supporting towers are capable of being telescoped from nested positions to heights of 55-89 feet. Some structures are poles or masts and may also be telescoping in nature. Antennas employed are typically YAGI designs which utilize relatively thin metal elements or wires. The nature of amateur radio installations is that they are much less visible than are commercial tower installations.

In times of emergency, amateurs provide not only their antennas and equipment, free of charge, but also the personnel trained to man the gear as well. Amateur operators at their own expense experiment, develop and promote technologies that find their way into our everyday lives such as the origins of satellite communications, delivery of critical data to police patrol cars on the road, television and cellular telephones.

The United States Congress has repeatedly recognized the value of the amateur service expressing, for example in Public Law 103-408 a Joint Resolution of Congress to Recognize the Achievements of Radio Amateurs as Public Policy that

> (1) radio amateurs are hereby commended for their contributions to technical progress in electronics, and for their emergency radio communications in times of disaster;
>
> (2) the Federal Communications Commission is urged to continue and enhance the development of the amateur radio service as a public benefit by adopting rules and regulations which encourage the use of new technologies within the amateur radio service; and
>
> (3) reasonable accommodation should be made for the effective operation of amateur radio from residences, private vehicles and public areas, and that regulation at all levels of government should facilitate and encourage amateur radio operation as a public benefit.

Principal objections are usually aesthetic

The Primary objection seems always to be the aesthetic, though that specific reason is often approached with an argument about safety, property valuation, or some other concern.

1. Cases that speak to aesthetics.

Structural Safety

1. Fences around the antenna? Saratoga calls for 4 ft. fence.
2. Towers don't fall as a stick or jump. They crumble.
3. Towers are over-engineered for wind loads
4. Manufacturers adhere to international building codes (TIA/EIA)

5. ## Electromagnetic Radiation Levels

Radio Frequency Interference

According to the ARRL, in one word -- everyone. Everyone involved in an interference problem may have responsibilities and they must address those responsibilities fairly if a solution is to be found. Over and above the letter of the law, the FCC encourages an atmosphere of cooperation and trust when it comes to resolving RFI problems.

In many cases, responsibility may be shared between various people involved in the problem, but often to varying degrees. For examples, if an electrical noise generator is the source of the interference, it is the responsibility of the device operator to rectify the problem. If the amateur transmitter is being operated in a completely legal manner using good engineering practice, the interference is probably caused by design deficiencies in the affected device, often fundamental overload.

Let's cut to the chase -- most hams want the answer to one question: "When one of my neighbors has an interference problem, what do the rules say about whether it is my fault or not?" This question is especially important if one of your neighbors raises it. The bottom line is simple: The amateur is responsible for the proper operation of his or her station. This means that all Part 97 rules must be followed at all times. If the amateur isn't experiencing a problem with his own consumer equipment, it's a pretty sure bet that his equipment isn't at fault.

As an amateur, you are directly responsible for interference that results from FCC rules violations at your station. In the RFI world, this means that if your station is transmitting signals outside the amateur band that cause interference to other radio services, it is your responsibility. This is the only specific requirement under Part 97 rules.

Only the FCC has jurisdiction over interference! Municipal zoning authorities, including local law enforcement officials, do not have that authority.

As with restrictive antenna ordinances, the FCC, through a directive from Congress, has preempted any concurrent state or local regulation of RFI pursuant to the provisions of §302(a) of the Communications Act of 1934, as amended. The legal cite is: 47 USC §302(a) and it provides that the:

> Commission may, consistent with the public interest, convenience, and necessity, make reasonable regulations (1) governing the interference potential of devices which in their operation are capable of emitting radio frequency energy by radiation, conduction, or other means in sufficient degree to cause harmful interference to radio communications; and (2) establishing minimum performance standards for home electronic equipment and systems to reduce their susceptibility to interference from radio frequency energy. Such regulations shall be applicable to the manufacture, import, sale, offer for sale, or shipment of such devices and home electronic equipment and systems, and to the use of such devices.

The legislative history of §302(a) provides explicitly that the Commission has exclusive authority to regulate radio frequency interference (RFI). In its Conference Report No. 97-765, Congress declared:

> The Conference Substitute is further intended to clarify the reservation of exclusive jurisdiction to the Federal Communications Commission over matters involving RFI. Such matters shall not be regulated by local or state law, nor shall radio transmitting be subject to local or state regulation as part of any effort to resolve an RFI complaint.

The legal cite for this report is: H.R. Report No. 765, 97th Cong., 2d Sess. 33 (1982), reprinted at 1982 U.S. Code Cong. & Ad News 2277.

State laws and local ordinances that require amateurs to cease operations or incur penalties as a consequence of radio interference thus have been entirely preempted by Congress. This was written by then-FCC General Counsel Robert L. Pettit in a letter dated February 14, 1990 to ARRL General Counsel Chris Imlay, W3KD.

Antenna Height and Communications Effectiveness

Excerpts from an ARRL publication by Dean Straw and Gerald Hall follow (full paper available on request):

Executive Summary

Amateur radio operators, or "hams" as they are called, communicate with stations located all over the world. Some contacts may be local in nature, while others may be literally halfway around the world. Hams use a variety of internationally allocated frequencies to accomplish their communications.

Except for local contacts, which are primarily made on Very High and Ultra High Frequencies (VHF and UHF), communicating between any two points on the earth rely primarily on high-frequency (HF) signals propagating through the ionosphere. The earth's ionosphere acts much like a mirror at heights of about 150 miles. The vertical angle of radiation of a signal launched from an antenna is one of the key factors determining effective communication distances. The ability to communicate over long distances generally requires a low radiation angle, meaning that an antenna must be placed high above the ground in terms of the wavelength of the radio wave being transmitted.

A beam type of antenna at a height of 70 feet or more will provide greatly superior performance over the same antenna at 35 feet, all other factors being equal. A height of 120 feet or even higher will provide even more advantages for long-distance communications. To a distant receiving station, a transmitting antenna at 120 feet will provide the effect of approximately 8 to 10 times more transmitting power than the same antenna at 35 feet. Depending on the level of noise and interference, this performance disparity is often enough to mean the difference between making distant radio contact with fairly reliable signals, and being unable to make distant contact at all.

Radio Amateurs have a well-deserved reputation for providing vital communications in emergency situations, such as in the aftermath of a severe ice storm, a hurricane or an earthquake. Short-range communications at VHF or UHF frequencies also require sufficient antenna heights above the local terrain to ensure that the antenna has a clear horizon.

In terms of safety and aesthetic considerations, it might seem intuitively reasonable for a planning board to want to restrict antenna installations to low heights. However, such height restrictions often prove very counterproductive and frustrating to all parties involved. If an amateur is restricted to low antenna heights, say 35 feet, he will suffer from poor transmission of his own signals as well as poor reception of distant signals. In an attempt to compensate on the transmitting side (he can't do anything about the poor reception problem), he might boost his transmitted power, say from 150 watts to 1,500 watts, the maximum legal limit. This ten-fold increase in power will very significantly increase the potential for interference to telephones, televisions, VCRs and audio equipment in his neighborhood.

Instead, if the antenna can be moved farther away from neighboring electronic devices— putting it higher, in other words—this will greatly reduce the likelihood of interference, which decreases at the inverse square of the distance. For example, doubling the distance reduces the potential for interference by 75%. As a further benefit, a large antenna doesn't look anywhere near as large at 120 feet as it does close-up at 35 feet.

As a not-so-inconsequential side benefit, moving an antenna higher will also greatly reduce the potential of exposure to electromagnetic fields for neighboring human and animals. Interference and RF exposure standards have been thoroughly covered in recently enacted Federal Regulations.

The purpose of this paper is to provide general information about communications effectiveness as related to the physical height of antennas. The intended audience is amateur radio operators and the city and town Planning Boards before which a radio amateur must sometimes appear to obtain building permits for radio towers and antennas.

The performance of horizontally polarized antennas at heights of 35, 70 and 120 feet is examined in detail. Vertically polarized arrays are not considered here because at short-wave frequencies, over average terrain and at low radiation angles, they are usually less effective than horizontal antennas.

Antenna Height and Interference

Extensive Federal Regulations cover the subject of interference to home electronic devices. It is an unfortunate fact of life, however, that many home electronic devices (such as stereos, TVs, telephones and VCRs) do not meet the Federal standards. They are simply inadequately designed to be resistant to RF energy in their vicinity. Thus, a perfectly legal amateur-radio transmitter may cause interference to a neighbor's VCR or TV because cost-saving shortcuts were taken in the design and manufacture of these home entertainment devices. Unfortunately, it is difficult to explain to an irate neighbor why his brand-new $1000 stereo is receiving the perfectly legitimate transmissions by a nearby radio operator.

The potential for interference to any receiving device is a function of the transmitter power, transmitter frequency, receiver frequency, and most important of all, the proximity of the transmitter to the potential receiver. The transmitted field intensity decreases as the inverse square of the distance. This means that doubling the height of an antenna from 35 to 70 feet will reduce the potential for interference by 75%. Doubling the height again to 140 feet high would reduce the potential another 75%. Higher is better to prevent interference in the first place!

Recently enacted Federal Regulations address the potential for harm to humans because of exposure to electromagnetic fields. Amateur-radio stations rarely have problems in this area, because they use relatively low transmitting power levels and intermittent duty cycles compared to commercial operations, such as TV or FM broadcast stations. Nevertheless, the potential for RF exposure is again directly related to the distance separating the transmitting antenna and the human beings around it. Again, doubling the height will reduce potential exposure by 75%. The higher the antenna, the less there will any potential for significant RF exposure.

THE WORLD IS A VERY COMPLICATED PLACE

It should be pretty clear by now that designing scientifically valid communication systems is an enormously complex subject. The main complications come from the vagaries of the medium itself, the Earth's ionosphere. However, local terrain can considerably complicate the analysis also.

The main points of this paper may be summarized briefly:

The radiation elevation angle is the key factor determining effective communication distances beyond line-of-sight. Antenna height is the primary variable under control of the station builder, since antenna height affects the angle of radiation.

In general, placing an amateur antenna system higher in the air enhances communication capabilities and also reduces chances for electromagnetic interference with neighbors.

Location of Commercial

Towers and Antennas

The following website provides mapping of commercial towers and antennas: www.antennasearch.com

Sample Proposed Ordinance

An ordinance of XXXX City, XXXX County, Utah

WHEREAS, the legislative body has previously adopted ordinances intended to regulate Low Power Radio Communication Towers and Antennas in within the City, as defined in the ordinance XX-XX-XX; and

WHEREAS, the legislative body has indicated a need for amendments to the said ordinance for the purpose of updating the municipal code to conform to federal and state law regulating Amateur Radio; and

WHEREAS, Amateur Radio is regulated by the Federal Communications Commission (FCC) in 47 CFR §97; and

WHEREAS, the state of Utah has also codified certain federal law as 10-9a-515 UCA wherein a municipality may not enact or enforce an ordinance that does not comply with the FCC ruling "Amateur Radio Preemption, 101 FCC 2nd 952 (1985)"; and

WHEREAS, the nature of Amateur Radio differs from the services regulated in XX-XX-XX in that it is non-commercial, serves the public interest by providing equipment and trained operators in times of emergency, contributes to the advancement of communication technology, and promotes international goodwill; and

WHEREAS, regulations must reasonably accommodate amateur radio and represent the minimal practicable regulation; and

WHEREAS, the XXXX Planning Commission recommended to the XXXX City Council that a separate ordinance by to the XXXX Municipal Code be approved; and

WHEREAS, on _____ the XXXX City Council held a public hearing to consider the matter; and

WHEREAS, at its meeting the XXXX City Council was satisfied that the amendments to the XXXX Municipal Code are in the best interest of the public and consistent with the goals and policies of the General Plan.

NOW, THEREFORE, BE IT ORDAINED by the City Council of XXXX City, XXXX County, State of Utah, as follows:

Section XX-XX-XX, of the XXXX XXXX City Municipal Code shall read as follows:

XX-XX-XX: Amateur Radio Support Structures and Antennas

Definitions.

"Amateur Radio Antenna" shall mean any antenna which is used for purpose of transmitting and receiving radio signals in conjunction with an amateur radio station licensed by the Federal Communications Commission.

"Antenna Support Structure" shall mean any structure, mast, pole, tripod or tower utilized for the purpose of supporting an amateur radio antenna.

Permitted Use.

Amateur radio antennas and structures are permitted as an accessory use in all zoning districts, except the XXXX zone, subject to the issuance of any appropriate building permit.

Permit Required.

It shall be unlawful for any person to install, construct or increase the height of any antenna support structure without first obtaining a building permit, except that no permit shall be required if the height of the support structure (excluding the height of any building to which the antenna support structure is attached) is less than 12 feet.

Permit Application.

Application for a building permit shall be made upon such forms requested by the city and shall have attached the following items:

A site plan identifying the boundary, location of existing buildings or structures and the proposed location for the antenna support structure.

Manufacturer's specifications for the antenna support structure and details of footings and guys.

A copy of the applicant's Amateur Radio License.

A building permit fee of $22.00 or other building permit fee as adopted by the city from time to time by the City Council.

Height Limitation.

Antenna support structures may have a height of seventy-five feet (75') above grade including the height of any building upon which the antenna support structure is mounted.

Antenna support structures to exceed seventy-five feet in height may be allowed with a conditional use permit. Application for such permit shall specify why the applicant contends that such a design and height are necessary to achieve the communications desired. The city, in considering the application, must apply the minimal practicable regulation necessary to achieve its goal of protecting the welfare of the community while ensuring the regulation will not impinge on the needs of the amateur operator to engage in amateur communications.

Attachment "2"

Hi Sean,

Thanks for your inquiry. We are glad you thought to contact some radio amateurs before enacting regulations that affect them and will be happy to share information.

The FCC rules for the Amateur Radio service allow operation in a large number of bands and modes, and depending on the goals of a particular amateur operator, the antenna support(s) needed may range from a 10-foot pole to a tower hundreds of feet tall. There really is no one size that fits all situations.

However, there really is something "magic" about the 75-foot height. The frequency band most used for contacts with other countries is the 14-MHz (or "20-meter") band. Signals from an antenna radiate, to some extent, in all directions, including toward the ground. It happens that near 75 feet is a height where ground reflections of 14-MHz signals return to the antenna in the correct phase to reinforce (rather than cancel) the incident wave. For this reason amateur 75-foot towers are very common, and towers above, perhaps, 80 feet are very uncommon. Increasing the height of a tower always increases the cost, difficulty of maintenance, and likelihood of lightening hits; while increasing the height small amounts over 75 feet can actually cause a reduction in signal strength on the horizon. So the 70- to 75-foot area is a "sweet spot" for cost versus benefit. That may be the reason for numbers in that range appearing in some zoning regulations.

You may be aware of FCC's declaration of federal preemption in the case of amateur antenna height, and the fact that the Utah Legislature incorporated its language in a public law several years ago. The whole FCC proceeding can be found at: http://wireless.fcc.gov/services/index.htm?job=prb-1&id=amateur&page=1 The crux of it, though, is this passage:

"We will not, however, specify any particular height limitation below which a local government may not regulate, nor will we suggest the precise language that must be contained in local ordinances, such as mechanisms for special exceptions, variances, or conditional use permits. Nevertheless, local regulations which involve placement, screening, or height of antennas based on health, safety, or aesthetic considerations must be crafted to accommodate reasonably amateur communications, and to represent the minimum practicable regulation to accomplish the local authority's legitimate purpose."

I will forward this to Mel Parkes, the Utah Section Manager for the national association of radio amateurs. He has been more involved than I in regulatory matters and may have further comments or suggestions.

Sincerely,

Gordon Smith
(Board member of the Utah Amateur Radio Club)

Attachment "3"
Federal Communications Commission

PRB-1 (1985)

Adopted 9/16/1985
Released 9/19/1985
MEMORANDUM OPINION AND ORDER (FCC 85-506)
Federal preemption of state and Local Regulations Pertaining to Amateur Radio Facilities
Before the Federal Communications Commission Washington, D.C. 20554 36149
By the Commission: Commissioner Rivera not participating.

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Background

1. On July 16, 1984, the American Radio Relay League, Inc. (ARRL) filed a Request for Issuance of a Declaratory Ruling asking us to delineate the limitations of local zoning and other local and state regulatory authority over Federally-licensed radio facilities. Specifically, the ARRL wanted an explicit statement that would preempt all local ordinances which provably preclude or significantly inhibit effective, reliable amateur radio communications. The ARRL acknowledges that local authorities can regulate amateur installations to insure the safety and health of persons in the community, but believes that those regulations cannot be so restrictive that they preclude effective amateur communications.
2. Interested parties were advised that they could file comments in the matter. [1] With extension, comments were due on or before December 26, 1984[2], with reply comments due on or before January 25, 1985[3]. Over sixteen hundred comments were filed.

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Local Ordinances

3. Conflicts between amateur operators regarding radio antennas and local authorities regarding restrictive ordinances are common. The amateur operator is governed by the regulations contained in Part 97 of our rules. Those rules do not limit the height of an amateur antenna but they require, for aviation safety reasons, that certain FAA notification and FCC approval procedures must be followed for antennas which exceed 200 feet in height above ground level or antennas which are to be erected near airports. Thus, under FCC rules some amateur antenna support structures require obstruction marking and lighting. On the other hand, local municipalities or governing bodies frequently enact regulations limiting antennas and their support structures in height and locations, e.g. to side or rear yards, for health, safety or aesthetic considerations. These limiting regulations can result in conflict because the effectiveness of the communications that emanate from an amateur radio station are directly dependent upon the

location and the height of the antenna. Amateur operators maintain that they are precluded from operating in certain bands allocated for their use if the height of their antennas is limited by a local ordinance.

4. Examples of restrictive local ordinances were submitted by several amateur operators in this proceeding. Stanley J. Cichy, San Diego, California, noted that in San Diego amateur radio antennas come under a structures ruling which limits building heights to 30 feet. Thus, antennas there are also limited to 30 feet. Alexander Vrenlos, Mundelein, Illinois wrote that an ordinance of the Village of Mundelein provides that an antenna must be a distance from the property line that is equal to one and one-half times its height. In his case, he is limited to an antenna tower for his amateur station just over 53 feet in height.

5. John C. Chapman, an amateur living in Bloomington, Minnesota, commented that he was not able to obtain a building permit to install an amateur radio antenna exceeding 35 feet in height because the Bloomington city ordinance restricted "structures" heights to 35 feet. Mr. Chapman said that the ordinance, when written, undoubtedly applied to buildings but was now being applied to antennas in the absence of a specific ordinance regulating them. There were two options open to him if he wanted to engage in amateur communications. He could request a variance to the ordinance by way of a hearing before the City Council, or he could obtain affidavits from his neighbors swearing that they had no objection to the proposed antenna installation. He got the building permit after obtaining the cooperation of his neighbors. His concern, however, is that he had to get permission from several people before he could effectively engage in radio communications for which he had a valid FCC amateur license.

6. In addition to height restrictions, other limits are enacted by local jurisdictions -- anti-climb devices on towers or fences around them; minimum distances from high voltage power lines; minimum distances of towers from property lines; and regulations pertaining to the structural soundness of the antenna installation. By and large, amateurs do not find these safety precautions objectionable. What they do object to are the sometime prohibitive, non-refundable application filing fees to obtain a permit to erect an antenna installation and those provisions in ordinances which regulate antennas for purely aesthetic reasons. The amateurs contend, almost universally, that "beauty is in the eye of the beholder." They assert that an antenna installation is not more aesthetically displeasing than other objects that people keep on their property, e.g. motor homes, trailers, pick-up trucks, solar collectors and gardening equipment.

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Restrictive Comments

7. Amateur operators also oppose restrictions on their amateur operations which are contained in the deeds for their homes or in their apartment leases. Since these restrictive covenants are contractual agreements between private parties, they are not generally a matter of concern to the Commission. However, since some amateurs who commented in this proceeding provided us with examples of restrictive covenants, they are included for information. Mr. Eugene O. Thomas of Hollister, California included in his comments an extract of the Declaration of Covenants and Restrictions for Ridgemark Estates, County of San Benito, State of California. It provides:

"No antenna for transmission or reception of radio signals shall be erected outdoors for use by any dwelling unit except upon approval of the Directors. No radio or television signals or any other form of electomagnetic radiation shall be permitted to originate from any lot

which may unreasonably interfere with the reception of television or radio signals upon any other lot."
Marshall Wilson, Jr. provided a copy of the restrictive covenant contained in deeds for the Bell Martin Addition #2, Irving, Texas. It is binding upon all of the owners or purchasers of the lots in the said addition, his or their heirs, executors, administrators or assigns. It reads:
"No antenna or tower shall be erected upon any lot for the purpose of radio operations. William J. Hamilton resides in an apartment building in Gladstone, Missouri. He cites a clause in his lease prohibiting the erection of an antenna. He states that he has been forced to give up operating amateur radio equipment except a hand-held 2 meter (144-148 MHz) radio transceiver. He maintains that he should not be penalized just because he lives in an apartment."
Other restrictive covenants are less global in scope than those cited above. For example, Robert Webb purchased a home in Houston, Texas. His deed restriction prohibited "transmitting or receiving antennas extending above the roof line."
8. Amateur operators generally oppose restrictive covenants for several reasons. They maintain that such restrictions limit the places that they can reside if they want to pursue their hobby of amateur radio. Some state that they impinge on First Amendment rights of free speech. Others believe that a constitutional right is being abridged because, in their view, everyone has a right to access the airwaves regardless of where they live.
9. The contrary belief held by housing subdivision communities and condominium or homeowner's associations is that amateur radio installations constitute safety hazards, cause interference to other electronic equipment which may be operated in the home (televisions, radio, stereos) or are eyesores that detract from the aesthetic and tasteful appearance of the housing development or apartment complex. To counteract these negative consequences, the subdivisions and associations include in their deeds, leases or by-laws restrictions and limitations on the location and height of antennas or, in some cases, prohibit them altogether. The restrictive covenants are contained in the contractual agreement entered into at the time of the sale or lease of the property. Purchasers or lessees are free to choose whether they wish to reside where such restrictions on amateur antennas are in effect or settle elsewhere.
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Supporting Comments

10. The Department of Defense (DOD) supported the ARRL and emphasized in its comments that continuesd success of existing national security and emergency preparedness telecommunications plans involving amateur stations would be severely diminished if state and local ordinances were allowed to prohibit the construction and usage of effective amateur transmission facilities. DOD utilizes volunteers in the Military Affiliate Radio Service (MARS)[4], Civil Air Patrol (CAP) and the Radio Amateur Civil Emergency Service (RACES). It points out that these volunteer communicators are operating radio equipment installed in their homes and that undue restrictions on antennas by local authorities adversely affected their efforts. DOD states that the responsiveness of these volunteer systems would be impaired if local ordinances interfere with the effectiveness of these important national telecommunication resources. DOD favors the issuance of a ruling that would set limits for local and state regulatory bodies when they are dealing with amateur stations.
11. Various chapters of the American Red Cross also came forward to support the ARRL's request for a preemptive ruling. The Red Cross works closely with amateur radio volunteers. It

believes that without amateurs' dedicated support, disaster relief operations would significantly suffer and that its ability to serve disaster victims would be hampered. It feels that antenna height limitations that might be imposed by local bodies will negatively affect the service now rendered by the volunteers.

12. Cities and counties from various parts of the United States filed comments in support of the ARRL's request for a Federal preemption ruling. The comments from the Director of Civil Defense, Port Arthur, Texas are representative:

The Amateur Radio Service plays a vital role with our Civil Defense program here in Port Arthur and the design of these antennas and towers lends greatly to our ability to communicate during times of disaster.

We do not believe that there should be any restrictions on the antennas and towers except for reasonable safety precautions. Tropical storms, hurricanes and tornadoes are a way of life here on the Texas Gulf Coast and good communications are absolutely essential when preparing for a hurricane and even more so during recovery operations after the hurricane has past.

13. The Quarter Century Wireless Association took a strong stand in favor of the issuance of a declaratory ruling. It believes that Federal preemption is necessary so that there will be uniformity for all Amateur radio installations on private property throughout the United States.

14. In its comments, the ARRL argued that the Commission has the jurisdiction to preempt certain local land use regulations which frustrate or prohibit amateur communications. It said that the appropriate standard in preemption cases is not the extent of state and local interest in a given regulation, but rather the impact of that regulation on Federal goals. Its position is that Federal preemption is warranted whenever local governmental regulations relate adversely to the operational aspects of amateur communication. The ARRL maintains that localities routinely employ a variety of land use devices to preclude the installation of effective amateur antennas, including height restrictions, conditional use permits, building setbacks and dimensional limitations on antennas. It sees a declaratory ruling of Federal preemption as necessary to cause municipalities to accommodate amateur operator needs in land use planning efforts.

15. James C. O'Connell, an attorney who has represented several amateurs before local zoning authorities, said that requiring amateurs to seek variances or special use approval to erect reasonable antennas unduly restricts the operation of amateur stations. He suggested that the Commission preempt zoning ordinances which impose antenna height limits of less than 65 feet. He said that this height would represent a reasonable accommodation of the communication needs of most amateurs and the legitimate concerns of local zoning authorities.

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Opposing Comments

16. The City of La Mesa, California has a zoning regulation which controls amateur antennas. Its comments reflected an attempt to reach a balanced view.

This regulation has neither the intent, nor the effect, of precluding or inhibiting effective and reliable communications. Such antennas may be built as long as their construction does not unreasonably block views or constitute eyesores. The reasonable assumption is that there are always alternatives at a given site for different placement, and/or methods for aesthetic treatment. Thus, both public objectives of controlling land use for the public health, safety, and convenience, and providing an effective communications network, can be satisfied.

A blanket ruling to completely set aside local control, or a ruling which recognizes control only for the purpose of safety of antenna construction, would be contrary to . . . legitimate local control.

17. Comments from the County of San Diego state:

While we are aware of the benefits provided by amateur operators, we oppose the issuance of a preemption ruling which would elevate 'antenna effectiveness' to a position above all other considerations. We must, however, argue that the local government must have the ability to place reasonable limitations upon the placement and configuration of amateur radio transmitting and receiving antennas. Such ability is necessary to assure that the local decision-makers have the authority to protect the public health, safety and welfare of all citizens. In conclusion, I would like to emphasize an important difference between your regulatory powers and that of local governments. Your Commission's approval of the preemptive requests would establish a 'national policy'. However, any regulation adopted by a local jurisdiction could be overturned by your Commission or a court if such regulation was determined to be unreasonable.

18. The City of Anderson, Indiana, summarized some of the problems that face local communities:

I am sympathetic to the concerns of these antenna owners and I understand that to gain the maximum reception from their devices, optimal location is necessary. However, the preservation of residential zoning districts as 'liveable neighborhoods' is jeopardized by placing these antennas in front yards of homes. Major problems of public safety have been encountered, particularly vision blockage for auto and pedestrian access. In addition, all communities are faced with various building lot sizes. Many building lots are so small that established setback requirements (in order to preserve adequate air and light) are vulnerable to the unregulated placement of these antennas. . . . the exercise of preemptive authority by the FCC in granting this request would not be in the best interest of the general public.

19. The National Association of Counties (NACO), the American Planning Association (APA) and the National League of Cities (NLC) all opposed the issuance of an antenna preemption ruling. NACO emphasized that federal and state power must be viewed in harmony and warns that Federal intrusion into local concerns of health, safety and welfare could weaken the traditional police power exercised by the state and unduly interfere with the legitimate activities of the states. NLC believed that both Federal and local interests can be accommodated without preempting local authority to regulate the installation of amateur radio antennas. The APA said that the FCC should continue to leave the issue of regulating amateur antennas with the local government and with the state and Federal courts.

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Discussion

20. When considering preemption, we must begin with two constitutional provisions. The tenth amendment provides that any powers which the constitution does not delegate to the United States or does not prohibit the states from exercising are reserved to the states. These are the police powers of the states. The Supremacy Clause, however, provides that the constitution and the laws of the United States shall supersede any state law to the contrary. Article III, Section 2. Given these basic premises, state laws may be preempted in three ways: First, Congress may expressly preempt the state law. See Jones v. Rath Packing Co., 430 U.S. 519, 525 (1977). Or, Congress may indicate its intent to completely occupy a given field so that any state law encompassed within that field would implicitly be preempted. Such intent to preempt could be

found in a congressional regulatory scheme that was so pervasive that it would be reasonable to assume that Congress did not intend to permit the states to supplement it. See Fidelity Federal Savings & Loan Ass'n v. de la Cuesta, 458 U.S. 141, 153 (1982). Finally, preemption may be warranted when state law conflicts with federal law. Such conflicts may occur when "compliance with both Federal and state regulations is a physical impossibility," Florida Lime and Avocado Growers, Inc. v. Paul, 373 U.S. 132, 142, 143 (1963), or when state law "stands as an obstacle to the accomplishment and execution of the full purposes and objectives of Congress," Hines v. Davidowitz, 312 U.S. 52, 67 (1941). Furthermore, federal regulations have the same preemptive effect as federal statutes. Fidelity Federal Savings & Loan Association v. de la Cuesta, supra.

21. The situation before us requires us to determine the extent to which state and local zoning regulations may conflict with federal policies concerning amateur radio operators.

22. Few matters coming before us present such a clear dichotomy of viewpoint as does the instant issue. The cities, counties, and local communities and housing associations see an obligation to all of their citizens and try to address their concerns. This is accomplished through regulations, ordinances or covenants oriented toward the health, safety and general welfare of those they regulate. At the opposite pole are the individual amateur operators and their support groups who are troubled by local regulations which may inhibit the use of amateur stations or, in some instances, totally preclude amateur communications. Aligned with the operators are such entities as the Department of Defense, the American Red Cross and local civil defense and emergency organizations who have found in Amateur Radio a pool of skilled radio operators and a readily available backup network. In this situation, we believe it is appropriate to strike a balance between the federal interest in promoting amateur operations and the legitimate interests of local governments in regulating local zoning matters. The cornerstone on which we will predicate our decision is that a reasonable accommodation may be made between the two sides.

23. Preemption is primarily a function of the extent of the conflict between federal and state and local regulation. Thus, in considering whether our regulations or policies can tolerate a state regulation, we may consider such factors as the severity of the conflict and the reasons underlying the state's regulations. In this regard, we have previously recognized the legitimate and important state interests reflected in local zoning regulations. For example, in Earth Satellite Communications, Inc., 95 FCC 2d 1223 (1983), we recognized that . . . countervailing state interests inhere in the present situation . . . For example, we do not wish to preclude a state or locality from exercising jurisdiction over certain elements of an SMATV operation that properly may fall within its authority, such as zoning or public safety and health, provided the regulation in question is not undertaken as a pretext for the actual purpose of frustrating achievement of the preeminent federal objective and so long as the non-federal regulation is applied in a nondiscriminatory manner.

24. Similarly, we recognize here that there are certain general state and local interests which may, in their even-handed application, legitimately affect amateur radio facilities. Nonetheless, there is also a strong federal interest in promoting amateur communications. Evidence of this interest may be found in the comprehensive set of rules that the Commission has adopted to regulate the amateur service [5]. Those rules set forth procedures for the licensing of stations and operators, frequency allocations, technical standards which amateur radio equipment must meet and operating practices which amateur operators must follow. We recognize the Amateur radio service as a voluntary, noncommercial communication service, particularly with respect to providing emergency communications. Moreover, the amateur radio service provides a reservoir of trained operators, technicians and electronic experts who can be called on in times of national

or local emergencies. By its nature, the Amateur Radio Service also provides the opportunity for individual operators to further international goodwill. Upon weighing these interests, we believe a limited preemption policy is warranted. State and local regulations that operate to preclude amateur communications in their communities are in direct conflict with federal objectives and must be preempted.

25. Because amateur station communications are only as effective as the antennas employed, antenna height restrictions directly affect the effectiveness of amateur communications. Some amateur antenna configurations require more substantial installations than others if they are to provide the amateur operator with the communications that he/she desires to engage in. For example, an antenna array for International amateur communications will differ from an antenna used to contact other amateur operators at shorter distances. We will not, however, specify any particular height limitation below which a local government may not regulate, nor will we suggest the precise language that must be contained in local ordinances, such as mechanisms for special exceptions, variances, or conditional use permits. Nevertheless, local regulations which involve placement, screening, or height of anatennas based on health, safety, or aesthetic considerations must be crafted to accommodate reasonably amateur communications, and to represent the minimum practicable regulation to accomplish the local authority's legitimate purpose.[6]

26. Obviously, we do not have the staff or financial resources to review all state and local laws that affect amateur operations. We are confident, however, that state and local governments will endeavor to legislate in a manner that affords appropriate recognition to the important federal interest at stake here and thereby avoid unnecessary conflict with federal policy, as well as time-consuming and expensive litigation in this area. Amateur operators who believe that local or state governments have been overreaching and thereby have precluded accomplishment of their legitimate communications goals, may, in addition, use this document to bring our policies to the attention of local tribunals and forums.

27. Accordingly, the Request for Declaratory Ruling filed July 16, 1984, by the American Radio Relay League, Inc., IS GRANTED to the extent indicated herein and, in all other respects, IS DENIED.

FEDERAL COMMUNICATIONS COMMISSION

William J. Tricarico

Secretary

State Code

10-9a-515. Regulation of amateur radio antennas.

(1) A municipality may not enact or enforce an ordinance that does not comply with the ruling of the Federal Communications Commission in "Amateur Radio Preemption, 101 FCC 2nd 952 (1985)" or a regulation related to amateur radio service adopted under 47 C.F.R. Part 97.

(2) If a municipality adopts an ordinance involving the placement, screening, or height of an amateur radio antenna based on health, safety, or aesthetic conditions, the ordinance shall:

(a) reasonably accommodate amateur radio communications; and

(b) represent the minimal practicable regulation to accomplish the municipality's purpose.