



Federal Communications Commission
Washington, D.C. 20554

October 25, 2002

District of Columbia Zoning Commission
441 4th Street, NW
Room 210S
Washington, DC 20001

RE: Case # 01-02 (Public Hearing regarding the regulation of antennas and towers)

Dear Commissioners:

Thank you for this opportunity to participate in your Public Hearing, Case # 01-02, regarding the regulation of antennas and towers. We understand that you are considering amendments to the D.C. Zoning Regulations affecting placement of antennas, towers, and monopoles. The Federal Communications Commission (FCC) is the federal agency with principal responsibility for regulating interstate and foreign commerce by wire and radio so as to make available to the American people wire and radio communications service with adequate facilities at reasonable charges. We are therefore pleased to highlight the relevant legal framework in this area in order to assist the Zoning Commission in formulating regulations governing wireless facilities placement that serve the public interest and comply with federal law.

Wireless services have emerged as a vital aspect of the nation's economy, as well as a critical component of the country's public safety and homeland security infrastructure. The provision of such services is dependent upon the creation of a nationwide wireless network. Such a network can only be established by the placement of wireless facilities in locations necessary to provide service. As the demand for wireless services increases, more antenna sites will be needed to support the increased volume of communications as well as new and innovative types of service.

Section 332(c)(7) of the Communications Act of 1934, as amended by Section 704 of the Telecommunications Act of 1996, governs the powers of local governments with respect to the placement, construction, and modification of facilities used to provide cellular, broadband PCS, and other personal wireless services. Section 332(c)(7) preserves the authority of State and local governments in this area, provided they comply with some basic limitations set forth in the statute. Specifically, a State or local government may not unreasonably discriminate among providers of functionally equivalent personal wireless services, and it may not regulate in a manner that prohibits or has the effect of prohibiting the provision of personal wireless services. A State or

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local government also may not regulate the placement, construction, or modification of these facilities on the basis of the environmental effects of radio frequency (RF) emissions, to the extent the facilities comply with the FCC's regulations concerning such emissions. In addition, a State or local government must act on a request to place, construct, or modify personal wireless service facilities within a reasonable time, and any denial of a request must be made in writing and supported by substantial evidence contained in a written record.

The limitations on local authority in Section 332(c)(7) were intended by Congress to promote the availability of, and competition in, personal wireless services, while recognizing the critical role of the local zoning and site approval process in ensuring that the development of personal wireless systems occurs in a manner that is consistent with local land use priorities. Therefore, the key considerations are whether the proposed regulations may prohibit or have the effect of prohibiting the provision of personal wireless services, or whether the proposed regulations unreasonably discriminate among providers of functionally equivalent personal wireless services.

We understand that much of the testimony regarding the proposed regulations has been directed at the potential health effects of RF emissions. As discussed above, Section 332(c)(7) prohibits a State or local government from regulating the placement, construction, or modification of personal wireless service facilities on the basis of the environmental effects of RF emissions, to the extent the facilities comply with the FCC's regulations concerning such emissions. The FCC's rules are designed to protect public health by limiting the maximum amount of RF emissions to which a licensee's facilities, in combination with other sources of RF emissions, may cause workers and the general public to be exposed. The rules are based on standards developed by the Institute of Electrical and Electronic Engineers, Inc. (IEEE) and adopted by the American National Standards Institute (ANSI), as well as guidelines recommended by the National Council on Radiation Protection and Measurements (NCRP). The rules were coordinated with and are supported by federal agencies with health and safety responsibilities, including the Environmental Protection Agency (EPA), the Food and Drug Administration (FDA), the National Institute for Occupational Safety and Health, and the Occupational Safety and Health Administration (OSHA). In February 2000, the United States Court of Appeals for the Second Circuit affirmed the FCC's RF guidelines in *Cellular Phone Taskforce v. FCC*, 205 F.3d 82 (2d Cir. 2000). The FCC continues to monitor research on the issue of RF emissions and health.

As discussed in the enclosed "Local Government Official's Guide to Transmitting Antenna RF Emission Safety" ("Local Official's Guide"), most personal wireless service facilities create maximum exposures that are only a small fraction of the FCC's limits.

The Local Official's Guide also offers guidance for determining whether particular facilities may raise concerns regarding compliance with these limits. The key consideration is whether the proposed rule regulates the placement of personal wireless service facilities based on the environmental effects of RF emissions where those facilities comply with the FCC's limits.

In addition to local zoning, the placement of towers and antennas is subject to FCC review for effects on the environment and historic preservation under the National Environmental Policy Act (NEPA) and the National Historic Preservation Act (NHPA). With regard to historic preservation, the FCC, the Advisory Council on Historic Preservation (ACHP), and the National Conference of State Historic Preservation Officers (NCSHPO) entered into a nationwide programmatic agreement on March 16, 2001 that excludes most antennas collocated on existing towers, buildings, or other structures from historic preservation review, subject to narrow exceptions specified in the programmatic agreement. This provision reflects the agreement of the signatories, including federal and state agencies whose mission is historic preservation, that these collocated antennas ordinarily should not have an adverse effect on historic properties. You may wish to consider the judgment of these historic preservation experts when formulating your own zoning provisions for historic preservation.

To further assist you in your efforts, I am enclosing several documents for the record. Enclosed please find two Fact Sheets on national wireless facilities siting policies, a Bulletin that focuses specifically on the biological effects and potential hazards of RF electromagnetic fields, and the "Local Official's Guide." I am also enclosing a copy of the Collocation Agreement and a Fact Sheet regarding the Collocation Agreement. Additional information is also available on the FCC's Wireless Telecommunications Bureau web site at <http://www.fcc.gov/wtb/siting>, and the FCC's Office of Engineering and Technology (OET) RF Safety Program web site at <http://www.fcc.gov/oet/rfsafety>.

Please feel free to contact us if we can be of additional assistance, to the extent consistent with your procedures. Should you have any additional questions concerning the potential health effects of RF emissions, please contact the FCC's RF Safety Program

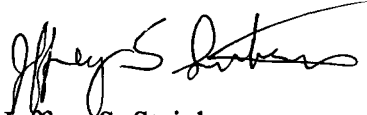
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at 202-418-2464. Should you have any other questions concerning the authority of State or local governments to regulate the siting of wireless telecommunications facilities, please contact me at (202) 418-0896.

Sincerely,

A handwritten signature in black ink, appearing to read "Jeffrey S. Steinberg", with a long horizontal flourish extending to the right.

Jeffrey S. Steinberg
Deputy Chief, Commercial Wireless Division
Wireless Telecommunications Bureau

Enclosures

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CC: CWD



April 23, 1996

FEDERAL COMMUNICATIONS COMMISSION

FACT SHEET

Information provided by the Wireless Telecommunications Bureau

NEW NATIONAL WIRELESS TOWER SITING POLICIES

The Telecommunications Act of 1996 contains important provisions concerning the placement of towers and other facilities for use in providing personal wireless services. Most state and local communities have worked closely with cellular and other wireless service providers on such placement plans, but this new law establishes new responsibilities for communities and for the Federal Communications Commission (FCC). The rapid expansion in the wireless industry makes these issues even more important.

This fact sheet is intended to explain the new provisions and to help state and local governments as they deal with the complex issues of facilities siting in their local communities. At the end of this fact sheet, you will find names of contacts for additional information about this area and other issues before the FCC.

Section 704 of the Telecommunications Act of 1996 (the "1996 Act") governs federal, state and local government oversight of siting of "personal wireless service" facilities. The 1996 Act establishes a comprehensive framework for the exercise of jurisdiction by state and local zoning authorities over the construction, modification and placement of facilities such as towers for cellular, personal communications service (PCS), and specialized mobile radio (SMR) transmitters:

- The new law preserves local zoning authority, but clarifies when the exercise of local zoning authority may be preempted by the FCC.
- Section 704 prohibits any action that would discriminate between different providers of personal wireless services, such as cellular, wide-area SMR and broadband PCS. It also prohibits any action that would ban altogether the construction, modification or placement of these kinds of facilities in a particular area.
- The law also specifies procedures which must be followed for acting on a request to place these kinds of facilities, and provides for review in the courts or the FCC of any decision by a zoning authority that is inconsistent with Section 704.

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- Finally, Section 704 requires the federal government to take steps to help licensees in spectrum-based services, such as PCS and cellular, get access to preferred sites for their facilities. Federal agencies and departments will work directly with licensees to make federal property available for this purpose, and the FCC is directed to work with the states to find ways for states to accommodate licensees who wish to erect towers on state property, or use state easements and rights-of-way.

The attachments to this fact sheet seek to provide information concerning tower siting for personal wireless communications services. They include a summary of the provisions of Section 704 of the 1996 Act, the actual text of Section 704, and a technical information summary that describes the cellular, wide-area SMR and broadband PCS technologies that underlie the majority of requests for new tower sites.

Questions about the Telecommunications Act of 1996 generally may be addressed to Sheryl Wilkerson in the FCC's Office of Legislative and Intergovernmental Affairs, 202-418-1902 (e-mail: swilkers@fcc.gov). Questions about tower siting, licensing issues or technical matters may be addressed to Steve Markendorff, Deputy Chief, Commercial Wireless Division in the Wireless Telecommunications Bureau, 202-418-0620, (e-mail: smarkend@fcc.gov).

This Fact Sheet is available on our fax-on-demand system. The telephone number for fax-on-demand is 202-418-2830. The Fact Sheet may also be found on the World Wide Web at <http://www.fcc.gov/wtb/wirehome.html>.

SUMMARY OF SECTION 704 OF THE TELECOMMUNICATIONS ACT OF 1996

The following is a summary of key provisions. The text of Section 704 is reproduced in its entirety as an attachment to this summary.

1. Local Zoning Authority Preserved

Section 704(a) of the 1996 Act amends Section 332(c) of the Communications Act ("Mobile Services") by adding a new paragraph (7). It preserves the authority of state and local governments over decisions regarding the placement, construction, and modification of personal wireless service facilities, except as provided in the new paragraph (7).

2. Exceptions

a. States and Localities May Not Take Discriminatory or Prohibiting Actions

Section 704(a) of the 1996 Act states that the regulation of the placement, construction, and modification of personal wireless service facilities by any State or local government or instrumentality thereof shall not unreasonably discriminate among providers of functionally equivalent services and shall not prohibit or have the effect of prohibiting the provision of personal wireless services. 47 U.S.C. §332(c)(7)(B)(i).

Review: Any person that is adversely affected by a state or local government's action or failure to act that is inconsistent with Section 332(c)(7) may seek expedited review in the courts. 47 U.S.C. §332(c)(7)(B)(v).

b. Procedures for Ruling on Requests to Place, Construct or Modify Personal Wireless Service Facilities

Section 704(a) also requires a State or local government to act upon a request for authorization to place, construct, or modify personal wireless service facilities within a reasonable time. Any decision to deny a request must be made in writing and be supported by substantial evidence contained in a written record. 47 U.S.C. §332(c)(7)(B)(ii), (iii).

c. Regulations Based On Environmental Effects of RF Emissions Preempted

Section 704(a) of the 1996 Act expressly preempts state and local government regulation of the placement, construction, and modification of personal wireless service facilities on the basis of the environmental effects of radio frequency emissions to the extent that such facilities comply with the FCC's regulations concerning such emissions. 47 U.S.C. §332(c)(7)(B)(iv).

Review: Parties may seek relief from the FCC if they are adversely affected by a state or local government's final action or failure to act that is inconsistent with this provision. 47 U.S.C. § 332(c)(7)(B)(v).

3. Federal Guidelines Concerning RF Emissions

Section 704(b) requires the FCC to prescribe and make effective new rules regarding the environmental effects of radio frequency emissions, which are under consideration in ET Docket 93-62, within 180 days of enactment of the 1996 Act.

NOTE: The pendency of this proceeding before the FCC does not affect the rules which currently are in effect governing the environmental effects of radio frequency emissions. Section 704(b) gives preemptive effect to these existing rules. See related attachments to the Fact Sheet.

4. Use of Federal or State Government Property

a. Federal Property

Section 704(c) of the 1996 Act requires the President (or his designee) to prescribe procedures by which the federal government may make available on a fair, reasonable and nondiscriminatory basis, property, rights-of-way and easements under their control, for the placement of new spectrum-based telecommunications services.

b. State Property

With respect to facilities siting on state property, Section 704(c) of the 1996 Act requires the FCC to provide technical support to States to encourage them to make property, rights-of-way and easements under their jurisdiction available for the placement of new spectrum-based telecommunications services.

NOTE: Information concerning technical support for tower siting which the FCC is making available to state and local governments is attached to the Fact Sheet.

5. Definitions

"Personal wireless services" include commercial mobile services, unlicensed wireless services, and common carrier wireless exchange access services. 47 U.S.C. §332(c)(7)(C)(i).

"Commercial mobile services" are defined in Section 332 of the Communications Act and the FCC's rules, and include cellular telephone services regulated under Part 22 of the FCC's rules, SMR services regulated under Part 90 of the FCC's rules, and PCS regulated under Part 24 of the FCC's rules. 47 C.F.R. §20.9.

"Unlicensed wireless services" are defined as the offering of telecommunications services using duly authorized devices which do not require individual licenses; direct-to-home satellite services are excluded from this definition. 47 U.S.C. §332(c)(7)(C)(iii).

COMPLETE TEXT OF SEC. 704 OF THE TELECOMMUNICATIONS ACT OF 1996

SEC. 704. FACILITIES SITING; RADIO FREQUENCY EMISSION STANDARDS.

(a) NATIONAL WIRELESS TELECOMMUNICATIONS SITING POLICY- Section 332(c) (47 U.S.C. 332(c)) is amended by adding at the end the following new paragraph:

(7) PRESERVATION OF LOCAL ZONING AUTHORITY-

(A) GENERAL AUTHORITY- Except as provided in this paragraph, nothing in this Act shall limit or affect the authority of a State or local government or instrumentality thereof over decisions regarding the placement, construction, and modification of personal wireless service facilities.

(B) LIMITATIONS-

(i) The regulation of the placement, construction, and modification of personal wireless service facilities by any State or local government or instrumentality thereof--

(I) shall not unreasonably discriminate among providers of functionally equivalent services; and

(II) shall not prohibit or have the effect of prohibiting the provision of personal wireless services.

(ii) A State or local government or instrumentality thereof shall act on any request for authorization to place, construct, or modify personal wireless service facilities within a reasonable period of time after the request is duly filed with such government or instrumentality, taking into account the nature and scope of such request.

(iii) Any decision by a State or local government or place,

construct, or modify personal wireless service facilities shall be in writing and supported by substantial evidence contained in a written record.

(iv) No State or local government or instrumentality thereof may regulate the placement, construction, and modification of personal wireless service facilities on the basis of the environmental effects of radio frequency emissions to the extent that such facilities comply with the Commission's regulations concerning such emissions.

(v) Any person adversely affected by any final action or failure to act by a State or local government or any instrumentality thereof that is inconsistent with this subparagraph may, within 30 days after such action or failure to act, commence an action in any

court of competent jurisdiction. The court shall hear and decide such action on an expedited basis. Any person adversely affected by an act or failure to act by a State or local government or any instrumentality thereof that is inconsistent with clause (iv) may petition the Commission for relief.

(C) DEFINITIONS- For purposes of this paragraph--

(i) the term 'personal wireless services' means commercial mobile services, unlicensed wireless services, and common carrier wireless exchange access services;

(ii) the term 'personal wireless service facilities' means facilities for the provision of personal wireless services; and

(iii) the term 'unlicensed wireless service' means the offering of telecommunications services using duly authorized devices which do not require individual licenses, but does not mean the provision of direct-to-home satellite services (as defined in section 303(v)).

(b) RADIO FREQUENCY EMISSIONS- Within 180 days after the enactment of this Act, the Commission shall complete action in ET Docket 93-62 to prescribe and make effective rules regarding the environmental effects of radio frequency emissions.

(c) AVAILABILITY OF PROPERTY- Within 180 days of the enactment of this Act, the President or his designee shall prescribe procedures by which Federal departments and agencies may make available on a fair, nondiscriminatory basis, property, rights-of-way, and easements under their control for the placement of new telecommunications services that are dependent, in whole or in part, upon the utilization of Federal spectrum rights for the transmission or reception of such services. These procedures may establish a presumption that requests for the use of property, rights-of-way, and easements by duly authorized providers should be granted absent unavoidable direct conflict with the department or agency's mission, or the current or planned use of the property, rights-of-way, and easements in question. Reasonable fees may be charged to providers of such telecommunications services for use of property, rights-of-way, and easements. The Commission shall provide technical support to States to encourage them to make property, rights-of-way, and easements under their jurisdiction available for such purposes.

TECHNICAL INFORMATION CONCERNING CELLULAR, SPECIALIZED MOBILE RADIO AND PERSONAL COMMUNICATIONS SERVICES

April 1996

Cellular Information

The FCC established rules and procedures for licensing cellular systems in the United States and its Possessions and Territories. These rules designated 306 Metropolitan Statistical Areas and 428 Rural Service Areas for a total of 734 cellular markets and spectrum was allocated to license 2 systems in each market. Cellular is allocated spectrum in the 824-849 and 869-894 MHz ranges. Cellular licensees are generally required to license only the tower locations that make up their outer service contour. Licensees desiring to add or modify any tower locations that are within an already approved and licensed service area do not have to submit an application for that location to be added to their cellular license, although they may need FCC approval if the antenna would constitute a major environmental action (See question 2, below) or would exceed the criteria specified in Part 17 of the FCC's Rules ("Construction, Marking and Lighting of Antenna Structures"). Part 17 includes criteria for determining when construction or placement of a tower would require prior notification to the Federal Aviation Administration (FAA). (See question 3, below.)

A cellular system operates by dividing a large geographical service area into cells and assigning the same frequencies to multiple, non-adjacent cells. This is known in the industry as frequency reuse. As a subscriber travels across the service area the call is transferred (handed-off) from one cell to another without noticeable interruption. All the cells in a cellular system are connected to a Mobile Telephone Switching Office (MTSO) by landline or microwave links. The MTSO controls the switching between the Public Switched Telephone Network (PSTN) and the cell site for all wireline-to-mobile and mobile-to-wireline calls.

Specialized Mobile Radio (SMR) Information

Specialized Mobile Radio (SMR) service licensees provide land mobile communications on a commercial (*i.e.*, for profit) or private basis. A traditional SMR system consists of one or more base station transmitters, one or more antennas and end user radio equipment which often consists of a mobile radio unit either provided by the end user or obtained from the SMR operator. The base station receives either telephone transmissions from end users or low power signals from end user mobile radios.

SMR systems operate in two distinct frequency ranges: 806-821/851-866 MHz (800 MHz) and 896-901/935-940 MHz (900 MHz). 800 MHz SMR services have been licensed by the FCC on a site-by-site basis, so that the SMR provider must approach the FCC and receive a license for each and every tower/base site. In the future the FCC will license this band on a wide-area market approach. 900 MHz SMR was originally licensed in 46 Designated Filing Areas (DFAs) comprised of only the top 50 markets in the country. The Commission is in the process of auctioning the remainder of the United States and its Possessions and Territories in the Rand McNally defined 51 Major Trading Areas.

PCS Information

Broadband PCS systems are very similar to the cellular systems but operate in a higher frequency band, in the 1850-1990 MHz range. One other difference is that the FCC used different market areas for licensing purposes. The FCC used the Rand McNally definitions for 51 Major Trading Areas (MTAs) and 493 Basic Trading Areas (BTAs). PCS was allocated spectrum for six Broadband PCS systems and 26 Narrowband systems. The six Broadband PCS systems will be licensed as follows: two Broadband PCS licenses will be issued for each of the 51 MTAs and four for each of the 493 BTAs. The 26 Narrowband systems will be licensed as follows: eleven Narrowband PCS licenses will be issued for nationwide systems, six for each of five regional areas, seven for each of the 51 MTAs and two for each of the 493 BTAs.

PCS licensees are issued a blanket license for their entire market area and are not required to submit applications to license individual cell sites unless construction of the facility would be a major environmental action or would require FAA notification. Major environmental actions are defined by the National Environmental Policy Act of 1969 that is discussed in question 2, below. Therefore, the FCC has no technical information on file concerning PCS base stations.

Frequently asked questions concerning tower siting for personal wireless services.

1. Do local zoning authorities have any authority to deny a request for tower siting?

Answer: Yes. The Telecommunications Act of 1996 specifically leaves in place the authority that local zoning authorities have over the placement of personal wireless facilities. It does prohibit the denial of facilities siting based on RF emissions if the licensee has complied with the FCC's regulations concerning RF emissions. It also requires that denials be based on a reasoned approach, and prohibits discrimination and outright bans on construction, placement and modification of personal wireless facilities.

2. What requirements do personal wireless communications licensees have to determine whether a site is in a flood plain? A historical sites must also comply with the National Environmental Policy Act of 1969 (NEPA), as well as other mandatory federal environmental statutes. The FCC's rules that implement the federal environmental statutory provisions are contained in sections 1.1301-1.1319. The FCC's environmental rules place the responsibility on each applicant to investigate all the potential environmental effects, and disclose any significant effects on the environment in an Environmental Assessment (EA), as outlined in section 1.1311, prior to constructing a tower. The applicant is required to consult section 1.1307 to determine if its proposed antenna structure will fall under any of the listed categories that may significantly affect the environment. If it does, the applicant must provide an EA prior to proceeding with the tower construction and, under section 1.1312, must await FCC approval before commencing any such construction even if FCC approval is not otherwise required for such construction. The FCC places all proposals that may significantly impact the environment on public notice for a period of 30 days, seeking any public comments on the proposed structures.

The categories set forth in section 1.1307 include:

Wilderness Area
Wildlife Preserve
Endangered Species
Historical Site
Indian Religious Site
Flood Plain
Wetlands
High Intensity White Lights in Residential Neighborhoods
Excessive Radiofrequency Radiation Exposure

3. Are there any FCC regulations that govern where towers can or cannot be placed?

Answer: The FCC mandates that personal wireless companies build out their systems so that adequate service is provided to the public. In addition, all antenna structures used for communications must be approved by the FCC in accordance with Part 17 of the FCC Rules. The FCC must determine if there is a reasonable possibility that the structure may constitute a menace to air navigation. The tower height and its proximity to an airport or flight path will be considered when making this determination. If such a determination is made the FCC will specify appropriate painting and lighting requirements. Thus, the FCC does not mandate where towers must be placed, but it may prohibit the placement of a tower in a particular location without adequate lighting and marking.

4. Does the FCC maintain any records on tower sites throughout the United States? How does the public get this information (if any)?

Answer: The FCC maintains a general tower database on the following structures: (1) any towers over 200 feet, (2) any towers over 20 feet on an existing structure (such as a building, water tower, etc.) and (3) towers that are close to airports that may cause potential hazards to air navigation. The FCC's licensing databases contain some base site information for Cellular and SMR systems. The general tower database and the Cellular and SMR data that may be on file with the FCC is available in three places:

(1) Cellular licensing information is available in the Public Reference Room of the Wireless Telecommunications Bureau's Commercial Wireless Division. The Public Reference Room is located on the fifth floor of 2025 M Street, NW, Washington, DC 20554, telephone (202)418-1350. On-line database searches of cellular licensing information along with queries of the FCC's general tower database can also be accomplished at the Public Reference Room.

(2) People who would like to obtain general tower information through an on-line public access database should call or write Interactive Systems, Inc., 1601 North Kent St., Suite 1103, Arlington, VA 22209, telephone 703-812-8270.

(3) The FCC does not duplicate these records, but has contracted with International Transcription Service, Inc. to provide this service. Requests for copies of information should be addressed to International Transcription Service, Inc. (ITS, Inc.), 2100 M St., NW, Suite 140, Washington, DC 20037, telephone 202-857-3800.

5. Why do Cellular and PCS providers require so many tower sites?

Answer: Low powered transmitters are an inherent characteristic of Cellular Radio and Broadband PCS. As these systems mature and more subscribers are added, the effective radiated power of the cell site transmitters is reduced so frequencies can be reused at closer intervals thereby increasing subscriber capacity. There are over 30 million mobile/portable cellular units and more than 22 thousand cell sites operating within the United States and its Possessions and Territories. PCS is just beginning to be offered around the country. Due to the fact that Broadband PCS is located in a higher frequency range, PCS operators will require more tower sites as they build their systems to provide coverage in their service areas as compared to existing Cellular carriers. Therefore, due to the nature of frequency reuse and the consumer demand for services, Cellular and PCS providers must build numerous base sites.

6. Can Cellular, SMR and PCS providers share tower structures?

Answer: Yes, it is technologically possible for these entities to share tower structures. However, there are limits to how many base station transmitters a single tower can hold and different tower structures have different limits. Moreover, these providers are competitors in a more and more competitive marketplace and may not be willing to share tower space with each other. Local zoning authorities may wish to retain a consulting engineer to evaluate the proposals submitted by wireless communications licensees. The consulting engineer may be able to determine if there is some flexibility as to the geographic location of the tower.

7. Is the Federal government helping to find ways to accommodate multiple licensees of personal wireless services?

Answer: Yes. The FCC has designated Steve Markendorff, Chief, Broadband Branch, Commercial Wireless Division, Wireless Telecommunications Bureau, FCC to ask and respond to questions concerning tower siting issues. His telephone number is 202-418-0620. Also, President Clinton issued an Executive Memorandum on August 10, 1995 directing the Administrator of General Services (GSA), in coordination with other Government departments and agencies, to develop procedures to facilitate appropriate access to Federal property for the siting of mobile services antennas. GSA recently released "Government-Wide Procedures for Placing Commercial Antennas," 61 Fed Reg 14,100 (March 29, 1996). For further information contact James Herbert, Office of Property Acquisition and Realty Services, Public Building Service, General Services Administration, 18th & F Streets, NW, Washington, DC 20405, telephone 202-501-0376.

8. Have any studies been completed on potential hazards of locating a tower/base site close to residential communities?

Answer: In connection with its responsibilities under NEPA, the FCC considers the potential effects of radiofrequency (RF) emissions from FCC-regulated transmitters on human health and safety. Since the FCC is not the expert agency in this area, it uses standards and guidelines developed by those with the appropriate expertise. For example, in the absence of a uniform federal standard on RF exposure, the FCC has relied since 1985 on the RF exposure guidelines issued in 1982 by the American National Standards Institute (ANSI C95.1-1982). In 1991, the Institute of Electrical and Electronic Engineers (IEEE) issued guidelines designed to replace the RF ANSI exposure guidelines. These guidelines (ANSI/IEEE C95.1-1992) were adopted by ANSI. The Telecommunications Act of 1996 mandates that the FCC complete its proceeding in ET Docket 93-62, in which it is considering updating the RF exposure guidelines, no later than early August 1996. Copies of this proceeding can be obtained from the International Transcription Service, Inc. (ITS), telephone 202-857-3800. Presently, RF emission requirements are contained in Section 1.1307(b) of the FCC's rules, 47 C.F.R. §1.1307(b), for all services. PCS has service specific RF emission provisions in Section 24.52 of the FCC's rules, 47 C.F.R. § 24.52.

Additional information concerning RF emission hazards can be obtained through a variety of sources:

- (1) Information concerning RF hazards can be obtained on the World Wide Web at <http://www.fcc.gov/oet/faqs>. RF safety questions are answered and further RF documents and information are contained under the Cellular Telephony Section.
- (2) OET Bulletins 56 and 65 concerning effects and potential RF hazards can be requested through the Radiofrequency Safety Program at 202-418-2464. Additionally, any specific questions concerning RF hazards can be answered by contacting the FCC at this phone number.

The FCC maintains a Communications and Crisis Management Center which is staffed 24 hours a day, seven days a week. In the event of an emergency, such as a radiofrequency hazard threatening public safety or health, you may call 202-632-6975. The watch officer who answers at that number can contact our compliance personnel in your area and dispatch them within a matter of hours.



FEDERAL COMMUNICATIONS COMMISSION
WIRELESS TELECOMMUNICATIONS BUREAU
2025 M Street, N.W., Washington, DC 20554

FACT SHEET #2

SEPTEMBER 17, 1996

NATIONAL WIRELESS FACILITIES SITING POLICIES

The Telecommunications Act of 1996 (the 1996 Act) contains important provisions concerning the placement of antenna structures and other facilities for use in providing personal wireless services. State and local governments have already been working closely with wireless service providers to place such facilities within their localities. The new law establishes a framework for the exercise of jurisdiction by state and local zoning authorities over the construction, modification and placement of facilities for personal wireless services.

The new law also directs the Commission to offer assistance to state and local governments in resolving wireless facilities siting issues. In that capacity, the Commission has formed a Wireless Facilities Siting Task Force to serve as a focal point for collection and dissemination of information relating to the efforts of state and local governments, as well as providers of personal wireless services, to address facilities siting concerns. The Task Force believes it can serve as a valuable information resource for state and local governments and for the industry as they carry out the responsibilities assigned them under the new law. Proper implementation of the new law will ultimately benefit the American public by preserving local zoning and land use authority, while at the same time, promoting the broad availability of these exciting new technologies.

On April 23, 1996, the Wireless Telecommunications Bureau issued **Fact Sheet #1** to inform the public about the provisions of Section 704 of the 1996 Act, and to assist state and local governments as they deal with the complex issues of personal wireless facilities siting in their local communities. **Fact Sheet #1** summarized key provisions of Section 704, reprinted the complete text of Section 704 of the 1996 Act, provided technical information concerning personal wireless services, and, finally, answered frequently asked questions.

This **Fact Sheet #2** consists of four parts :

- PART I is a new compilation of frequently asked questions and answers:
- PART II summarizes the Commission's radiofrequency (RF) emission rules governing personal wireless services, adopted August 1, 1996, and sets forth the

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most relevant RF rules for personal wireless facilities siting purposes:

- PART III provides revised information about those personal wireless services most likely to be submitting facilities siting requests during the upcoming year; and
- PART IV consists of maps showing the geographic areas used by the Commission to license cellular radiotelephone service and personal wireless services, and lists licensees for certain personal communications services.

Fact Sheet #1 and **Fact Sheet #2** on *National Wireless Facilities Siting Policies* are both available from the Commission's "fax-on-demand" system at (202) 418-2830. To obtain the 12-page **Fact Sheet #1** from fax-on-demand, please reference Document Number 6507. To obtain the 39-page **Fact Sheet #2**, please reference Document Number 6508. Both **Fact Sheets** are also available on the Internet, from the Wireless Telecommunications Bureau homepage, at <http://www.fcc.gov/wtb/wirehome.html>.

In addition to the contacts listed elsewhere in this **Fact Sheet #2**, questions on the following general topics should be directed to the Commission staff listed below:

- The Telecommunications Act of 1996 in general:
Office of Legislative and Intergovernmental Affairs Voice: (202) 418-1900
Fax: (202) 418-2806
- Federal regulation of wireless communications services in general:
Rosalind K. Allen Voice: (202) 418-0600
Deputy Chief Fax: (202) 418-0787
Wireless Telecommunications Bureau E-mail: rallen@fcc.gov
- Antenna structure siting, licensing issues and technical matters:
Steve Markendorff Voice: (202) 418-0620
Chief, Broadband Branch Fax: (202) 418-1412
Wireless Telecommunications Bureau E-mail: smarkend@fcc.gov
- Commission guidelines on radiofrequency emissions:
RF Safety Program Voice: (202) 418-2464
Office of Engineering and Technology Fax: (202) 418-1918
E-mail: rfsafety@fcc.gov
- Transmitter power, antenna structure painting and lighting requirements:
Dan S. Emrick Voice: (202) 418-1170
Compliance Division Fax: (202) 418-2813
Compliance and Information Bureau E-mail: demrick@fcc.gov

Additional questions on wireless facilities siting issues may be addressed to the following national governmental and trade associations:

- **American Planning Association**
Karen B. Graham
Public Affairs Associate
Voice: (202) 872-0611
Fax: (202) 872-0643
- **National Association of Counties**
Robert J. Fogel
Associate Legislative Director
Voice: (202) 393-6226
Fax: (202) 393-2630
- **National Association of Telecommunications Officers and Advisors**
Eileen E. Huggard
Executive Director
Voice: (202) 429-5101
Fax: (202) 223-4579
- **National League of Cities**
Frank Shafroth
Director of Policy and Federal Relations
Voice: (202) 626-3026
Fax: (202) 626-3043
- **United States Conference of Mayors**
Kevin S. McCarty
Assistant Executive Director
Voice: (202) 293-7330
Fax: (202) 293-2352
- **American Mobile Telecommunications Association**
Jill Lyon
Director of Regulatory Relations
Voice: (202) 331-7773
Fax: (202) 331-9062
- **Cellular Telecommunications Industry Association**
Andrea D. Williams
Assistant General Counsel
or
Lauren Fry
Manager for Industry Education
Voice: (202) 785-0081
Fax: (202) 785-0721
Voice: (202) 785-3236
Fax: (202) 887-1629
- **Personal Communications Industry Association**
Mark J. Golden
Senior VP, Industry Affairs
Voice: (703) 739-0300 x 3008
Fax: (703) 836-1608

PART I

FREQUENTLY ASKED QUESTIONS

The Commission's Wireless Facilities Siting Task Force has spent a substantial amount of time over the past three months meeting with representatives from various state and local governments and their national associations, as well as with representatives from personal wireless service providers and their trade associations. We have also answered numerous inquiries from members of the public on facilities siting and RF emission issues. The questions and answers listed below reflect the Task Force's collective assessment of those issues of most interest to parties affected by wireless facilities siting issues.

PERSONAL WIRELESS SERVICES & FACILITIES

1. *What are "personal wireless facilities" referenced in Section 704 of the 1996 Act?*

Answer: Personal wireless facilities are transmitters, antenna structures and other types of installations used for the provision of personal wireless services. Section 704 defines personal wireless services to include a broad range of spectrum-based services. All commercial mobile services fall within the definition of personal wireless services. Elsewhere in the statute, commercial mobile services have been defined as mobile services that are for-profit, are available to the public or a substantial portion of the public, and provide subscribers with the ability to access or receive calls from the public switched telephone network. Common examples of commercial mobile services are personal communications services (PCS), cellular radio mobile service and paging. Personal wireless services also includes unlicensed wireless services, which are services that are not licensed by the Commission, but are deployed through equipment that is authorized by the Commission. Finally, personal wireless services include common carrier wireless exchange access services, which are offerings designed as competitive alternatives to traditional wireline local exchange providers.

2. *Are home satellite services considered "personal wireless service"?*

Answer: No. Section 704 of the 1996 Act specifically excludes "direct-to-home satellite services" from the definition of personal wireless services. State and local regulation of facilities used to receive these broadcast services is addressed under Section 207 of the 1996 Act. Pursuant to Section 207, the Commission has adopted rules concerning state, local, and private restrictions on viewers' ability to receive video programming signals from direct broadcast satellites, multichannel multipoint distribution (wireless cable) providers, and television broadcast stations. For more information on the Commission's rules under Section 207, please contact 1-888-225-5322. A separate fact sheet has been prepared regarding these rules, which is available from the Commission's fax-on-demand system at (202) 418-2830 or from the Internet at http://www.fcc.gov/Bureaus/Common_Carrier/Factsheets/otafacts.html.

3. *How can providers of personal wireless services benefit my community?*

Answer: Personal wireless services are not just car phones for businesses. Due to technological innovation and the continuing availability of additional spectrum, PCS and cellular providers are offering light-weight portable phones at increasingly affordable prices that enable consumers to make and accept calls anywhere and at anytime. It is also anticipated that providers of personal wireless services will offer wireless computer networking and wireless Internet access. Many PCS providers also intend to offer a service that will eventually compete directly with residential local exchange and exchange access services. The inherent flexibility of wireless services makes it possible to introduce new service offerings on a dynamic basis as consumer demands grow and change.

Wireless services are also integral to many businesses that rely on mobility of their operations to provide goods and services to consumers. Communicating by a wireless network enables companies in various businesses, from car rentals to package delivery, to operate in a more efficient manner, and to ultimately lower the cost to the consumer while improving the quality of service.

It is also worthwhile to keep in mind that the antenna structures required to deploy personal wireless services can be used for other purposes that could benefit your community. For example, a community that has a long-term plan to improve its public safety communications may be able to expedite that process by teaming with personal wireless service providers to construct new sites that could be used for deployment of both public safety and personal wireless communications. Furthermore, wireless telecommunications and data services play an increasing (and increasingly sophisticated) role in providing healthcare services. Wireless services may be particularly helpful in delivering healthcare to the home, for example, by allowing a nurse, while in a patient's home, to access the patient's vital information directly from the database at the hospital. Personal wireless service providers may also serve as a lower-cost source of advanced telecommunications capabilities for schools and libraries. Therefore, state and local governments should engage the personal wireless service providers in a dialogue about how their offerings can best serve the community.

4. *Why do personal wireless service providers require so many antenna structures?*

Answer: Generally, low powered transmitters are an inherent characteristic of cellular radio and broadband PCS. As these systems develop and more subscribers are added, the effective radiated power of the cell site transmitters is reduced. Channels are reused at closer intervals to increase the subscriber capacity of the system, and therefore, more transmitting facilities are needed. Additionally, because broadband PCS operates at a higher frequency than cellular, these providers may require more antenna structures than cellular services to provide equivalent coverage in their service areas.

5. *It seems as if the Commission is authorizing a large number of these personal wireless service providers. How many new antenna structures should my community expect to accommodate?*

Answer: Currently, there are over 40 million mobile/portable cellular units and over 22,000 cell sites operating within the United States and its Possessions and Territories. The Commission is allocating spectrum to personal wireless service providers on an ongoing basis. In addition, at the direction of Congress, the federal government is making spectrum currently allocated to federal government use available to the Commission for private sector use. As a result, it is difficult at this time to predict the ultimate number of personal wireless service providers that may serve your community. At present, however, the greatest demand for new site construction is concentrated in cellular and broadband PCS.

In most parts of the country, there are two Commission-licensed entities providing cellular services. In addition, the Commission has already issued two broadband PCS licenses in each Major Trading Area, and soon will issue four more broadband PCS licenses for Basic Trading Areas. (PART IV of this **Fact Sheet #2** contains maps showing the Major and Basic Trading Areas). Therefore, during the upcoming year, local governments can expect approximately eight discrete cellular and broadband PCS licensees to seek antenna facilities in each community. However, the actual number is likely to be smaller than eight due to the ability of existing cellular and PCS licensees to obtain more than one license in an area, and the expected consolidation of providers within the wireless communications industry.

6. *Does the Commission maintain any records on the locations of personal wireless structures throughout the United States?*

Answer: The Commission maintains site information on antenna structures that may affect air navigation, including (1) antenna structures located over 200 feet above ground, and (2) antenna structures that are in close proximity to airport runways. Antenna structures that do not exceed 20 feet above existing landscape or buildings, however, are not included. Site information for structures built prior to July 1, 1996, is contained in the Commission's "tower file" database. Site information for structures built after July 1, 1996, as well as an increasing number of structures built before that date, is contained in the Commission's "antenna registration" database. The registration database will contain all the tower file information by July 1998. Additionally, the Commission's cellular and SMR licensing databases contain some site information for base stations in those services.

For a fee, you can request a search of the tower file or antenna registration databases through International Transcription Service, Inc. (ITS), 2100 M Street, N.W., Suite 140, Washington, DC 20037, at (202) 857-3800. You may also view the antenna registration database on-line using the Commission's ASR Electronic Filing/Viewing Software. For more information on this software, please call (800) 322-1117.

The cellular and SMR databases are available for on-line viewing in the Public Reference Room of the Wireless Telecommunications Bureau's Commercial Wireless Division, located on the fifth floor of 2025 M Street, N.W., Washington, DC 20554. For more information, you may contact the Reference Room at (202) 418-1350. You may also obtain on-line access from a remote location, by contacting Interactive Systems, Inc., 1601 North Kent Street, Suite 1103, Arlington, VA 22209, at (703) 812-8270. However, because PCS licensees are issued a blanket license for their entire geographic area, the Commission does not maintain any information in its databases on the specific locations of any PCS base stations, unless they fall into the categories listed above.

7. *Some people consider personal wireless service facilities to be unsightly. Is there some way to make these structures blend in with their surroundings?*

Answer: Antennas for personal wireless services can sometimes be mounted on existing structures such as building roof tops, church steeples, street lights, traffic lights, or electric utility substations, where they are relatively unobtrusive. Painting antenna structures to blend in with the existing structure is also an effective camouflage. Camouflaging of antennas is also used to accommodate highly specialized land use concerns. For example, a personal wireless service provider seeking to locate a transmitter site in a historic district may consider camouflaging the antenna in such structures as clock towers or artificial trees. Such camouflaging is, however, expensive and time consuming and most service providers are reluctant to routinely use the camouflage option.

ZONING ISSUES

8. *What types of information exchanges should occur at the beginning of the local zoning process that would be helpful both to local and state governments and to personal wireless service providers?*

Answer: From the perspective of the local and state governments, it is helpful for the wireless service provider to supply as much advance information as possible about the nature of its service offerings and the "big picture" plan for service deployment. Local zoning authorities have a strong interest in becoming fully informed about exactly what they are authorizing, and what will be the long-term effects of facilities siting on land use in their communities. Many personal wireless service providers have found it helpful to organize seminars aimed at acquainting local zoning authorities with their services. Community outreach is also a productive way for new wireless service providers to pave the way for introduction of their offerings. Personal wireless service providers may be able to expedite the zoning authorization process if they target, where possible, site locations that are compatible with the proposed use, such as industrial zones, utility rights of way and pre-existing structures.

From the perspective of the personal wireless service provider, knowing what to expect in the zoning process is the primary concern. Therefore, state and local authorities should endeavor to provide wireless service providers with a clear picture of the zoning authorization process in

advance. It is also helpful for zoning authorities to share information about their land use priorities to determine where and how wireless service facilities fit into the plans. Finally, keep in mind that wireless telecommunications systems are very dynamic. Personal wireless services are thus designed to respond quickly to customer demands which may change dramatically as a result of the construction of new highways and roads and the development of new residential and business communities.

9. *How do personal wireless service providers approach state and local governments to request authorization to construct, place or modify their facilities?*

Answer: A personal wireless service provider may have an internal antenna facilities siting team which seeks potential sites for the company's own needs, or it may hire an independent contractor to seek potential sites. Some of these independent facilities siting companies may be working on behalf of more than one Commission licensee at a time, or they may not be seeking sites for any Commission licensees at all. The local zoning authorities should therefore be aware that a facilities siting company may not be seeking the sites that are of most interest to particular Commission licensees, but rather seek general sites on highly elevated locations in the hopes of leasing the sites, in turn, to Commission licensees.

10. *Can personal wireless service providers share common structures to house their transmitters?*

Answer: Yes, it is possible for these entities to share structures. Sharing of structures by several wireless service providers is typically referred to as "collocation." The Commission encourages collocation of antenna structures to the extent technologically feasible, and recommends that local zoning authorities engage the parties in cooperative efforts to chart the potential overlap of desirable locations, in order to minimize the number of antenna structures to be sited. It has also been our experience that personal wireless service providers are responsive to positive incentives to collocate, such as, for example, processing the zoning application of a collocating facility more quickly. There are, however, limitations on collocation, and it should not be viewed as a complete solution to all land use concerns associated with the deployment of personal wireless services.

First, there are physical limitations on how many transmitters a single structure can sustain. Different tower structures have different structural tolerances. In general, there are other technical issues that the service provider must consider, including the evaluation of interference and compliance with the Commission's RF emissions criteria. In addition, personal wireless services will deploy a variety of technologies that will require differing site configurations to provide subscribers with quality service. It is also important to note that as additional service providers enter the market, they will tailor their offerings to market demands that remain unsatisfied, so that while the first two providers in the community may be able to share a site because they seek to provide similar service to a similar market, the third provider may require a new site configuration because it intends, for example, to provide wireless Internet access to the

community's educational institutions. For this third provider, collocation with the first two providers may therefore be technically or economically problematic. Additionally, because collocation groups many pieces of equipment on a single structure, collocation may result in larger and more obtrusive and unsightly structures than multiple, discrete installations of individual antennas and transmitters.

It should also be kept in mind that personal wireless service providers are fierce competitors that are often deploying the first commercial use of a particular technology. As a result, the providers may be unwilling to share their siting plans, particularly actual site locations, because they consider these plans proprietary business information, or they may be reluctant to engage in group discussions with their competitors about siting because such conduct could be viewed as anticompetitive.

Finally, because these services are new technologies, it will be difficult to predict the exact location of all sites at the time of initial service deployment, and adjustments may be necessary along the way. New technologies also present unique technical challenges. Attempts by state and local governments to "reengineer" these new technologies and service offerings may have unpredictable effects on service quality and coverage. At the same time, the new law recognizes the legitimacy of local zoning and land use concerns. Service providers and local zoning authorities are thus encouraged to work together to develop ways to protect the proprietary nature of siting plans yet still yield information that can be useful to local zoning authorities for developing overall zoning plans for personal wireless facilities.

11. How quickly must state or local zoning authorities process applications for new personal wireless antenna structures?

Answer: Section 704 of the 1996 Act states that local authorities are required to act upon an application for a facility site within a reasonable period of time. The Conference Report accompanying Section 704 explains that the "nature and scope" of each request should be taken into account. The Conference Report further explains that "[i]f a request for placement of a personal wireless facility involves a zoning variance or a public hearing or comment process, the time period for rendering a decision will be the usual period under such circumstances. It is not the intent of this provision to give preferential treatment to the personal wireless service industry in the processing of requests, or to subject their requests to any but the generally applicable time frame for zoning decision."

Some state and local governments have adopted, or have considered adopting, "freezes" on the processing of facilities siting applications in anticipation of an increase in applications for personal wireless antenna structures. Many state or local governments believe that such freezes or moratoria are necessary because they are being asked to evaluate long-term land use issues without having relevant ordinances in place, and in some instances without the information they need to make these types of global assessments. Freezes of this nature are not looked upon favorably by personal wireless service providers because the providers are generally concerned

that moratoria (especially those that are open-ended or renewable) cause uncertainty and disruption to their business plans. In addition, wireless service providers find the lack of certainty amplified when it is not clear exactly what the state or local government is accomplishing during the moratorium other than not processing their applications.

While the issue of whether moratoria are consistent with Section 704 is being developed in the courts, the Conference Report provides some guidance: "It is the intent of this section that bans or policies that have the effect of banning personal wireless services or facilities not be allowed and that decisions be made on a case-by case basis." Moratoria may have a disproportionate impact on some personal wireless service providers, who may be effectively blocked from entering the market during the pendency of the freeze, or may be inhibited from further deployment or improvement of existing service. For one court's opinion on this issue, see *Sprint Spectrum, L.P. v. City of Medina*, 924 F. Supp. 1036 (W.D. Wash. 1996).

In certain instances, state and local governments may benefit from a brief, finite period of consideration in order to set up a process for the orderly handling of facilities siting requests. These brief periods of consideration may be most effective if the state or local government communicates clearly to wireless service providers the specific duration of the moratorium, the tasks that the local governmental entity intends to accomplish during the moratorium and the ways in which the wireless service providers can help the local government to achieve the stated goals of the moratorium by, for example, providing additional information about their needs and about their services.

12. *If the state or local zoning authorities deny applications for personal wireless antenna structures, must the decisions be in writing?*

Answer: Yes. Section 704 of the 1996 Act mandates that the decision must be in writing, and supported by substantial evidence contained in a written record. The Conference Report explains that "substantial evidence contained in a written record" means "the traditional standard used for judicial review of agency actions." For one court's opinion on this issue, see *BellSouth Mobility Inc., v. Gwinnett County*, No. 1:96-cv-1268-GET (N.D. Ga. Aug. 13, 1996).

13. *Section 704 states that state or local governments may not unreasonably discriminate among providers of functionally equivalent services. What types of state and local governmental actions constitute unreasonable discrimination?*

Answer: It appears that what constitutes "reasonable" discrimination among providers will be developed in the courts on a case-by-case basis. However, Congress' Conference Report accompanying Section 704 provides some guidance as well, explaining that the intent of the conferees is "to ensure that a State or local government does not in making a decision regarding the placement, construction and modification of facilities of personal wireless services . . . unreasonably favor one competitor over another." The Conference Report further explains the intent of the conferees is to "provide localities with the flexibility to treat facilities that create

different visual, aesthetic, or safety concerns differently to the extent permitted under generally applicable zoning requirements even if those facilities provide functionally equivalent services. For example, the conferees do not intend that if a State or local government grants a permit in a commercial district, it must also grant a permit for a competitor's 50-foot tower in a residential district." As a general matter, there appears to be an expectation that state and local governments should endeavor to avoid making land use decisions that give one personal wireless service provider a competitive advantage over another. For one court's opinion on this issue, see *Westel-Milwaukee Co., Inc. v. Walworth County*, No. 95-2097, 1996 WL 496670 (Wis. Ct. App. Sept. 4, 1996).

14. *What should I do if the state or local government has acted inconsistently with Section 704, and I have been adversely affected?*

Answer: If the state or local governmental action is inconsistent with Section 704, and you are adversely affected by such action, you may appeal the zoning authority's decision to a court of competent jurisdiction. Congress' Conference Report which accompanied Section 704 states that such actions may be filed in the federal district court in which the facilities are located or a State court of competent jurisdiction, at the option of the party appealing the decision. Section 704 also requires that such action be filed in court within 30 days after the state or local government acts or fails to act, and courts are directed to rule expeditiously on such cases.

If the decision of a state or local government authority which adversely affects you is based on the environmental effects of radiofrequency emissions, such decision may be appealed to the courts or it may be appealed directly to the Commission through a request for Declaratory Ruling, pursuant to Section 1.2 of the Commission's Rules. Either way, however, the appeal must be filed within 30 days after the state or local government's action.

15. *What can the federal government do to accommodate multiple providers of personal wireless services in seeking antenna structure locations?*

Answer: Section 704 of the 1996 Act mandates that the federal government make available property, rights-of-way, and easements under its control for the placement of new spectrum-based telecommunications services. It also provides that a presumption may be established to grant such requests absent unavoidable direct conflict with the government's mission or planned use of the locations, and that the decisions regarding siting on such locations must be fair, reasonable, and nondiscriminatory.

On August 10, 1995, President Clinton issued an Executive Memorandum directing the Administrator of the General Services Administration (GSA), in coordination with other federal government departments and agencies, to develop procedures to facilitate appropriate access to federal property for the siting of mobile services antenna structures. In response to this order and the Congressional mandate, GSA has prepared a manual entitled "Government-Wide Procedures for Placing Commercial Antennas," which is published in Volume 61, page 14100 of the Federal

Register, issued on March 29, 1996. For more information on the use of federal property to site wireless antenna facilities, please contact James Herbert, Office of Property Acquisition and Realty Services, Public Building Service, General Services Administration, at (202) 501-0376, or write to GSA at 18th & F Streets, NW, Washington, DC 20405.

Section 704 also mandated the Commission to provide technical support to states in order to encourage them to make property, rights-of-way and easements under their jurisdiction available for the placement of new spectrum-based telecommunications services. For more information on how the Commission can be of assistance to the state and local governments in this area, please contact Steve Markendorff, Chief of the Broadband Branch, Commercial Wireless Division, Wireless Telecommunications Bureau, at (202) 418-0620, or fax (202) 418-1412, or email "smarkend@fcc.gov."

RADIOFREQUENCY (RF) EMISSIONS

- 16. *Does Section 704 preempt state and local governments from basing regulation of the placement, construction or modification of personal wireless facilities directly or indirectly on the environmental effects of RF emissions?***

Answer: Yes. Section 704 states that "No State or local government or instrumentality thereof may regulate the placement, construction, and modification of personal wireless service facilities on the basis of the environmental effects of radio frequency emissions to the extent that such facilities comply with the Commission's regulations concerning such emissions."

- 17. *Have any studies been conducted on potential health hazards of locating an antenna structures close to residential communities?***

Answer: Many governmental agencies, scientists, engineers and professional associations have conducted studies of exposure levels due to RF emissions from cellular transmitter facilities. These levels have been found to be typically thousands of times below the levels considered to be safe by expert entities such as the Institute of Electrical and Electronics Engineers, Inc. (IEEE), and the National Council on Radiation Protection and Measurements (NCRP), as reflected in the Commission's rules governing RF emissions.

- 18. *Has the Commission adopted new guidelines for evaluating RF exposures?***

Answer: Yes. In light of revised guidelines developed by the Institute of Electrical and Electronics Engineers, Inc. and adopted by the American National Standards Institute in 1992 (ANSI/IEEE C95.1-1992), the Commission initiated a proceeding in 1993 to determine whether the Commission should adopt these guidelines to replace the 1982 ANSI guidelines. Section 704 of the 1996 Act required the Commission to complete this rulemaking proceeding (ET Docket 93-62) and have in place revised RF exposure guidelines by August 7, 1996. The Commission adopted a *Report and Order*, FCC 96-326, on August 1, 1996, which revised the guidelines that

the Commission will use to evaluate the environmental effects of transmitters licensed or authorized by the Commission. The new guidelines governing transmitter facilities become effective January 1, 1997. Guidelines governing equipment authorization become effective immediately.

19. *How do the new guidelines differ from the existing guidelines used by the Commission?*

Answer: The new guidelines are based on recommendations from the public, including federal health and safety agencies, such as the Environmental Protection Agency (EPA) and the Food and Drug Administration (FDA). These agencies recommended that we adopt elements of both the 1992 revision of the ANSI standard and the exposure criteria recommended by the National Council on Radiation Protection and Measurements. In certain respects the new guidelines are more stringent than those used previously by the Commission. For example, exposure limits allowed for the general public are stricter with respect to exposure from building-mounted and tower-mounted transmitting antennas as well as from hand-held devices such as cellular telephones.

20. *Which federal agencies made recommendations to the Commission that formed a basis for the final rules?*

Answer: While Congress vested the Commission with the authority and responsibility for regulating the environmental effects of RF emissions, four key federal agencies with responsibility for health and safety filed comments in this proceeding and made specific recommendations. These agencies were the Environmental Protection Agency (EPA), the Center for Devices and Radiological Health (CDRH) of the Food and Drug Administration (FDA), the National Institute for Occupational Safety and Health (NIOSH) and the Occupational Safety and Health Administration (OSHA). In adopting the new guidelines, the Commission paid considerable deference to the recommendations of these federal agencies, and these agencies have reaffirmed their support for the Commission's action with letters which are part of the record in this docket.

21. *What is the American National Standards Institute?*

Answer: The American National Standards Institute (ANSI) is a non-profit, privately funded membership organization that coordinates the development of voluntary national standards in the United States. ANSI, based in New York, New York, has a membership composed of over 1200 companies, 250 professional, technical, trade, labor and consumer organizations, and approximately 30 government agencies. ANSI and IEEE standards are often recognized by many government agencies and organizations in both the United States and abroad.

22. *What is the Institute of Electrical and Electronics Engineers, Inc?*

The Institute of Electrical and Electronic Engineers (IEEE) is the world's largest technical

professional society comprised of over 320,000 engineers throughout the world. IEEE is a non-profit organization that promotes the development and application of electrotechnology and applied sciences for the benefit of humanity, the advancement of the profession and the well being of its members. The technical objectives of the IEEE focus on advancing the theory and practice of electrical, electronics and computer engineering, and computer science.

IEEE standards are voluntary and these documents are developed within the Technical Committees of the IEEE Societies and the Standards Coordinating Committees of the IEEE Standards Board. Members of these committees serve voluntarily and without compensation and may or may not be members of the institute. The standards developed within the IEEE represent a consensus of the broad expertise on the subject within the Institute as well as those activities outside the IEEE that have expressed an interest in participating in the development of the standard.

23. *What is the National Council on Radiation Protection and Measurements?*

Answer: The National Council on Radiation Protection and Measurements (NCRP) is a non-profit organization chartered by the United States Congress to provide government, the public, and industry with recommendations and guidance concerning human exposure to ionizing and non-ionizing radiation. The Commission, along with other government agencies and organizations, has an official relationship with NCRP as a "collaborating organization."

24. *How will antenna sites be evaluated for RF exposure?*

Answer: Antenna sites will be evaluated for compliance with limits for maximum permissible exposure (MPE) if they meet the criteria based on operating power, location, or height above ground set forth in Table 1 in the new Section 1.1307 of the Commission's rules. Under the rules, all sites are required to comply with the new MPE limits, but only certain sites are required to undergo environmental evaluation. The rules provide specific guidelines and procedures for such evaluation.

25. *Some carriers say their facilities are "categorically excluded" from compliance. What does that mean?*

Answer: In the past, the Commission categorically excluded certain radio services, including cellular, land mobile services, and others, from routine environmental evaluation requirements. Categorical exclusions are allowed under the National Environmental Policy Act if such facilities are determined, individually or collectively, to have no significant impact on the quality of the human environment. This does not mean, however, that such facilities do not have to meet the Commission's guidelines for exposure to RF emissions. Rather, it means that certain facilities will normally be assumed not to exceed the applicable MPE limits, and do not have to demonstrate compliance routinely.

Under the new rules, the Commission has changed the ways it determines which facilities should be categorically excluded. Instead of exempting whole services, the categorical exclusions are now based on the operating power, location, or accessibility of an individual facility. Thus, the categories requiring environmental evaluation have been changed to include some facilities which were previously categorically excluded and to categorically exclude others which were previously included. Table 1 in the new Section 1.1307 of the Commission's rules identifies those facilities that are subject to routine environmental evaluation. Thus, under the new rules which apply to cellular, PCS, and paging, as well as other services, some of a carrier's facilities may be categorically excluded, while others are subject to routine environmental evaluation. It is important to note that if the Commission receives evidence that a particular facility or equipment may not be in compliance with the MPE or specific absorption rate (SAR) limits, the Commission can require that the operator of such facility or the manufacturer of such device demonstrate compliance, even if it is otherwise categorically excluded.

26. *How can I obtain a copy of the new Commission rules adopting the revised RF exposure guidelines?*

Answer: PART II of this **Fact Sheet #2** sets forth the most relevant Commission rules governing RF emissions. Paper copies of the Commission's *Report and Order* which adopted these new guidelines can be obtained from the Commission's duplication contractor, International Transcription Service (ITS), 2100 M Street, N.W., Suite 140, Washington, DC 20037, at (202) 857-3800. An electronic version of the *Report and Order* is also available from the Internet on the Commission's Office of Engineering and Technology (OET) homepage at <http://www.fcc.gov/oet>. Under the section entitled "Headlines," click on the sentence concerning RF guidelines. The text of a press release and the complete *Report and Order* can be accessed this way.

27. *How can I obtain additional information about RF safety and standards?*

Answer: The Commission's Office of Engineering and Technology (OET) provides technical bulletins and fact sheets that address these issues. These documents are available by mail upon request to the OET's RF Safety Information Line at (202) 418-2464. Additionally, the Commission's Compliance and Information Bureau maintains a Communications and Crisis Management Center which is staffed 24 hours a day, seven days a week. In the event of an emergency, such as a radiofrequency hazard threatening public safety or health, the public can call (202) 632-6975, or fax (202) 418-2813, or e-mail "dprescot@fcc.gov." The watch officer who answers at that number can contact the Commission's staff in the affected area and dispatch them within a matter of hours.

For more general background information on the health and safety issues related to electromagnetic fields and biological effects, you may also call the Environmental Protection Agency's Electromagnetic Field (EMF) information line at 1-800-363-2383.

**IMPACT OF PERSONAL WIRELESS FACILITIES
ON AIRPLANE NAVIGATION AND ON THE ENVIRONMENT**

28. *Are personal wireless facilities hazardous to airplane navigation? What has the Commission done to address this problem?*

Answer: Antenna structures or towers which are proposed to be constructed taller than 60.96 meters (200 feet) above ground level and towers which are to be located within certain distances of airport runways must be registered with the Commission, regardless of whether or not any other notification to the Commission is required for that particular type of communications service. The Commission works closely with the Federal Aviation Administration (FAA) to ensure that Commission licensees do not construct antenna structures which may constitute a menace to air navigation because both of these agencies have jurisdiction and responsibility of regulating the construction, marking and lighting of these antenna structures. Depending on the FAA's recommendations reached upon conducting an aeronautical study of the proposed structure, the Commission may require these Commission-registered structures to be marked, painted and/or lighted, or in some situations to be constructed at a reduced height, in order to avoid becoming a public safety hazard.

For more information on the FAA safety requirements, please refer to the Commission's Wireless Telecommunications Bureau's Fact Sheet PR5000 #15, entitled "Antenna Structure Registration." A copy of this Fact Sheet can be obtained by request at 1-800-322-1117, or by sending a request by email to "mayday@fcc.gov." Fact Sheet PR5000 #15 is also available on the Internet on the Commission's Wireless Telecommunications Bureau homepage at <http://www.fcc.gov/wtb/antstruc.html>.

29. *Are there any requirements that personal wireless services providers consider the effect of their proposed facilities upon the environment?*

Answer: Yes. As a federal agency, the Commission is required by the National Environmental Policy Act of 1969 (NEPA) to ensure that it considers effects upon the environment of any major action that it takes. Because the Commission is a licensing agency, it requires that all licensees comply with NEPA as well, by evaluating their actions for environmental consequences.

The Commission's rules implementing NEPA are found in Title 47 of the Code of Federal Regulations, Part 1, Sections 1.1301-1.1319, 47 C.F.R. §§ 1.1301-1.1319. Each licensee must evaluate the location of a proposed structure to determine if it is in an environmentally sensitive area as determined in Section 1.1307. Specifically, there are eight categories listed in Section 1.1307(a), as follows:

- (1) officially designated wilderness areas;
- (2) officially designated wildlife preserves;

- (3) situations which may affect listed threatened or endangered species or critical habitats;
- (4) situations which may affect historical sites listed or eligible for listing in the National Register of Historic Places;
- (5) Indian religious sites;
- (6) 100-year floodplains (as determined by the Federal Emergency Management Agency (FEMA)'s flood insurance rate maps);
- (7) situations which may cause significant change in surface features, such as wetland fills, deforestation or water diversion; and
- (8) proposed use of high intensity white lights in residential neighborhoods.

Section 1.1307(b) also requires an environmental evaluation if the proposed transmitter may cause human exposure to RF radiation in excess of the Commission's adopted guidelines.

If the licensee's proposed construction falls within one of these categories, the licensee is required to prepare an environmental assessment (EA), as instructed in Section 1.1311, and file that document with the appropriate Bureau of the Commission for evaluation. Pursuant to Section 1.1312, a licensee that files an EA must await Commission approval of its proposed project before commencing any construction, even if Commission approval is not otherwise required for such construction. The licensee's application is also placed on public notice as a "major action," and all interested parties are afforded a 30-day period in which to file comments on the proposed effects upon the environment. If this period expires without any negative comments, and if the Commission staff, after consulting other governmental agencies with expertise over the subject matter, makes a finding of no significant impact, then the construction can proceed.

For more information on the Commission's NEPA compliance requirements and preparation of EAs in general, contact the Enforcement Division of the Wireless Telecommunications Bureau, at (202) 418-0569, or fax (202) 418-2644.

PART II

SUMMARY OF THE COMMISSION'S REVISED RADIOFREQUENCY EMISSIONS GUIDELINES

As required by Section 704 of the Telecommunications Act of 1996, on August 1, 1996, the Commission adopted new guidelines and methods for evaluating the environmental effects of radiofrequency (RF) emissions. These new guidelines apply to all transmitters licensed and or authorized by the Commission to be sold by manufacturers. For purposes of Section 704, the RF emission rules apply to all transmitters licensed or authorized by the Commission. This would include both transmitter structures licensed to personal wireless service providers, and the mobile telephone handsets used by subscribers to the service.

The updated guidelines are based on recommendations of federal agencies with expertise in health and safety issues, such as the Environmental Protection Agency and the Food and Drug Administration, as well as of the Institute of Electrical and Electronics Engineers, Inc., the American National Standards Institute and the National Council on Radiation Protection and Measurements, and will ensure that the public and workers are adequately protected from exposure to potentially harmful RF emissions.

The new rules adopt two limitations on exposure to RF emissions:

- First, the Commission adopted Maximum Permissible Exposure (MPE) limits for electric and magnetic field strength and power flux density for transmitters operating at frequencies from 300 kHz to 100 GHz, which includes, for example, cellular radio services, personal communications services (PCS) and specialized mobile radio (SMR) services. The MPE limits for field strength and power density are generally based on recommendations made by the National Council on Radiation Protection and Measurements (NCRP) in 1986. With the exception of the limits on exposure to power density above 1500 MHz and the limits for exposure to lower frequency magnetic fields, these MPE limits are also generally based on the guidelines contained in the 1992 RF safety standard developed by the Institute for Electrical and Electronics Engineers, Inc. (IEEE) and adopted by the American National Standards Institute (ANSI).
- Second, the Commission adopted exposure limits for Specific Absorption Rate (SAR) to be used for evaluating certain hand-held devices such as cellular radio and PCS telephones. The SAR limits for hand-held devices are the same as those recommended by ANSI/IEEE which are generally similar to those recommended by the NCRP.

The new rules also categorically exclude certain transmitting facilities from routine evaluation for compliance with the RF emission guidelines based on the Commission's determination that they are extremely unlikely to cause workers or the general public to become exposed to emissions that exceed the guidelines.

- For cellular and certain SMR facilities, transmitters are categorically excluded if they are located ten meters or more off the ground (other than on a rooftop), or if the total power of all channels is 1000 watts effective radiated power (ERP) or less. Broadband PCS facilities are categorically excluded if they are located ten meters or more off the ground (other than on a rooftop), or if the total power of all channels is 2000 watts ERP or less. Categorical exclusions for other personal wireless services are specified in the new RF rules.
- Facilities that are categorically excluded need not undergo routine evaluation for compliance with the Commission's guidelines, but they nevertheless must comply with these guidelines, and the Commission may order an evaluation if it determines that a facility may have a significant impact upon the human environment.
- If a facility is not categorically excluded, the application must contain a statement confirming that the facility will not expose workers or the general public to emissions that exceed the guidelines. Technical information showing the basis for this statement must be submitted to the Commission upon request. If the facility will expose workers or the general public to emissions that exceed the guidelines, either by itself or cumulatively with other transmitters, the applicant must prepare an environmental assessment (EA) which is filed with the Commission for its review. The applicant is not authorized to begin construction of its facilities until the EA is ultimately approved by the Commission.

The new guidelines for MPE will apply to applications for transmitter facilities filed with the Commission on or after January 1, 1997, in order to provide licensees with a reasonable transition period for compliance with the new requirements. Transmitter facilities for which applications are filed before January 1, 1997, will continue to be governed by the old guidelines. However, the new requirements for SAR evaluation of hand-held devices will apply immediately to cellular and PCS handsets that are submitted for Commission approval prior to marketing.

The new RF emissions rules amend various portions of the Commission's Rules which are found at Title 47 of the Code of Federal Regulations (CFR). Because these rules were just adopted, they will not appear in the CFR until the October 1996 edition, which is expected to be available in early 1997. We therefore reproduce in the next section of this **Fact Sheet #2** those revised and/or new RF rules which are most relevant to personal wireless facilities siting issues.

SELECTED TEXT OF THE COMMISSION'S RULES ADOPTING THE NEW RADIOFREQUENCY EMISSIONS GUIDELINES

The Commission's *Report and Order* in ET Docket No. 93-62, released on August 1, 1996, amends Parts 1, 2, 15, 24 and 97 of the Commission's Rules, which are found in Title 47 of the Code of Federal Regulations. The following is a reproduction of the most relevant existing rules (in italics) and new rule provisions added by this action (in regular text) for the purpose of personal wireless facilities siting. Deletions of rule provisions which are not relevant to the RF evaluations are indicated with asterisks (* * * * *).

To obtain a hard copy of the *Report and Order* in ET Docket No. 93-62, including the complete text of the new and revised RF rules, contact the Commission's duplications contractor, International Transcription Service (ITS), at (202) 857-3800. An electronic copy of the text is available on the Internet at <http://www.fcc.gov/oet>, under the section entitled "Headlines." For more information about these RF rules, contact the Commission's Radiofrequency Safety Information Line at (202) 418-2464.

PART 1—PRACTICE AND PROCEDURE

Subpart I—Procedures Implementing the National Environmental Policy Act of 1969

* * * * *

§ 1.1307 Actions which may have a significant environmental effect, for which Environmental Assessments (EAs) must be prepared.

(a) Commission actions with respect to the following types of facilities may significantly affect the environment and thus require the preparation of EAs by the applicant (see §§ 1.1308 and 1.1311) and may require further Commission environmental processing (see §§ 1.1314, 1.1315 and 1.1317):

(1) Facilities that are to be located in an officially designated wilderness area.

(2) Facilities that are to be located in an officially designated wildlife preserve.

(3) Facilities that:

(i) May affect listed threatened or endangered species or designated critical habitats; or

(ii) are likely to jeopardize the continued existence of any proposed endangered or threatened species or likely to result in the destruction or adverse modification of proposed critical habitats, as determined by the Secretary of the Interior pursuant to the Endangered Species Act of 1973.

NOTE: The list of endangered and threatened species is contained in 50 CFR 17.11, 17.22, 222.23(a) and 227.4. The list of designated critical habitats is contained in 50 CFR 17.95, 17.96 and Part 226. To ascertain the status of proposed species and habitats, inquiries also may be directed to the Regional Director of the Fish and Wildlife Service, Department of the Interior.

(4) *Facilities that may affect districts, sites, buildings, structures or objects, significant in American history, architecture, archeology, engineering or culture, that are listed, or are eligible for listing, in the National Register of Historic Places. (See 16 U.S.C. 470w(5); 36 CFR 60 and 800.)*

NOTE: The National Register is updated and re-published in the Federal Register each year in February. To ascertain whether a proposal affects a historical property of national significance, inquiries also may be made to the appropriate State Historic Preservation Officer, see 16 U.S.C. 470a(b); 36 CFR Parts 63 and 800.

(5) *Facilities that may affect Indian religious sites.*

(6) *Facilities to be located in a flood Plain (See Executive Order 11988.)*

(7) *Facilities whose construction will involve significant change in surface features (e.g., wetland fill, deforestation or water diversion). (In the case of wetlands on Federal property, see Executive Order 11990.)*

(8) *Antenna towers and/or supporting structures that are to be equipped with high intensity white lights which are to be located in residential neighborhoods, as defined by applicable zoning law.*

(b) In addition to the actions listed in paragraph (a) of this section, Commission actions granting construction permits, licenses to transmit or renewals thereof, equipment authorizations or modifications in existing facilities, require the preparation of an Environmental Assessment (EA) if the particular facility, operation or transmitter would cause human exposure to levels of radiofrequency radiation in excess of the limits in § 1.1310 and § 2.1093 of this chapter. Applications to the Commission for construction permits, licenses to transmit or renewals thereof, equipment authorizations or modifications in existing facilities must contain a statement confirming compliance with the limits unless the facility, operation, or transmitter is categorically excluded, as discussed below. Technical information showing the basis for this statement must be submitted to the Commission upon request.

(1) The exposure limits in § 1.1310 are generally applicable to all facilities, operations and transmitters regulated by the Commission. However, a determination of compliance with the exposure limits in § 1.1310 (routine environmental evaluation), and preparation of an EA if the limits are exceeded, is necessary only for facilities, operations and transmitters that fall into the categories listed in Table 1, or those specified in paragraph (b)(2) of this section. All other facilities, operations and transmitters are categorically excluded from making such studies or preparing an EA, except as indicated in paragraphs (c) and (d) of this section. For purposes of Table 1, "rooftop" means the roof or otherwise outside, topmost level or levels of a building structure that is occupied as a workplace or residence and where either workers or the general public may have access. The term "power" in column 2 of Table 1 refers to total operating power of the transmitting operation in question in terms of effective radiated power (ERP), equivalent isotropically radiated power (EIRP), or peak envelope power (PEP), as defined in § 2.1 of this chapter. For the case of the Cellular Radiotelephone Service, subpart H of part 22 of this chapter; the Personal Communications Service, part 24 of this chapter and covered Specialized Mobile Radio Service operations, part 90 of this chapter, the phrase "total power of all channels" in column 2 of Table 1 means the sum of the ERP or EIRP of all co-located simultaneously operating transmitters of the facility. When applying the criteria of Table 1, radiation in all directions should be considered. For the case of transmitting facilities using sectorized transmitting antennas, applicants and licensees should apply the criteria to all transmitting channels in a given sector, noting that for a highly directional antenna there is relatively little contribution to ERP or EIRP summation for other directions.

TABLE 1: TRANSMITTERS, FACILITIES AND OPERATIONS SUBJECT TO ROUTINE ENVIRONMENTAL EVALUATION

SERVICE (TITLE 47 RULE PART)	EVALUATION REQUIRED IF:
Experimental Radio Services (Part 5)	power > 100W ERP (164W EIRP)
Radio Frequency Devices (Part 15)	millimeter wave device operating in one of the following bands 46.7-46.8 GHz, 59.0-64.0 GHz or 76.0-77.0 GHz (see §§ 15.253 and 15.255 of this chapter) unlicensed personal communications service devices operating under Subpart D of this chapter
Multipoint Distribution Service (Subpart K of Part 21)	<u>non-rooftop antennas</u> : height above ground level to radiation center < 10 m <u>and</u> power > 1640 W EIRP <u>rooftop antennas</u> : power > 1640W EIRP
Paging and Radiotelephone Service (Subpart E of Part 22)	<u>non-rooftop antennas</u> : height above ground level to radiation center < 10 m <u>and</u> power > 1000W ERP (1640W EIRP) <u>rooftop antennas</u> : power > 1000W ERP (1640W EIRP)
Cellular Radiotelephone Service (Subpart H of Part 22)	<u>non-rooftop antennas</u> : height above ground level to radiation center < 10 m <u>and</u> total power of all channels > 1000W ERP (1640 W EIRP) <u>rooftop antennas</u> : total power of all channels > 1000W ERP (1640W EIRP)
Personal Communications Services (Part 24)	(1) Narrowband PCS (subpart D): <u>non-rooftop antennas</u> : height above ground level to radiation center <10 m <u>and</u> total power of all channels > 1000W ERP (1640 W EIRP) <u>rooftop antennas</u> : total power of all channels > 1000W (1640W EIRP) (2) Broadband PCS (subpart E): <u>non-rooftop antennas</u> : height above ground level to radiation center <10 m <u>and</u> total power of all channels > 2000W ERP (3280 W EIRP) <u>rooftop antennas</u> : total power of all channels > 2000W (3280W EIRP)
Satellite Communications (Part 25)	all included
Radio Broadcast Services (Part 73)	all included

SERVICE (TITLE 47 RULE PART)	EVALUATION REQUIRED IF:
Experimental, Auxiliary, and Special Broadcast and Other Program Distributional Services (Part 74)	(1) subparts A, G, L: power > 100W ERP (2) subpart I: <u>non-rooftop antennas</u> : height above ground level to radiation center < 10 m <u>and</u> power > 1640 W EIRP <u>rooftop antennas</u> : power > 1640W EIRP
Stations in the Maritime Services (Part 80)	ship earth stations only
Private Land Mobile Radio Services Paging Operations (Part 90)	<u>non-rooftop antennas</u> : height above ground level to radiation center < 10 m <u>and</u> power > 1000W ERP (1640W EIRP) <u>rooftop antennas</u> : power > 1000W ERP (1640 W EIRP)
Private Land Mobile Radio Services Specialized Mobile Radio ("covered" providers only - see below)* (Part 90)	<u>non-rooftop antennas</u> : height above ground level to radiation center < 10 m <u>and</u> total power of all channels > 1000W ERP (1640 W EIRP) <u>rooftop antennas</u> : total power of all channels > 1000W ERP (1640W EIRP)
Amateur Radio Service (Part 97)	transmitter output power > 50W PEP

* NOTE: "Covered" SMR providers include geographic area SMR licensees in the 800 MHz and 900 MHz bands that offer real-time, two-way switched voice service that is interconnected with the public switched network and Incumbent Wide Area SMR licensees, as defined in § 20.3 of this chapter.

(2) Mobile and portable transmitting devices that operate in the Cellular Radiotelephone Service, the Personal Communications Services (PCS), the Satellite Communications Services, the Maritime Services (ship earth stations only) and covered Specialized Mobile Radio Service providers authorized under subpart H of part 22, part 24, part 25, part 80, and part 90 of this chapter are subject to routine environmental evaluation for RF exposure prior to equipment authorization or use, as specified in §§ 2.1091 and 2.1093 of this chapter. All unlicensed PCS and millimeter wave devices are also subject to routine environmental evaluation for RF exposure prior to equipment authorization or use, as specified in § 15.253(f), § 15.255(g), and § 15.319(i) of this chapter. All other mobile, portable, and unlicensed transmitting devices are categorically excluded from routine environmental evaluation for RF exposure under §§ 2.1091 and 2.1093 of this chapter except as specified in paragraphs (c) and (d) of this section.

(3) In general, when the guidelines specified in § 1.1310 are exceeded in an accessible area due to the emissions from multiple fixed transmitters, actions necessary to bring the area into compliance with the guidelines are the shared responsibility of all licensees whose transmitters produce field strengths or power density levels at the area in question in excess of 1% of the exposure limits applicable to their particular transmitter.

(i) Applicants for proposed (not otherwise excluded) transmitters, facilities or modifications that would cause non-compliance with the limits specified in § 1.1310 at an accessible area previously in compliance must submit an EA if emissions from the applicant's transmitter or facility would result in a field

strength or power density at the area in question that exceeds 1% of the exposure limit applicable to that transmitter or facility.

(ii) Renewal applicants whose (not otherwise excluded) transmitters or facilities contribute to the field strength or power density at an accessible area not in compliance with the limits specified in § 1.1310 must submit an EA if emissions from the applicant's transmitter or facility results in a field strength or power density at the area in question that exceeds 1% of the exposure limit applicable to that transmitter or facility.

(4) Transition Provisions. For applications filed with the Commission prior to January 1, 1997, Commission actions granting construction permits, licenses to transmit or renewals thereof, equipment authorizations, or modifications in existing facilities require the preparation of an Environmental Assessment if the particular facility, operation or transmitter would cause human exposure to levels of radiofrequency radiation that are in excess of the requirements contained in paragraphs (4)(i) - (4)(iii) of this section. These transition provisions do not apply to applications for equipment authorization of mobile, portable, and unlicensed devices specified in paragraph (2) of this section.

(i) For facilities and operations licensed or authorized under parts 5, 21 (subpart K), 25, 73, 74 (subparts A, G, I, and L), and 80 of this chapter, the "Radio Frequency Protection Guides" recommended in "American National Standard Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 300 kHz to 100 GHz", (ANSI C95.1-1982), issued by the American National Standards Institute (ANSI) and copyright 1982 by the Institute of Electrical and Electronics Engineers, Inc., New York, New York shall apply. With respect to subpart K of part 21 and subpart I of Part 74 of this chapter, these requirements apply only to multipoint distribution service and instructional television fixed service stations transmitting with an equivalent isotropically radiated power (EIRP) in excess of 200 watts. With respect to subpart L of part 74 of this chapter, these requirements apply only to FM booster and translator stations transmitting with an effective radiated power (ERP) in excess of 100 watts. With respect to part 80 of this chapter, these requirements apply only to ship earth stations.

(ii) For facilities and operations licensed or authorized under part 24 of this chapter, licensees and manufacturers are required to ensure that their facilities and equipment comply with IEEE C95.1-1991 (ANSI/IEEE C95.1-1992), "Safety Levels With Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz." Measurement methods are specified in IEEE C95.3-1991, "Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields -- RF and Microwave." Copies of these standards are available from IEEE Standards Board, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331. Telephone: 1-800-678-4333. The limits for both "controlled" and "uncontrolled" environments, as defined by IEEE C95.1-1991, will apply to all PCS base and mobile stations, as appropriate.

(iii) Applications for all other types of facilities and operations are categorically excluded from routine RF radiation evaluation except as provided in paragraphs (c) and (d) of this section.

(c) If an interested person alleges that a particular action, otherwise categorically excluded, will have a significant environmental effect, the person shall submit to the Bureau responsible for processing that action a written petition setting forth in detail the reasons justifying or circumstances necessitating environmental consideration in the decision-making process. (See § 1.1313). The Bureau shall review the petition and consider the environmental concerns that have been raised. If the Bureau determines that the action may have a significant environmental impact, the Bureau will require the applicant to prepare an EA (see §§ 1.1308 and 1.1311), which will serve as the basis for the determination to proceed with or terminate environmental processing.

(d) If the Bureau responsible for processing a particular action, otherwise categorically excluded, determines that the proposal may have a significant environmental impact, the Bureau, on its own motion, shall require the applicant to submit an EA. The Bureau will review and consider the EA as in paragraph (c)

NAME AND ADDRESS	POINT OF CONTACT	MTA
Cox Communications, Inc. 1400 Lake Hearn Drive, N.E. Atlanta, Georgia 30319 (404) 843-5740	Laura Phillips Dow, Lohnes, Albertson 1255 23rd Street, NW Washington, DC 20037 (202) 857-2824	Los Angeles/ San Diego. Omaha (NE)
GCI Communication Corp. 2550 Denali Street Suite 1000 Anchorage, Alaska 99503-2781 (907) 265-5647	Kathy Shobert GCI Communication Corp. 901 15th Street, NW, Suite 900 Washington, DC 20005 (202) 842-8847	Alaska
GTE Mobilnet Inc. 245 Perimeter Center Parkway 3 REG Atlanta, Georgia (404) 391-1732	Suzanne Carmel GTE Service Corporation 1850 M Street, NW, Suite 1200 Washington, DC 20036 (202) 463-5295	Atlanta. Cincinnati. Denver. Seattle
Omnipoint Corp. 1365 Garden of the Gods Road Colorado Springs, CO 80907 (719) 548-1200	Mark Tauber or Mark O'Connor Piper & Marbury 1200 19th Street, NW, 7th Floor Washington, DC 20036 (202) 861-3913 / (202) 861-6471	New York
Pacific Telesis Mobile Services 4420 Rosewood Drive Bldg. 2, 4th Floor Pleasanton, California 94588 (510) 227-3015	Mike Patrick Pacific Telesis Mobile Services 4420 Rosewood Drive Bldg. 2, 4th Floor Pleasanton, CA 94588 (510) 227-3015	Los Angeles. San Diego. San Francisco
PCS Primeco, L.P. 6 Campus Circle Westlake, Texas 76262 (817) 962-8070	William Roughton Airtouch Communications, Inc 1818 N Street, NW, Suite 800 Washington, DC 20036 (202) 293-3800	San Antonio. Dallas/Fort Worth. Houston. Tampa. Jacksonville. Miami. New Orleans. Milwaukee. Richmond (VA). Chicago. Honolulu
PhillieCo, L.P. 9221 Ward Parkway Kansas City, Missouri 64114 (913) 624-6940	Jay Keithley Sprint Co. 1850 M Street, NW, Suite 1100 Washington, DC 20036 (202) 828-7453	Philadelphia
Poko Lambro Telephone Cooperative, Inc. 11.5 Miles North of Tahoka on U.S. 87 Tahoka, Texas 79373 (806) 924-7234	Sylvia Lesse Kraskin & Lesse 2120 L Street, NW, Suite 520 Washington, DC 20037 (202) 296-8890	Spokane (WA)/ Billings (MT). Guam

NAME AND ADDRESS	POINT OF CONTACT	MTA
Powertel PCS Partners, Inc. 1239 O.G. Skinner Drive West Point, Georgia 31833 (205) 644-9400	Michele Walters Hogan & Hartson, L.L.P. 555 13th Street, NW Washington, DC 20004 (202) 637-5857	Memphis (TN); Birmingham (AL); Jacksonville (FL)
South Seas Cable and Wireless, Inc. c/o 25 N. Stonington Road South Laguna, California 92677 (714) 499-4469	Michael Morrone Keller and Heckman 1001 G Street, NW, Suite 500-W Washington, DC 20001 (202) 434-4124	American Samoa
Southwestern Bell Mobile Systems, Inc. 17330 Preston Road Suite 100-A Dallas, Texas 75252 (214) 733-2000	Steve Portnoy Southwestern Bell Mobile Systems, Inc. 17330 Preston Rd, Suite 100A Dallas, TX 75252 (214) 733-2116	Memphis (TN); Little Rock (AR); Tulsa (OK)
Sprint Telecommunications Venture 9221 Ward Parkway Kansas City, Missouri 64114 Washington, D.C. 20036 (913) 624-6940	Jay Keithley Sprint Co. 1850 M Street, NW, Suite 1100 Washington, DC 20036 (202) 828-7453	Nationwide MTAs
Western PCS I Corp./Western PCS II Corp. 330 120th Avenue, N.E. Suite 200 Bellevue, Washington 98005 (206) 635-0300	Louis Gurman Gurman, Kurtis, Blask & Freedman, Chartered 1400 16th Street, NW, Suite 500 Washington, DC 20036 (202) 328-8200	Portland (OR); Des Moines (IA); Salt Lake City; El Paso (TX); Albuquerque (NM); Oklahoma City, Honolulu

NARROWBAND PCS LICENSEE INFORMATION

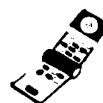
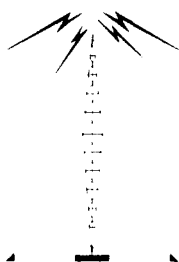
NAME AND ADDRESS	POINT OF CONTACT	MARKET
AirTouch Paging 12221 Merit Drive, Suite 800 Dallas, Texas 75251 (214) 458-5200	James R. Lawson or Mark A. Stachiw Airtouch Paging 12221 Merit Drive, Suite 800 Dallas, Texas 75251 (214)458-5200	Nationwide
MobileMedia Communications, Inc. (Assigned from BellSouth Wireless, Inc.) 2101 Wilson Boulevard, Suite 935 Arlington, Virginia 22201 (703) 312-5151	Gene P. Belardi MobileMedia PCS, Inc. 2101 Wilson Boulevard, Suite 935 Arlington, Virginia 22201 (703)312-5151	Nationwide
Destineer Corp. Formerly - NWM 200 South Lamar Street Security Centre, S. Bldg. Jackson, Mississippi 39201 (601) 944-1300	Thomas Gutierrez Lukas, McGowan, Nace & Gutierrez, Chartered 1111 Nineteenth Street, N.W., Suite 1200 Washington, D.C. 20036 (202)828-9470	Nationwide
DM Messaging 1150 Connecticut Avenue, N.W., 4th Fl. Washington, D.C. 20036 (202) 223-9222	David C. Jatlow 2300 N Street, N.W., Suite 600 Washington, D.C. 20037 (202)663-9080	Nationwide
PageMart II, Inc. 6688 N. Central Expressway, Suite 800 Dallas, Texas 75206 (214) 750-5809	Todd A. Bergwall PageMart, Inc. 6688 N. Central Expressway, Suite 800 Dallas, Texas 75206 (214)706-3789	Nationwide
Paging Network of Virginia DBA - PageNet 4965 Preston Park Boulevard, Suite 600 Plano, Texas 75093 (214) 985-4100	David P. Gamble Paging Network, Inc. 4965 Preston Park Boulevard, Suite 600 Plano, Texas 75093 (214)985-4100	Nationwide
Advanced Wireless Messaging, Inc. 1300 Godward Street, N.E., Suite 3100 Minneapolis, Minnesota 55413 (612) 623-3100	George Y. Wheeler Koteen & Naftalin 1150 Connecticut Ave. N.W., Suite 1150 Washington, D.C. 20036 (202) 467-5700	1-5 All Regions Nationwide Service
AirTouch Paging 12221 Merit Drive, Suite 800 Dallas, Texas 75251 (214) 458-5200	James R Lawson or Mark A. Stachiw Airtouch Paging 12221 Merit Drive, Suite 800 Dallas, Texas 75251 (214) 458-5200	1, 4, 5 1 = Northeast 4 = Central 5 = West

NAME AND ADDRESS	POINT OF CONTACT	MARKET
Ameritech Mobile Services, Inc. 2000 West Ameritech Center Drive Hoffman Estates, Illinois 60196 (708) 706-7640	William J. Edwards Ameritech Mobile Services, Inc. 1515 Woodfield Road, 14th Floor Schaumburg, Illinois 60173 (708) 706-7640	3 3 = Midwest
Benbow P.C.S. Ventures, Inc. 1615 Highland Avenue Eureka, California 95503 (707) 443-0806	June E. Walsh Benbow P.C.S. Ventures, Inc. 1615 Highland Avenue Eureka, California 95503 (707) 443-0806	4 & 5 4 = Central 5 = West
Insta-Check Systems, Inc. 1691 N.W. 107th Avenue Miami, Florida 33172 (800) 222-6385 ext. 800	Thomas Gutierrez Lukas, McGowan, Nace & Gutierrez 1111 19th Street, N.W., Suite 1200 Washington, D.C. 20036 (202) 828-9470	2 2 = South
MobileMedia PCS, Inc. 2101 Wilson Boulevard, Suite 935 Arlington, Virginia 22201 (703) 312-5151	Gene P. Belardi MobileMedia PCS, Inc. 2101 Wilson Boulevard, Suite 935 Arlington, Virginia 22201 (703) 312-5151	1-5 All Regions Nationwide Service
Page Call, Inc. 5 West 3rd Street Coudersport, Pennsylvania 16915 (814) 274-9403	Laura Phillips Dow, Lohnes, Albertson 1255 23rd Street, N.W. Washington, D.C. 20037 (202) 857-28240	1, 2, 3 1 = Northeast 2 = South 3 = Midwest
PageMart PCS, Inc. 6688 N. Central Expressway, Suite 800 Dallas, Texas 75206 (214) 750-5809	Todd A. Bergwall PageMart, Inc. 6688 N. Central Expressway, Suite 800 Dallas, Texas 75206 (214) 706-3789	1-5 1 = Northeast 5 = West
PCS Development Corporation 15 South Main, Suite 810 Greenville, South Carolina 29601 (803) 235-0940	Gerald S. McGowan Lukas, McGowan, Nace & Gutierrez 1111 19th Street, N.W., Suite 1200 Washington, D.C. 20036 (202) 828-9470	1-5 1 = Northeast 5 = West



*Federal Communications Commission
Office of Engineering & Technology*

Questions and Answers about Biological Effects and Potential Hazards of Radiofrequency Electromagnetic Fields



OET BULLETIN 56 *Fourth Edition*

August 1999

ZONING COMMISSION
District of Columbia

Case 01-02

Exhibit 115-C

***Questions and Answers about Biological
Effects and Potential Hazards of
Radiofrequency Electromagnetic Fields***



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Washington, D.C. 20554**

INTRODUCTION

Many consumer and industrial products and applications make use of some form of electromagnetic energy. One type of electromagnetic energy that is of increasing importance worldwide is radiofrequency (or "RF") energy, including radio waves and microwaves, which is used for providing telecommunications, broadcast and other services. In the United States the Federal Communications Commission (FCC) authorizes or licenses most RF telecommunications services, facilities, and devices used by the public, industry and state and local governmental organizations. Because of its regulatory responsibilities in this area the FCC often receives inquiries concerning whether there are potential safety hazards due to human exposure to RF energy emitted by FCC-regulated transmitters. Heightened awareness of the expanding use of RF technology has led some people to speculate that "electromagnetic pollution" is causing significant risks to human health from environmental RF electromagnetic fields. This document is designed to provide factual information and to answer some of the most commonly asked questions related to this topic.¹

WHAT IS RADIOFREQUENCY ENERGY?

Radio waves and microwaves are forms of electromagnetic energy that are collectively described by the term "radiofrequency" or "RF." RF emissions and associated phenomena can be discussed in terms of "energy," "radiation" or "fields." Radiation is defined as the propagation of energy through space in the form of waves or particles. Electromagnetic "radiation" can best be described as waves of electric and magnetic energy moving together (i.e., radiating) through space as illustrated in **Figure 1**. These waves are generated by the movement of electrical charges such as in a conductive metal object or antenna. For example, the alternating movement of charge (i.e., the "current") in an antenna used by a radio or television broadcast station or in a cellular base station antenna generates electromagnetic waves that radiate away from the "transmit" antenna and are then intercepted by a "receive" antenna such as a rooftop TV antenna, car radio antenna or an antenna integrated into a hand-held device such as a cellular telephone. The term "electromagnetic field" is used to indicate the presence of electromagnetic energy at a given location. The RF field can be described in terms of the electric and/or magnetic field strength at that location.²

Like any wave-related phenomenon, electromagnetic energy can be characterized by a wavelength and a frequency. The wavelength (λ) is the distance covered by one complete

¹ Exposure to low-frequency electromagnetic fields generated by electric power transmission has also been the subject of public concern. However, because the FCC does not have regulatory authority with respect to power-line electromagnetic fields, this document only addresses questions related to **RF** exposure. Information about exposure due to electrical power transmission can be obtained from several sources, including the following Internet World Wide Web site: <http://www.niehs.nih.gov/emfrapid>

² The term "EMF" is often used to refer to electromagnetic fields, in general. It can be used to refer to either power-line frequency fields, radiofrequency electromagnetic fields or both.

electromagnetic wave cycle, as shown in **Figure 1**. The frequency is the number of electromagnetic waves passing a given point in one second. For example, a typical radio wave transmitted by an FM radio station has a wavelength of about three (3) meters and a frequency of about 100 million cycles (waves) per second or "100 MHz." One "hertz" (abbreviated "Hz") equals one cycle per second. Therefore, in this case, about 100 million RF electromagnetic waves would be transmitted to a given point every second.

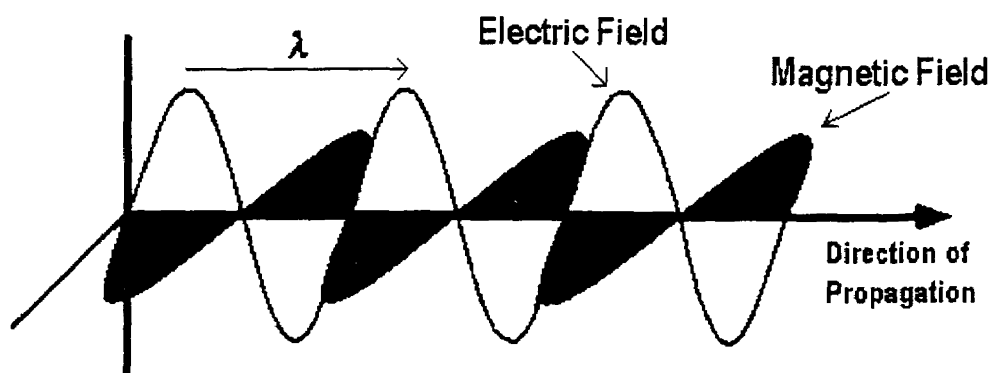


FIGURE 1. *Electromagnetic Wave*

Electromagnetic waves travel through space at the speed of light, and the wavelength and frequency of an electromagnetic wave are inversely related by a simple mathematical formula: frequency (f) times wavelength (λ) = the speed of light (c), or $f \times \lambda = c$. This simple equation can also be expressed as follows in terms of either frequency or wavelength:

$$f = \frac{c}{\lambda} \quad \text{or} \quad \lambda = \frac{c}{f}$$

Since the speed of light in a given medium or vacuum does not change, high-frequency electromagnetic waves have short wavelengths and low-frequency waves have long wavelengths. The electromagnetic "spectrum" (**Figure 2**) includes all the various forms of electromagnetic energy from extremely low frequency (ELF) energy, with very long wavelengths, to X-rays and gamma rays, which have very high frequencies and correspondingly short wavelengths. In between these extremes are radio waves, microwaves, infrared radiation, visible light, and ultraviolet radiation, in that order. The RF part of the electromagnetic spectrum is generally defined as that part of the spectrum where

electromagnetic waves have frequencies in the range of about 3 kilohertz to 300 gigahertz. One kilohertz (kHz) equals one thousand hertz, one megahertz (MHz) equals one million hertz, and one gigahertz (GHz) equals one billion hertz. Thus, when you tune your FM radio to 101.5, it means that your radio is receiving signals from a radio station emitting radio waves at a frequency of 101.5 million cycles (waves) per second, or 101.5 MHz.

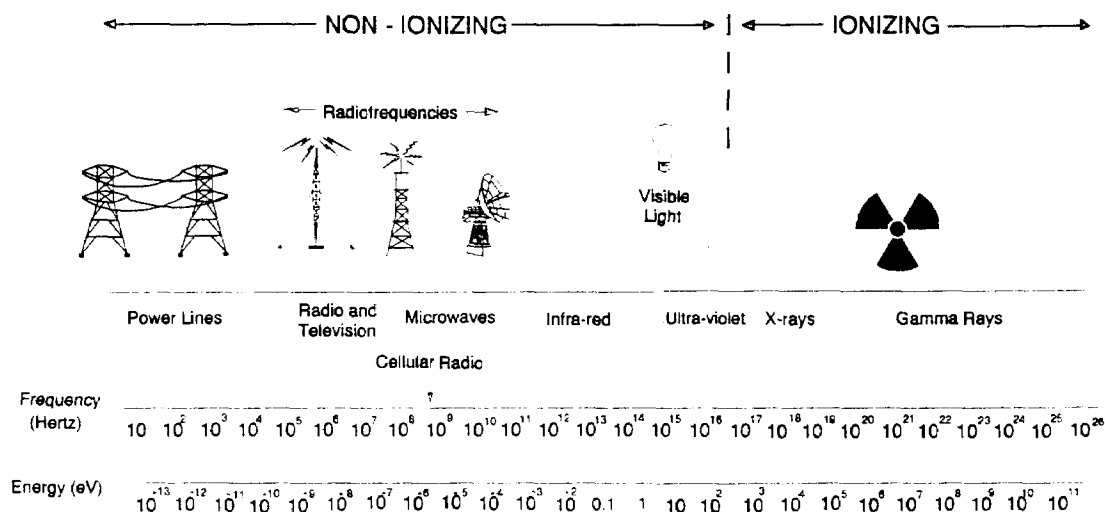


FIGURE 2. *The Electromagnetic Spectrum*

HOW DO WE USE RADIOFREQUENCY ENERGY?

Probably the most important use for RF energy is in providing telecommunications services to the public, industry and government. Radio and television broadcasting, cellular telephones, personal communications services (PCS), pagers, cordless telephones, business radio, radio communications for police and fire departments, amateur radio, microwave point-to-point radio links and satellite communications are just a few of the many applications of RF energy for telecommunications.

Microwave ovens and radar are examples of non-communications uses of RF energy. Also important are uses of RF energy in industrial heating and sealing where electronic devices generate RF radiation that rapidly heats the material being processed in the same way that a microwave oven cooks food. RF heaters and sealers have many uses in industry,

biological tissue and an increase in body temperature. Tissue damage in humans could occur during exposure to high RF levels because of the body's inability to cope with or dissipate the excessive heat that could be generated. Under certain conditions, exposure to RF energy at power density levels of 1-10 mW/cm² and above can result in measurable heating of biological tissue (but not necessarily tissue damage). The extent of this heating would depend on several factors including radiation frequency; size, shape, and orientation of the exposed object; duration of exposure; environmental conditions; and efficiency of heat dissipation.

Two areas of the body, the eyes and the testes, are known to be particularly vulnerable to heating by RF energy because of the relative lack of available blood flow to dissipate the excessive heat load (blood circulation is one of the body's major mechanisms for coping with excessive heat). Laboratory experiments have shown that short-term exposure (e.g., 30 minutes to one hour) to very high levels of RF radiation (100-200 mW/cm²) can cause cataracts in rabbits. Temporary sterility, caused by such effects as changes in sperm count and in sperm motility, is possible after exposure of the testes to high-level RF radiation (or to other forms of energy that produce comparable increases in temperature).

Studies have shown that environmental levels of RF energy routinely encountered by the general public are *far below* levels necessary to produce significant heating and increased body temperature (References 32, 37, 45, 46, 48 and 54). However, there may be situations, particularly workplace environments near high-powered RF sources, where recommended limits for safe exposure of human beings to RF energy could be exceeded. In such cases, restrictive measures or actions may be necessary to ensure the safe use of RF energy.

In addition to intensity, the frequency of an RF electromagnetic wave can be important in determining how much energy is absorbed and, therefore, the potential for harm. The quantity used to characterize this absorption is called the "specific absorption rate" or "SAR," and it is usually expressed in units of watts per kilogram (W/kg) or milliwatts per gram (mW/g). In the far-field of a source of RF energy (e.g., several wavelengths distance from the source) whole-body absorption of RF energy by a standing human adult has been shown to occur at a maximum rate when the frequency of the RF radiation is between about 80 and 100 MHz, depending on the size, shape and height of the individual. In other words, the SAR is at a maximum under these conditions. Because of this "resonance" phenomenon, RF safety standards have taken account of the frequency dependence of whole-body human absorption, and the most restrictive limits on exposure are found in this frequency range (the very high frequency or "VHF" frequency range).

Although not commonly observed, a microwave "hearing" effect has been shown to occur under certain very specific conditions of frequency, signal modulation, and intensity where animals and humans may perceive an RF signal as a buzzing or clicking sound. Although a number of theories have been advanced to explain this effect, the most widely-accepted hypothesis is that the microwave signal produces thermoelastic pressure within the head that is perceived as sound by the auditory apparatus within the ear. This effect is not recognized as a health hazard, and the conditions under which it might occur

including molding plastic materials, gluing wood products, sealing items such as shoes and pocketbooks, and processing food products.

There are a number of medical applications of RF energy, including a technique called *diathermy*, that take advantage of the ability of RF energy to rapidly heat tissue below the body's surface. Tissue heating ("hyperthermia") can be beneficial in the therapeutic treatment of injured tissue and cancerous tumors (*see* References 17 & 18).

WHAT ARE MICROWAVES?

Microwaves are a specific category of radio waves that can be defined as radiofrequency radiation where frequencies range upward from several hundred megahertz (MHz) to several gigahertz (GHz). One of the most familiar and widespread uses of microwave energy is found in household microwave ovens, which operate at a frequency of 2450 MHz (2.45 GHz).

Microwaves are also widely used for telecommunications purposes such as for cellular radio, personal communications services (PCS), microwave point-to-point communication, transmission links between ground stations and orbiting satellites, and in certain broadcasting operations such as studio-to-transmitter (STL) and electronic news gathering (ENG) radio links. Microwave radar systems provide information on air traffic and weather and are extensively used in military and police applications. In the medical field microwave devices are used for a variety of therapeutic purposes including the selective heating of tumors as an adjunct to chemotherapy treatment (microwave hyperthermia).

Radiofrequency radiation, especially at microwave frequencies, efficiently transfers energy to water molecules. At high microwave intensities the resulting energetic water molecules can generate heat in water-rich materials such as most foods. The operation of microwave ovens is based on this principle. This efficient absorption of microwave energy via water molecules results in rapid heating throughout an object, thus allowing food to be cooked more quickly than in a conventional oven.

WHAT IS NON-IONIZING RADIATION?

As explained earlier, electromagnetic radiation is defined as the propagation of energy through space in the form of waves or particles. Some electromagnetic phenomena can be most easily described if the energy is considered as waves, while other phenomena are more readily explained by considering the energy as a flow of particles or "photons." This is known as the "wave-particle" duality of electromagnetic energy. The energy associated with a photon, the elemental unit of an electromagnetic wave, depends on its frequency (or

away from the RF emitter to be located in what is commonly referred to as the "far-field" zone of the radiation source, e.g., more than several wavelengths distance from a typical RF source. In the far field, the electric and magnetic fields are related to each other in a known way, and it is only necessary to measure one of these quantities in order to determine the other quantity or the power density. In closer proximity to an antenna, i.e., in the "near-field" zone, the physical relationships between the electric and magnetic components of the field are usually complex. In this case, it is necessary to determine both the electric and magnetic field strengths to fully characterize the RF environment. (Note: In some cases equipment used for making field measurements displays results in terms of "far-field equivalent" power density, even though the measurement is being taken in the near field.) At frequencies above about 300 MHz it is usually sufficient to measure only the electric field to characterize the RF environment if the measurement is not made too close to the RF emitter.

Power density is defined as power per unit area. For example, power density can be expressed in terms of milliwatts per square centimeter (mW/cm^2) or microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). One mW equals 0.001 watt of power, and one μW equals 0.000001 watt. With respect to frequencies in the microwave range and higher, power density is usually used to express intensity since exposures that might occur would likely be in the far-field. More details about the physics of RF fields and their analysis and measurement can be found in References 2, 3, 8, 21, 33, 34 and 35.

WHAT BIOLOGICAL EFFECTS CAN BE CAUSED BY RF ENERGY?

A biological effect occurs when a change can be measured in a biological system after the introduction of some type of stimuli. However, the observation of a biological effect, in and of itself, does not necessarily suggest the existence of a biological *hazard*. A biological effect only becomes a safety hazard when it "causes detectable impairment of the health of the individual or of his or her offspring" (Reference 25).

There are many published reports in the scientific literature concerning possible biological effects resulting from animal or human exposure to RF energy. The following discussion only provides highlights of current knowledge, and it is not meant to be a complete review of the scientific literature in this complex field. A number of references are listed at the end of this document that provide further information and details concerning this topic and some recent research reports that have been published (References 1, 3, 6, 7, 9, 14, 15-19, 21, 25, 26, 28-31, 34, 36, 39-41, 47, 49 and 53).

Biological effects that result from heating of tissue by RF energy are often referred to as "thermal" effects. It has been known for many years that exposure to high levels of RF radiation can be harmful due to the ability of RF energy to heat biological tissue rapidly. This is the principle by which microwave ovens cook food, and exposure to very high RF power densities, i.e., on the order of $100 \text{ mW}/\text{cm}^2$ or more, can clearly result in heating of

wavelength). The higher the frequency of an electromagnetic wave (and the shorter its corresponding wavelength), the greater will be the energy of a photon associated with it. The energy content of a photon is often expressed in terms of the unit "electron-volt" or "eV".

Photons associated with X-rays and gamma rays (which have very high electromagnetic frequencies) have a relatively large energy content. At the other end of the electromagnetic spectrum, photons associated with low-frequency waves (such as those at ELF frequencies) have many times less energy. In between these extremes ultraviolet radiation, visible light, infrared radiation, and RF energy (including microwaves) exhibit intermediate photon energy content. For comparison, the photon energies associated with high-energy X-rays are billions of times *more* energetic than the energy of a 1-GHz microwave photon. The photon energies associated with the various frequencies of the electromagnetic spectrum are shown in the lower scale of **Figure 2**.

Ionization is a process by which electrons are stripped from atoms and molecules. This process can produce molecular changes that can lead to damage in biological tissue, including effects on DNA, the genetic material. This process requires interaction with photons containing high energy levels, such as those of X-rays and gamma rays. A single quantum event (absorption of an X-ray or gamma-ray photon) can cause ionization and subsequent biological damage due to the high energy content of the photon, which would be in excess of 10 eV (considered to be the minimum photon energy capable of causing ionization). Therefore, X-rays and gamma rays are examples of *ionizing* radiation. Ionizing radiation is also associated with the generation of nuclear energy, where it is often simply referred to as "radiation."

The photon energies of RF electromagnetic waves are not great enough to cause the ionization of atoms and molecules and RF energy is, therefore, characterized as *non-ionizing* radiation, along with visible light, infrared radiation and other forms of electromagnetic radiation with relatively low frequencies. It is important that the terms "ionizing" and "non-ionizing" not be confused when discussing biological effects of electromagnetic radiation or energy, since the mechanisms of interaction with the human body are quite different.

HOW ARE RADIOFREQUENCY FIELDS MEASURED?

Because an RF electromagnetic field has both an electric and a magnetic component (electric field and magnetic field), it is often convenient to express the intensity of the RF field in terms of units specific for each component. The unit "volts per meter" (V/m) is often used to measure the strength ("field strength") of the electric field, and the unit "amperes per meter" (A/m) is often used to express the strength of the magnetic field.

Another commonly used unit for characterizing an RF electromagnetic field is "power density." Power density is most accurately used when the point of measurement is far enough

would rarely be encountered by members of the public. Therefore, this phenomenon should be of little concern to the general population. Furthermore, there is no evidence that it could be caused by telecommunications applications such as wireless or broadcast transmissions.

At relatively low levels of exposure to RF radiation, i.e., field intensities lower than those that would produce significant and measurable heating, the evidence for production of harmful biological effects is ambiguous and unproven. Such effects have sometimes been referred to as "non-thermal" effects. Several years ago publications began appearing in the scientific literature, largely overseas, reporting the observation of a wide range of low-level biological effects. However, in many of these cases further experimental research was unable to reproduce these effects. Furthermore, there has been no determination that such effects might indicate a human health hazard, particularly with regard to long-term exposure.

More recently, other scientific laboratories in North America, Europe and elsewhere have reported certain biological effects after exposure of animals (*"in vivo"*) and animal tissue (*"in vitro"*) to relatively low levels of RF radiation. These reported effects have included certain changes in the immune system, neurological effects, behavioral effects, evidence for a link between microwave exposure and the action of certain drugs and compounds, a "calcium efflux" effect in brain tissue (exposed under very specific conditions), and effects on DNA.

Some studies have also examined the possibility of a link between RF and microwave exposure and cancer. Results to date have been inconclusive. While some experimental data have suggested a possible link between exposure and tumor formation in animals exposed under certain specific conditions, the results have not been independently replicated. In fact, other studies have failed to find evidence for a causal link to cancer or any related condition. Further research is underway in several laboratories to help resolve this question.

In general, while the possibility of "non-thermal" biological effects may exist, whether or not such effects might indicate a human health hazard is not presently known. Further research is needed to determine the generality of such effects and their possible relevance, if any, to human health. In the meantime, standards-setting organizations and government agencies continue to monitor the latest experimental findings to confirm their validity and determine whether alterations in safety limits are needed in order to protect human health.

WHAT RESEARCH IS BEING DONE ON RF BIOLOGICAL EFFECTS?

For many years research into possible biological effects of RF energy has been carried out in government, academic and industrial laboratories all over the world, and such research is continuing. Past research has resulted in a very large number of scientific publications on this topic, some of which are listed in the reference section of this document. For many years the U.S. Government has sponsored research into the biological effects of RF energy. The majority of this work has been funded by the Department of Defense, due, in part, to the

In the United States, although the Federal Government has never itself developed RF exposure standards, the FCC has adopted and used recognized safety guidelines for evaluating RF environmental exposure since 1985. Federal health and safety agencies, such as the Environmental Protection Agency (EPA), the Food and Drug Administration (FDA), the National Institute for Occupational Safety and Health (NIOSH) and the Occupational Safety and Health Administration (OSHA) have also been actively involved in monitoring and investigating issues related to RF exposure. For example, the FDA has issued guidelines for safe RF emission levels from microwave ovens, and it continues to monitor exposure issues related to the use of certain RF devices such as cellular telephones. NIOSH conducts investigations and health hazard assessments related to occupational RF exposure.

In 1971, a federal RF radiation protection guide for workers was issued by OSHA based on the 1966 American National Standards Institute (ANSI) RF exposure standard. However, the OSHA regulation was later ruled to be advisory only and not enforceable. Presently, OSHA enforcement actions related to RF exposure of workers are undertaken using OSHA's "general duty clause," which relies on the use of widely-supported voluntary "consensus" standards such as those discussed below.³

U.S. federal, state and local governmental agencies and other organizations have generally relied on RF exposure standards developed by expert non-government organizations such as ANSI, the Institute of Electrical and Electronics Engineers (IEEE) and the National Council on Radiation Protection and Measurements (NCRP).⁴ For example, in 1966, 1974, and 1982, ANSI issued protection guides for RF exposure developed by committees of experts. These earlier ANSI standards recommended limits for exposure of the public that were the same as those recommended for exposure of workers.

In 1986, the NCRP issued exposure criteria for the workplace that were the same as the 1982 ANSI recommended levels, but the NCRP also recommended more restrictive limits for exposure of the general public. Therefore, the NCRP exposure criteria included *two* tiers of recommended limits, one for the general population and another for occupational exposure. In 1987, the ANSI committee on RF exposure standards (Standards Coordinating Committee 28) became a committee of the IEEE, and, in 1991, revised its earlier standard and issued its own two-tiered standard that had been developed over a period of several years.

³ For information about OSHA RF-related activities and RF protection programs for workers, see the OSHA Internet Web site (case sensitive): www.osha-slc.gov/SLTC/ (select subject: "radiofrequency radiation").

⁴ ANSI is a non-profit, privately funded, membership organization that coordinates development of voluntary national standards. The IEEE is a non-profit technical and professional engineering society. The NCRP is a non-profit corporation chartered by the U.S. Congress to develop information and recommendations concerning radiation protection. Several government agencies, including the FCC, and non-government organizations have established relationships with NCRP as "Collaborating Organizations."

The ANSI/IEEE standards have been widely used and cited and have served as the basis for similar standards in the United States and in other countries. Both the NCRP and ANSI/IEEE guidelines were developed by scientists and engineers with a great deal of experience and knowledge in the area of RF biological effects and related issues. These individuals spent a considerable amount of time evaluating published scientific studies relevant to establishing safe levels for human exposure to RF energy.

In addition to NCRP and ANSI/IEEE, other organizations and countries have issued exposure guidelines. For example, several European countries are basing guidelines on exposure criteria developed by the International Committee on Nonionizing Radiation Protection (ICNIRP, Reference 25). The ICNIRP guidelines are also derived from an SAR threshold of 4 W/kg (for adverse effects) and are similar to the 1992 ANSI/IEEE and NCRP recommendations with certain exceptions. For example, ICNIRP recommends somewhat different exposure levels in the lower and upper frequency ranges and for localized exposure due to such devices as hand-held cellular telephones. Many, but not all, countries have based exposure recommendations on the same general concepts and thresholds as those used by the NCRP, ANSI/IEEE and ICNIRP. Because of differences in international standards, the World Health Organization (WHO), as part of its EMF Project (discussed earlier), has initiated a program to try and develop an international framework for RF safety standards.

FCC Exposure Guidelines

In 1985, the FCC adopted the 1982 ANSI guidelines for purposes of evaluating exposure due to RF transmitters licensed and authorized by the FCC. This decision was in response to provisions of the National Environmental Policy Act of 1969 requiring all Federal Government agencies to evaluate the impact of their actions on the "quality of the human environment."⁵ In 1992, ANSI adopted the 1991 IEEE standard as an American National Standard (a revision of its 1982 standard) and designated it ANSI/IEEE C95.1-1992.⁶

In 1993, the FCC proposed to update its rules and adopt the new ANSI/IEEE guidelines. After a lengthy period to allow for the filing of comments and for deliberation the FCC decided, in 1996, to adopt a modified version of its original proposal.⁷ The FCC's

⁵ The National Environmental Policy Act of 1969, 42 USC Section 4321, *et seq.*

⁶ ANSI/IEEE C95.1-1992 (originally issued as IEEE C95.1-1991), "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz," (Reference 3).

⁷ See *Report and Order* and *Second Memorandum Opinion and Order and Notice of Proposed Rulemaking*, ET Docket 93-62, (References 55 and 56). In 1997, the FCC released a technical bulletin entitled, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields," OET Bulletin 65 (Reference 57) that contains detailed information on methods for compliance with FCC guidelines. These documents can be accessed at the FCC's Web site: <http://www.fcc.gov/oet/rfsafety>.

action also fulfilled requirements of the Telecommunications Act of 1996 for adopting new RF exposure guidelines.⁸

The FCC considered a large number of comments submitted by industry, government agencies and the public. In particular, the FCC considered comments submitted by the EPA, FDA, NIOSH and OSHA, which have primary responsibility for health and safety in the Federal Government. The guidelines the FCC adopted were based on the recommendations of those agencies, and they have sent letters to the FCC supporting its decision and endorsing the FCC's guidelines as protective of public health.

In its 1996 Order, the FCC noted that research and analysis relating to RF safety and health is ongoing and changes in recommended exposure limits may occur in the future as knowledge increases in this field. In that regard, the FCC will continue to cooperate with industry and with expert agencies and organizations with responsibilities for health and safety in order to ensure that the FCC's guidelines continue to be appropriate and scientifically valid.

The FCC's guidelines are based on recommended exposure criteria issued by the NCRP and ANSI/IEEE. The NCRP exposure guidelines are similar to the ANSI/IEEE 1992 guidelines except for differences in recommended exposure levels at the lower frequencies and higher frequencies of the RF spectrum. Both ANSI/IEEE and NCRP recommend two different tiers of exposure limits. The NCRP designates one tier for occupational exposure and the other for exposure of the general population while ANSI/IEEE designates exposure tiers in terms of "environments," one for "controlled" environments and the other for "uncontrolled" environments. Over a broad range of frequencies, NCRP exposure limits for the public are generally one-fifth those for workers in terms of power density.⁹

The NCRP and ANSI/IEEE exposure criteria identify the same threshold level at which harmful biological effects may occur, and the values for Maximum Permissible Exposure (MPE) recommended for electric and magnetic field strength and power density in

⁸ The Telecommunications Act of 1996, enacted on February 8, 1996, required that: "Within 180 days after the enactment of this Act, the Commission shall complete action in ET Docket 93-62 to prescribe and make effective rules regarding the environmental effects of radio frequency emissions." See Section 704(b) of the Telecommunications Act of 1996, Pub. L. No. 104-104, 110 Stat. 56 (1996).

⁹ The FCC adopted limits for field strength and power density that are based on Sections 17.4.1 and 17.4.2, and the time-averaging provisions of Sections 17.4.1.1 and 17.4.3, of "Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields," NCRP Report No. 86, for frequencies between 300 kHz and 100 GHz (Reference 34). With the exception of limits on exposure to power density above 1500 MHz, and limits for exposure to lower frequency magnetic fields, these MPE limits are also based on the guidelines developed by the IEEE and adopted by ANSI. See Section 4.1 of ANSI/IEEE C95.1-1992, "Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz" (Reference 3).

both documents are based on this threshold level.¹⁰ In addition, both the ANSI/IEEE and NCRP guidelines are frequency dependent, based on findings (discussed earlier) that whole-body human absorption of RF energy varies with the frequency of the RF signal. The most restrictive limits on exposure are in the frequency range of 30-300 MHz where the human body absorbs RF energy most efficiently when exposed in the far field of an RF transmitting source. Although the ANSI/IEEE and NCRP guidelines differ at higher and lower frequencies, at frequencies used by the majority of FCC licensees the MPE limits are essentially the same regardless of whether ANSI/IEEE or NCRP guidelines are used.

Most radiofrequency safety limits are defined in terms of the electric and magnetic field strengths as well as in terms of power density. For lower frequencies, limits are more meaningfully expressed in terms of electric and magnetic field strength values, and the indicated power densities are actually "far-field equivalent" power density values. The latter are listed for comparison purposes and because some instrumentation used for measuring RF fields is calibrated in terms of far-field or plane-wave equivalent power density. At higher frequencies, and when one is actually in the "far field" of a radiation source, it is usually only necessary to evaluate power density. In the far field of an RF transmitter power density and field strength are related by standard mathematical equations.¹¹

The exposure limits adopted by the FCC in 1996 expressed in terms of electric and magnetic field strength and power density for transmitters operating at frequencies from 300 kHz to 100 GHz are shown in **Table 1**. The FCC also adopted limits for localized ("partial body") absorption in terms of SAR, shown in **Table 2**, that apply to certain portable transmitting devices such as hand-held cellular telephones.¹²

¹⁰ These exposure limits are based on criteria quantified in terms of specific absorption rate (SAR). SAR is a measure of the rate at which the body absorbs RF energy. Both the ANSI/IEEE and NCRP exposure criteria are based on a determination that potentially harmful biological effects can occur at an SAR level of 4 W/kg as averaged over the whole-body. Appropriate safety factors have been incorporated to arrive at limits for both whole-body exposure (0.4 W/kg for "controlled" or "occupational" exposure and 0.08 W/kg for "uncontrolled" or "general population" exposure, respectively) and for partial-body (localized SAR), such as might occur in the head of the user of a hand-held cellular telephone. The new MPE limits are more conservative in some cases than the limits specified by ANSI in 1982. However, these more conservative limits do not arise from a fundamental change in the SAR threshold for harm, but from a precautionary desire to add an additional margin of safety for exposure of the public or exposure in "uncontrolled" environments.

¹¹ See OET Bulletin 65 (Reference 57) for details.

¹² These guidelines are based on those recommended by ANSI/IEEE and NCRP. See Sections 4.2.1 and 4.2.2 of ANSI/IEEE C95.1-1992 and Section 17.4.5 of NCRP Report No. 86. For purposes of evaluation, the FCC has designated these devices as either "portable" or "mobile" depending on how they are to be used. Portable devices are normally those used within 20 centimeters of the body and must be evaluated with respect to SAR limits. Mobile devices are normally used 20 centimeters or more away from the body and can be evaluated in terms of either SAR or field intensity. Detailed information on FCC requirements for evaluating portable and mobile devices can be found in OET Bulletin 65 and in the FCC's Rules and Regulations, 47 CFR 2.1091 and 2.1093.

Time Averaging of Exposure

The NCRP and ANSI/IEEE exposure criteria and most other standards specify "***time-averaged***" MPE limits. This means that it is permissible to exceed the recommended limits for short periods of time as long as the ***average*** exposure (over the appropriate period specified) does not exceed the limit. For example, Table 1 shows that for a frequency of 100 MHz the recommended power density limit is 1 mW/cm² with an averaging time of six minutes (any six-minute period) for occupational/controlled exposure.

The time-averaging concept can be illustrated as follows for exposure in a workplace environment. The sum of the product (or products) of the actual exposure level(s) multiplied by the actual time(s) of exposure must not be greater than the allowed (average) exposure limit times the specified averaging time. Therefore, for 100 MHz, exposure at 2 mW/cm² would be permitted for three minutes in any six-minute period as long as during the remaining three minutes of the six-minute period the exposure was at or near "zero" level of exposure. Therefore, in this example:

$$(2 \text{ mW/cm}^2) \times (3 \text{ min.}) + (0 \text{ mW/cm}^2) \times (3 \text{ min.}) = (1 \text{ mW/cm}^2) \times (6 \text{ min.})$$

Of course, other combinations of power density and time are possible. It is *very important* to remember that time averaging of exposure is only necessary or relevant for situations where temporary exposures might occur that are *in excess of* the absolute limits for power density or field strength. These situations usually only occur in workplace environments where exposure can be monitored and controlled. For general population/uncontrolled exposures, say in a residential neighborhood, it is seldom possible to have sufficient information or control regarding how long people are exposed, and averaging of exposure over the designated time period (30 minutes) is normally not appropriate. For such public exposure situations, the MPE limits normally apply for continuous exposure. In other words, as long as the absolute limits are not exceeded, indefinite exposure is allowed.

Induced and Contact Currents

In addition to limits on field strength, power density and SAR, some standards for RF exposure have incorporated limits for currents induced in the human body by RF fields. For example, the 1992 ANSI/IEEE standard (Reference 3), includes specific restrictions that apply to "induced" and "contact" currents (the latter, which applies to "grasping" contact, is more related to shock and burn hazards). The limits on RF currents are based on experimental data showing that excessive SAR levels can be created in the body due to the presence of these currents. In its 1996 Order adopting new RF exposure guidelines the FCC declined to adopt limits on induced and contact currents due primarily to the difficulty of reliably determining compliance, either by prediction methods or by direct measurement. However, the FCC may reconsider this decision in the future because of the development of new instrumentation and analytical techniques that may be more reliable indicators of exposure.

Table 1. FCC Limits for Maximum Permissible Exposure (MPE)**(A) Limits for Occupational/Controlled Exposure**

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time $ E ^2$, $ H ^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f ²)*	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6

(B) Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time $ E ^2$, $ H ^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f ²)*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

f = frequency in MHz

*Plane-wave equivalent power density

NOTE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

Table 2. FCC Limits for Localized (Partial-body) Exposure

Specific Absorption Rate (SAR)	
Occupational/Controlled Exposure (100 kHz - 6 GHz)	General Uncontrolled/Exposure (100 kHz - 6 GHz)
< 0.4 W/kg whole-body ≤ 8 W/kg partial-body	< 0.08 W/kg whole-body ≤ 1.6 W/kg partial-body

WHY HAS THE FCC ADOPTED GUIDELINES FOR RF EXPOSURE?

The FCC authorizes and licenses devices, transmitters and facilities that generate RF and microwave radiation. It has jurisdiction over all transmitting services in the U.S. except those specifically operated by the Federal Government. However, the FCC's primary jurisdiction does not lie in the health and safety area, and it must rely on other agencies and organizations for guidance in these matters.

Under the National Environmental Policy Act of 1969 (NEPA), the FCC has certain responsibilities to consider whether its actions will "significantly affect the quality of the human environment." Therefore, FCC approval and licensing of transmitters and facilities must be evaluated for significant impact on the environment. Human exposure to RF radiation emitted by FCC-regulated transmitters is one of several factors that must be considered in such environmental evaluations.

Major RF transmitting facilities under the jurisdiction of the FCC, such as radio and television broadcast stations, satellite-earth stations, experimental radio stations and certain cellular, PCS and paging facilities are required to undergo routine evaluation for RF compliance whenever an application is submitted to the FCC for construction or modification of a transmitting facility or renewal of a license. Failure to comply with the FCC's RF exposure guidelines could lead to the preparation of a formal Environmental Assessment, possible Environmental Impact Statement and eventual rejection of an application. Technical

guidelines for evaluating compliance with the FCC RF safety requirements can be found in the FCC's OET Bulletin 65 (Reference 57).

Low-powered, intermittent, or inaccessible RF transmitters and facilities are normally "categorically excluded" from the requirement for *routine* evaluation for RF exposure. These exclusions are based on calculations and measurement data indicating that such transmitting stations or devices are unlikely to cause exposures in excess of the guidelines under normal conditions of use.¹³ The FCC's policies on RF exposure and categorical exclusion can be found in Section 1.1307(b) of the FCC's Rules and Regulations.¹⁴ It should be emphasized, however, that these exclusions are *not* exclusions from compliance, but, rather, only exclusions from routine evaluation. Furthermore, transmitters or facilities that are otherwise categorically excluded from evaluation may be required, on a case-by-case basis, to demonstrate compliance when evidence of potential non-compliance of the transmitter or facility is brought to the Commission's attention [*see* 47 CFR §1.1307(c) and (d)].

The FCC's policies with respect to environmental RF fields are designed to ensure that FCC-regulated transmitters do not expose the public or workers to levels of RF radiation that are considered by expert organizations to be potentially harmful. Therefore, if a transmitter and its associated antenna are regulated by the FCC, they must comply with provisions of the FCC's rules regarding human exposure to RF radiation. In its 1997 Order, the FCC adopted a provision that all transmitters regulated by the FCC, regardless of whether they are excluded from routine evaluation, are expected to be in compliance with the new guidelines on RF exposure by September 1, 2000 (Reference 56).

In the United States some local and state jurisdictions have also enacted rules and regulations pertaining to human exposure to RF energy. However, the Telecommunications Act of 1996 contained provisions relating to federal jurisdiction to regulate human exposure to RF emissions from certain transmitting devices.. In particular, Section 704 of the Act states that, "No State or local government or instrumentality thereof may regulate the placement, construction, and modification of personal wireless service facilities on the basis of the environmental effects of radio frequency emissions to the extent that such facilities comply with the Commission's regulations concerning such emissions." Further information on FCC policy with respect to facilities siting is available in a factsheet from the FCC's Wireless Telecommunications Bureau.¹⁵

¹³ The Council on Environmental Quality, which has oversight responsibility with regard to NEPA, permits federal agencies to categorically exclude certain actions from routine environmental processing when the potential for individual or cumulative environmental impact is judged to be negligible (40 CFR §§ 1507, 1508.4 and "Regulations for Implementing the Procedural Provisions of NEPA, 43 Fed. Reg. 55,978, 1978).

¹⁴ 47 Code of Federal Regulations 1.1307(b).

¹⁵ "Fact Sheet 2", September 17, 1997, entitled, "*National Wireless Facilities Siting Policies*," from the FCC's Wireless Telecommunications Bureau. This factsheet can be viewed and downloaded from the bureau's Internet World Wide Web Site: <http://www.fcc.gov/wtb/>.

ARE EMISSIONS FROM RADIO AND TELEVISION ANTENNAS SAFE?

Radio and television broadcast stations transmit their signals via RF electromagnetic waves. There are currently approximately 14,000 radio and TV stations on the air in the United States. Broadcast stations transmit at various RF frequencies, depending on the channel, ranging from about 550 kHz for AM radio up to about 800 MHz for some UHF television stations. Frequencies for FM radio and VHF television lie in between these two extremes. Operating powers ("effective radiated power") can be as little as a few hundred watts for some radio stations or up to millions of watts for certain television stations. Some of these signals can be a significant source of RF energy in the local environment, and the FCC requires that broadcast stations submit evidence of compliance with FCC RF guidelines.

The amount of RF energy to which the public or workers might be exposed as a result of broadcast antennas depends on several factors, including the type of station, design characteristics of the antenna being used, power transmitted to the antenna, height of the antenna and distance from the antenna. Since energy at some frequencies is absorbed by the human body more readily than energy at other frequencies, the frequency of the transmitted signal as well as its intensity is important. Calculations can be performed to predict what field intensity levels would exist at various distances from an antenna.

Public access to broadcasting antennas is normally restricted so that individuals cannot be exposed to high-level fields that might exist near antennas. Measurements made by the FCC, EPA and others have shown that ambient RF radiation levels in inhabited areas near broadcasting facilities are typically well below the exposure levels recommended by current standards and guidelines (References 32, 46, 48, 51, 52). There have been a few situations around the country where RF levels in publicly accessible areas have been found to be higher than those recommended by applicable safety standards (e.g., see Reference 50). But, in spite of the relatively high operating powers of many stations, such cases are unusual, and members of the general public are unlikely to be exposed to RF levels from broadcast towers that exceed FCC limits. Wherever such situations have arisen corrective measures have been undertaken to ensure that areas promptly come into compliance with the applicable guidelines.

In cases where exposure levels might pose a problem, there are various steps a broadcast station can take to ensure compliance with safety standards. For example, high-intensity areas could be posted and access to them could be restricted by fencing or other appropriate means. In some cases more drastic measures might have to be considered, such as re-designing an antenna, reducing power, or station relocation.

Antenna maintenance workers are occasionally required to climb antenna structures for such purposes as painting, repairs, or beacon replacement. Both the EPA and OSHA have reported that in these cases it is possible for a worker to be exposed to high levels of RF energy if work is performed on an active tower or in areas immediately surrounding a

radiating antenna (e.g., see Reference 42, 43, 45, and 51). Therefore, precautions should be taken to ensure that maintenance personnel are not exposed to unsafe RF fields. Such precautions could include temporarily lowering power levels while work is being performed, having work performed only when the station is not broadcasting, using auxiliary antennas while work is performed on the main antenna, and establishing work procedures that would specify the minimum distance that a worker should maintain from an energized antenna.

HOW SAFE ARE MICROWAVE AND SATELLITE ANTENNAS?

Point-to-Point Microwave Antennas

Point-to-point microwave antennas transmit and receive microwave signals across relatively short distances (from a few tenths of a mile to 30 miles or more). These antennas are usually rectangular or circular in shape and are normally found mounted on a supporting tower, on rooftops, sides of buildings or on similar structures that provide clear and unobstructed line-of-sight paths between both ends of a transmission path or link. These antennas have a variety of uses such as transmitting voice and data messages and serving as links between broadcast or cable-TV studios and transmitting antennas.

The RF signals from these antennas travel in a directed beam from a transmitting antenna to a receiving antenna, and dispersion of microwave energy outside of the relatively narrow beam is minimal or insignificant. In addition, these antennas transmit using very low power levels, usually on the order of a few watts or less. Measurements have shown that ground-level power densities due to microwave directional antennas are normally a thousand times or more below recommended safety limits. (e.g., see Reference 38) Moreover, as an added margin of safety, microwave tower sites are normally inaccessible to the general public. Significant exposures from these antennas could only occur in the unlikely event that an individual were to stand directly in front of and very close to an antenna for a period of time.

Satellite-Earth Stations

Ground-based antennas used for satellite-earth communications typically are parabolic "dish" antennas, some as large as 10 to 30 meters in diameter, that are used to transmit ("uplinks") or receive ("downlinks") microwave signals to or from satellites in orbit around the earth. The satellites receive the signals beamed up to them and, in turn, retransmit the signals back down to an earthbound receiving station. These signals allow delivery of a variety of communications services, including long distance telephone service. Some satellite-earth station antennas are used only to *receive* RF signals (i.e., just like a rooftop television antenna used at a residence), and, since they do not transmit, RF exposure is not an issue.

Since satellite-earth station antennas are directed toward satellites above the earth, transmitted beams point skyward at various angles of inclination, depending on the particular satellite being used. Because of the longer distances involved, power levels used to transmit these signals are relatively large when compared, for example, to those used by the microwave point-to-point antennas discussed above. However, as with microwave antennas, the beams used for transmitting earth-to-satellite signals are concentrated and highly directional, similar to the beam from a flashlight. In addition, public access would normally be restricted at station sites where exposure levels could approach or exceed safe limits.

Although many satellite-earth stations are "fixed" sites, portable uplink antennas are also used, e.g., for electronic news gathering. These antennas can be deployed in various locations. Therefore, precautions may be necessary, such as temporarily restricting access in the vicinity of the antenna, to avoid exposure to the main transmitted beam. In general, however, it is unlikely that a transmitting earth station antenna would routinely expose members of the public to potentially harmful levels of microwaves.

ARE CELLULAR AND PCS TOWERS AND ANTENNAS SAFE? WHAT ABOUT CAR PHONES AND HAND-HELD PHONES?

Base Stations

Cellular radio systems use frequencies between 800 and 900 megahertz (MHz). Transmitters in the Personal Communications Service (PCS) use frequencies in the range of 1850-1990 MHz. The antennas for cellular and PCS transmissions are typically located on towers, water tanks or other elevated structures including rooftops and the sides of buildings. The combination of antennas and associated electronic equipment is referred to as a cellular or PCS "base station" or "cell site." Typical heights for free-standing base station towers or structures are 50-200 feet. A cellular base station may utilize several "omni-directional" antennas that look like poles, 10 to 15 feet in length, although these types of antennas are becoming less common in urban areas.

In urban and suburban areas, cellular and PCS service providers now more commonly use "sector" antennas for their base stations. These antennas are rectangular panels, e.g., about 1 by 4 feet in dimension, typically mounted on a rooftop or other structure, but they are also mounted on towers or poles. The antennas are usually arranged in three groups of three each. One antenna in each group is used to transmit signals to mobile units (car phones or hand-held phones), and the other two antennas in each group are used to receive signals from mobile units.

The FCC authorizes cellular and PCS carriers in various service areas around the country. At a cell site, the total RF power that could be transmitted from each transmitting antenna at a cell site depends on the number of radio channels (transmitters) that have been

authorized and the power of each transmitter. Typically, for a cellular base station, a maximum of 21 channels per sector (depending on the system) could be used. Thus, for a typical cell site utilizing sector antennas, each of the three transmitting antennas could be connected to up to 21 transmitters for a total of 63 transmitters per site. When omnidirectional antennas are used, up to 96 transmitters could be implemented at a cell site, but this would be unusual. While a typical base station could have as many as 63 transmitters, not all of the transmitters would be expected to operate simultaneously thus reducing overall emission levels. For the case of PCS base stations, fewer transmitters are normally required due to the relatively greater number of base stations.

Although the FCC permits an *effective radiated power* (ERP) of up to 500 watts per channel (depending on the tower height), the majority of cellular base stations in urban and suburban areas operate at an ERP of 100 watts per channel or less. An ERP of 100 watts corresponds to an *actual* radiated power of about 5-10 watts, depending on the type of antenna used (ERP is not equivalent to the power that is radiated but, rather, is a quantity that takes into consideration transmitter power and antenna directivity). As the capacity of a system is expanded by dividing cells, i.e., adding additional base stations, lower ERPs are normally used. In urban areas, an ERP of 10 watts per channel (corresponding to a radiated power of 0.5 - 1 watt) or less is commonly used. For PCS base stations, even lower radiated power levels are normally used.

The signal from a cellular or PCS base station antenna is essentially directed toward the horizon in a relatively narrow pattern in the vertical plane. The radiation pattern for an omni-directional antenna might be compared to a thin doughnut or pancake centered around the antenna while the pattern for a sector antenna is fan-shaped, like a wedge cut from a pie. As with all forms of electromagnetic energy, the power density from a cellular or PCS transmitter decreases rapidly (according to an inverse square law) as one moves away from the antenna. Consequently, normal ground-level exposure is much less than exposures that might be encountered if one were very close to the antenna and in its main transmitted beam.

Measurements made near typical cellular and PCS installations, especially those with tower-mounted antennas, have shown that ground-level power densities are well below limits recommended by RF/microwave safety standards (References 32, 37, and 45). For example, for a base-station transmitting frequency of 869 MHz the FCC's RF exposure guidelines recommend a Maximum Permissible Exposure level for the public ("general population/uncontrolled" exposure) of about 580 microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). This limit is many times greater than RF levels found near the base of typical cellular towers or in the vicinity of lower-powered cellular base station transmitters, such as might be mounted on rooftops or sides of buildings. Measurement data obtained from various sources have consistently indicated that "worst-case" ground-level power densities near typical cellular towers are on the order of $1 \mu\text{W}/\text{cm}^2$ or less (usually significantly less). Calculations corresponding to a "worst-case" situation (all transmitters operating simultaneously and continuously at the maximum licensed power) show that in order to be exposed to levels near the FCC's limits for cellular frequencies, an individual would essentially have to remain in

the main transmitting beam (at the height of the antenna) and within a few feet from the antenna. This makes it extremely unlikely that a member of the general public could be exposed to RF levels in excess of these guidelines due to cellular base station transmitters. For PCS base station transmitters, the same type of analysis holds, except that at the PCS transmitting frequencies (1850-1990 MHz) the FCC's exposure limits for the public are $1000 \mu\text{W}/\text{cm}^2$. Therefore, there would typically be an even greater safety margin between actual public exposure levels and recognized safety limits.

When cellular and PCS antennas are mounted at rooftop locations it is possible that ambient RF levels greater than $1 \mu\text{W}/\text{cm}^2$ could be present on the rooftop itself. However, exposures approaching or exceeding the safety guidelines are only likely to be encountered very close to or directly in front of the antennas. For sector-type antennas RF levels to the side and in back of these antennas are insignificant.

Even if RF levels were higher than desirable on a rooftop, appropriate restrictions could be placed on access. Factoring in the time-averaging aspects of safety standards could also be used to reduce potential exposure of workers who might have to access a rooftop for maintenance tasks or other reasons. The fact that rooftop cellular and PCS antennas usually operate at lower power levels than antennas on free-standing towers makes excessive exposure conditions on rooftops unlikely. In addition, the significant signal attenuation of a building's roof minimizes any chance for persons living or working within the building itself to be exposed to RF levels that could approach or exceed applicable safety limits.

Vehicle-Mounted Antennas

Vehicle-mounted antennas used for cellular communications normally operate at a power level of 3 watts or less. These cellular antennas are typically mounted on the roof, on the trunk, or on the rear window of a car or truck. Studies have shown that in order to be exposed to RF levels that approach the safety guidelines it would be necessary to remain very close to a vehicle-mounted cellular antenna for an extended period of time (Reference 20).

Studies have also indicated that exposure of vehicle occupants is reduced by the shielding effect of a vehicle's metal body. Some manufacturers of cellular systems have noted that proper installation of a vehicle-mounted antenna is an effective way to maximize this shielding effect and have recommended antenna installation either in the center of the roof or the center of the trunk. With respect to rear-window-mounted cellular antennas, a minimum separation distance of 30-60 cm (1 to 2 feet) has been suggested to minimize exposure to vehicle occupants that could result from antenna mismatch.

Therefore, properly installed, vehicle-mounted, personal wireless transceivers using up to 3 watts of power result in maximum exposure levels in or near the vehicle that are well below the FCC's safety limits. This assumes that the transmitting antenna is at least 15 cm

(about 6 inches) or more from vehicle occupants. Time-averaging of exposure (as appropriate) should result in even lower values when compared with safety guidelines.

Mobile and Portable Phones and Devices

The FCC's exposure guidelines, and the ANSI/IEEE and NCRP guidelines upon which they are based, specify limits for human exposure to RF emissions from hand-held RF devices in terms of *specific absorption rate (SAR)*. For exposure of the general public, e.g., exposure of the user of a cellular or PCS phone, the FCC limits RF absorption (in terms of SAR) to 1.6 watts/kg (W/kg), as averaged over one gram of tissue. Less restrictive limits, e.g., 2 W/kg averaged over 10 grams of tissue, are specified by guidelines used in some other countries (Reference 25).

Measurements and computational analysis of SAR in models of the human head and other studies of SAR distribution using hand-held cellular and PCS phones have shown that the 1.6 W/kg limit is unlikely to be exceeded under normal conditions of use (References 4, 16, 27). The same can be said for cordless telephones used in the home. Lower frequency (46-49 MHz) cordless telephones operate at very low power levels that could not result in exposure levels that even come close to the 1.6 W/kg level. Higher frequency cordless phones operating near 900 MHz (near the frequencies used for cellular telephones) operate with power levels similar to or less than those used for cell phones. They are also unlikely to exceed the SAR limits specified by the FCC under normal conditions of use.

In any case, compliance with the 1.6 W/kg safety limit must be demonstrated before FCC approval can be granted for marketing of a cellular or PCS phone. Testing of hand-held phones is normally done under conditions of maximum power usage. However, normal power usage is less since it depends on distance of the user from the base station transmitter. Therefore, typical exposure to a user would actually be expected to be less than that indicated by testing for compliance with the limit.

In recent years, publicity, speculation, and concern over claims of possible health effects due to RF emissions from hand-held wireless telephones prompted industry-sponsored groups to initiate research programs to investigate whether there is any risk to users of these devices. Organizations such as Wireless Technology Research (funded by the cellular radio service industry) and wireless equipment manufacturers, such as Motorola, Inc., have been investigating potential health effects from the use of hand-held cellular telephones and other wireless telecommunications devices.

In 1994, the U.S. General Accounting Office (GAO) issued a report that addressed the status of research on the safety of cellular telephones and encouraged U.S. Government agencies to work closely with industry to address wireless safety issues (Reference 59). In that regard, the Federal Government has been monitoring the results of ongoing research through an inter-agency working group led by the EPA and the FDA's Center for Devices and

Radiological Health. In a 1993 "Talk Paper," the FDA stated that it did not have enough information at that time to rule out the possibility of risk, but if such a risk exists, "it is probably small" (Reference 58). The FDA concluded that there is no proof that cellular telephones can be harmful, but if individuals remain concerned several precautionary actions could be taken, including limiting conversations on hand-held cellular telephones and making greater use of telephones with vehicle-mounted antennas where there is a greater separation distance between the user and the radiating antennas.

HOW SAFE ARE FIXED AND MOBILE RADIO TRANSMITTERS USED FOR PAGING AND "TWO-WAY" COMMUNICATIONS?

"Land-mobile" communications include a variety of communications systems which require the use of portable and mobile RF transmitting sources. These systems operate in narrow frequency bands between about 30 and 1000 MHz. Radio systems used by the police and fire departments, radio paging services and business radio are a few examples of these communications systems. They have the advantage of providing communications links between various fixed and mobile locations.

As with cellular and PCS communications, there are three types of RF transmitters associated with land-mobile systems: base-station transmitters, vehicle-mounted transmitters, and hand-held transmitters. The antennas used for these various transmitters are adapted for their specific purpose. For example, a base-station antenna must radiate its signal to a relatively large area, and, therefore, its transmitter generally has to use much higher power levels than a vehicle-mounted or hand-held radio transmitter.

Although these base-station antennas usually operate with higher power levels than other types of land-mobile antennas, they are normally inaccessible to the public since they must be mounted at significant heights above ground to provide for adequate signal coverage. Also, many of these antennas transmit only intermittently. For these reasons, such base-station antennas have generally not been of concern with regard to possible hazardous exposure of the public to RF radiation. However, studies at rooftop locations have indicated that high-powered paging antennas may increase the potential for exposure to workers or others with access to such sites, e.g., maintenance personnel (Reference 12). This could be a concern especially when multiple transmitters are present. In such cases, restriction of access or other corrective actions may be necessary.¹⁶

Transmitting power levels for vehicle-mounted land-mobile antennas are generally less than those used by base-station antennas but higher than those used for hand-held units. As with cellular transmitters, some manufacturers recommend that users and other nearby

¹⁶ Methods and techniques for controlling exposure are discussed in OET Bulletin 65 (Reference 57).

individuals maintain a minimum distance (e.g., 1 to 2 feet) from a vehicle-mounted antenna during transmission or mount the antenna in such a way as to provide maximum shielding for vehicle occupants. Studies have shown that this is probably a conservative precaution, particularly when the "duty factor" (percentage of time an antenna is actually radiating) is taken into account since safety standards are "time-averaged." Unlike cellular telephones, which transmit continuously throughout a call, two-way radios normally transmit only when the "press-to-talk" button is depressed. The extent of any possible exposure would also depend on the actual power level and frequency used by the vehicle-mounted antenna. In general, there is no evidence that there would be a safety hazard associated with exposure from vehicle-mounted, two-way antennas when the manufacturer's recommendations are followed.

Hand-held "two-way" portable radios such as walkie-talkies are low-powered devices used to transmit and receive messages over relatively short distances. Because of the relatively low power levels used (usually no more than a few watts) and, especially, because of the intermittency of transmissions (low duty factor) these radios would normally not be considered to cause hazardous exposures to users. As with vehicle-mounted mobile units, time averaging of exposure can normally be considered when evaluating two-way radios for compliance with safety limits, since these units are "push to talk." Laboratory measurements have been made using hand-held radios operating at various frequencies to determine the amount of RF energy that might be absorbed in the head of a user. In general, the only real possibility of a potential hazard would occur in the unlikely event that the tip of the transmitting antenna were to be placed directly at the surface of the eye, contrary to manufacturers' recommended precautions, or if for some reason continuous exposure were possible over a significant period of time, which is unlikely. If hand-held radios are used properly there is no evidence that they could cause hazardous exposure to RF energy (References 5, 11, 13, and 27).

ARE RF EMISSIONS FROM AMATEUR RADIO STATIONS HARMFUL?

There are hundreds of thousands of amateur radio operators ("hams") worldwide. Amateur radio operators in the United States are licensed by the FCC. The Amateur Radio Service provides its members with the opportunity to communicate with persons all over the world and to provide valuable public service functions, such as making communications services available during disasters and emergencies. Like all FCC licensees, amateur radio operators are expected to comply with the FCC's guidelines for safe human exposure to RF fields. Under the FCC's rules, amateur operators can transmit with power levels of up to 1500 watts. However, most hams use considerably less power than this. Studies by the FCC and others have shown that most amateur radio transmitters would not normally expose persons to RF levels in excess of safety limits. This is primarily due to the relatively low operating powers used by most amateurs, the intermittent transmission characteristics typically used and the relative inaccessibility of most amateur antennas. As long as appropriate

distances are maintained from amateur antennas, exposure of nearby persons should be well below safety limits. This has been demonstrated by studies carried out by the FCC and others (Reference 54). If there were any opportunity for significant RF exposure, it would most likely apply to the amateur operator and his or her immediate household. To help ensure compliance of amateur radio facilities with RF exposure guidelines, both the FCC and American Radio Relay League (ARRL) have developed technical publications to assist operators in evaluating compliance of their stations (References 23 and 57).

CAN IMPLANTED ELECTRONIC CARDIAC PACEMAKERS BE AFFECTED BY NEARBY RF DEVICES SUCH AS MICROWAVE OVENS OR CELLULAR TELEPHONES?

Over the past several years there has been concern that signals from some RF devices could interfere with the operation of implanted electronic pacemakers and other medical devices. Because pacemakers are electronic devices, they could be susceptible to electromagnetic signals that could cause them to malfunction. Some allegations of such effects in the past involved emissions from microwave ovens. However, it has never been shown that signals from a microwave oven are strong enough to cause such interference.

The FDA requires pacemaker manufacturers to test their devices for susceptibility to electromagnetic interference (EMI) over a wide range of frequencies and to submit the results as a prerequisite for market approval. Electromagnetic shielding has been incorporated into the design of modern pacemakers to prevent RF signals from interfering with the electronic circuitry in the pacemaker. The potential for the "leads" of pacemakers to be susceptible to RF radiation has also been of some concern, but this does not appear to be a serious problem.

Recently there have been reports of possible interference to implanted cardiac pacemakers from digital RF devices such as cellular telephones. An industry-funded organization, Wireless Technology Research, LLC (WTR), working with the FDA, sponsored an investigation as to whether such interference could occur, and, if so, what corrective actions could be taken. The results of this study were published in 1997 (*see* Reference 24), and WTR and the FDA have made several recommendations to help ensure the safe use of wireless devices by patients with implanted pacemakers. One of the primary recommendations is that digital wireless phones be kept at least six inches from the pacemaker and that they not be placed directly over the pacemaker, such as in the breast pocket, when in the "on" position. Patients with pacemakers should consult their physician or the FDA if they believe that they may have a problem related to RF interference.

WHICH OTHER FEDERAL AGENCIES HAVE RESPONSIBILITIES RELATED TO POTENTIAL RF HEALTH EFFECTS?

Various agencies in the Federal Government have been involved in monitoring, researching or regulating issues related to human exposure to RF radiation. These agencies include the Food and Drug Administration (FDA), the Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), the National Institute for Occupational Safety and Health (NIOSH), the National Telecommunications and Information Administration (NTIA) and the Department of Defense (DOD).

By authority of the Radiation Control for Health and Safety Act of 1968, the Center for Devices and Radiological Health (CDRH) of the FDA develops performance standards for the emission of radiation from electronic products including X-ray equipment, other medical devices, television sets, microwave ovens, laser products and sunlamps. The CDRH established a product performance standard for microwave ovens in 1971 limiting the amount of RF leakage from ovens. However, the CDRH has not adopted performance standards for other RF-emitting products. The FDA is, however, the lead federal health agency in monitoring the latest research developments and advising other agencies with respect to the safety of RF-emitting products used by the public, such as cellular and PCS phones.

The FDA's microwave oven standard is an *emission* standard (as opposed to an *exposure* standard) that allows leakage (measured at five centimeters from the oven surface) of 1 mW/cm² at the time of manufacture and a maximum level of 5 mW/cm² during the lifetime of the oven.¹⁷ The standard also requires ovens to have two independent interlock systems that prevent the oven from generating microwaves the moment that the latch is released or the door of the oven is opened. The FDA has stated that ovens that meet its standards and are used according to the manufacturer's recommendations are safe for consumer and industrial use.

The EPA has, in the past, considered developing federal guidelines for public exposure to RF radiation. However, EPA activities related to RF safety and health are presently limited to advisory functions. For example, the EPA now chairs an Inter-agency Radiofrequency Working Group, which coordinates RF health-related activities among the various federal agencies with health or regulatory responsibilities in this area.

OSHA is responsible for protecting workers from exposure to hazardous chemical and physical agents. In 1971, OSHA issued a protection guide for exposure of workers to RF radiation [29 CFR 1910.97]. The guide, covering frequencies from 10 MHz to 100 GHz, stated that exposure of workers should not exceed a power density of ten milliwatts per square centimeter (10 mW/cm²) as averaged over any 6-minute period of the workday. However, this guide was later ruled to be only advisory and not mandatory. Moreover, it was

¹⁷ 21 Code of Federal Regulations 1030.10.

based on an earlier (1966) American National Standards Institute (ANSI) RF protection guide that has been superseded by revised versions in 1974, 1982 and 1992 (see previous discussion of standards). OSHA personnel have recently stated that OSHA uses the ANSI/IEEE 1992 guidelines for enforcement purposes under OSHA's "general duty clause" (see OSHA's Internet Web Site, listed in Table 3, for further information).

NIOSH is part of the U.S. Department of Health and Human Services. It conducts research and investigations into issues related to occupational exposure to chemical and physical agents. NIOSH has, in the past, undertaken to develop RF exposure guidelines for workers, but final guidelines were never adopted by the agency. NIOSH conducts safety-related RF studies through its Physical Agents Effects Branch.

The NTIA is an agency of the U.S. Department of Commerce and is responsible for authorizing Federal Government use of the RF electromagnetic spectrum. Like the FCC, the NTIA also has NEPA responsibilities and has considered adopting guidelines for evaluating RF exposure from U.S. Government transmitters such as radar and military facilities.

The Department of Defense (DOD) has conducted research on the biological effects of RF energy for a number of years. This research is now conducted primarily at the DOD facility at Brooks Air Force Base, Texas. In addition, the DOD uses the ANSI/IEEE 1992 standard as a guide for protecting military personnel from excessive exposure to RF electromagnetic fields.

WHERE CAN I OBTAIN INFORMATION ON RF EXPOSURE AND HEALTH EFFECTS?

Although relatively few offices or agencies within the Federal Government routinely deal with the issue of human exposure to RF fields, it is possible to obtain information and assistance on certain topics from the following federal agencies. Most of these agencies also have Internet Web sites.

FDA: For information about radiation from microwave ovens and other consumer and industrial products contact: Center for Devices and Radiological Health (CDRH), Food and Drug Administration, Rockville, MD 20857.

EPA: The Environmental Protection Agency's Office of Radiation and Indoor Air is responsible for monitoring potential health effects due to public exposure to RF fields. Contact: Environmental Protection Agency, Office of Radiation and Indoor Air, 401 M Street, S.W., Washington, D.C. 20460.

OSHA: The Occupational Safety and Health Administration's (OSHA) Health Response Team (1781 South 300 West, Salt Lake City, Utah 84165) has been involved in studies related to occupational exposure to RF radiation. OSHA also maintains an Internet World

Wide Web site that may be of interest. The URL (case sensitive) is: <http://www.osha-slc.gov/SLTC/> (select subject: radiofrequency radiation).

NIOSH: The National Institute for Occupational Safety and Health (NIOSH) monitors RF-related safety issues as they pertain to the workplace. Contact: NIOSH, Physical Agents Effects Branch, Mail Stop C-27, 4676 Columbia Parkway, Cincinnati, Ohio 45226. Toll-free number: 1-800-35-NIOSH (1-800-356-4674).

DOD: Questions regarding Department of Defense activities related to RF safety and its biological research program can be directed to the Radio Frequency Radiation Branch, Air Force Research Laboratory, Brooks Air Force Base, TX 78235.

FCC: Questions regarding potential RF hazards from FCC-regulated transmitters can be directed to the RF Safety Program, Office of Engineering and Technology, Technical Analysis Branch, Federal Communications Commission, 445 Twelfth Street, S.W., Washington, D.C. 20554. The telephone number for inquiries on RF safety issues is: 1-202-418-2464. Calls for routine information can also be directed to the FCC's toll-free number: 1-888-CALL-FCC (225-5322). Another source of information is the FCC's RF Safety Internet Web site (<http://www.fcc.gov/oet/rfsafety>) where FCC documents and notices can be viewed and downloaded. Questions can also be sent via e-mail to: rfsafety@fcc.gov.

In addition to government agencies, there are other sources of information and possible assistance regarding environmental RF energy. Some states also maintain non-ionizing radiation programs or, at least, some expertise in this field, usually in a department of public health or environmental control. The list of references at the end of this bulletin can be consulted for detailed information on specific topics, and **Table 3** provides a list of some relevant Internet Web sites.

TABLE 3. INTERNET WEB SITES FOR FURTHER INFORMATION

Note: All Internet addresses below preceded by "http://".

Also, some URL's may be case sensitive

American Radio Relay League: www.arrl.org
American National Standards Institute: www.ansi.org
Bioelectromagnetics Society: www.bioelectromagnetics.org
COST 244 (Europe): www.radio.fer.hr/cost244
DOD: www.brooks.af.mil/AFRL (select radiofrequency radiation)
European Bioelectromagnetics Association: www.ebea.org
Electromagnetic Energy Association: www.elecenergy.com
Federal Communications Commission: www.fcc.gov/oet/rfsafety
ICNIRP (Europe): www.icnirp.de
IEEE: www.ieee.org
IEEE Committee on Man & Radiation: www.seas.upenn.edu/~kfoster/comar.htm
International Microwave Power Institute: www.impi.org
Microwave News: www.microwavenews.com
J.Moulder, Med.Coll.of Wisc.: www.mcw.edu/gcrc/cop/cell-phone-health-FAQ/toc.html
National Council on Radiation Protection & Measurements: www.ncrp.com
NJ Dept Radiation Protection: www.state.nj.us/depl/rpp (select non-ionizing radiation)
Richard Tell Associates: www.radhaz.com
US OSHA: www.osha-slc.gov/SLTC (select subject: radiofrequency radiation)
Wireless Industry (CTIA): www.wow-com.com
Wireless Industry (PCIA): www.pcia.com
World Health Organization EMF Project: www.who.ch/peh-emf

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This list is not meant to be a complete bibliography, but, rather it provides a selection of some of the more relevant and recent references and publications related to this topic.

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**FEDERAL COMMUNICATIONS COMMISSION
WIRELESS TELECOMMUNICATIONS BUREAU
AND MASS MEDIA BUREAU
445 Twelfth Street, S.W., Washington, DC 20554**

**FACT SHEET
January 10, 2002**

ANTENNA COLLOCATION PROGRAMMATIC AGREEMENT

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The Federal Communications Commission (FCC or Commission), the Advisory Council on Historic Preservation (ACHP or Council), and the National Conference of State Historic Preservation Officers (NCSHPO) entered into a Nationwide Programmatic Agreement for the Collocation of Wireless Antennas (the "Agreement") on March 16, 2001.¹ The Agreement applies to wireless and broadcast facilities and is intended to streamline procedures for review of collocations of wireless and broadcast antennas and associated equipment (herein "antennas") on existing towers and other structures under the National Historic Preservation Act (NHPA).²

This Fact Sheet provides guidance regarding the implementation of the Agreement for Commission broadcast and wireless service licensees, applicants, tower companies, and tower owners (collectively, "applicants"). This Fact Sheet also provides guidance to State Historic Preservation Officers (SHPOs), Tribal Historic Preservation Officers (THPOs), and other interested parties. The guidance set forth in this Fact Sheet does not amend or act as a substitute for the text of the Agreement or the Commission's rules. The guidance also does not amend or act as a substitute for the ACHP's rules (except to the extent the Agreement itself substitutes for the ACHP's rules). The complete text of the Agreement is available on the Wireless

¹ *Public Notice*, Wireless Telecommunications Bureau Announces Execution of Programmatic Agreement with Respect to Collocating Wireless Antennas on Existing Structures, DA 01-691, rel. March 16, 2001.

² 16 U.S.C. §§ 470 *et seq.*

ZONING COMMISSION
District of Columbia
Case 01-02
115-D

Telecommunications Bureau (“WTB”) web site at <<http://wireless.fcc.gov/siting/>> or by contacting the WTB by e-mail at wtb_towersiting@fcc.gov or by phoning Ivy Harris at (202) 418-0621 for wireless-related inquiries; or on the Mass Media Bureau (“MMB”) web site at <http://www.fcc.gov/mmb/mmb_siting.html> or by contacting the MMB by e-mail at mmb_siting@fcc.gov or by phoning Marva Dyson at (202) 418-2870 for broadcast-related inquiries.

1) Background, Purpose, and Scope of the Agreement

Under Section 106 of the NHPA (16 U.S.C. § 470f), federal agencies are required to take into account the effects of federal undertakings on historic properties. The Commission’s environmental rules require licensees and applicants to evaluate whether proposed facilities may affect historic properties that are listed or eligible for listing in the National Register of Historic Places (“National Register”). *See* 47 C.F.R. § 1.1307(a)(4). Consistent with Section 106, this evaluation process includes consultation with the relevant State Historic Preservation Officer (SHPO) and/or Tribal Historic Preservation Officer (THPO), as well as compliance with other procedures set out in the ACHP rules, 36 C.F.R. Part 800, Subpart B. The Commission becomes directly involved in the consultation process when an applicant determines that a proposed facility will have an adverse effect or when there is a dispute between the applicant and the SHPO/THPO regarding whether a proposed facility will have an adverse effect.³ Where a facility may have an adverse effect on a historic property, the Commission’s rules require submission of an Environmental Assessment (EA) prior to construction.⁴

The purpose of the Agreement is to streamline the procedures associated with Section 106 review and the Commission’s rules in order to facilitate access to advanced telecommunications services by all Americans in a manner that is consistent with the NHPA’s goal of preserving the nation’s historic properties and with the pro-competitive and deregulatory goals of the Communications Act of 1934, as amended. According to one industry source, the number of wireless cell sites in the United States increased from a total of 913 in 1985 to 104,288 in 2000.⁵ This explosive growth in the number of wireless communications facilities has imposed strains on all parties to the historic preservation review process and led to delays in deployment. Additionally, Congress has mandated that all television stations convert to digital transmission by the end of 2006. While television broadcasters will likely attempt to collocate their digital facilities in the interest of economy and expedition, the transition may necessitate the construction of some new towers to support the digital antennas. However, not all facilities construction is alike in its potential to affect adversely historic properties. In particular, the addition of an antenna to a pre-existing tower or other structure that is not itself a historic property (*i.e.*, collocation) ordinarily should not have an adverse effect on historic properties. The Agreement therefore exempts collocated antennas from the review process under the NHPA unless they fall

³ *See also* Memorandum from John M. Fowler, Executive Director, Advisory Council on Historic Preservation, to Federal Communications Commission, State Historic Preservation Officers, and Tribal Historic Preservation Officers, dated September 21, 2000 (confirming authority to delegate)(ACHP Delegation Memo).

⁴ 47 C.F.R. § 1.1307(a)(4). No EA is required for a finding of “no effect” or “no adverse effect.” *See* Section 9, *infra*.

⁵ *Cellular Telecommunications Industry Association Semi-Annual Wireless Survey*, Table (“Cell Sites”), December 31, 2000.

within a set of exceptions designed to encompass potential problematic situations. The Agreement is intended to encourage the collocation of future antennas on existing structures, create an incentive for parties to comply with Section 106 on a going-forward basis, and, where reasonably possible from a network and coverage perspective, to encourage applicants to locate their facilities away from historic properties.

The Agreement governs only the review of collocations under the NHPA for effects on historic properties listed, or eligible for listing, in the National Register. New tower construction and the replacement of existing towers are not exempted from review under the Agreement. The Agreement does not affect the review of collocations to determine compliance with other aspects of the FCC's environmental rules or other federal, state, or local laws.

2) General Operation of the Agreement

Stipulations III, IV, and V form the core of the Agreement's provisions for collocations. The general effect of these provisions is to exempt all collocations of antennas from the Section 106 review process, unless an exception stated in Stipulation III, IV, or V applies. **Thus, unless an exception is applicable, collocations shall not be submitted to the SHPO for review.** A more detailed discussion of these three stipulations is included in the fourth, fifth, and sixth sections of this Fact Sheet.

We note that the Agreement governs only Section 106 review of the collocation itself. Nothing in the Agreement affects the rights, if any, of the FCC, ACHP, SHPOs, THPOs, tribal governments, or members of the public to challenge any underlying tower that has an adverse effect on a historic property, independent of the collocation process.

- A. Pre-Existing Towers. Stipulation III governs collocation on all towers constructed on or before the date of the Agreement, March 16, 2001. Stipulation III allows for collocation on those towers without the collocation having to undergo consultation and review under Section 106 of the NHPA, whether or not the underlying tower has previously undergone Section 106 review, unless the collocation is subject to one of the exceptions listed in Stipulation III (*see* Section 4, below, "Collocation on Towers Constructed on or before March 16, 2001").
- B. Newly Constructed Towers. Stipulation IV covers collocations on towers built after March 16, 2001. Stipulation IV allows for collocation on those towers without the collocation having to undergo Section 106 consultation and review, unless the collocation is subject to one of the exceptions listed in Stipulation IV (*see* Section 5, below, "Collocation on Towers Constructed after March 16, 2001"). For towers built after March 16, 2001, one of these exceptions occurs when the underlying tower has not completed Section 106 review. If the underlying tower has not gone through Section 106 review, an applicant cannot collocate on that tower without a written concurrence with a finding of "no effect" or "no adverse effect" on historic properties from the relevant SHPO, the ACHP, or the FCC, or an agreement on mitigation of adverse effects and subsequent approval under the FCC's rules.

- C. Buildings and Non-Tower Structures outside Historic Districts. Stipulation V governs collocations of antennas on buildings and non-tower structures outside historic districts. Stipulation V allows for collocations on buildings and non-tower structures without the collocation having to undergo Section 106 review, unless the collocation is subject to one of the exceptions listed in Stipulation V (*see* Section 6, below, “Collocation on Buildings and Non-Tower Structures outside Historic Districts”).

3) Definitions

Collocation: “Collocation” means the mounting or installation of an antenna on an existing tower, building or structure for the purpose of transmitting and/or receiving radio frequency signals for communications purposes. Under the Agreement, the term “collocation” includes excavation and the placement of equipment necessarily or reasonably associated with the mounting or installation of an antenna.

Tower: “Tower” is any structure built for the sole or primary purpose of supporting antennas and their associated facilities used to provide FCC-licensed services.⁶ A water tower, utility tower, or other structure built primarily for a purpose other than supporting FCC-licensed services is not a “tower” for purposes of the Agreement, but is a non-tower structure.

Substantial increase in the size of the tower: Although Stipulations III and IV permit collocation on towers without the collocation having to undergo Section 106 consultation and review, this authorization is limited by, among other things, the size and scope of the collocation. Thus, if the collocation will result in a “substantial increase in the size of the tower,” the collocation must go through Section 106 consultation and review. A “substantial increase in the size of the tower” occurs under one or more of the following circumstances:

- (1) The height of the tower will be increased by more than the greater of: (a) 10% of the height of the tower; or (b) the height extension needed to accommodate one additional antenna array with a separation of 20 feet from the nearest existing antenna. Thus, a 150-foot tower may be increased in height by up to 15 feet without constituting a substantial increase in size. If there is already an antenna at the top of the tower, the tower height may be increased by up to 20 feet plus the height of a new antenna to be located at the new top of the tower.
- (2) More than four new equipment cabinets or more than one new equipment shelter will be added.
- (3) The width of the tower will be increased by more than the greater of: (a) 20 feet in any direction from the edge of the tower; or (b) the width of the tower structure at the level of the appurtenance. For example, if the width of the tower structure at the level of the appurtenance is 40 feet, the appurtenance can protrude up to 40 feet from the edge of the tower at that point without constituting a substantial increase in the size of the tower.
- (4) Excavation will occur outside the current tower site, defined as the area within the boundaries of the leased or owned property surrounding the tower at the time of the proposed collocation, and including any access or utility easements related to the site.

⁶ This may include a tower on which no antennas have been located prior to the collocation at issue, if the principal purpose for constructing the tower was to support FCC-licensed antennas.

A collocation may exceed the size limits in the first category without requiring Section 106 review if the additional height is necessary to avoid radio interference with or from existing antennas. A collocation may exceed the size limits in the third category without requiring Section 106 review if the additional width is necessary to shelter the antenna from inclement weather or to connect the antenna to the tower via cable. If a complaint is filed regarding a specific collocation that exceeds the size limits set out in the Agreement, the Commission may require the applicant to explain why one of these exceptions is applicable to the collocation.

4) Collocation on Towers Constructed on or before March 16, 2001 (Stipulation III)

For towers constructed on or before March 16, 2001, the Agreement generally allows collocation without consultation or review under Section 106 and Subpart B of 36 CFR Part 800. There are four situations involving the mounting of antennas on such towers, however, that still require review:

- (1) the mounting of the antenna will result in a substantial increase in the size of the tower (*see* Section 3, Definitions, above); or,
- (2) prior to the collocation, the tower has been determined by the FCC to have an effect on one or more historic properties, unless such effect has been found to be not adverse through a “no adverse effect” finding, or if found to be adverse or potentially adverse, has been resolved, such as through a conditional “no adverse effect” determination, a Memorandum of Agreement, a programmatic agreement, or otherwise in compliance with Section 106 and Subpart B of 36 CFR Part 800; or,
- (3) the tower is the subject of a pending environmental review or related proceeding before the FCC involving compliance with Section 106 of the National Historic Preservation Act; or,
- (4) the collocation licensee or the owner of the tower has received written or electronic notification that the FCC is in receipt of a complaint from a member of the public, a SHPO or the Council supported by substantial evidence that the collocation has an adverse effect on one or more historic properties.

For purposes of the third exception, a “review or related proceeding” commences with respect to wireless facilities or tower registration when the FCC’s WTB assigns it a file number and contacts the tower owner, tower manager, or the owner’s authorized agent (herein collectively the “tower owner”) in response to a SHPO adverse effect letter, a complaint from a member of the public, or otherwise. Similarly, a “review or related proceeding” commences with respect to broadcast facilities when (1) due to the proximity of historic properties, an applicant cannot certify compliance with the FCC’s environmental rules and submits an Environmental Assessment with its application to the MMB; or (2) the FCC receives a SHPO adverse effect letter or a complaint from a member of the public. A review is “pending” from the time it commences until the FCC dismisses, closes, or otherwise resolves the matter. Simple receipt by the Commission of a letter from a SHPO alleging that its ability to consult about a tower or collocation prior to construction may have been foreclosed does not in itself establish that a review is pending.

To determine whether a review is pending on a particular tower, an interested party should contact the tower owner. In addition, the FCC will soon make available a database listing

pending Section 106 reviews and related proceedings for both wireless and broadcast services. Potential collocators are encouraged to consult the FCC database in addition to contacting the tower owner; however, parties should not rely solely on the database. Any party that follows these steps in good faith to determine the pendency of a proceeding will be considered to have complied with the intent of the Agreement.

A tower is considered to be constructed on or before March 16, 2001 if the structure reached its initial intended height above ground, or was available for the mounting of collocations by March 16, 2001. For towers that must be registered with the FCC under Part 17 of the Commission's rules,⁷ the completion date will be the date reported to the Commission on FCC Form 854 as the date of completion of construction.⁸

5) Collocation on Towers Constructed after March 16, 2001 (Stipulation IV)

The Agreement generally allows collocation on towers constructed after March 16, 2001, without consultation or review of the collocation under Section 106 and Subpart B of 36 CFR Part 800. There are four situations involving the mounting of antennas on such towers, however, that still require review:

- (1) the Section 106 review process for the tower and any associated environmental reviews have not been completed; or,
- (2) the collocation will result in a substantial increase in the size of the tower (*see* Section 3, Definitions, above); or,
- (3) prior to the collocation, the tower has been determined by the FCC to have an effect on one or more historic properties, unless such effect has been found to be not adverse through a "no adverse effect" finding, or if found to be adverse or potentially adverse, has been resolved, such as through a conditional "no adverse effect" determination, a Memorandum of Agreement, a programmatic agreement, or otherwise in compliance with Section 106 and Subpart B of 36 CFR Part 800; or,
- (4) the collocation licensee or the owner of the tower has received written or electronic notification that the FCC is in receipt of a complaint from a member of the public, a SHPO, or the Council supported by substantial evidence that the collocation has an adverse effect on one or more historic properties.

We emphasize that pursuant to Subsection (1) of Stipulation IV, above, a tower built after March 16, 2001, may benefit from the collocation provisions of the Agreement only if that tower has completed the Section 106 review and related historic preservation review under the FCC's NEPA rules.⁹ Typical evidence of a completed Section 106 review would include a SHPO's written concurrence with a finding of "no effect" or "no adverse effect" or an executed Memorandum of Agreement. Where a SHPO has an express policy of allowing applicants to

⁷ See 47 C.F.R. §§ 17.1 *et seq.* These rules require that antenna structures located close to airports or that are greater than 200 feet in height comply with painting and lighting specifications designed to ensure aircraft navigation safety. The FCC requires certain antenna structure owners to register structures with the Commission.

⁸ See 47 C.F.R. § 17.57.

⁹ 47 C.F.R. § 1.1307(a)(4).

presume concurrence if no objection is received within 30 days of receipt of the applicant's finding, a tower owner may document completion of the Section 106 review by retaining an appropriate memorandum, together with a copy of the submission to the SHPO and proof of the date of submission, in the company file.

If a tower constructed after March 16, 2001 did not go through Section 106 review prior to construction, an applicant cannot collocate on that tower unless the tower owner first either: (1) obtains written concurrence with a finding of "no effect" or "no adverse effect" on historic properties from either the relevant SHPO, the ACHP, or the FCC, or (2) executes a Memorandum of Agreement on mitigation of adverse effects and thereafter submits an EA and completes the approval process under the FCC's rules.¹⁰

6) Collocation on Buildings and Non-Tower Structures outside Historic Districts (Stipulation V)

For buildings and non-tower structures, the Agreement allows collocation without consultation or review under Section 106 in some circumstances. Collocation without Section 106 review is more limited in these cases to account for the fact that the building or non-tower structure itself could be a historic property. There are four situations involving the mounting of antennas on buildings and non-tower structures that require review:

- (1) the building or structure is over 45 years old;¹¹ or,
- (2) the building or structure is (a) inside the boundary of a historic district, or (b) outside (but within 250 feet of) the boundary of a historic district and the antenna is visible from ground level anywhere within the historic district; or
- (3) the building or structure is either (a) a designated National Historic Landmark or (b) listed in or eligible for listing in the National Register of Historic Places;¹² or,

¹⁰ Where there has been an adverse effect finding, a Memorandum of Agreement ("MOA") is typically signed by the applicant, the relevant SHPO (and/or the ACHP), and the FCC. See 36 C.F.R. § 800.6(b)(1),(2). The MOA is then submitted to the Commission with an Environmental Assessment ("EA"), which upon approval by the Commission results in the issuance of a Finding of No Significant Impact ("FONSI"). See 47 C.F.R. § 1.1308.

¹¹ Suitable methods for determining the age of a building include, but are not limited to: (1) obtaining the opinion of a consultant who meets the Secretary of Interior's Professional Qualifications Standards (36 CFR Part 61); or (2) consulting public records.

¹² The National Register is the Nation's official list of cultural resources officially deemed worthy of preservation. See the National Park Service's cultural resources page on the National Register: <http://www.cr.nps.gov/nr/about.htm>. Authorized under the NHPA, the National Register is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect our historic and archeological resources. Properties listed in the Register include districts, sites, buildings, structures, and objects that are significant in American history, architecture, archeology, engineering, and culture. The National Register is administered by the National Park Service, which is part of the U.S. Department of the Interior. Included among the nearly 73,000 listings that make up the National Register are: 1) all historic areas in the National Park System (<http://www.nps.gov/>); 2) over 2,300 National Historic Landmarks (<http://www.cr.nps.gov/nhl>), which have been designated by the Secretary of the Interior because of their importance to all Americans; and, 3) properties across the country that have been nominated by governments, organizations, and individuals because they are significant to the nation, to a state, or to a community. Interested parties may begin their research by using the following National Register web site: <http://www.cr.nps.gov/nr/research/>. Other useful resources include the ACHP web site at <http://www.achp.gov>; the various State Historic Preservation Offices, accessible through the ACHP web site at

- (4) the collocation licensee or the owner of the building or structure has received written or electronic notification that the FCC is in receipt of a complaint from a member of the public, a SHPO or the Council supported by substantial evidence that the collocation has an adverse effect on one or more historic properties.

For collocations on buildings and non-tower structures after March 16, 2001, the ACHP or the relevant SHPO or THPO may notify the FCC that it has determined that the collocation of the antenna or its associated equipment has resulted in an adverse effect on historic properties listed or eligible for listing in the National Register. The FCC will then act accordingly.

Subsection A.2. of Stipulation V applies where the building or other non-tower structure on which the antenna is to be mounted is located outside, but within 250 feet of the boundary of, a historic district, and the antenna to be collocated will be clearly visible when viewed from an eye level of five to six feet above the ground from any point within the boundary of the historic district.

7) **Tribal Lands and Tribal Consultations**

The terms of the Agreement do not apply on “tribal lands” as defined under Section 800.16(x) of the Council’s regulations, 36 CFR § 800.16(x) (“Tribal lands means all lands within the exterior boundaries of any Indian reservation and all dependent Indian communities.”).¹³ Thus, any collocation on tribal lands must be reviewed and approved by the appropriate tribal authorities, which may include a THPO.¹⁴ The FCC recognizes that Indian Tribes, as domestic dependent nations, “exercise inherent sovereign powers over their members and territory.”¹⁵

Although the Agreement exempts most collocations outside tribal lands from Section 106 review, an Indian Tribe¹⁶ or Native Hawaiian organization¹⁷ may initiate consultation directly with

<http://www.achp.gov/shpo.html>; the various Tribal Historic Preservation Offices, accessible through: <http://www.achp.gov/thpo.html>; and the Bureau of Indian Affairs web site at <http://www.doi.gov/bia/areas/agency.html>.

¹³ For a discussion of the definition of “dependent Indian communities,” see *Alaska v. Native Village of Venetie Tribal Government*, 522 U.S. 520 (1998).

¹⁴ For an online map of Indian lands in the United States, visit the Bureau of Indian Affairs’ web site, “US Indian Lands,” located at: <http://www.gdsc.bia.gov/products/indland.htm>.

¹⁵ In the Matter of Statement of Policy on Establishing a Government-to-Government Relationship with Indian Tribes, *Policy Statement*, 16 FCC Rcd. 4078, 4080 (2000) (*FCC Tribal Policy Statement*).

¹⁶ Section 301(4) of the NHPA defines “Indian tribe” or “tribe” as “an Indian tribe, band, nation, or other organized group or community, including a Native village, Regional Corporation or Village Corporation, as those terms are defined in section 3 of the Alaska Native Claims Settlement Act [43 U.S.C. 1602], which is recognized as eligible for the special programs and services provided by the United States to Indians because of their status as Indians.” 16 U.S.C. § 470w(4).

¹⁷ Section 301(18) of the NHPA defines “Native Hawaiian organization” as “any organization which — (A) serves and represents the interests of Native Hawaiians; (B) has as a primary and stated purpose the provision of services to Native Hawaiians; and (C) has demonstrated expertise in aspects of historic preservation that are culturally significant to Native Hawaiians. The term includes, but is not limited to, the Office of Hawaiian Affairs of the State of Hawaii and Hui Malama I Na Kupuna O Hawai’i Nei, an organization incorporated under the laws of the State of Hawaii.” 16 U.S.C. § 470w(18).

the FCC or with its licensees, tower companies and applicants when a collocation outside tribal lands may affect historic properties that are of religious or cultural significance to that Indian tribe or Native Hawaiian organization. Where a collocation is not exempt from Section 106 review under the Agreement, the applicant must make a good faith effort to identify Indian tribes and Native Hawaiian organizations whose historic properties may be affected and involve those entities in the Section 106 process as provided in the ACHP rules.¹⁸

The excavation of Indian or Native Hawaiian artifacts, burial mounds, or other religious sites has the potential to cause a significant environmental effect and thus requires the preparation of an EA.¹⁹ If an existing tower site is known to contain any Indian or Native Hawaiian archeological, religious, or cultural property that may be significantly affected by excavation or other work undertaken in connection with a collocation otherwise categorically excluded from environmental processing, an EA must be submitted prior to any new excavation or other work within that site. Similarly, if Indian or Native Hawaiian remains or other artifacts are discovered during excavation, the party must immediately cease construction and prepare an EA.²⁰

We emphasize that when licensees, tower companies, and other applicants consult with tribal authorities they are acting as delegates of the FCC, which has a government-to-government relationship with tribes. The FCC recognizes “the unique legal relationship that exists between the federal government and Indian Tribal governments, as reflected in the Constitution of the United States, treaties, federal statutes, Executive orders, and numerous court decisions.”²¹ Thus, tribal authorities may request FCC participation in consultation on any matter at any time. Consistent with the FCC’s trust relationship with federally recognized Indian tribes, applicants in undertaking all construction activities should be sensitive to the religious and cultural traditions of Indian peoples, and should endeavor to avoid actions that would adversely affect the preservation of those traditions. In particular, applicants are reminded that any information regarding historic properties or sacred sites to which Indian tribes attach significance may be highly confidential, private, and sensitive, and shall be treated accordingly in conformance with tribal wishes.

¹⁸ See 25 C.F.R. § 800.2(c)(2)(ii).

¹⁹ See 47 C.F.R. § 1.1307(a)(5) (an EA is required where an undertaking “may affect Indian religious sites”); see also *Public Notice*, “Wireless Telecommunications Bureau Announces that Sprint Spectrum L.P., D/B/A SPRINT PCS Has Voluntarily Relocated a Wireless Telecommunications Tower Constructed on an Indian Burial Mound,” DA 01-1600 (rel. July 6, 2001).

²⁰ See 47 C.F.R. § 1.1312(d) (“If, following the initiation of construction..., [a] licensee or applicant discovers that the proposed facility may have a significant environmental effect, it shall immediately cease construction...”); see also 36 C.F.R. § 800.13 (procedures for post-review discoveries).

²¹ *FCC Tribal Policy Statement*, 16 FCC Rcd. at 4080.

8) **Federal Property**

The terms of the Agreement do not alter any Section 106 responsibilities that federal agencies other than the FCC may have with regard to the collocation of antennas. Thus, licensees and applicants that wish to collocate an antenna on property owned or managed by a federal agency must continue to follow the procedures set forth by that agency for ensuring compliance with Section 106.²²

9) **Need for Applicants to File Environmental Assessments**

Section 1.1307 of the Commission's rules sets forth nine categories of facilities that may significantly affect the environment and thus require the preparation of an EA prior to construction.²³ Subsection (4) of Section 1.1307(a) sets forth the category related to historic preservation: "Facilities that may affect districts, sites, buildings, structures or objects, significant in American history, architecture, archeology, engineering or culture, that are listed, or eligible for listing, in the National Register of Historic Places [citation omitted]."²⁴

Section 1.1307(a)(4) is intended to implement the NHPA. Therefore, applicants should not file an EA with the Commission under Section 1.1307(a)(4) if a SHPO has concurred in a proposed finding of "no effect" or "no adverse effect" on a property listed or eligible for listing in the National Register. In addition, if a collocation is exempted by the Agreement from Section 106 review, then Section 1.1307(a)(4) of the Commission's rules does not apply to the collocation. Therefore, applicants should only file an EA for a collocation under Section 1.1307(a)(4) when the collocation falls within one of the Agreement's exceptions (*e.g.*, "substantial increase in size") *and* the collocation will adversely affect a historic property. Failure to file an EA when required to do so is a violation of the Commission's rules and may subject the licensee, applicant, or tower company/owner to a forfeiture or fine assessed pursuant to Sections 501 to 503 of the Communications Act, or other sanctions.²⁵

Note 1 to Section 1.1306 of the Commission's NEPA rules categorically excludes the mounting of antennas on an existing building or antenna tower from the requirement to file an EA unless: (1) the collocation may affect historic properties under Section 1.1307(a)(4); or (2) the collocation would result in human exposure to RF emissions in excess of the Commission's RF limits set forth in Section 1.1307(b).²⁶ Note 1 also states that the use of existing buildings or

²² See 47 C.F.R. § 1.1311(e) (providing that an EA need not be submitted to the Commission if another federal agency has assumed responsibility for environmental review).

²³ See 47 C.F.R. §§ 1.1307(a), 1.1307(b).

²⁴ See 47 C.F.R. § 1.1307(a)(4). Other categories are wilderness areas, wildlife preserves, endangered species, Indian religious sites, floodplains, surface features, high intensity lights in residential neighborhoods, and excessive radiofrequency exposure.

²⁵ See 47 U.S.C. §§ 501, 502, 503; 47 C.F.R. § 1.80; and, The Commission's Forfeiture Policy Statement and Amendment of Section 1.80 of the Rules to Incorporate the Forfeiture Guidelines, *Report and Order*, 12 FCC Rcd 17087 (1997), *recon. denied* 15 FCC Rcd 303 (1999).

²⁶ Note 1 to Section 1.1306 of the Commission's NEPA rules, 47 C.F.R. § 1.1306, states in part that: "[t]he provisions of § 1.1307(a) of this part requiring the preparation of EAs do not encompass the mounting of antenna(s) on an existing building or antenna tower unless § 1.1307(a)(4) of this part is applicable. Such antennas

towers is an environmentally desirable alternative to the construction of new facilities. Accordingly, no proposed or constructed wireless facility, including antennas and their supporting towers or other structures, that has completed processing under Section 106 or the Commission's environmental rules shall be required to be processed again for a collocation, except: (1) for Section 106 review, where the addition of a collocated antenna and its related facilities cause a substantial increase in the size of the tower as defined in the Agreement; or (2) for review under the Commission's environmental rules, where modification of the facility is not categorically excluded from the Commission's NEPA rules.

10) **Filing Instructions / ULS**

The instructions for FCC Form 601 (Schedule D & Schedule I (Microwave only)) and FCC Form 854 will be updated to reflect the Agreement's impact on the requirement to file an EA. Likewise, the instructions and worksheets for the FCC Forms used for broadcast construction permits and licenses will be amended to reflect the provisions of the Agreement.²⁷ Until those changes have been put in effect and approved by the United States Office of Management & Budget, parties that are required to file Forms 601 and 854 or any of the relevant broadcast forms should complete the current versions. Where a collocation is exempt from review under the terms of the Agreement, filers should answer "No" to the question whether the action may significantly affect the environment and thus require an EA, unless an EA is required under a provision other than Section 1.1307(a)(4). During this interim period, we encourage filers to assist the FCC's WTB and MMB licensing staff by indicating, in a brief statement, that the antenna falls within the terms of the March 16, 2001 Collocation Agreement. Additionally, the MMB anticipates releasing a *Public Notice* advising permittees, licensees, and prospective applicants of their rights and responsibilities under the terms of the Collocation Agreement until the forms and instructions can be amended. Applicants should no longer file Form 601 or 854 solely in order to file an EA under Section 1.1307(a)(4) for a facility that is exempted from Section 106 review under the Agreement.

11) **Disposition of Pending Matters**

The Commission has before it certain pending reviews of collocations that, if undertaken after March 16, 2001, would have fallen within the terms of the Agreement. Consistent with the principles underlying the Agreement, these collocations ordinarily will not have an adverse effect on properties listed or eligible for listing in the National Register. Accordingly, licensees, applicants, and tower companies/owners are invited to inform the Commission of pending reviews of collocations that would be covered by the Agreement, where none of the exceptions in Stipulation III or V applies. If Commission staff agrees that the exceptions in Stipulation III or V

are subject to §1.1307(b) of this part and require EAs if their construction would result in human exposure to radiofrequency radiation in excess of the applicable health and safety guidelines cited in §1.1307(b) of this part."

²⁷ FCC Forms 301 (Full-service Commercial Broadcast Construction Permit), 302-AM/FM-CA-TV (Full-service Commercial Broadcast License), 318 (Low Power FM Construction Permit), 319 (Low Power FM License), 340 (Noncommercial Educational Broadcast Construction Permit), 346 (Low Power TV, TV Translator, or TV Booster Construction Permit); 345 (Low Power TV, TV Translator, or TV Booster License), 349 (FM Translator or FM Booster Construction Permit) and 350 (FM Translator or FM Booster License).

do not apply, the licensee, applicant, or tower company/owner will be notified that further processing under the NHPA and Section 1.1307(a)(4) is not required.

12) Complaints

The Agreement notes that persons may file a complaint with the FCC stating that a particular collocation “has an adverse effect on one or more historic properties.” The Agreement states that any such complaint must be: 1) in writing; and 2) supported by substantial evidence describing how the effect from the particular collocation is adverse to the attributes that qualify any affected historic property for eligibility or potential eligibility for the National Register. The Commission will promptly review all complaints so labeled, and will promptly open a case and notify the collocating licensee or tower owner if it determines that the complaint has presented substantial evidence that a proposed collocation at a specifically identified site will have an adverse effect on a specifically identified historic property.

The person(s) filing the complaint should provide contact information including name, address, phone number, and an email address (optional but helpful to the staff). All complaints regarding tower registration or wireless services should be mailed to Federal Communications Commission, Wireless Telecommunications Bureau, Commercial Wireless Division, 445 12th Street, S.W., Washington, DC 20554. The complaints should be marked: ATTENTION: NHPA COLLOCATION COMPLAINT.” All complaints regarding broadcast facilities should be mailed to Federal Communications Commission, Mass Media Bureau, Chief, Audio Services Division (for radio antennas)/ Chief, Video Services Division (for television antennas), 445 12th Street, S.W., Washington, DC 20554. These complaints also should be marked: ATTENTION: NHPA COLLOCATION COMPLAINT.” If a person is filing a complaint electronically, please e-mail the complaint to wtb_towersiting@fcc.gov or mmb_siting@fcc.gov, as appropriate.

Copies of the Programmatic Agreement and this Fact Sheet are available for inspection and duplication during regular business hours in the Reference Information Center, 445 Twelfth Street, S.W., Courtyard Level, Washington, DC 20554. Copies may also be obtained from Qualex International, 445 Twelfth Street, S.W., Room CY-B402, Washington, DC 20554; phone number: (202) 863-2893. Copies are also posted on the Commission’s web site at <http://wireless.fcc.gov/siting> and http://www.fcc.gov/mmb/mmb_siting.html. For further information, contact Ivy Harris at (202) 418-0621 for inquiries regarding wireless services, or Marva Dyson at (202) 418-2870 for inquiries regarding broadcast services. Send e-mail questions concerning implementation of the Agreement to: wtb_towersiting@fcc.gov or mmb_siting@fcc.gov, as appropriate.

**NATIONWIDE PROGRAMMATIC AGREEMENT
for the
COLLOCATION OF WIRELESS ANTENNAS**

Executed by

**The FEDERAL COMMUNICATIONS COMMISSION,
The NATIONAL CONFERENCE OF STATE HISTORIC PRESERVATION OFFICERS
and
The ADVISORY COUNCIL ON HISTORIC PRESERVATION**

WHEREAS, the Federal Communications Commission (FCC) establishes rules and procedures for the licensing of wireless communications facilities in the United States and its Possessions and Territories; and,

WHEREAS, the FCC has largely deregulated the review of applications for the construction of individual wireless communications facilities and, under this framework, applicants are required to prepare an Environmental Assessment (EA) in cases where the applicant determines that the proposed facility falls within one of certain environmental categories described in the FCC's rules (47 C.F.R. § 1.1307), including situations which may affect historical sites listed or eligible for listing in the National Register of Historic Places ("National Register"); and,

WHEREAS, Section 106 of the National Historic Preservation Act (16 U.S.C. §§ 470 *et seq.*) ("the Act") requires federal agencies to take into account the effects of their undertakings on historic properties and to afford the Advisory Council on Historic Preservation (Council) a reasonable opportunity to comment; and,

WHEREAS, Section 800.14(b) of the Council's regulations, "Protection of Historic Properties" (36 CFR § 800.14(b)), allows for programmatic agreements to streamline and tailor the Section 106 review process to particular federal programs; and,

WHEREAS, in August 2000, the Council established a Telecommunications Working Group to provide a forum for the FCC, Industry representatives, State Historic Preservation Officers (SHPOs) and Tribal Historic Preservation Officers (THPOs), and the Council to discuss improved coordination of Section 106 compliance regarding wireless communications projects affecting historic properties; and,

WHEREAS, the FCC, the Council and the Working Group have developed this Collocation Programmatic Agreement in accordance with 36 CFR Section 800.14(b) to address the Section 106 review process as it applies to the collocation of antennas (collocation being defined in Stipulation I.A below); and,

WHEREAS, the FCC encourages collocation of antennas where technically and economically feasible, in order to reduce the need for new tower construction; and,

WHEREAS, the parties hereto agree that the effects on historic properties of collocations of antennas on towers, buildings and structures are likely to be minimal and not adverse, and that in cases where an adverse effect might occur, the procedures provided and referred to herein are proper and sufficient, consistent with Section 106, to assure that the FCC will take such effects into account; and

WHEREAS, the execution of this Nationwide Collocation Programmatic Agreement will streamline the Section 106 review of collocation proposals and thereby reduce the need for the construction of new towers, thereby reducing potential effects on historic properties that would otherwise result from the construction of those unnecessary new towers; and,

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WHEREAS, the FCC and the Council have agreed that these measures should be incorporated into a Nationwide Programmatic Agreement to better manage the Section 106 consultation process and streamline reviews for collocation of antennas; and,

WHEREAS, since collocations reduce both the need for new tower construction and the potential for adverse effects on historic properties, the parties hereto agree that the terms of this Agreement should be interpreted and implemented wherever possible in ways that encourage collocation; and

WHEREAS, the parties hereto agree that the procedures described in this Agreement are, with regard to collocations as defined herein, a proper substitute for the FCC's compliance with the Council's rules, in accordance and consistent with Section 106 of the National Historic Preservation Act and its implementing regulations found at 36 CFR Part 800; and

WHEREAS, the FCC has consulted with the National Conference of State Historic Preservation Officers (NCSHPO) and requested the President of NCSHPO to sign this Nationwide Collocation Programmatic Agreement in accordance with 36 CFR Section 800.14(b)(2)(iii); and,

WHEREAS, the FCC sought comment from Indian tribes and Native Hawaiian Organizations regarding the terms of this Nationwide Programmatic Agreement by letters of January 11, 2001 and February 8, 2001; and,

WHEREAS, the terms of this Programmatic Agreement do not apply on "tribal lands" as defined under Section 800.16(x) of the Council's regulations, 36 CFR § 800.16(x) ("Tribal lands means all lands within the exterior boundaries of any Indian reservation and all dependent Indian communities."); and,

WHEREAS, the terms of this Programmatic Agreement do not preclude Indian tribes or Native Hawaiian Organizations from consulting directly with the FCC or its licensees, tower companies and applicants for antenna licenses when collocation activities off tribal lands may affect historic properties of religious and cultural significance to Indian tribes or Native Hawaiian organizations; and,

WHEREAS, the execution and implementation of this Nationwide Collocation Programmatic Agreement will not preclude members of the public from filing complaints with the FCC or the Council regarding adverse effects on historic properties from any existing tower or any activity covered under the terms of this Programmatic Agreement.

NOW THEREFORE, the FCC, the Council, and NCSHPO agree that the FCC will meet its Section 106 compliance responsibilities for the collocation of antennas as follows.

STIPULATIONS

The FCC, in coordination with licensees, tower companies and applicants for antenna licenses, will ensure that the following measures are carried out.

I. DEFINITIONS

For purposes of this Nationwide Programmatic Agreement, the following definitions apply.

- A. "Collocation" means the mounting or installation of an antenna on an existing tower, building or structure for the purpose of transmitting and/or receiving radio frequency signals for communications purposes.

B. "Tower" is any structure built for the sole or primary purpose of supporting FCC-licensed antennas and their associated facilities.

C. "Substantial increase in the size of the tower" means:

- 1) The mounting of the proposed antenna on the tower would increase the existing height of the tower by more than 10%, or by the height of one additional antenna array with separation from the nearest existing antenna not to exceed twenty feet, whichever is greater, except that the mounting of the proposed antenna may exceed the size limits set forth in this paragraph if necessary to avoid interference with existing antennas; or
- 2) The mounting of the proposed antenna would involve the installation of more than the standard number of new equipment cabinets for the technology involved, not to exceed four, or more than one new equipment shelter; or
- 3) The mounting of the proposed antenna would involve adding an appurtenance to the body of the tower that would protrude from the edge of the tower more than twenty feet, or more than the width of the tower structure at the level of the appurtenance, whichever is greater, except that the mounting of the proposed antenna may exceed the size limits set forth in this paragraph if necessary to shelter the antenna from inclement weather or to connect the antenna to the tower via cable; or
- 4) The mounting of the proposed antenna would involve excavation outside the current tower site, defined as the current boundaries of the leased or owned property surrounding the tower and any access or utility easements currently related to the site.

II. APPLICABILITY

- A. This Nationwide Collocation Programmatic Agreement applies only to the collocation of antennas as defined in Stipulation I.A, above.
- B. This Nationwide Collocation Programmatic Agreement does not cover any Section 106 responsibilities that federal agencies other than the FCC may have with regard to the collocation of antennas.

III. COLLOCATION OF ANTENNAS ON TOWERS CONSTRUCTED ON OR BEFORE MARCH 16, 2001

A. An antenna may be mounted on an existing tower constructed on or before March 16, 2001 without such collocation being reviewed under the consultation process set forth under Subpart B of 36 CFR Part 800, unless:

1. The mounting of the antenna will result in a substantial increase in the size of the tower as defined in Stipulation I.C, above; or
2. The tower has been determined by the FCC to have an effect on one or more historic properties, unless such effect has been found to be not adverse through a no adverse effect finding, or if found to be adverse or potentially adverse, has been resolved, such as through a conditional no adverse effect determination, a Memorandum of Agreement, a

programmatic agreement, or otherwise in compliance with Section 106 and Subpart B of 36 CFR Part 800; or

3. The tower is the subject of a pending environmental review or related proceeding before the FCC involving compliance with Section 106 of the National Historic Preservation Act; or

4. The collocation licensee or the owner of the tower has received written or electronic notification that the FCC is in receipt of a complaint from a member of the public, a SHPO or the Council, that the collocation has an adverse effect on one or more historic properties. Any such complaint must be in writing and supported by substantial evidence describing how the effect from the collocation is adverse to the attributes that qualify any affected historic property for eligibility or potential eligibility for the National Register.

IV. COLLOCATION OF ANTENNAS ON TOWERS CONSTRUCTED AFTER MARCH 16, 2001

A. An antenna may be mounted on an existing tower constructed after March 16, 2001 without such collocation being reviewed under the consultation process set forth under Subpart B of 36 CFR Part 800, unless:

1. The Section 106 review process for the tower set forth in 36 CFR Part 800 and any associated environmental reviews required by the FCC have not been completed; or

2. The mounting of the new antenna will result in a substantial increase in the size of the tower as defined in Stipulation I.C, above; or

3. The tower as built or proposed has been determined by the FCC to have an effect on one or more historic properties, unless such effect has been found to be not adverse through a no adverse effect finding, or if found to be adverse or potentially adverse, has been resolved, such as through a conditional no adverse effect determination, a Memorandum of Agreement, a programmatic agreement, or otherwise in compliance with Section 106 and Subpart B of 36 CFR Part 800; or

4. The collocation licensee or the owner of the tower has received written or electronic notification that the FCC is in receipt of a complaint from a member of the public, a SHPO or the Council, that the collocation has an adverse effect on one or more historic properties. Any such complaint must be in writing and supported by substantial evidence describing how the effect from the collocation is adverse to the attributes that qualify any affected historic property for eligibility or potential eligibility for the National Register.

V. COLLOCATION OF ANTENNAS ON BUILDINGS AND NON-TOWER STRUCTURES OUTSIDE OF HISTORIC DISTRICTS

A. An antenna may be mounted on a building or non-tower structure without such collocation being reviewed under the consultation process set forth under Subpart B of 36 CFR Part 800, unless:

1. The building or structure is over 45 years old;¹ or

¹ Suitable methods for determining the age of a building include, but are not limited to: (1) obtaining the opinion of a consultant who meets the Secretary of Interior's Professional Qualifications Standards (36 CFR Part 61) or (2)

2. The building or structure is inside the boundary of a historic district, or if the antenna is visible from the ground level of the historic district, the building or structure is within 250 feet of the boundary of the historic district; or
3. The building or non-tower structure is a designated National Historic Landmark, or listed in or eligible for listing in the National Register of Historic Places based upon the review of the licensee, tower company or applicant for an antenna license; or
4. The collocation licensee or the owner of the tower has received written or electronic notification that the FCC is in receipt of a complaint from a member of the public, a SHPO or the Council, that the collocation has an adverse effect on one or more historic properties. Any such complaint must be in writing and supported by substantial evidence describing how the effect from the collocation is adverse to the attributes that qualify any affected historic property for eligibility or potential eligibility for the National Register.

B. Subsequent to the collocation of an antenna, should the SHPO/THPO or Council determine that the collocation of the antenna or its associated equipment installed under the terms of Stipulation V has resulted in an adverse effect on historic properties, the SHPO/THPO or Council may notify the FCC accordingly. The FCC shall comply with the requirements of Section 106 and 36 CFR Part 800 for this particular collocation.

VI. RESERVATION OF RIGHTS

Neither execution of this Agreement, nor implementation of or compliance with any term herein shall operate in any way as a waiver by any party hereto, or by any person or entity complying herewith or affected hereby, of a right to assert in any court of law any claim, argument or defense regarding the validity or interpretation of any provision of the National Historic Preservation Act (16 U.S.C. §§ 470 *et seq.*) or its implementing regulations contained in 36 CFR Part 800.

VII. MONITORING

A. FCC licensees shall retain records of the placement of all licensed antennas, including collocations subject to this Nationwide Programmatic Agreement, consistent with FCC rules and procedures.

B. The Council will forward to the FCC and the relevant SHPO any written objections it receives from members of the public regarding a collocation activity or general compliance with the provisions of this Nationwide Programmatic Agreement within thirty (30) days following receipt of the written objection. The FCC will forward a copy of the written objection to the appropriate licensee or tower owner.

VIII. AMENDMENTS

If any signatory to this Nationwide Collocation Programmatic Agreement believes that this Agreement should be amended, that signatory may at any time propose amendments, whereupon the signatories will consult to consider the amendments. This agreement may be amended only upon the written concurrence of the signatories.

consulting public records.

IX. TERMINATION

A. If the FCC determines that it cannot implement the terms of this Nationwide Collocation Programmatic Agreement, or if the FCC, NCSHPO or the Council determines that the Programmatic Agreement is not being properly implemented by the parties to this Programmatic Agreement, the FCC, NCSHPO or the Council may propose to the other signatories that the Programmatic Agreement be terminated.

B. The party proposing to terminate the Programmatic Agreement shall notify the other signatories in writing, explaining the reasons for the proposed termination and the particulars of the asserted improper implementation. Such party also shall afford the other signatories a reasonable period of time of no less than thirty (30) days to consult and remedy the problems resulting in improper implementation. Upon receipt of such notice, the parties shall consult with each other and notify and consult with other entities that are either involved in such implementation or that would be substantially affected by termination of this Agreement, and seek alternatives to termination. Should the consultation fail to produce within the original remedy period or any extension, a reasonable alternative to termination, a resolution of the stated problems, or convincing evidence of substantial implementation of this Agreement in accordance with its terms, this Programmatic Agreement shall be terminated thirty days after notice of termination is served on all parties and published in the Federal Register.

C. In the event that the Programmatic Agreement is terminated, the FCC shall advise its licensees and tower construction companies of the termination and of the need to comply with any applicable Section 106 requirements on a case-by-case basis for collocation activities.

X. ANNUAL MEETING OF THE SIGNATORIES

The signatories to this Nationwide Collocation Programmatic Agreement will meet on or about September 10, 2001, and on or about September 10 in each subsequent year, to discuss the effectiveness of this Agreement, including any issues related to improper implementation, and to discuss any potential amendments that would improve the effectiveness of this Agreement.

XI. DURATION OF THE PROGRAMMATIC AGREEMENT

This Programmatic Agreement for collocation shall remain in force unless the Programmatic Agreement is terminated or superseded by a comprehensive Programmatic Agreement for wireless communications antennas.

Execution of this Nationwide Programmatic Agreement by the FCC, NCSHPO and the Council, and implementation of its terms, evidence that the FCC has afforded the Council an opportunity to comment on the collocation as described herein of antennas covered under the FCC's rules, and that the FCC has taken into account the effects of these collocations on historic properties in accordance with Section 106 of the National Historic Preservation Act and its implementing regulations, 36 CFR Part 800.

FEDERAL COMMUNICATIONS COMMISSION

_____ **Date:** _____

ADVISORY COUNCIL ON HISTORIC PRESERVATION

_____ **Date:** _____

NATIONAL CONFERENCE OF STATE HISTORIC PRESERVATION OFFICERS

_____ **Date:** _____