




**COUNTY OF SANTA BARBARA
PLANNING AND DEVELOPMENT
MEMORANDUM**

TO: Board of Supervisors

FROM: Glenn Russell, Ph. D, Planning & Development Director 

DATE: August 16, 2012

RE: August 21, 2012 Board of Supervisors Hearing - Departmental Item No. 6

Goolsby and Goolsby Kay Appeal (Case No. 12APL-00000-00011) of the Montecito Planning Commission Approval of a Verizon Wireless Facility at Montecito Switch Station (Case No. 12CUP-00000-00007), First District

On August 9, 2012 Planning & Development received copies of a letters by Ms. Cindy Sage (dated June 12, 2012) and Mr. William Hammett (dated July 26, 2012) submitted to the First District's office. The letters raise detailed concerns regarding the adequacy the radio frequency analysis for the Verizon Wireless project on appeal.

To address the issues raised in these letters, Planning & Development had the letters and radio frequency emissions report peer reviewed by Mr. Jonathan Kramer, a radio frequency expert contracted by the County.

Mr. Kramer concluded the radiofrequency report is accurate and acceptable and that the concerns raised in the letter from Ms. Cindy Sage are not founded. Please see the attached letter from Mr. Kramer dated August 10, 2012 for your consideration.

Attachments:

- 1) Jonathan Kramer Letter – Peer Review, dated August 10, 2012 (with enclosures)
- 2) Cindy Sage Letter – RF Report Inadequacy Issues, dated June 12, 2012
- 3) William Hammett Letter – Responding to Inadequacy Claims, dated July 26, 2012

Telecommunications Technology
Counsel for Government Agencies
and Private Institutions

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Our File Reference:
23596.33

August 10, 2012

Ms. Megan Lowery, Planner
Santa Barbara County
Planning & Development
123 East Anapamu Street
Santa Barbara, CA 93101-2058

RE: Verizon Wireless Telecommunications Site Modifications
Site Address: 512 Santa Angela Lane, Montecito, CA 93108
Verizon Site Number: 115535 "Montecito Relo"

Dear Ms. Lowery:

You have asked that I review and comment on radio frequency emissions information for the proposed Verizon collocation at the existing AT&T wireless site located at 512 Santa Angela, Montecito, CA 93108. This location is a Verizon Central Office.

I
Qualifications

My qualifications to perform this review are set out in Exhibit 1 attached to this letter.

You will note from my Statement of Qualifications that I am a qualified radio frequency telecommunications engineer working for local governments with over 30 years of experience. I am also a telecommunication lawyer working for local governments.

I co-authored and co-edited the FCC's National Guidance to Governments regarding radio frequency emissions safety, titled "A Local Government Official's Guide to Transmitting Antenna radio frequency Emission Safety: Rules, Procedures, and Practical Guidance" attached to this letter as Exhibit 2. I have also authored California-specific radio frequency emissions safety guidance to local governments in my State Bar of California Public Law Journal article, "A Practical Guide to Radio Frequency Emissions Safety" attached to this letter as Exhibit 3.

II
Summary of Opinions
and Recommendations

My opinions and recommendations in this matter are as follows:

1. Congress has limited the County's ability to consider radio frequency emissions beyond determining whether a project demonstrates planned compliance with the FCC's radio frequency emissions safety rules; and
2. In this case, the proposed Verizon project as designed and in conjunction with the existing AT&T wireless site demonstrates planned compliance with the FCC radio frequency emissions safety rules; and
3. The alleged deficiencies charged by Ms. Sage against Hammett & Edison in her letter are wholly without merit; and
4. The Hammett & Edison report is not deficient simply because it lacks information specified by Ms. Sage; and
5. Substantial portions of the information requested in Ms. Sage's letter have already been placed into the record by Verizon; and
6. Acting on Ms. Sage's requests would exceed the County's authority in light of Verizon's shown planned compliance with the FCC rules; and
6. I recommend the County refrain from acting on any of Ms. Sage's requests and recommendations.

III
Documents Reviewed and Considered

In preparation for this letter I have carefully reviewed the following documents provided to me by the County:

1. The Zoning Drawings submitted by Verizon Wireless dated March 29, 2012;

2. The Hammett & Edison Radio Frequency Emissions Report dated May 2, 2012;
3. The Sage Associates letter to the County dated June 12, 2012; and
4. The Hammett & Edison response letter to Sage Associates dated July 26, 2012.

I have also reviewed the revised Hammett & Edison Radio Frequency Emissions Report dated August 10, 2012 correcting a typographical error in its May 2, 2012 report (T-Mobile was shown in Hammett & Edison's May report, where it should have read AT&T). The revised Hammett & Edison report does not change any of the material technical facts, conclusions, or recommendations contained in its May report. I have attached Hammett & Edison's revised report to this letter as Exhibit 4.

IV
Analysis of FCC Compliance
by the Proposed Verizon Wireless Collocation

In the Telecommunications Act of 1996, Congress delegated sole national authority to the FCC to set radio frequency emissions standards. The FCC has adopted national radio frequency emissions standards (found at 47 C.F.R. § 1.1307 et seq., hereinafter the "FCC rules"). The FCC completely occupies the field as to setting radio frequency safety standards, and a local government is not permitted to consider or set its own radio frequency safety standards regardless of whether higher, lower, or even the same as the FCC's standards. Congress does, however, authorize a local government to determine whether a proposed wireless project will comply with all of the required FCC rules, including the FCC rules as explained in FCC Office of Engineering and Technology Bulletin 65 ("Bulletin 65").

Under the FCC rules, certain types of wireless projects are deemed to be "categorically excluded" thus not subject to further radio frequency evaluation due to identified factors including whether the antenna supporting structure is not a building or shared to perform some other function and the lowest portion of the transmitting antenna is at least 10 meters above ground.

The proposed project does not qualify for categorical exclusion under the FCC rules because it is to be constructed on a building (here, a Verizon telephone central office). Accordingly, a detailed radio frequency

safety report is necessary to determine whether the proposed project will comply with the FCC rules.

Complying with its federal obligation, Verizon has evaluated its proposed radio frequency emissions in light of the existing AT&T radio frequency emissions from the site. Verizon has performed this analysis through services provided by its consulting engineers, Hammett & Edison, a firm of qualified and experienced radio frequency engineers. I have been personally familiar with that firm and its work for nearly 20 years. I have reviewed and evaluated hundreds of its reports for accuracy and reliability during that period in my capacity as technical and legal advisor to local government agencies in California and beyond.

To determine planned compliance with the FCC rules and Bulletin 65, Hammett & Edison conducted an on-site evaluation of the radio frequency emissions emanating from AT&T's antennas at the site. They then utilized those actual radio frequency emissions data in combination with the emissions data for Verizon's proposed antennas. This radio frequency information was analyzed by Hammett & Edison taking into account many technical factors, including the height of the existing and proposed antennas as well as the frequency, transmission power, transmission angles, and orientation of each of the existing and proposed antennas.

Based on its analysis, Hammett & Edison reports that the maximum radio frequency exposure will amount to 9.5% of the applicable FCC public exposure limit for uncontrolled exposures at ground level. Utilizing the underlying factual data in the Hammett & Edison report, and also evaluating the antenna locations and orientations as shown on the Zoning Drawings, I find Hammett & Edison's analysis to be consistent with required by the FCC for this type of process and their estimations (based on the Bulletin 65 calculation method) to be reliable. Given my clear understanding of the specific and conservative nature of the workings of the FCC formula for computing RF emissions used by both Hammett & Edison and my firm, I expect actual radio frequency emissions from the site—if permitted by the County—will be substantially less than the estimated 9.5%.

It is my opinion that the proposed Verizon project as designed and in conjunction with the existing AT&T wireless site demonstrates planned compliance with the FCC rules for radio frequency emissions safety as clearly also set out in the Hammett & Edison report.

V
Sage Associates Letter

A
Sage Letter Critique of
Hammett & Edison Report

The correspondence from Ms. Cindy Sage of Sage Associates to the County asserts that Hammett & Edison's report "is deficient" and that the report contains "a flawed analysis and prediction of RFR levels." Ms. Sage requests the County require substantially more and different radio frequency emissions data in this case.

First, Ms. Sage faults the Hammett & Edison analysis for "combin[ing] measurements (from AT&T's existing antennas) and computer modeling for the proposed antennas." She calls this "an apples-and-oranges approach that minimizes [radio frequency radiation] exposure levels." Ms. Sage's assertion is simply incorrect. Verizon's radio frequency emissions do not yet exist, thus the process followed by Hammett & Edison of measuring the current emissions from AT&T and adding those to Verizon's proposed emissions is both correct from an engineering standpoint, and also the accepted method used by governments (including the FCC) when assessing planned compliance with the FCC rules.

Next, Ms. Sage faults Hammett & Edison for switching between the FCC's 'occupational' exposure standard to the FCC's 'general population standard.' In fact, Hammett & Edison's analysis for roof properly uses the occupational standard as the building roof is controlled by Verizon, and for emissions beyond the roof Hammett & Edison properly uses the most restrictive FCC general population standard. Accordingly, Hammett & Edison's 'switching' of FCC standards is correct for this proposed site, and exactly compliant with the requirements of the FCC rules.

Ms. Sage continues by saying that the "RFR exposures [must be] assessed using public safety limits." As I have just discussed, Ms. Sage is incorrect as to the roof of Verizon's building (which is subject to the occupational standard). I have 'worked back' from Hammett & Edison's exposure calculation for the general population through the underlying data and applying those data to the approved FCC calculation formula. The only way Hammett & Edison could reach its stated conclusions for exposure *beyond the roof of the building* was to apply the most restrictive FCC general population standard, which is clearly and properly what Hammett & Edison did in this case. Accordingly, Ms.

Sage is incorrect when she asserts that Hammett & Edison used the wrong standard in this case as to publicly-accessible areas beyond the building roof.

Finally, Ms. Sage asserts, without explanation, that the Hammett & Edison report is somehow deficient for not providing what she refers to as “full runout tables of power density versus distance”.

A ‘runout table’ is not the same as a radio frequency coverage map; rather it is an information-dense engineering tool that in tabular form provides radio frequency emission levels versus distance versus azimuth. As requested by Ms. Sage, it would contain many thousands of calculated entries decipherable only by qualified and experienced radio frequency engineers. As I explain below, the specific runout reports requested by Ms. Sage would actually *misrepresent* the level of this project’s planned with the FCC rules and would, therefore, be completely without reliability or utility in this planning case.

There is no FCC requirement that such a runout table be produced. It is not a table even infrequently required by most governments because of its highly technical nature, and I do not find any requirement for such a runout table in the Santa Barbara County Code. Accordingly, it is my opinion that Hammett & Edison’s report is not deficient simply because it lacks the runout tables sought by Ms. Sage.

B
Sage Letter
Recommendations

Now I turn to Ms. Sage’s recommendations, contained in the section of her letter titled, “What Should Be Done?”

In this section of her letter, Ms. Sage suggests that the information she requests the County require Verizon to produce (but which is not required by FCC rules), and that the County direct Verizon to require the Hammett & Edison revise its report to reflect her requests.

Specifically, Ms. Sage asks disclosure of radio frequency radiation “expressed in microwatts per centimeter squared, not in percent of the safety standard.” This is a nonsensical request as the thousands of individual calculations and entries would be reported as ‘raw’ numbers rather than related to a final result that might be understood by non-engineers.

Ms. Sage goes on to request information already in the case documents provided by Verizon through its Zoning Drawings and via the Hammett & Edison report. I address each of her bulleted requests in [bracketed] comments below each bullet:

- antenna transmitter location

[The antenna location and the location of the transmitter are already provided in Verizon's Zoning Drawings.]

- the number of transmitters operating simultaneously

[Not relevant; this information is an element of the effective radiated power by band already disclosed in the Hammett & Edison report.]

- the frequency of each transmitting antenna

[Not relevant; this information is an element of the effective radiated power by band already disclosed in the Hammett & Edison report.]

- the number of channels (radios) per antenna

[Not relevant; this information is an element of the effective radiated power by band already disclosed in the Hammett & Edison report.]

- the effective maximum radiated power (ERP) for each channel and the expected radiated power for each channel

[Not relevant; the maximum effective radiated power by band is already disclosed in the Hammett & Edison report.]

- the direction of each antenna (show vertical plane pattern)

[The direction of each antenna is already disclosed in Verizon's Zoning Drawings and in the Hammett & Edison report. The "vertical plane pattern" is already available through the antenna model references in the Hammett & Edison report.]

- downtilt of antennas should be taken into account in calculations

[The downtilt information is already disclosed in the Hammett & Edison report.]

- a topographic map showing location of the site and of surrounding buildings

[The topographic map solicited lacks the specificity necessary to understand the scope of the request. In any event, the “location of the site and surrounding buildings” is known.]

- the number of occupied stories and heights of each floor of buildings

[The “number of occupied stories and heights of each floor of buildings” lacks the specificity necessary to understand the scope of the request. In any event, the request is clearly related to nebulous radio frequency emissions concerns that have already been shown to comply with the FCC rules as this project is proposed.]

- RFR contours should plot ERP at one meter and three meters above ground level, and establish AGL reference points to take ground elevation changes into account

[Contradictory and not relevant; “RFR contours” refer to the horizontal plane, while the information requested by Ms. Sage is provided in the vertical plane. Moreover, when FCC-specified radio frequency signal measurements are performed, they are averaged over a continuous span of two meters from ground level upwards (to reflect an average height of a man), therefore ground level elevation changes are automatically taken into account.]

- RFR runout tables to 0.01 microwatt per centimeter squared at ten foot intervals depicting the new project’s maximum calculated power density should be provided. Contour maps showing power density at 100, 50, 20, 10, 5, 2, 1 0.1 and 0.01 $\mu\text{W}/\text{cm}^2$ contours for the proposed project should be provided.

[Contradictory, not relevant, and circular; the “RFR runout tables” specified cannot be produced because it would only consider Verizon’s proposed emissions, rather than the sum of Verizon’s proposed emissions and AT&T’s existing emissions. Accordingly, the many thousands of calculations required by this request would actually underrepresent the information apparently sought. In any event, the request is clearly related to nebulous radio frequency emissions concerns that have already been shown to comply with the FCC rules as this project is proposed.]

- RFR runout tables to 0.01 microwatt per centimeter squared at ten foot intervals depicting all co-located antenna power density should be provided. Contour maps showing power density at 100, 50, 20, 10, 5, 2, 1 0, 0.1 and 0.01 uW/cm² should be provided for all co-located transmitting antennas.

[Contradictory, not relevant, and circular; the “RFR runout tables” specified cannot be produced because it would only consider AT&T’s proposed emissions, rather than the sum of Verizon’s proposed emissions and AT&T’s existing emissions. According, the many thousands of calculations, different from those in the prior request would also underrepresent the information apparently sought. In any event, the request is clearly related to nebulous radio frequency emissions concerns that have already been shown to comply with the FCC rules as this project is proposed.]

- Information should be overlain on a land use map showing nearest uncontrolled public access, distance to occupied buildings and designated land use for each building (home, school, day-care, pre-school, hospital, convalescent hospital or home, commercial office, shopping mall, etc)

[Contradictory, not relevant, and circular; the “information” sought is not specified in any meaningful manner. The other data requested in the bullets by Ms. Sage cannot be meaningfully presented in combination on a land use map. In any event, the request is clearly related to nebulous radio frequency emissions concerns that have already been shown to comply with the FCC rules as this project is proposed.]

It my opinion that the alleged deficiencies charged by Ms. Sage against Hammett & Edison in the first portion of her letter are wholly without merit.

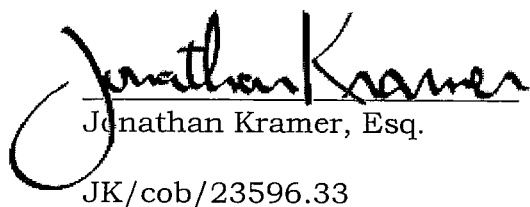
Because substantial portions of the requested information specified in the second portion of Ms. Sage’s letter have already been placed into the record by the applicant, and Ms. Sage’s additional requests would exceed the County’s authority in light of Verizon’s shown planned compliance with the FCC rules, it is my opinion the County should answer the question posed (“What Should Be Done?”) by refraining from acting on *any* of her recommendations.

VI
Hammett & Edison
Response to the Sage Associates Letter

Having first reviewed the underlying technical data and plans, and then the Sage Associates letter, I conclude this letter with my evaluation of the letter from Hammett & Edison dated July 26th responding to the assertions made in the Sage Associates letter.

Having independently analyzed the radio frequency emissions facts in this planning case, my conclusions are consistent with Hammett & Edison's response. I find no fault in either the logic or the explanation of the facts discussed by Hammett & Edison in its response. I accord the Hammett & Edison letter full weight regarding the facts discussed therein.

Respectfully submitted,


Jonathan Kramer, Esq.
JK/cob/23596.33

Attached Exhibits (4):

1. Statement of Qualifications for Jonathan L. Kramer (14 pages)
2. "A Local Government Official's Guide to Transmitting Antenna RF Emission Safety: Rules, Procedures, and Practical Guidance" (34 pages)
3. "A Practical Guide to Radio Frequency Emissions Safety" (Cal. Bar. Pub. Law J.) (10 pages)
4. Hammett & Edison Radio Frequency Emissions Report dated August 10, 2012 (revision to May 2, 2012 report)

EXHIBITS

1. Statement of Qualifications for Jonathan L. Kramer (14 pages)
2. "A Local Government Official's Guide to Transmitting Antenna RF Emission Safety: Rules, Procedures, and Practical Guidance" (34 pages)
3. "A Practical Guide to Radio Frequency Emissions Safety" (California Public Law Journal) (10 pages)
4. Hammett & Edison Radio Frequency Emissions Report dated August 10, 2012 (revision to May 2, 2012 report) (7 pages)

EXHIBIT 1

Statement of Qualifications for
Jonathan L. Kramer
(14 pages)

Jonathan L. Kramer

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2006 – Present	Principal Attorney, Kramer Telecom Law Firm, P.C. (Los Angeles, CA)
1999 – Present	Principal Technologist, Kramer.Firm, Inc. (Los Angeles, CA)
1987 – 1999	President, Communications Support Corp. (El Toro, CA; Los Angeles, CA)
1984 – 1987	Owner, Communicable Consultants (El Toro, CA)
1982 – 1984	Regional Technical Manager, Storer Communications (Southern California Region) (Laguna Niguel, CA)
1982 – 1982	Engineering Manager, Western Cable Services, Inc. (Ventura, CA)
1979 – 1982	System Engineer, Warner Cable of Malibu (Malibu, CA)
1978 – 1979	Self-employed radio telecommunications engineer (Malibu, California)
1976 – 1978	Field Technician, Motorola Communications & Electronics Area F Project Management (California, Nevada, Arizona, New Mexico)
1973 – 1974	Rovafone of Los Angeles (Woodland Hills, CA)

Admitted as an Attorney by the State Bar of California (SBN 244074)
Admitted as an Attorney by the United States District Court, Central District of California
Attorney Member, Federal Communications Bar Association
Attorney Member, International Municipal Lawyers Association
Attorney Member, Second Life Bar Association

Licensed by the Federal Communications Commission: General Radiotelephone Operator License, with Ship Radar and Broadcast endorsements; Previously licensed as a Second Class Radio Telephone Operator, Sept. 1975; First Class Radiotelephone Operator, Nov. 1977; General Radiotelephone Operator License, June 1987; Global Maritime Distress and Safety System Operator / Maintainer License, with Ship Radar Endorsement; Restricted Radiotelephone licensee; Amateur radio operator since November 1970 currently licensed as an Extra Class operator.

Licensed by the California Contractors State License Board for low voltage communications (Class C7). License No. 433113. Licensed since 1982.

Life member of the American Radio Relay League; ARRL book article author and review editor on cable television RF interference matters; Appointed Volunteer Counsel of the ARRL.

Former wireless technology advisor to and testifying expert before the FCC State & Local Government Advisory Committee

Co-author, co-editor of "A Local Government Official's Guide to Transmitting Antenna RF Emission Safety: Rules, Procedures, and Practical Guidance", a wireless technology advisory to local governments based on OET Bulletin 65 published by the FCC, Spring 2000 (download from: <http://www.FCC.gov/oet/rfsafety>)

Former Chairperson, International Right of Way Association Wireless Committee

Former National Board of Directors member, National Association of Telecommunications Officers and Advisors (NATOA), an affiliate of the National League of Cities (Terms: 1997-2000, 1992-1994)

Former Co-chair of the Joint Task Force on Technical Standards Committee, appointed by NATOA, National League of Cities, and US Conference of Mayors to develop the national technical standards for cable television systems adopted by the FCC in February 1992

NATOA's only twice-honored Member of the Year (1997 and 1991)

Current advisor to the Executive Committee Board Member of the State Bar of California Public Law Section (2011-2012)

Executive Committee Board Member of the State Bar of California Public Law Section (2008-2011)

Immediate Past President, States of California and Nevada Chapter of NATOA (SCAN NATOA) (2006-2008); founding member of that Chapter. Chapter President: 2009-2010.

Charter Member, California Wireless Association (CALWA)

Former Co-chair of National Technical Standards committee appointed by NATOA, National League of Cities, and US Conference of Mayors to develop the national technical standardized testing manual to determine compliance with the FCC rules

Fellow Member of Society of Cable Telecommunication Engineers, United Kingdom society (FSCTE designation).

Senior Member of Society of Cable Telecommunications Engineers, United States society (SCTE-US). SCTE-US Senior Member since April 1993; member since 1981.

Member of the Professional Development Committee of the SCTE, which develops and supervises all professional safety and technical training and education conducted by the SCTE within the U.S. and internationally.

Certified as a Broadband Transport Specialist (BTS designation) by the SCTE-US.

Certified as a Broadband Distribution Specialist (BDS designation) by the SCTE-US.

Certified as a Broadband Premises Specialist (BPS designation) by the SCTE-US.

Member, SCTE's Loyal Order of the 704 (Membership restricted to recognized cable engineers with a minimum of 30 years in CATV engineering experience)

Co-Chair, SCTE's WG7 Committee developing standardized cable TV industry interpretations to the National Electrical Code

Member, Society of Broadcast Engineers (member since 2008)

Awarded recognition as a “Certified Broadcast Technologist” by the Society of Broadcast Engineers (2009).

Awarded recognition as a “Public Safety Radio Technician” by the Association of Public-Safety Communications Officials – International, Inc. (APCO)

Elected Life Member, American Radio Relay League (member since 1971)

Witness before the FCC's State & Local Government Advisory Committee on OET 65, March 2000

Witness before the FCC in Cable TV re-regulation hearings, March 1990, representing NATOA, USCM, NACO, ICMA.

Testifying expert witness in federal and state court cases regarding cable television technology, and federal and state court cases regarding wireless technology.

Technology speaker at every NATOA National Conference from 1988 to 2000, and 2002 to 2004;
Technology speaker at many regional and local NATOA and SCAN NATOA meetings

Communications technology speaker at Society of Cable Telecommunications Engineers conferences, and cable industry conferences

Published author of book and magazine articles on communications technology, plant safety, construction and administration

Cable system engineering and technical management experience six years before forming Kramer.Firm, Inc.; Chief Technician, Technical Manager, Regional Engineer.

Former Field Engineering Representative for Motorola Communications and Electronics, Area F Program Management team — Areas of experience include microwave radio; baseband RF and audio; digital signaling; UHF and VHF two-way radio (including high stability Simulcast® radio operations); telephony; and command and control communications.

Juris Doctor Degree *cum laude*, Abraham Lincoln University School of Law, Los Angeles (2001).
LL.M. I.T. Law and Telecommunications Law candidate, University of Strathclyde (course completion in Fall 2012). AS Degree in Radio Communications (with honors), Los Angeles Trade Technical College.
Undergraduate education at CSUN, UCLA, and WLAC.

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The following is a partial list of the over 700 governments, public agencies and private entities that have relied upon Mr. Kramer's broadband and/or radio-telecommunications advice as a telecommunications technology advisor/inspector/expert witness since 1984, and/or as an attorney since 2006:

Selected Federal Agencies – States – Local Agencies – National Associations – Entities

Federal Communications Commission	National Association of Counties
U.S. Department of Justice	National League of Cities
National Association of Telecommunications Officers and Advisors	State of Michigan PUC
Soc. of Cable Telecom. Engineers	State of Connecticut DPUC
United States Army, Ft. Irwin, CA	Connecticut Siting Council
U.S. Marine Corps, Twentynine Palms, CA	League of California Cities
U.S. Marine Corps, San Diego, CA	Los Angeles Police Department
U.S. Navy; Monterey, CA	Otay Water District
U.S. Navy, San Diego, CA	Las Virgines School District
U.S. Navy, Lemoore, CA	Oxnard Union School District
United States Conference of Mayors	Communications Workers of America
	Monterey Bay Aquarium

Selected Local Governments and Government Associations

Addison, Illinois	Branford, Connecticut
Aiken County, South Carolina	Brentwood, California
Albany, California	Brighton Indian Reservation, Florida
Albuquerque, New Mexico	Bronxville, New York
Alcoa, Tennessee	Buena Park, California
Aliso Viejo, California	Buffalo Grove, Illinois
Anaheim, California	Burr Ridge, Illinois
Antioch, California	Butte County, California
Apache Junction., Arizona	Calabasas, California
Arcadia, California	Calimesa, California
Aurora, Illinois	Canandaigua, New York
Austin, Texas	Canton, Michigan
Avon, Ohio	Capitola, California
Azusa, California	Carol Stream, Illinois
Baldwin Park, California	Carson, California
Barrington, Illinois	Cedar Lake, Indiana
Bartlett, Illinois	Centerville, Ohio
Bellbrook, Ohio	Cerritos, California
Bellflower, California	Chelan, Washington
Bellingham, Washington	Cheshire, Connecticut
Benica, California	Chester, Connecticut
Berkeley, California	Chico, California
Beverly Hills, California	Chino Hills, California
Big Bear Lake, California	Chino, California
Big Cypress Indian Reservation, Florida	Chula Vista, California
Birmingham, Alabama	Clarendon Hills, Illinois
Bloomington, Illinois	Cleveland Heights, Ohio
Blount County, Tennessee	Clinton, Connecticut
Bolingbrook, Illinois	Colchester, Connecticut
Bozrah, Connecticut	Colton, California

Columbia Heights, Michigan	Goleta, California
Commerce, California	Goshen, Connecticut
Concord, California	Granby, Connecticut
Cornwall, Connecticut	Greenville, Illinois
Corona, California	Greenwich, Connecticut
Culver City, California	Griffith, Indiana
Cypress, California	Guilford, Connecticut
Darien, Connecticut	Hacienda Heights, California
Darien, Illinois	Haddam, Connecticut
Davis, California	Half Moon Bay, California
Decatur, Alabama	Hanover Park, Illinois
Deep River, Connecticut	Hartland, Connecticut
Deerfield Beach, Florida	Hermosa Beach, California
Denver, Colorado	Hesperia, California
Diamond Bar, California	Hidden Hills, California
Downers Grove, Illinois	Highland Park, Illinois
Duarte, California	Highland, California
Dublin, California	Highland, Indiana
Dubuque, Iowa	Hillsborough, California
DuPage County, Illinois	Hinsdale, Illinois
Durango, Colorado	Hobart, Illinois
Durham, Connecticut	Hoffman Estates, Illinois
Dyer, Indiana	Hollywood, Florida
East Haven, Connecticut	Homewood, Alabama
Eagan, Michigan	Homewood, Illinois
East Granby, Connecticut	Huntington Beach, California
East Windsor, Connecticut	Hunts Point, Washington
Eastchester, New York	Immokalee Indian Reservation., Florida
Easton, Connecticut	Indian Wells, California
El Monte, California	Inglewood, California
Elburn, Illinois	Irvine, California
Elk Grove Village, Illinois	Itasca, Illinois
Elmhurst, Illinois	Kettering, Ohio
Encinitas, California	Killingworth, Connecticut
Enfield, Connecticut	King County, Washington
Escondido, California	La Canada Flintridge, California
Essex, Connecticut	La Grange, Illinois
Fairfax, California	La Habra Heights, California
Federal Way, Washington	La Mesa, California
Flora, Illinois	La Puente, California
Fort Wayne, Indiana	La Quinta, California
Franklin, Connecticut	Lacy, Washington
Franklin, Kentucky	Laguna Beach, California
Fremont, California	Laguna Niguel, California
Fullerton, California	Lake County, Illinois
Galena, Illinois	Lake County, Indiana
Garden Grove, California	Lake Station, Indiana
Gardena, California	Lakewood, Ohio
Germantown, Ohio	Lemont, Illinois
Glen Ellyn, Illinois	Lisbon, Connecticut
Glendale Heights, Illinois	Lisle, Illinois
Glendale, California	Litchfield, Connecticut
Glenwood, Illinois	Live Oak, Texas
	Livermore, California

Lombard, Illinois
Lompoc, California
Lone Tree, Colorado
Longmont, Colorado
Long Beach, California
Los Alamos, California
Los Altos, California
Los Angeles County, California
Los Angeles, California
Louisville, Colorado
Loveland, Colorado
Lowell, Indiana
Lynchburg, Virginia
Madison, Connecticut
Malibu, California
Manhattan Beach, California
Maryville, Tennessee
Mentor, Ohio
Merced, California
Meriden, Connecticut
Merrillville, Indiana
Miamisburg, Ohio
Middlebury, Connecticut
Milpitas, California
Minooka, Illinois
Mission Viejo, California
Modesto, California
Monterey County, California
Moreno Valley, California
Morris, Connecticut
Mount Carmel, Illinois
Mount Orab, Ohio
Mount Prospect, Illinois
Mountain View, California
Mundelein, Illinois
Munster, Indiana
Naperville, Illinois
New Canaan, Connecticut
New Haven, Connecticut
New Martinsville, West Virginia
New Orleans, Louisiana
Newport Beach, California
Newton Falls, Ohio
Niles, Illinois
No. Aurora, Illinois
No. Branford, Connecticut
No. Haven, Connecticut
Norfolk, Virginia
North Aurora, Illinois
Norwalk, Connecticut
Norwich, Connecticut
Oak Brook, Illinois
Oak Park, Illinois
Oakbrook Terrace, Illinois

Oakwood, Ohio
Oceanside, California
Ojai, California
Old Saybrook, Connecticut
Olean, New York
Olympia, Washington
Opelika, Alabama
Orange County, California
Orange, California
Oxnard, California
Paducah, Kentucky
Palm Springs, California
Palos Verdes Estates, California
Paris, Illinois
Park Forest, Illinois
Pasadena, California
Peoria County, Illinois
Philadelphia, Pennsylvania
Piedmont, California
Piqua, Ohio
Placentia, California
Pleasant Hill, California
Plymouth, Connecticut
Plymouth, Minnesota
Port Townsend, Washington
Portland, Oregon
Portola Valley, California
Poway, California
Preston, Connecticut
Prospect, Connecticut
Redding, Connecticut
Redondo Beach, California
Rialto, California
Richmond, California
Riverside, California
Rochester, Michigan
Rolling Hills Estates, California
Rolling Meadows, Illinois
Roselle, Illinois
Roseville, Michigan
Salem, Illinois
San Antonio, Texas
Santa Barbara, California
Santa Barbara County, California
San Bernardino, California
San Bernardino County, California
San Clemente, California
San Diego County, California
San Diego, California
San Francisco, California
San Juan Capistrano, California
San Luis Obispo County, California
San Luis Obispo, California
San Marcos, California

San Rafael, California
Santa Ana, California
Santa Barbara County, California
Santa Clara, California
Santa Clarita, California
Santa Cruz County, California
Santa Cruz, California
Santa Fe, New Mexico
Santa Maria, California
Santa Monica, California
Schaumburg, Illinois
Schererville, Indiana
Seattle, Washington
Simi Valley, California
Sistersville, West Virginia
Solana Beach, California
Solon, Ohio
Somers, Connecticut
Southington, Connecticut
Spokane, Washington
Springboro, Ohio
St. Charles, Illinois
St. John, Indiana
St. Louis, Missouri
Stafford, Connecticut
Suffield, Connecticut
Sugar Grove, Illinois
Sunnyvale, California
Sutter County, California
Temecula, California
Thousand Oaks, California
Thurston County, Washington
Tiburon, California
Tipp City, Ohio
Torrance, California
Torrington, Connecticut
Troy, Ohio
Tuckahoe, New York
Tucson, Arizona
Tumwater, Washington
Tustin, California
Union, Connecticut
Vail, Colorado
Ventura County, California
Victoria, Texas
Villa Park, California
Villa Park, Illinois
Virginia Beach, Virginia
Wallingford, Connecticut
Walnut, California
Walnut Creek, California
Warren, Connecticut
Warrenville, Illinois
Waterbury, Connecticut
Waterford, Minnesota
Watertown, Connecticut
Wayne, Illinois
West Allis, WI
West Carrollton, Ohio
West Chicago, Illinois
West Covina, California
West Frankfort, Illinois
West Hollywood, California
West Milton, Ohio
West Palm Beach, Florida
Westbrook, Connecticut
Westmont, Illinois
Weston, Connecticut
Westport, Connecticut
Wheaton, Illinois
White Plains, New York
Willowbrook, Illinois
Wilmette, Illinois
Wilton, Connecticut
Windsor Locks, Connecticut
Winfield, Illinois
Wolcott, Connecticut
Wood Dale, Illinois
Woodridge, Illinois
Yorba Linda, California

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**Litigation Where Jonathan L. Kramer Served as a
Testifying or Non-Testifying Expert and/or as a Trial Consultant**

(Wireless Communications)

T-Mobile et al v. City and County of San Francisco (Retained by City)
Alaska National Insurance Co. v. GCI (Retained by Alaska National Ins.)
T-Mobile v. City of Thousand Oaks (Retained by City)
T-Mobile v. County of Los Angeles (Retained by County)
T-Mobile v. City of Los Angeles (Retained by City)
T-Mobile v. City of Albuquerque (Retained by City)
Omnipoint Communications, Inc. v. City of Huntington Beach (Retained by City)
T-Mobile West Corporation v. City of Huntington Beach (T-Mobile 1) (Retained by City)
T-Mobile West Corporation v. City of Huntington Beach (T-Mobile 2) (Retained by City)
Armstrong/McEachron v. Cazcom (Retained by Armstrong)
MetroPCS v. City and County of San Francisco (Retained by City)
Bay Area Cellular v. City and County of San Francisco (Retained by City)
Sprint v. City of Palos Verdes Estates (Retained by City)
Sprint v. City of La Canada Flintridge (Retained by City)
T-Mobile v. City of Gardena (Retained by City)
AT&T Wireless v. City of San Diego (Retained by City)
New Cingular Wireless v. City of Simi Valley (Retained by City)
Nextel v. City of San Diego (Retained by City)
AT&T Wireless v. City of Carlsbad (Retained by City)
Omnipoint v. Garden City, Michigan (Retained by City)
GTE Mobilnet v. City and County of San Francisco (Retained by City)
Illinois RSA 3 v. Peoria County (Retained by County)

(Wired Communications)

T-Mobile, et al v. City and County of San Francisco (Retained by City)
P
Mejia-Gutierrez v. Comcast (Retained by intervenor Seabright Insurance Co.)
Qwest v. City of Santa Fe (Retained by City)
NewPath Networks v. City of Davis (Retained by City)
Marcus Cable Associates v. City of Glendale (Retained by City)
Evergreen v. San Diego Gas & Electric, et al (Retained by Evergreen)
NextG Networks v. City of Huntington Beach (Federal) (Retained by City)
NextG Networks v. City of Huntington Beach (State) (Retained by City)
Sunesys, LLC v. City of Huntington Beach (State)
NewPath Networks v. City of Irvine (Retained by City)
Adelphia Cable v. City of Thousand Oaks (Retained by City)
Malencon v. Cox Communications (Retained by Malencon)
Roddy King v. AT&T (Retained by King)
Schaff Dev. Group v. S.E. Fla. Cable, Inc., dba Adelphia Cable (Retained by Schaff)
Qwest v. City of Berkeley (Retained by City)
Playboy Enterprises v. United States (Retained by FCC, U.S. Department of Justice)
Jones Intercable v. City of Chula Vista (Retained by City)
Sierra East Television v. Westar Cable (Retained by Sierra East)
Booth American v. United States (Retained by Department of Justice)
D.B. Cable v. Kalma Busk (Retained by Busk)

Selected Published Articles by Jonathan L. Kramer

DAS All Folks	AGL Magazine	2012
A Practical Guide to Radio Frequency Emissions Safety	State Bar of California	2009
Radio Frequency Emissions Safety – A Practical and Practice Guide	Nat. Assoc. of Telecom Off. and Advisors	2009
Use a Cell Phone Jammer and Get Jammed Up With the FCC	Ezinearticles.com	2008
Your California Cable TV Company Missed an Appointment? The Law Protects Cable TV Subscribers	Ezinearticles.com	2008
A Modern Game of Hide and Seek	AGL Magazine	2007
Give Me Your Bond	Communications Technology Magazine	2007
Picture Quality in the Digital World: A lost Science?	NATOA Journal	2007
Effective Management of a Cable TV Rebuild/Upgrade in Your Community	NACO County News	2004
Leveling the Playing Field for Cable TV Franchise Renewals	Public Management Magazine	2003
A Local Government Official's Guide to Transmitting Antenna RF Emission Safety: Rules, Procedures, and Practical Guidance	Federal Communications Commission	2000

Selected Lectures - Universities, Colleges, School Districts

Yale University, New Haven, CT
USC Annenberg School of Communications, Los Angeles, CA
University of Alabama, Birmingham, AL
Pepperdine University, Malibu, California
Orange Coast College, Orange County, CA
Rancho Santiago College, Santa Ana, CA

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Selected Lectures – Legal, Industry, and Professional Organizations

Speaking Engagement	Conference or Event	Year
Current Issues in Cell Tower Leasing	Lorman Educational Services	2012
Sec. 6409(a): New Federal Regulation	Kramer Telecom Law Firm	2012
Sec. 6409(a): New Federal Regulation	Lorman Education Services	2012
If the Tower Doesn't Grow, Can Municipalities Say No?	T-Mobile External Affairs Headliners Series	2012 2012
Current Issues in Cell Tower Regulation and Zoning Rules	Lorman Educational Services	2012
Wireless Site Collocations Under Sec. 6409	KTLF Teleconference	2011
Santa Fe Neighborhood Law Center	Law and Policy for Neighborhoods	2011
Wireless Lease Buyouts: A Government Perspective	International Municipal Lawyers Association	2011
Current Issues in Wireless Lease Buyouts	Lorman Educational Services	2011
Is There Such A Thing As A Good Wireless Ordinance?	AGL Regional Conf. – Denver	
Current Issues in WiMax, 4G and LTE Leases	Lorman Educational Services	2011
Wireless Facilities Siting Update	SCAN NATOA	2011
Current Issues in Cell Tower Leasing	Lorman Educational Services	2011
Wireless 101 for Attorneys	New Mexico Municipal League	2010
Cell Tower Leasing Issues	International Municipal Lawyers Association	2010
Current Issues in Cell Tower Regulation and Zoning Rules	Lorman Educational Services	2010
Is There Such A Thing As A Good Wireless Ordinance?	AGL Regional Conf. – San Francisco	2010
Follow-up to Wireless Facilities Siting	NATOA	2010
Wireless Update	SCAN NATOA	2010
Major Issues in WiMAX Tower Leases and Zoning	Lorman Education Services	2010

Speaking Engagement	Conference or Event	Year
Current Issues in Wireless Siting	Gateway Cities Council of Governments	2010
Wireless Issues Update	League of California Cities City Attorneys' Conf.	2010
Recent Wireless Siting Developments	Amer. Plan. Assoc. Orange County (CA) Chapter	2010
Educational Seminar Panel	California Wireless Association	2010
Current Issues in Cell Tower Leasing	Lorman Educational Services	2010
Educational Seminar Panel	California Wireless Association	2010
New FCC Cell Tower Zoning 'Shot-Clock' Order: Issues and Guidance to Effectively Deal With Federally-Imposed Zoning Deadlines	International Municipal Lawyers Association	2009
FCC Declaratory Ruling on Wireless Siting	eNATOA Conference	2009
Technology Solutions for Small Law Firms	Provisors LLP M	2009
Major Issues in WiMAX Tower Leases and Zoning	Lorman Education Services	2009
Current Issues in Cell Tower Leasing	Lorman Education Services	2009
Top Tech Topics for a Law Practice	State Bar of California	2009
"I'm from the Government [Planning Department] and I'm here to help you"	Amateur Radio Club of El Cajon	2009
The National Electrical Code: Why comply?	SCTE Live Learning	2009
DTV Transition: Last Steps	SCTE Live Learning	2009
"Tower Siting: Getting to Win/Win for Localities and for Carriers"	California Wireless Association	2009
Telecom 101: What Every Practioner Should Know	State Bar of California Section Education Institute	2009
Secret Life of PDA: Ethical Considerations	State Bar of California Section Education Institute	2009
Cable TV Law Update - Cable Television Unraveled	Pennsylvania Bar Institute	2008

Speaking Engagement	Conference or Event	Year
Wireless Telecommunications Law Update: Current Issues in Cell Tower Regulation	Lorman Education Services	2008
Automated Photo Red Light Enforcement Users Group	Los Angeles Police Department	2008
"I'm From the Government (Planning Department) and I'm Here to Help You"	Palomar (California) ARC Meeting	2008
"Surfin' Telecommunication Choices: A New World, A New Direction"	SCAN NATOA Annual Conference	2008
FCC Regulations Regarding Cable TV	SCTE Show Me Chapter	2008
Mobile Security and Ethical Issues for Attorneys	State Bar of California Annual Conference	2008
"I'm From the Government (Planning Department) and I'm Here to Help You"	ARRL Southwest Division Conference	2007
AT&T Project Lightspeed	League of California Cities Policy Conference	2007
Right of Way Furniture	SCAN NATOA Annual Conference	2007
Wild Wired (and Wireless) West	State Bar of California Annual Conference	2007
Wireless telecommunications planning	APA National Conference	2006
Ask the Experts	SCAN NATOA Conf.	2006
Wireless and Wired Telecommunications Law Update	League of California Cities City Attorneys Section Conference	2006
Wireless Case Mock Hearing	PCIA Annual Conference	2006
PEG Programming	Alliance for Community Media	2005
Wireless Siting 101	Assoc of Environmental Professionals – O.C. Chapter	2005
A Sea Change in Wireless Siting	California APA Conference	2005
Cable TV and Wireless Regulation and Law Update	Florida Cable and Telecommunications Law	2005

Speaking Engagement	Conference or Event	Year
	Local Government Workshop	
Emerging and Competing Broadband Technology	NATOA National Conference	2005
"Future of Cable Television"	SCAN NATOA Annual Conference	2005
Wireless Siting Planning: A Government Perspective	APA - Regional Planning Conference	2004
Cable TV Regulation: Local, State, and Federal Regulation	City of Kent (WA) Cable TV Conference	2004
Telecommunications Law Update	City Attorneys Association of San Diego County	2004
Cable TV and Wireless Regulation and Law Update	Florida Cable and Telecommunications Law Local Government Workshop	2004
Telecommunications Safety Code Violations: A Field Guide for Attorneys	IMLA Annual Conference	2004
Keynote Lecture on Telecommunications Grounding	Thomas & Betts Power And Grounding Council Meeting	2004
Cable TV and Wireless Regulation and Law Update	Florida Cable and Telecommunications Law Local Government Workshop	2003
How to Get A Wireless Tower Siting Permit Application Denied!	IRWA Chapter 1 Conference	2003
Maximizing Wireless Resources	NATOA Annual Conference	2003
Right of Way Considerations for Local Governments	Law Seminars International - Early Stage Due Diligence Technology Considerations	2002
When Bad Things Happen to Good Cable Systems	Center for International Legal Studies International Info Tech, Media, and Telecom Law Conference	2002

Speaking Engagement	Conference or Event	Year
New FCC Technical Standards	NCTA Education Conference	2002
Conference on Telecommunications Policy and Opportunities 2001	Westside Summit Cities	2001
Hiding Cell Phone Sites In Plain Sight Now you see 'em...now you don't!	NATOA 2001 Annual Conference	2001
ANTENNA AND TOWER SITING: Final Frontier	SCAN NATOA Conf.	2001
Wireless Siting: Policy Issues and Practical Solutions - A Municipal View	Law Seminars International The Third Annual Conference on Local Telecommunications Infrastructure	2001
Cable TV Regulation	NATOA Annual Conference	2000
Cable TV Regulation	NATOA Annual Conference	1999
Cable TV Regulation	NATOA Annual Conference	1998
Cable TV Regulation	NATOA Annual Conference	1997
Cable TV Regulation	NATOA Annual Conference	1996
Cable TV Regulation	NATOA Annual Conference	1995
Cable TV Regulation	NATOA Annual Conference	1994
Cable TV Regulation	NATOA Annual Conference	1993
Cable TV Regulation	NATOA Annual Conference	1992
Cable TV Regulation	NATOA Annual Conference	1991
Cable TV Regulation	NATOA Annual Conference	1990
Cable TV Regulation	NATOA Annual Conference	1989
Cable TV Regulation	Michigan NATOA Conference	1987

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EXHIBIT 2

“A Local Government Official's Guide to Transmitting Antenna RF
Emission Safety: Rules, Procedures, and Practical Guidance”
(34 pages)



**Federal
Communications
Commission**

**Local and State
Government
Advisory
Committee**

**A Local Government Official's Guide to
Transmitting Antenna RF Emission Safety:
Rules, Procedures, and Practical Guidance**



June 2, 2000

A Local Government Official's Guide to Transmitting Antenna RF Emission Safety: Rules, Procedures, and Practical Guidance

Over the past two years, the Federal Communications Commission (FCC) and its Local and State Government Advisory Committee (LSGAC) have been working together to prepare a voluntary guide to assist state and local governments in devising efficient procedures for ensuring that the antenna facilities located in their communities comply with the FCC's limits for human exposure to radiofrequency (RF) electromagnetic fields. The attached guide is the product of this joint effort.

We encourage state and local government officials to consult this guide when addressing issues of facilities siting within their communities. This guide contains basic information, in a form accessible to officials and citizens alike, that will alleviate misunderstandings in the complex area of RF emissions safety. This guide is not intended to replace OET Bulletin 65, which contains detailed technical information regarding RF issues, and should continue to be used and consulted for complex sites. The guide contains information, tables, and a model checklist to assist state and local officials in identifying sites that do not raise concerns regarding compliance with the Commission's RF exposure limits. In many cases, the model checklist offers a quick and effective way for state and local officials to establish that particular RF facilities are unlikely to exceed specific federal guidelines that protect the public from the environmental effects of RF emissions. Thus, we believe this guide will facilitate federal, state, and local governments working together to protect the public while bringing advanced and innovative communications services to consumers as rapidly as possible. We hope and expect that use of this guide will benefit state and local governments, service providers, and, most importantly, the American public.

We wish all of you good luck in your facilities siting endeavors.

William E. Kennard, Chairman
Federal Communications Commission

Kenneth S. Fellman, Chair
Local and State Government
Advisory Committee

A LOCAL GOVERNMENT OFFICIAL'S GUIDE TO TRANSMITTING ANTENNA RF EMISSION SAFETY: RULES, PROCEDURES, AND PRACTICAL GUIDANCE

A common question raised in discussions about the siting of wireless telecommunications and broadcast antennas is, "Will this tower create any health concerns for our citizens?" We have designed this guide to provide you with information and guidance in devising efficient procedures for assuring that the antenna facilities located in your community comply with the Federal Communication Commission's (FCC's) limits for human exposure to radiofrequency (RF) electromagnetic fields.¹

We have included a checklist and tables to help you quickly identify siting applications that do not raise RF exposure concerns. Appendix A to this guide contains a checklist that you may use to identify "categorically excluded" facilities that are unlikely to cause RF exposures in excess of the FCC's guidelines. Appendix B contains tables and figures that set forth, for some of the most common types of facilities, "worst case" distances beyond which there is no realistic possibility that exposure could exceed the FCC's guidelines.

As discussed below, FCC rules require transmitting facilities to comply with RF exposure guidelines. The limits established in the guidelines are designed to protect the public health with a very large margin of safety. These limits have been endorsed by federal health and safety agencies such as the Environmental Protection Agency and the Food and Drug Administration. The FCC's rules have been upheld by a Federal Court of Appeals.² As discussed below, most facilities create maximum exposures that are only a small fraction of the limits. Moreover, the limits themselves are many times below levels that are generally accepted as having the potential to cause adverse health effects. Nonetheless, it is recognized that any instance of noncompliance with the guidelines is potentially very serious, and the FCC has therefore implemented procedures to enforce compliance with its rules. At the same time, state and local governments may wish to verify compliance with the FCC's exposure limits in order to protect their own citizens. As a state or local government official, you can play an important role in ensuring that innovative and beneficial communications services are provided in a manner that is consistent with public health and safety.

This document addresses only the issue of compliance with RF exposure limits established by the FCC. It does not address other issues such as construction, siting, permits, inspection, zoning, environmental review, and placement of antenna facilities within communities. Such issues fall generally under the jurisdiction of states and local governments, within the limits imposed for personal wireless service facilities by Section 332(c)(7) of the Communications Act.³

¹ This guide is intended to complement, but not to replace, the FCC's OET Bulletin 65, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields," August 1997. Bulletin 65 can be obtained from the FCC's Office of Engineering and Technology (phone: 202-418-2464 or e-mail: rfsafety@fcc.gov). Bulletin 65 can also be accessed and downloaded from the FCC's "RF Safety" website: <http://www.fcc.gov/oet/rfsafety>.

² See *Cellular Phone Taskforce v. FCC*, 205 F.3d 82 (2d Cir. 2000).

This document is not intended to provide legal guidance regarding the scope of state or local government authority under Section 332(c)(7) or any other provision of law. Section 332(c)(7)⁴ generally preserves state and local authority over decisions regarding the placement, construction, and modification of personal wireless service facilities,⁵ subject to specific limitations set forth in Section 332(c)(7). Among other things, Section 332(c)(7) provides that “[n]o 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 [FCC’s] regulations concerning such emissions.” The full text of Section 332(c)(7) is set forth in Appendix C.

State and local governments and the FCC may differ regarding the extent of state and local legal authority under Section 332(c)(7) and other provisions of law. To the extent questions arise regarding such authority, they are being addressed by the courts. Rather than address these legal questions, this document recognizes that, as a practical matter, state and local governments have a role to play in ensuring compliance with the FCC’s limits, and it provides guidance to assist you in effectively fulfilling that role. The twin goals of this document are: (1) to define and promote locally-adaptable procedures that will provide you, as a local official concerned about transmitting antenna emissions, with adequate assurance of compliance, while (2), at the same time, avoiding the imposition of unnecessary burdens on either the local government process or the FCC’s licensees.

First, we’ll start with a summary of the FCC’s RF exposure guidelines and some background information that you’ll find helpful. Next, we’ll review the FCC’s procedures for verifying compliance with the guidelines and enforcing its rules. Finally, we’ll offer you some practical guidance to help you determine if personal wireless service facilities may raise compliance concerns. Note, however, that this guide is only intended to help you distinguish sites that are unlikely to raise compliance concerns from those that may raise compliance concerns, not to identify sites that are out of compliance. Detailed technical information necessary to determine compliance for individual sites is contained in the FCC’s OET Bulletin 65 (see footnote 1, above).

³ 47 U.S.C. § 332(c)(7). Under limited circumstances, the FCC also plays a role in the siting of wireless facilities. Specifically, the FCC reviews applications for facilities that fall within certain environmental categories under the National Environmental Policy Act of 1969 (NEPA), *see* 47 C.F.R. § 1.1307(a). Antenna structures that are over 200 feet in height or located near airport runways must be marked or lighted as specified by the Federal Aviation Administration and must be registered with the FCC, *see* 47 C.F.R. Part 17.

⁴ Section 332(c)(7) of the Communications Act is identical to Section 704(a) of the Telecommunications Act of 1996.

⁵ “Personal wireless services” generally includes wireless telecommunications services that are interconnected with the public telephone network and are offered commercially to the public. Examples include cellular and similar services (such as Personal Communications Service or “PCS”), paging and similar services, certain dispatch services, and services that use wireless technology to provide telephone service to a fixed location such as a home or office.

Before we start, however, let's take a short tour of the radiofrequency spectrum. RF signals may be transmitted over a wide range of frequencies. The frequency of an RF signal is expressed in terms of cycles per second or "Hertz," abbreviated "Hz." One kilohertz (kHz) equals one thousand Hz, one megahertz (MHz) equals one million Hz, and one gigahertz (GHz) equals one billion Hz. In the figure below, you'll see that AM radio signals are at the lower end of the RF spectrum, while other radio services, such as analog and digital TV (DTV), cellular and PCS telephony, and point-to-point microwave services are much higher in frequency.

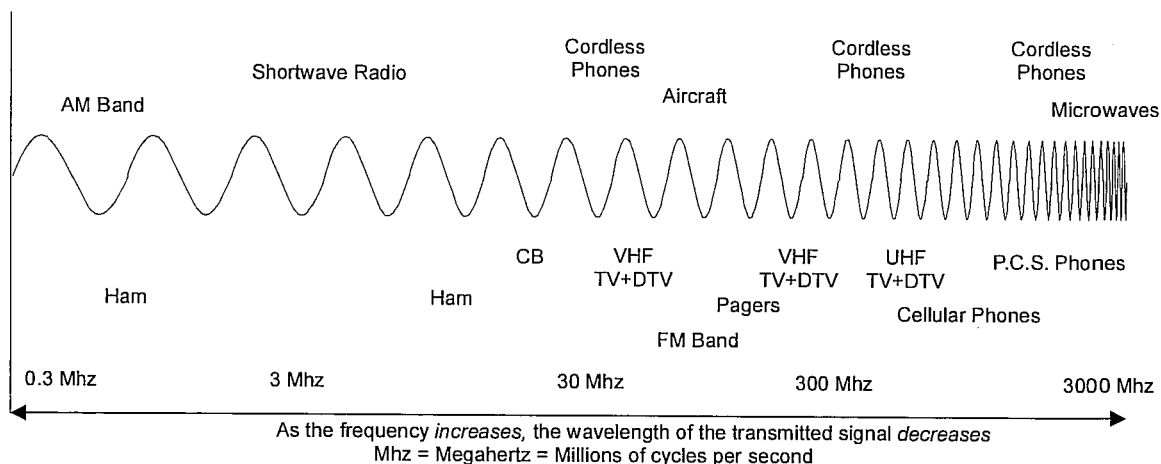


Illustration 1

The FCC's limits for maximum permissible exposure (MPE) to RF emissions depend on the frequency or frequencies that a person is exposed to. Different frequencies may have different MPE levels. Later in this document we'll show you how this relationship of frequency to MPE limit works.

I. The FCC's RF Exposure Guidelines and Rules.

Part 1 of the FCC's Rules and Regulations contains provisions implementing the National Environmental Policy Act of 1969 (NEPA). NEPA requires all federal agencies to evaluate the potential environmental significance of an agency action. Exposure to RF energy has been identified by the FCC as a potential environmental factor that must be considered before a facility, operation or transmitter can be authorized or licensed. The FCC's requirements dealing with RF exposure can be found in Part 1 of its rules at 47 C.F.R. § 1.1307(b). The exposure limits themselves are specified in 47 C.F.R. § 1.1310 in terms of frequency, field strength, power density and averaging time. Facilities and transmitters licensed and authorized by the FCC must either comply with these guidelines or else an applicant must file an Environmental Assessment (EA) with the FCC as specified in 47 C.F.R. § 1.1301 *et seq.* An EA is an official document required by the FCC's rules whenever an action may have a significant environmental impact (see discussion below). In practice, however, a potential environmental RF exposure problem is typically resolved before an EA would become necessary. Therefore, compliance with the FCC's RF guidelines constitutes a *de facto* threshold for obtaining FCC approval to construct or operate a station or transmitter. The FCC guidelines are based on exposure criteria

recommended in 1986 by the National Council on Radiation Protection and Measurements (NCRP) and on the 1991 standard developed by the Institute of Electrical and Electronics Engineers (IEEE) and later adopted as a standard by the American National Standards Institute (ANSI/IEEE C95.1-1992).

The FCC's guidelines establish separate MPE limits for "general population/uncontrolled exposure" and for "occupational/controlled exposure." The general population/uncontrolled limits set the maximum exposure to which most people may be subjected. People in this group include the general public not associated with the installation and maintenance of the transmitting equipment. Higher exposure limits are permitted under the "occupational/controlled exposure" category, but only for persons who are exposed as a consequence of their employment (*e.g.*, wireless radio engineers, technicians). To qualify for the occupational/controlled exposure category, exposed persons must be made fully aware of the potential for exposure (*e.g.*, through training), and they must be able to exercise control over their exposure. In addition, people passing through a location, who are made aware of the potential for exposure, may be exposed under the occupational/controlled criteria. The MPE limits adopted by the FCC for occupational/controlled and general population/uncontrolled exposure incorporate a substantial margin of safety and have been established to be well below levels generally accepted as having the potential to cause adverse health effects.

Determining whether a potential health hazard could exist with respect to a given transmitting antenna is not always a simple matter. Several important factors must be considered in making that determination. They include the following: (1) What is the frequency of the RF signal being transmitted? (2) What is the operating power of the transmitting station and what is the actual power radiated from the antenna?⁶ (3) How long will someone be exposed to the RF signal at a given distance from the antenna? (4) What other antennas are located in the area, and what is the exposure from those antennas? We'll explore each of these issues in greater detail below.

For all frequency ranges at which FCC licensees operate, Section 1.1310 of the FCC's rules establishes maximum permissible exposure (MPE) limits to which people may be exposed. The MPE limits vary by frequency because of the different absorptive properties of the human body at different frequencies when exposed to whole-body RF fields. Section 1.1310 establishes MPE limits in terms of "electric field strength," "magnetic field strength," and "far-field equivalent power density" (power density). For most frequencies used by the wireless services, the most relevant measurement is power density. The MPE limits for power density are given in terms of "milliwatts per square centimeter" or mW/cm^2 . One milliwatt equals one thousandth of one watt (1/1000 of a watt).⁷ In terms of power density, for a given frequency the FCC MPE limits can be interpreted as specifying the maximum rate that energy can be transferred (*i.e.*, the power) to a square centimeter of a person's body over a period of time (either 6 or 30 minutes, as explained

⁶ Power travels from a transmitter through cable or other connecting device to the radiating antenna. "Operating power of the transmitting station" refers to the power that is fed from the transmitter (transmitter output power) into the cable or connecting device. "Actual power radiated from the antenna" is the transmitter output power minus the power lost (power losses) in the connecting device plus an apparent increase in power (if any) due to the design of the antenna. Radiated power is often specified in terms of "effective radiated power" or "ERP" or "effective isotropic radiated power" or "EIRP" (see footnote 14).

⁷ Thus, by way of illustration, it takes 100,000 milliwatts of power to fully illuminate a 100 watt light bulb.

below). In practice, however, since it is unrealistic to measure separately the exposure of each square centimeter of the body, actual compliance with the FCC limits on RF emissions should be determined by “spatially averaging” a person’s exposure over the projected area of an adult human body (this concept is discussed in the FCC’s OET Bulletin 65).

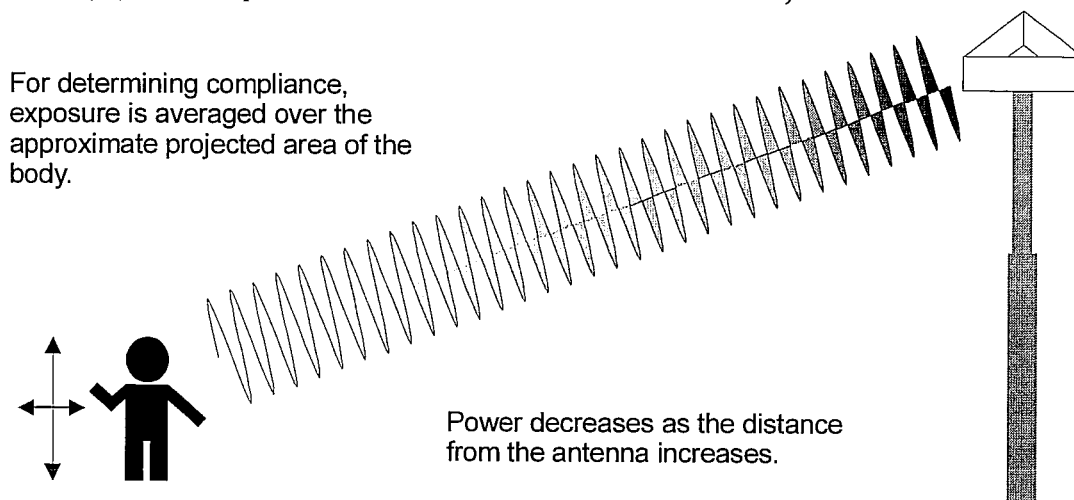


Illustration 2

Electric field strength and magnetic field strength are used to measure “near field” exposure. At frequencies below 300 MHz, these are typically the more relevant measures of exposure, and power density values are given primarily for reference purposes. However, evaluation of far-field equivalent power density exposure may still be appropriate for evaluating exposure in some such cases. For frequencies above 300 MHz, only one field component need be evaluated, and exposure is usually more easily characterized in terms of power density. Transmitters and antennas that operate at 300 MHz or lower include radio broadcast stations, some television broadcast stations, and certain personal wireless service facilities (*e.g.*, some paging stations). Most personal wireless services, including all cellular and PCS, as well as some television broadcast stations, operate at frequencies above 300 MHz. (See Illustration 1.)

As noted above, the MPE limits are specified as time-averaged exposure limits. This means that exposure can be averaged over the identified time interval (30 minutes for general population/uncontrolled exposure or 6 minutes for occupational/controlled exposure). However, for the case of exposure of the general public, time averaging is usually not applied because of uncertainties over exact exposure conditions and difficulty in controlling time of exposure. Therefore, the typical conservative approach is to assume that any RF exposure to the general public will be continuous. The FCC’s limits for exposure at different frequencies are shown in Illustration 3, below:

Illustration 3. 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 cannot exercise control over their exposure.

Finally, it is important to understand that the FCC's limits apply cumulatively to all sources of RF emissions affecting a given area. A common example is where two or more wireless operators have agreed to share the cost of building and maintaining a tower, and to place their antennas on that joint structure. In such a case, the total exposure from the two facilities taken together must be within the FCC guidelines, or else an EA will be required.

A. Categorically Excluded Facilities

The Commission has determined through calculations and technical analysis that due to their low power or height above ground level, many facilities by their very nature are highly unlikely to

cause human exposures in excess of the guideline limits, and operators of those facilities are exempt from routinely having to determine compliance. Facilities with these characteristics are considered "categorically excluded" from the requirement for routine environmental processing for RF exposure.

Section 1.1307(b)(1) of the Commission's rules sets forth which facilities are categorically excluded.⁸ If a facility is categorically excluded, an applicant or licensee may ordinarily assume compliance with the guideline limits for exposure. However, an applicant or licensee must evaluate and determine compliance for a facility that is otherwise categorically excluded if specifically requested to do so by the FCC.⁹ If potential environmental significance is found as a result, an EA must be filed with the FCC.

No radio or television broadcast facilities are categorically excluded. Thus, broadcast applicants and licensees must affirmatively determine their facility's compliance with the guidelines before construction, and upon every facility modification or license renewal application. With respect to personal wireless services, a cellular facility is categorically excluded if the total effective radiated power (ERP) of all channels operated by the licensee at a site is 1000 watts or less. If the facility uses sectorized antennas, only the total effective radiated power in each direction is considered. Examples of a 3 sector and a single sector antenna array are shown below:

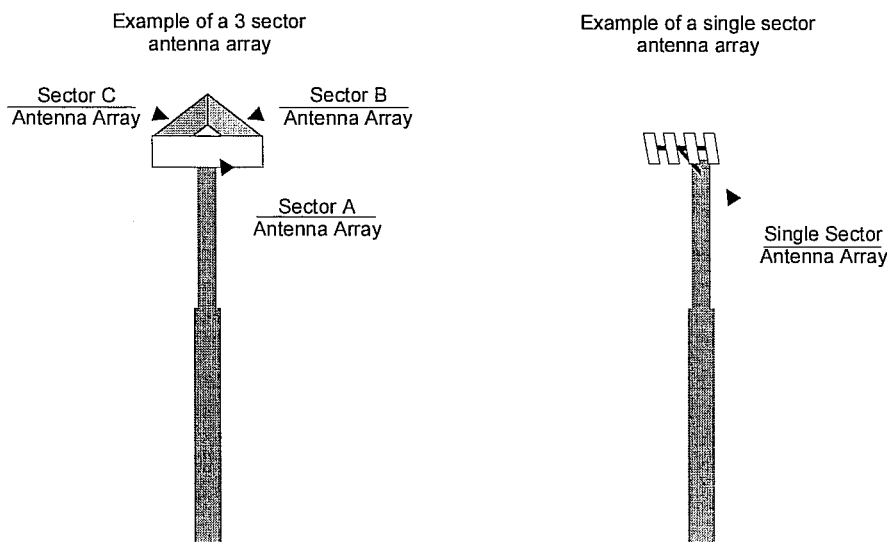


Illustration 4

⁸ "The appropriate exposure limits . . . are generally applicable to all facilities, operations and transmitters regulated by the Commission. However, a determination of compliance with the exposure limits . . . (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 [of §1.1307], or those specified in paragraph (b)(2) of this section. All other facilities, operations and transmitters are categorically excluded from making studies or preparing an EA . . ."

⁹ See 47 C.F.R §1.1307(c) and (d).

In addition, a cellular facility is categorically excluded, regardless of its power, if it is not mounted on a building and the lowest point of the antenna is at least 10 meters (about 33 feet) above ground level. A broadband PCS antenna array is categorically excluded if the total effective radiated power of all channels operated by the licensee at a site (or all channels in any one direction, in the case of sectorized antennas) is 2000 watts or less. Like cellular, another way for a broadband PCS facility to be categorically excluded is if it is not mounted on a building and the lowest point of the antenna is at least 10 meters (about 33 feet) above ground level. The power threshold for categorical exclusion is higher for broadband PCS than for cellular because broadband PCS operates at a higher frequency where exposure limits are less restrictive. For categorical exclusion thresholds for other personal wireless services, consult Table 1 of Section 1.1307(b)(1).¹⁰

For your convenience, we have developed the checklist in Appendix A that may be used to streamline the process of determining whether a proposed facility is categorically excluded. You are encouraged to adopt the use of this checklist in your jurisdiction, although such use is not mandatory.

B. What If An Applicant Or Licensee Wants To Exceed The Limits Shown In Illustration 3?

Any FCC applicant or licensee who wishes to construct or operate a facility that, by itself or in combination with other sources of emissions (*i.e.*, other transmitting antennas), may cause human exposures in excess of the guideline limits must file an Environmental Assessment (EA) with the FCC. Where more than one antenna is collocated (for example, on a single tower or rooftop or at a hilltop site), the applicant must take into consideration all of the RF power transmitted by all of the antennas when determining maximum exposure levels. Compliance at an existing site is the shared responsibility of all licensees whose transmitters produce exposure levels in excess of 5% of the applicable exposure limit. A new applicant is responsible for compliance (or submitting an EA) at a multiple-use site if the proposed transmitter would cause non-compliance and if it would produce exposure levels in excess of 5% of the applicable limit.¹¹

An applicant or licensee is not permitted to construct or operate a facility that would result in exposure in excess of the guideline limits until the FCC has reviewed the EA and either found no significant environmental impact, or pursued further environmental processing including the preparation of a formal Environmental Impact Statement. As a practical matter, however, this process is almost never invoked for RF exposure issues because applicants and licensees normally undertake corrective actions to ensure compliance with the guidelines before submitting an application to the FCC.

Unless a facility is categorically excluded (explained above), the FCC's rules require a licensee to evaluate a proposed or existing facility's compliance with the RF exposure guidelines and to

¹⁰ Table 1 of §1.1307(b)(1) is reproduced in Appendix A to this guide.

¹¹ For more information, see OET Bulletin 65, or see 47 CFR §1.1307(b)(3).

determine whether an EA is required. In the case of broadcast licensees, who are required to obtain a construction permit from the FCC, this evaluation is required before the application for a construction permit is filed, or the facility is constructed. In addition, if a facility requires the filing of an EA for any reason other than RF emissions, the RF evaluation must be performed before the EA is filed. Factors other than RF emissions that may require the filing of an EA are set out in 47 C.F.R. § 1.1307(a). Otherwise, new facilities that do not require FCC-issued construction permits should be evaluated before they are placed in operation. The FCC also requires its licensees to evaluate existing facilities and operations that are not categorically excluded if the licensee seeks to modify its facilities or renew its license. These requirements are intended to enhance public safety by requiring periodic site compliance reviews.

All facilities that were placed in service before October 15, 1997 (when the current RF exposure guidelines became effective) are expected to comply with the current guidelines no later than September 1, 2000, or the date of a license renewal, whichever is earlier.¹² If a facility cannot meet the September 1, 2000, date, the licensee of that facility must file an EA by that date. Section 1.1307(b) of the FCC's rules requires the licensee to provide the FCC with technical information showing the basis for its determination of compliance upon request.

II. How the FCC Verifies Compliance with and Enforces Its Rules.

A. Procedures Upon Initial Construction, Modification, and Renewal.

The FCC's procedures for verifying that a new facility, or a facility that is the subject of a facility modification or license renewal application, will comply with the RF exposure rules vary depending upon the service involved. Applications for broadcast services (for example, AM and FM stations, and television stations) are reviewed by the FCC's Mass Media Bureau (MMB). As part of every relevant application, the MMB requires an applicant to submit an explanation of what steps will be taken to limit RF exposure and comply with FCC guidelines. The applicant must certify that RF exposure procedures will be coordinated with all collocated entities (usually other stations at a common transmitter site or hill or mountain peak). If the submitted explanation does not adequately demonstrate a facility's compliance with the guidelines, the MMB will require additional supporting data before granting the application.

The Wireless Telecommunications Bureau (WTB) reviews personal wireless service applications (for cellular, PCS, SMR, etc.). For those services that operate under blanket area licenses, including cellular and PCS, the license application and renewal form require the applicant to certify whether grant of the application would have a significant environmental impact so as to require submission of an EA. The applicant's answer to this question covers all of the facilities sites included within the area of the license.

For those services that continue to be licensed by site (*e.g.*, certain paging renewals), the WTB requires a similar certification on the application form for each site. To comply with the FCC's rules, an applicant must determine its own compliance before completing this certification for

¹² Prior to October 15, 1997, the Commission applied a different set of substantive guidelines.

every site that is not categorically excluded. The WTB does not, however, routinely require the submission of any information supporting the determination of compliance.

B. Procedures For Responding To Complaints About Existing Facilities.

The FCC frequently receives inquiries from members of the public as to whether a particular site complies with the RF exposure guidelines. Upon receiving these inquiries, FCC staff may ask the inquiring party to describe the site at issue. In many instances, the information provided by the inquiring party does not raise any concern that the site could exceed the limits in the guidelines. FCC staff will then inform the inquiring party of this determination.

In some cases, the information provided by the inquiring party does not preclude the possibility that the limits could be exceeded. Under these circumstances, FCC staff may ask the licensee who operates the facility to supply information demonstrating its compliance. FCC staff may also inspect the site to determine whether it is accessible to the public, and examine other relevant physical attributes. Usually, the information obtained in this manner is sufficient to establish compliance. If compliance is established in this way, FCC staff will inform the inquiring party of this determination.

In some instances, a licensee may be unable to provide information sufficient to establish compliance with the guideline limits. In these cases, FCC staff may test the output levels of individual facilities and evaluate the physical installation. Keep in mind, however, that instances in which physical testing is necessary to verify compliance are relatively rare.

If a site is found to be out of compliance with the RF guidelines, the FCC will require the licensees at the site to remedy the situation. Depending on the service and the nature and extent of the violation, these remedies can include, for example, an immediate reduction in power, a modification of safety barriers, or a modification of the equipment or its installation. Actions necessary to bring a site into compliance are the shared responsibility of all licensees whose facilities cause exposures in that area that exceed 5% of the applicable MPE limit. In addition, licensees may be subject to sanctions for violating the FCC's rules and/or for misrepresentation.

The FCC is committed to responding fully, promptly, and accurately to all inquiries regarding compliance with the RF exposure guidelines, and to taking swift and appropriate action whenever the evidence suggests potential noncompliance. To perform this function effectively, however, the FCC needs accurate information about potentially problematic situations. By applying the principles discussed in this guide about RF emissions, exposure and the FCC's guidelines, state and local officials can fulfill a vital role in identifying and winnowing out situations that merit further attention.

III. Practical Guidance Regarding Compliance.

This section is intended to provide some general guidelines that can be used to identify sites that should not raise serious questions about compliance with FCC RF exposure guidelines. Sites that don't fall into the categories described here may still meet the guidelines, but the determination

of compliance will not be as straightforward. In such cases, a detailed review may be required. The tables and graphs shown in Appendix B are intended only to assist in distinguishing sites that should not raise serious issues from sites that may require further inquiry. They are not intended for use in identifying sites that are out of compliance. As noted above, the factors that can affect exposure at any individual site, particularly a site containing multiple facilities, are too numerous and subtle to be practically encompassed within this framework.

Applying the basic principles discussed in this guide should allow you to eliminate a large number of sites from further consideration with respect to health concerns. You may find it useful to contact a qualified radio engineer to assist you in your inquiry. Many larger cities and counties, and most states, have radio engineers on staff or under contract. In smaller jurisdictions, we recommend you seek initial assistance from other jurisdictions, universities that have RF engineering programs, or perhaps the engineer in charge of your local broadcast station(s).

We'll exclude any discussion of broadcast sites. As explained before, broadcast licensees are required to submit site-specific information on each facility to the FCC for review, and that information is publicly available at the station as long as the application is pending. The focus in this section is on personal wireless services, particularly cellular and broadband PCS, the services that currently require the largest numbers of new and modified facilities. Many other personal wireless services, however, such as paging services, operate in approximately the same frequency ranges as cellular and broadband PCS.¹³ Much of the information here is broadly applicable to those services as well, and specific information is provided in Appendix B for paging and narrowband PCS operations over frequency bands between 901 and 940 MHz.

Finally, this section only addresses the general population/uncontrolled exposure guidelines, since compliance with these guidelines generally causes the most concern to state and local governments. Compliance with occupational/controlled exposure limits should be examined independently.

A. Categorically Excluded Facilities.

As a first step in evaluating a siting application for compliance with the FCC's guidelines, you will probably want to consider whether the facility is categorically excluded under the FCC's rules from routine evaluation for compliance. The checklist in Appendix A will guide you in making this determination. Because categorically excluded facilities are unlikely to cause any exposure in excess of the FCC's guidelines, determination that a facility is categorically excluded should generally suffice to end the inquiry.

B. Single Facility Sites.

If a wireless telecommunications facility is not categorically excluded, you may want to evaluate potential exposure using the methods discussed below and the tables and figures in Appendix B.

¹³ The major exception is fixed wireless services, which often operate at much higher frequencies. In addition, some paging and other licensees operate at lower frequencies

If you "run the numbers" using the conservative approaches promoted in this paper and the site in question does not exceed these values, then you generally need look no further. Alternately, if the "numbers" don't pass muster, you may have a genuine concern. But remember, there may be other factors (*i.e.*, power level, height, blockages, etc.) that contribute to whether the site complies with FCC guidelines.

Where a site contains only one antenna array, the maximum exposure at any point in the horizontal plane can be predicted by calculations. The tables and graphs in Appendix B show the maximum distances in the horizontal plane from an antenna at which a person could possibly be exposed in excess of the guidelines at various levels of effective radiated power (ERP).¹⁴ Thus, if people are not able to come closer to an antenna than the applicable distance shown in Appendix B, there should be no cause for concern about exposure exceeding the FCC guidelines. The tables and graphs apply to the following wireless antennas: (1) cellular omni-directional antennas (Table B1-1 and Figure B1-1); (2) cellular sectorized antennas (Table B1-2 and Figure B1-2); (3) broadband PCS sectorized antennas (Table B1-3 and Figure B1-3);¹⁵ and (4) high-power (900 MHz-band) paging antennas (Table B1-4 and Figure B1-4). Table B1-4 and Figure B1-4 can also be used for omni-directional, narrowband (900 MHz) PCS antennas. Note that both tables and figures in Appendix B have been provided. In some cases it may be easier to use a table to estimate exposure distances, but figures may also be used when a more precise value is needed that may not be listed in a table.

It's important to note that the predicted distances set forth in Appendix B are based on a very conservative, "worst case" scenario. In other words, Appendix B identifies the furthest distance from the antenna that presents even a remote realistic possibility of RF exposure that could exceed the FCC guidelines. The power levels are based on the approximate maximum number of channels that an operator is likely to operate at one site. It is further assumed that each channel operates with the maximum power permitted under the FCC's rules and that all of these channels are "on" simultaneously, an unlikely scenario. This is a very conservative assumption. In reality, most sites operate at a fraction of the maximum permissible power and many sites use fewer than the maximum number of channels. Therefore, actual exposure levels would be expected to be well below the predicted values. Another mitigating factor could be the presence of intervening structures, such as walls, that will reduce RF exposure by variable amounts. For all these reasons, the values given in these tables and graphs are considered to be quite conservative and should over-predict actual exposure levels.

¹⁴ ERP is the apparent effective amount of power leaving the transmit antenna. The ERP is determined by factors including but not limited to transmitter output power, coaxial line loss between the transmitter and the antenna, and the "gain" (focusing effect) of the antenna. In some cases, power may also be expressed in terms of EIRP (effective isotropically radiated power). Therefore, for convenience, the tables in Appendix B also include a column for EIRP. ERP and EIRP are related by the mathematical expression: $(1.64) \times \text{ERP} = \text{EIRP}$.

¹⁵ Because broadband PCS antennas are virtually always sectorized, no information is provided for omni-directional PCS antennas.

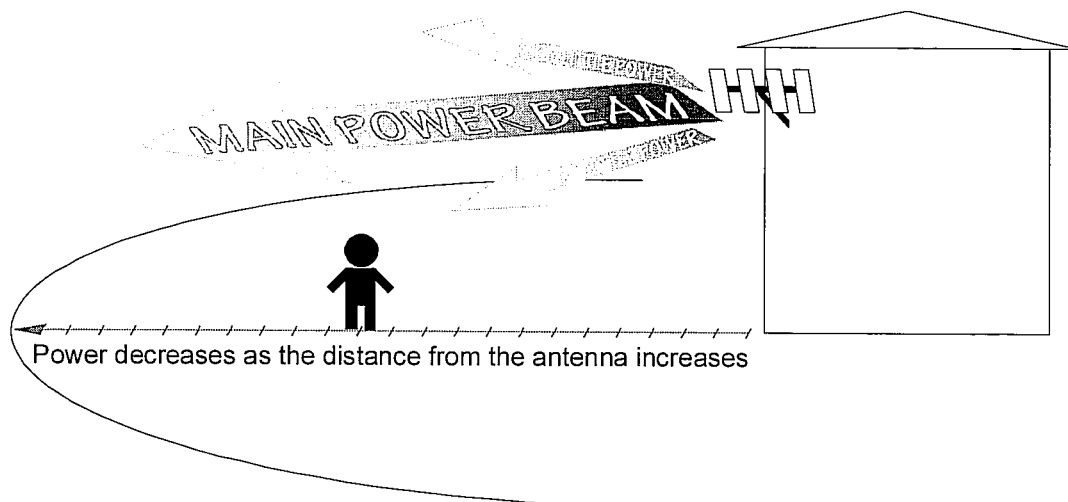


Illustration 5

Personal wireless service antennas typically do not emit high levels of RF energy directed above or below the horizontal plane of the antenna. Although the precise amount of energy transmitted outside the horizontal plane will depend upon the type of antenna used, we are aware of no wireless antennas that produce significant non-horizontal transmissions. Thus, exposures even a small distance below the horizontal plane of these antennas would be significantly less than in the horizontal plane. As discussed above, the tables and figures in Appendix B show distances in the horizontal plane from typical antennas at which exposures could potentially exceed the guidelines, assuming “worst case” operating conditions at maximum possible power levels. In any direction other than horizontal, including diagonal or straight down, these “worst case” distances would be significantly less.

Where unidirectional antennas are used, exposure levels within or outside the horizontal plane in directions other than those where the antennas are aimed will typically be insignificant. In addition, many new antennas are being designed with shielding capabilities to minimize emissions in undesired directions.

C. Multiple Facility Sites.

Where multiple facilities are located at a single site, the FCC’s rules require the total exposure from all facilities to fall within the guideline limits, unless an EA is filed and approved. In such cases, however, calculations of predicted exposure levels and overall evaluation of the site may become much more complicated. For example, different transmitters at a site may operate different numbers of channels, or the operating power per channel may vary from transmitter to transmitter. Transmitters may also operate on different frequencies (for example, one antenna array may belong to a PCS operator, while the other belongs to a cellular operator). A large number of variables such as these make the calculations more time consuming, and make it difficult to apply a simple rule-of-thumb test. See the following illustration.

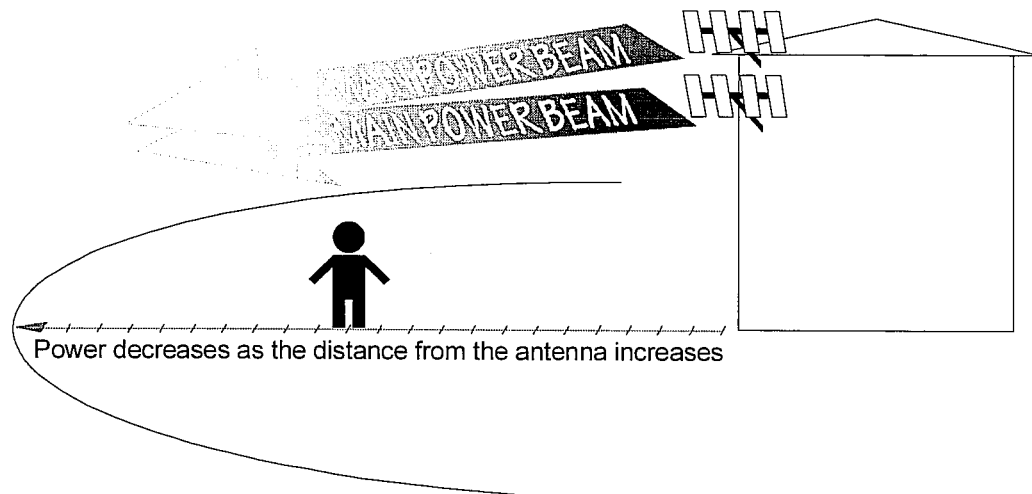


Illustration 6

However, we can be overly conservative and estimate a "worst case" exposure distance for compliance by assuming that the total power (e.g., ERP) of all transmitting antennas at the site is concentrated in the antenna that is closest to the area in question. (In the illustration above, this would be the antenna that is mounted lower on the building.) Then the values in the tables and graphs in Appendix B may be used as if this were the only antenna at the site, with radiated power equal to the sum of the actual radiated power of all antennas at the site. Actual RF exposure at any point will always be less than the exposure calculated using these assumptions. Thus, if people are not able to come closer to a group of antennas than the applicable distance shown in Appendix B using these assumptions, there should be no cause for concern about exposure exceeding the FCC guidelines. This is admittedly an extremely conservative procedure, but it may be of assistance in making a "first cut" at eliminating sites from further consideration.

IV. Conclusion.

We've highlighted many of the most common concerns and questions raised by the siting of wireless telecommunications and broadcast antennas. Applying the principles outlined in this guide will allow you to make initial conservative judgments about whether RF emissions are or should be of concern, consistent with the FCC's rules.

As we have explained, when first evaluating a siting application for compliance with the FCC's guidelines, you will probably want to consider whether the facility is categorically excluded under the FCC's rules from routine evaluation for compliance. The checklist in Appendix A will guide you in making this determination. Because categorically excluded facilities are unlikely to cause any exposure in excess of the FCC's guidelines, determination that a facility is categorically excluded should generally suffice to end the inquiry.

If a wireless telecommunications facility is not categorically excluded, you may want to evaluate potential exposure using the methods discussed in Part III of this paper and the tables and figures in Appendix B. If the site in question does not exceed the values, then you generally need look no further. Alternately, if the values don't pass muster, you may have a genuine concern. But

remember, there may be other factors (*i.e.*, power level, height, blockages, etc.) that contribute to whether the site complies with FCC guidelines.

If you have questions about compliance, your initial point of exploration should be with the facilities operator in question. That operator is required to understand the FCC's rules and to know how to apply them in specific cases at specific sites. If, after diligently pursuing answers from the operator, you still have genuine questions regarding compliance, you should contact the FCC at one of the numbers listed below. Provision of the information identified in the checklist in Appendix A may assist the FCC in evaluating your inquiry.

General Information: Compliance and Information Bureau, (888) CALL-FCC

Concerns About RF Emissions Exposure at a Particular Site: Office of Engineering and Technology, RF Safety Program, phone (202) 418-2464, FAX (202) 418-1918, e-mail rfsafety@fcc.gov

Licensing and Site Information Regarding Wireless Telecommunications Services: Wireless Telecommunications Bureau, Commercial Wireless Division, (202) 418-0620

Licensing and Site Information Regarding Broadcast Radio Services: Mass Media Bureau, Audio Services Division, (202) 418-2700

Licensing and Site Information Regarding Television Service (Including DTV): Mass Media Bureau, Video Services Division, (202) 418-1600

Also, note that the RF Safety Program Web site is a valuable source of general information on the topic of potential biological effects and hazards of RF energy. For example, OET recently updated its OET Bulletin 56 ("Questions and Answers about Biological Effects and Potential Hazards of Radiofrequency Electromagnetic Fields"). This latest version is available from the program and can be accessed and downloaded from the FCC's web site at:

<http://www.fcc.gov/oet/rfsafety/>

APPENDIX A

*Optional Checklist for Determination
Of Whether a Facility is Categorically Excluded*

**Optional Checklist for Local Government
To Determine Whether a Facility is Categorically Excluded**

Purpose: The FCC has determined that many wireless facilities are unlikely to cause human exposures in excess of RF exposure guidelines. Operators of those facilities are exempt from routinely having to determine their compliance. These facilities are termed "categorically excluded." Section 1.1307(b)(1) of the Commission's rules defines those categorically excluded facilities. This checklist will assist state and local government agencies in identifying those wireless facilities that are categorically excluded, and thus are highly unlikely to cause exposure in excess of the FCC's guidelines. Provision of the information identified on this checklist may also assist FCC staff in evaluating any inquiry regarding a facility's compliance with the RF exposure guidelines.

BACKGROUND INFORMATION

1. Facility Operator's Legal Name: _____
2. Facility Operator's Mailing Address: _____
3. Facility Operator's Contact Name/Title: _____
4. Facility Operator's Office Telephone: _____
5. Facility Operator's Fax: _____
6. Facility Name: _____
7. Facility Address: _____
8. Facility City/Community: _____
9. Facility State and Zip Code: _____
10. Latitude: _____
11. Longitude: _____

continue
→

Optional Local Government Checklist (page 2)

EVALUATION OF CATEGORICAL EXCLUSION

12. Licensed Radio Service (see attached Table 1): _____
13. Structure Type (free-standing or building/roof-mounted): _____
14. Antenna Type [omnidirectional or directional (includes sectored)]: _____
15. Height above ground of the lowest point of the antenna (in meters): _____
16. Check if all of the following are true:
- (a) This facility will be operated in the Multipoint Distribution Service, Paging and Radiotelephone Service, Cellular Radiotelephone Service, Narrowband or Broadband Personal Communications Service, Private Land Mobile Radio Services Paging Operations, Private Land Mobile Radio Service Specialized Mobile Radio, Local Multipoint Distribution Service, or service regulated under Part 74, Subpart I (see question 12).
 - (b) This facility will not be mounted on a building (see question 13).
 - (c) The lowest point of the antenna will be at least 10 meters above the ground (see question 15).

If box 16 is checked, this facility is categorically excluded and is unlikely to cause exposure in excess of the FCC's guidelines. The remainder of the checklist need not be completed. If box 16 is not checked, continue to question 17.

17. Enter the power threshold for categorical exclusion for this service from the attached Table 1 in watts ERP or EIRP* (note: $EIRP = (1.64) \times ERP$): _____
18. Enter the total number of channels if this will be an omnidirectional antenna, or the maximum number of channels in any sector if this will be a sectored antenna: _____
19. Enter the ERP or EIRP per channel (using the same units as in question 17): _____
20. Multiply answer 18 by answer 19: _____
21. Is the answer to question 20 less than or equal to the value from question 17 (yes or no)? _____

If the answer to question 21 is YES, this facility is categorically excluded. It is unlikely to cause exposure in excess of the FCC's guidelines.

If the answer to question 21 is NO, this facility is not categorically excluded. Further investigation may be appropriate to verify whether the facility may cause exposure in excess of the FCC's guidelines.

*"ERP" means "effective radiated power" and "EIRP" means "effective isotropic radiated power"

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

SERVICE (TITLE 47 CFR RULE PART)	EVALUATION REQUIRED IF:
Experimental Radio Services (part 5)	power > 100 W ERP (164 W EIRP)
Multipoint Distribution Service (subpart K of part 21)	<u>non-building-mounted antennas</u> : height above ground level to lowest point of antenna < 10 m <u>and</u> power > 1640 W EIRP <u>building-mounted antennas</u> : power > 1640 W EIRP
Paging and Radiotelephone Service (subpart E of part 22)	<u>non-building-mounted antennas</u> : height above ground level to lowest point of antenna < 10 m <u>and</u> power > 1000 W ERP (1640 W EIRP) <u>building-mounted antennas</u> : power > 1000 W ERP (1640 W EIRP)
Cellular Radiotelephone Service (subpart H of part 22)	<u>non-building-mounted antennas</u> : height above ground level to lowest point of antenna < 10 m <u>and</u> total power of all channels > 1000 W ERP (1640 W EIRP) <u>building-mounted antennas</u> : total power of all channels > 1000 W ERP (1640 W EIRP)

TABLE 1 (cont.)

SERVICE (TITLE 47 CFR RULE PART)	EVALUATION REQUIRED IF:
<p>Personal Communications Services (part 24)</p>	<p>(1) Narrowband PCS (subpart D): <u>non-building-mounted antennas</u>: height above ground level to lowest point of antenna < 10 m <u>and</u> total power of all channels > 1000 W ERP (1640 W EIRP) <u>building-mounted antennas</u>: total power of all channels > 1000 W ERP (1640 W EIRP)</p> <p>(2) Broadband PCS (subpart E): <u>non-building-mounted antennas</u>: height above ground level to lowest point of antenna < 10 m <u>and</u> total power of all channels > 2000 W ERP (3280 W EIRP) <u>building-mounted antennas</u>: total power of all channels > 2000 W ERP (3280 W EIRP)</p>
<p>Satellite Communications (part 25)</p>	<p>all included</p>
<p>General Wireless Communications Service (part 26)</p>	<p>total power of all channels > 1640 W EIRP</p>
<p>Wireless Communications Service (part 27)</p>	<p>total power of all channels > 1640 W EIRP</p>
<p>Radio Broadcast Services (part 73)</p>	<p>all included</p>

TABLE 1 (cont.)

SERVICE (TITLE 47 CFR RULE PART)	EVALUATION REQUIRED IF:
<p>Experimental, auxiliary, and special broadcast and other program distributional services (part 74)</p>	<p>subparts A, G, L: power > 100 W ERP subpart I: <u>non-building-mounted antennas</u>: height above ground level to lowest point of antenna < 10 m <u>and</u> power > 1640 W EIRP <u>building-mounted antennas</u>: power > 1640 W EIRP</p>
<p>Stations in the Maritime Services (part 80)</p>	<p>ship earth stations only</p>
<p>Private Land Mobile Radio Services Paging Operations (part 90)</p>	<p><u>non-building-mounted antennas</u>: height above ground level to lowest point of antenna < 10 m <u>and</u> power > 1000 W ERP (1640 W EIRP) <u>building-mounted antennas</u>: power > 1000 W ERP (1640 W EIRP)</p>
<p>Private Land Mobile Radio Services Specialized Mobile Radio (part 90)</p>	<p><u>non-building-mounted antennas</u>: height above ground level to lowest point of antenna < 10 m <u>and</u> total power of all channels > 1000 W ERP (1640 W EIRP) <u>building-mounted antennas</u>: total power of all channels > 1000 W ERP (1640 W EIRP)</p>

TABLE 1 (cont.)

SERVICE (TITLE 47 CFR RULE PART)	EVALUATION REQUIRED IF:
<p>Amateur Radio Service (part 97)</p>	<p>transmitter output power > levels specified in § 97.13(c)(1) of this chapter</p>
<p>Local Multipoint Distribution Service (subpart L of part 101)</p>	<p><u>non-building-mounted antennas</u>: height above ground level to lowest point of antenna < 10 m <u>and</u> power > 1640 W EIRP <u>building-mounted antennas</u>: power > 1640 W EIRP</p> <p>LMDS licensees are required to attach a label to subscriber transceiver antennas that: (1) provides adequate notice regarding potential radiofrequency safety hazards, <i>e.g.</i>, information regarding the safe minimum separation distance required between users and transceiver antennas; and (2) references the applicable FCC-adopted limits for radiofrequency exposure specified in § 1.1310 of this chapter.</p>

APPENDIX B

*Estimated "Worst Case" Distances that Should be Maintained from
Single Cellular, PCS, and Paging Base Station Antennas*

Table B1-1. Estimated "worst case" horizontal* distances that should be maintained from a single, omni-directional, **cellular base-station** antenna to meet FCC RF exposure guidelines

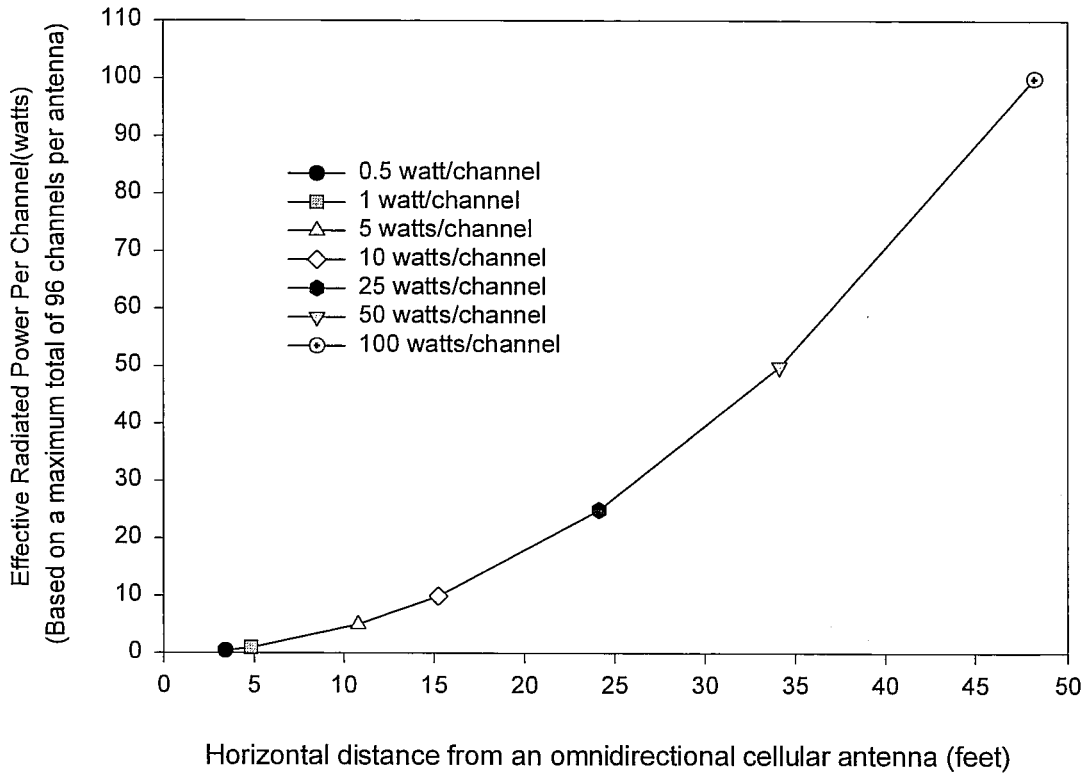
Effective Radiated Power (watts) per channel based on maximum total of 96 channels per antenna	Effective Isotropic Radiated Power (watts) per channel based on a maximum total of 96 channels per antenna	Horizontal* distance (feet) that should be maintained from a single omni-directional cellular antenna
0.5	0.82	3.4
1	1.6	4.8
5	8.2	10.8
10	16.4	15.2
25	41	24.1
50	82	34.1
100	164	48.2

For intermediate values not shown on this table, please refer to the Figure B1-1

*These distances are based on exposure at same level as the antenna, for example, on a rooftop or in a building directly across from and at the same height as the antenna.

Note: These estimates are worst case, assuming an omnidirectional antenna using 96 channels. If the systems are using fewer channels, the actual horizontal distances that must be maintained will be less. Cellular omnidirectional antennas transmit more or less equally from the antenna in all horizontal directions and transmit relatively little energy directly toward the ground. Therefore, these distances are even more conservative for “non-horizontal” distances, for example, distances directly below an antenna.

Figure B1-1. Estimated "worst case" horizontal* distances that should be maintained from a single omni-directional **cellular base station** antenna to meet FCC RF exposure guidelines



* These distances are based on exposure at same level as antenna, for example, on a rooftop or in a building directly across from and at the same height as the antenna.

Note: These estimates are worst case, assuming an omnidirectional antenna using 96 channels. If the systems are using fewer channels, the actual horizontal distances that must be maintained will be less. Cellular omnidirectional antennas transmit more or less equally from the antenna in all horizontal directions and transmit relatively little energy directly toward the ground.

Table B1-2. Estimated "worst case" horizontal* distances that should be maintained from a single, sectorized, **cellular base-station** antenna to meet FCC RF exposure guidelines

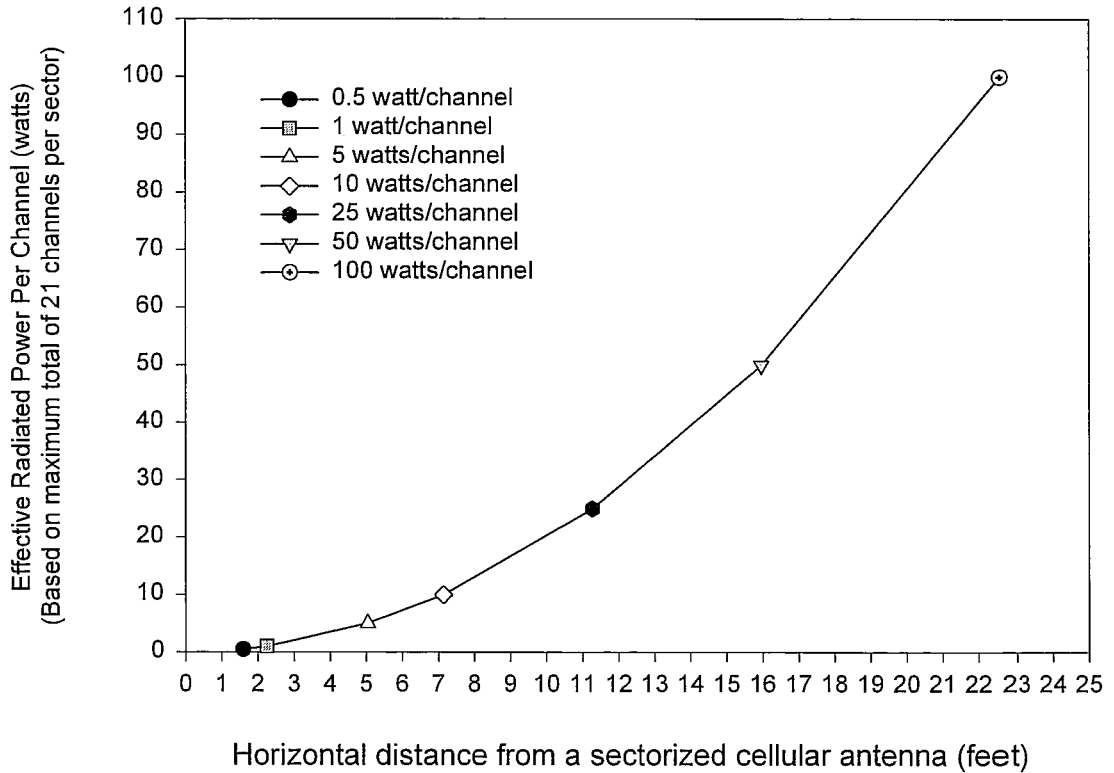
Effective Radiated Power (watts) per channel based on maximum total of 21 channels per sector	Effective Isotropic Radiated Power (watts) per channel based on maximum total of 21 channels per sector	Horizontal* distance (feet) that should be maintained from a single sectorized cellular antenna
0.5	0.82	1.6
1	1.6	2.3
5	8.2	5
10	16.4	7.1
25	41	11.3
50	82	16
100	164	22.6

For intermediate values not shown on this table, please refer to the Figure B1-2

*These distances are based on exposure at same level as the antenna, for example, on a rooftop or in a building directly across from and at the same height as the antenna.

Note: These estimates are "worst case," assuming a sectorized antenna using 21 channels. If the systems are using fewer channels, the actual horizontal distances that must be maintained will be less. Cellular sectorized antennas transmit more or less in one direction from the antenna in a horizontal direction and transmit relatively little energy directly toward the ground. Therefore, these distances are even more conservative for "non-horizontal" distances, for example, distances directly below an antenna.

Figure B1-2. Estimated "worst case" horizontal* distances that should be maintained from a single sectorized, **cellular base station** antenna to meet FCC RF exposure guidelines



* These distances are based on exposure at same level as antenna, for example, on a rooftop or in a building directly across from and at the same height as the antenna.

Note: These estimates are "worst case", assuming a sectorized antenna using 21 channels. If the systems are using fewer channels, the actual horizontal distances that must be maintained will be less. Cellular sectorized antennas transmit more or less in one direction from the antenna in a horizontal direction and transmit relatively little energy directly toward the ground.

Table B1-3. Estimated "worst case" horizontal* distances that should be maintained from a single sectorized **Broadband PCS base station** antenna to meet FCC RF exposure guidelines

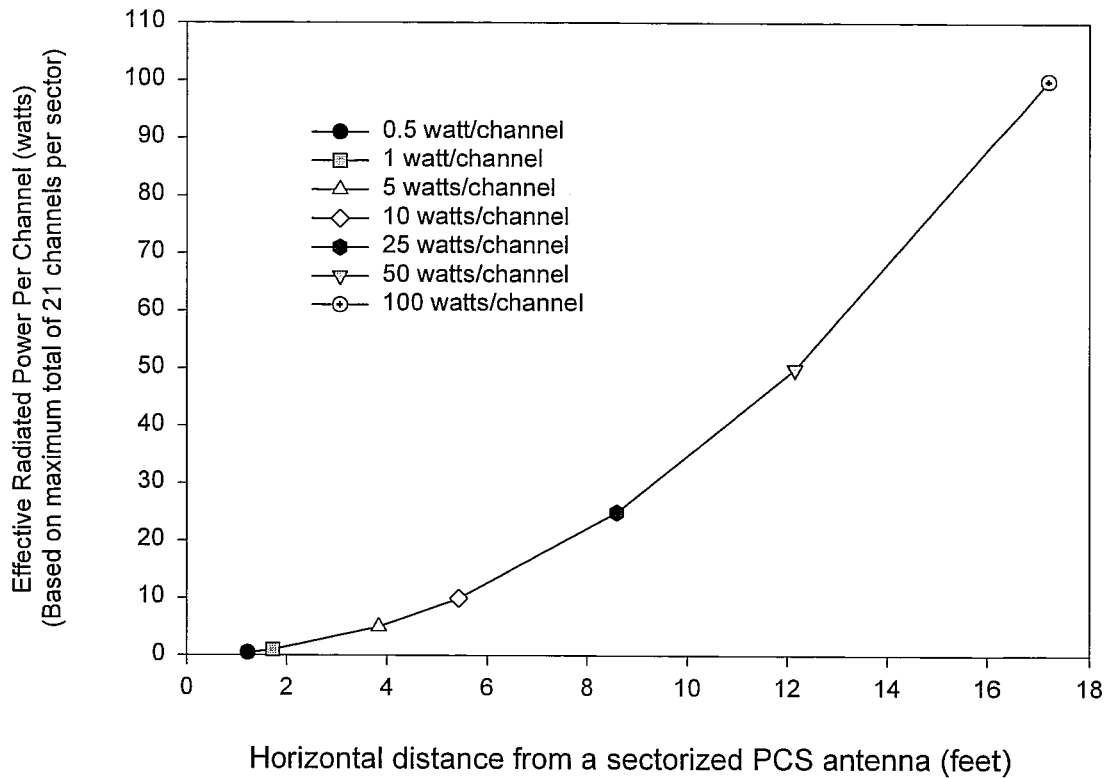
Effective Radiated Power (watts) per channel based on maximum total of 21 channels per sector	Effective Isotropic Radiated Power (watts) per channel based on maximum total of 21 channels per sector	Horizontal* distance (feet) that should be maintained from a single sectorized Broadband PCS antenna
0.5	0.82	1.2
1	1.6	1.7
5	8.2	3.8
10	16.4	5.4
25	41	8.6
50	82	12.1
100	164	17.2

For intermediate values not shown on this table, please refer to the Figure B1-3

*These distances are based on exposure at same level as the antenna, for example, on a rooftop or in a building directly across from and at the same height as the antenna.

Note: These estimates are "worst case," assuming a sectorized antenna using 21 channels. If the system is using fewer than 21 channels, the actual horizontal distances that must be maintained will be less. PCS sectorized antennas transmit more or less in one direction from the antenna in a horizontal direction and transmit relatively little energy directly toward the ground. Therefore, these distances are even more conservative for "non-horizontal" distances, for example, distances directly below an antenna.

Figure B1-3. Estimated "worst case" horizontal* distances that should be maintained from a single sectorized, PCS base station antenna to meet FCC RF exposure guidelines



* These distances are based on exposure at same level as antenna, for example, on a rooftop or in a building directly across from and at the same height as the antenna.

Note: These estimates are "worst case", assuming a sectorized antenna using 21 channels. If the systems are using fewer channels, the actual horizontal distances that must be maintained will be less. PCS sectorized antennas transmit more or less in one direction from the antenna in a horizontal direction and transmit relatively little energy directly toward the ground.

Table B1-4. Estimated "worst case" horizontal* distances that should be maintained from a single omnidirectional **paging** or **narrowband PCS** antenna to meet FCC RF exposure guidelines. Note: this table and the associated figure only apply to the 900-940 MHz band; paging antennas at other frequencies are subject to different values.

Effective Radiated Power (watts) based on one channel per antenna	Effective Isotropic Radiated Power (watts)	Horizontal* distance (feet) that should be maintained from a single omnidirectional paging or narrowband PCS antenna
50	82	3.4
100	164	4.8
250	410	7.5
500	820	10.6
1,000	1,640	15.1
2,000	3,280	21.3
3,500	5,740	28.2

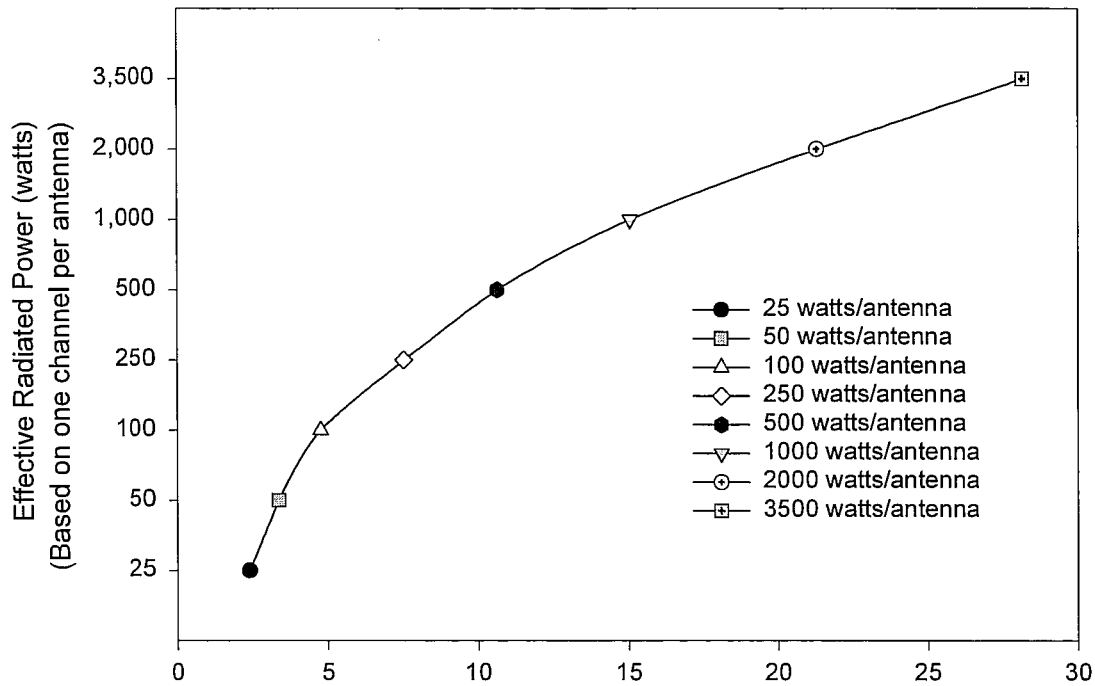
For intermediate values not shown on this table, please refer to the Figure B1-4

*These distances are based on exposure at same level as the antenna, for example, on a rooftop or in a building directly across from and at the same height as the antenna.

Note: These distances assume only one frequency (channel) per antenna. Distances would be greater if more than one channel is used per antenna. Omnidirectional paging and narrowband PCS antennas transmit more or less equally from the antenna in all horizontal directions and transmit relatively little energy toward the ground. Therefore, these distances are even more conservative for "non-horizontal" distances, for example, distances directly below an antenna.

Figure B1-4. Estimated "worst case" horizontal* distances that should be maintained from a single omnidirectional **paging** or **narrowband PCS** antenna to meet FCC RF exposure guidelines.

Note: this figure and the associated table only apply to the 900-940 MHz band; paging antennas at other frequencies are subject to different values



Horizontal distance from an omnidirectional paging or narrowband PCS antenna (feet)

* These distances are based on exposure at the same level as the antenna, for example, on a rooftop or building directly across from and at the same height as the antenna.

Note: These distances assume only one frequency (channel) per antenna. Distances would be greater if more than one channel is used per antenna. Omnidirectional paging and narrowband PCS antennas transmit more or less equally from the antenna in all horizontal directions and transmit relatively little energy towards the ground.

APPENDIX C

Text of 47 U.S.C. § 332(c)(7)

(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 and 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 instrumentality thereof to deny a request to 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, or 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 service 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)).

EXHIBIT 3

“A Practical Guide to Radio Frequency Emissions Safety”
(Cal. Bar. Pub. Law J.) (10 pages)

JOURNAL

PUBLIC LAW

Journal

Vol. 32, No. 3
Summer
2009

An Official Publication of the State Bar of California Public Law Section

Printed at TeleconLaw.com with permission from the Public Law Section

Inside this Issue

A Message from the Chair
By Leslie M. Gallagher Page 3

MCLE Self-Assessment Test
Page 8

*Conditioning Conversations:
Mobile Home Parks, the Map
Act, and El Dorado v. the City
of Palm Springs*
By Leah Castella & Laura Kennedy Page 9

*Municipal Bankruptcy
Hot Issues*
By Frank C. Adams, Dennis Beanson, &
Michael Thomas Page 13

**A Practical Guide to Radio
Frequency Emissions Safety**
By Jonathan L. Kramer, Esq. Page 16

*Cost Effectiveness Of
Paralegals' Crucial In Delivery
Of Services To The
Underserved And
Through Legal Aid Enterprises*
By Thomas F. Herlick Page 21

Section Focus Page 24

*Litigation &
Case Law Updates*
By Inga Linvald &
Richard C. Misch Page 25



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A Practical Guide to Radio Frequency Emissions Safety

By Jonathan L. Kramer, Esq.*

There is perhaps no hotter “hot button” in wireless siting matters today than the public’s perceptions regarding radio frequency (“RF”) emissions, and their concerns that those emissions may cause health problems. One need only perform an Internet search on the phrase “Cell Tower Emissions” to find tens of thousands of references to alleged health dangers attributed to wireless sites.

This paper addresses the practical issues surrounding how state and local governments (jointly for convenience, “local governments”) can maneuver through the federal legal requirements regarding RF emissions safety, and how to effectively and legally deal with RF safety matters and concerns in the planning context.

We start with a review of the legal issues underlying RF emissions safety regulation in the United States. Then we will explore what local governments may legally do in assessing RF safety compliance with the controlling regulations, and crafting appropriate permit conditions for wireless site approvals. Finally, we will conclude with a practical discussion of how to effectively deal with the RF safety issue before local government zoning bodies, typically zoning boards, commissions, and elected officials.

I. FEDERAL AND STATE LAW REGULATIONS REGARDING RF EMISSIONS

A. THE TELECOMMUNICATIONS ACT OF 1996

The Telecommunications Act of 1996 (the “Telecom Act”) was signed into law by President Clinton on February 8, 1996. One of the many purposes of the Telecom Act was to clearly delegate to the FCC national authority to set radio frequency emission standards,¹ and to prohibit any local government from “regulat[ing] 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.”² This type of very broad regulation is sometimes called “field preemption” because Congress has preempted the entire field of state and local government regulation in this area of law.

Congress crafted the first part of the Telecom Act RF emissions rule to make clear its intention that local governments shall *not* establish RF emissions regulations; that job belongs to the FCC. At the same time, however, in the last part of the rule Congress made it equally clear that local governments are delegated a proper role in determining *compliance* with the national RF safety regulations developed by the FCC. While some wireless carriers (and even some governments) take the position that governments are prohibited from addressing or even discussing RF emissions safety matters in planning cases, they are incorrect.⁴

B. THE FCC RF SAFETY RULES

The FCC’s rules regarding RF emissions safety, developed in response to the Congressional mandate, were adopted in 1997. They have been clarified in several FCC rulemakings.⁵ The FCC RF safety rules are found at 47 C.F.R. § 1.1310, *et seq.*, but are most conveniently grouped and discussed in the Commission’s Office of Engineering and Technology Bulletin 65, titled “Evaluating Compliance With FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields” Edition 97-01, August 1997⁶ (hereinafter “Bulletin 65”).⁷

Simply put, because of Congressional field preemption and designation of the FCC as the sole source of RF safety standards in the U.S., a local government cannot legally establish any RF safety standards or even adopt the FCC standards as its own, but local governments may legally determine whether a wireless project demonstrates planned compliance with the requirements in 47 C.F.R. § 1.1310, *et seq.*, and Bulletin 65.⁸ As will be discussed below, determining planned compliance with the RF emissions safety rules may be as simple as the wireless applicant filling out an easy-to-

complete two-page form published by the FCC specifically for this purpose.

If a local government steps beyond just verifying compliance with the FCC rules and thus contravenes the anti local regulation prohibition of the Telecom Act regarding RF emissions, Congress authorizes an aggrieved party—usually a wireless carrier—to directly petition the FCC for relief.⁹ Alternatively, Congress allows the same claim to be filed in a district court, which will hear and decide the matter on an expedited basis.¹⁰

C. CALIFORNIA GOVERNMENT CODE SECTION 65850.6(F)

In 2006, a major wireless carrier sponsored a wireless facilities siting bill in the California Senate (SB 1627, introduced by Sen. Kehoe, D-San Diego). One of the independent provisions of the legislation was to add California Government Code Section 65850.6(f) affirming that local governments in this state may consider RF emissions in connection with proposed wireless sites. The Government Code section says,

“With respect to the consideration of the environmental effects of radio frequency emissions, the review by the city or county shall be limited to that authorized by Section 332(c)(7) of Title 47 of the United States Code, or as that section may be hereafter amended.”¹¹

While § 65850.6(f) may be framed as a restriction, its effect is to confirm at the state level that a local government may review proposed RF emissions for compliance with the FCC rules.¹²

II. BULLETIN 65: RF SAFETY RULES EXPLAINED

A. TRANSMITTED FREQUENCY AND CLASS STATUS

In setting RF exposure limits, the Commission first considers the transmitted

frequency in its RF safety rules. This is because humans absorb RF emissions differently at different frequencies due to the fact that human bodies are largely composed of water.

Second, and less obvious, is that the FCC also considers the *status* of the person exposed to RF emissions in crafting its exposure limits. The FCC RF exposure limits are grouped into two categories: "General Population/Uncontrolled" and "Occupational/Controlled." General Population/Uncontrolled¹³ exposure limits protect persons who are *not* members of the very small Occupational/Controlled class.

General Population members include anyone not trained in RF emissions and who cannot exert control over his or her exposure to RF emissions. This would include every person living around or traveling by a proposed wireless site, and even wireless site trespassers.¹⁴

Members of the Occupational/Controlled class¹⁵ include only those persons who, by virtue of their employment and training, are in a position to exert control over their exposure to particular RF emissions. Usually only the radio frequency engineers and technicians of the particular wireless carrier servicing its own radio site will be in the Occupational/Controlled class.¹⁶

The FCC's most conservative RF emissions rules cover and protect members of the General Population class. The General Population/Uncontrolled standard is *five times* as strict as the Occupational/Controlled standard. This will be graphically illustrated in the following section.

B. TIME LENGTH OF ALLOWABLE RF EMISSIONS EXPOSURE

The FCC's RF emissions safety rules do *not* set hard numerical emissions *time limits* for either the General Population or Occupational classes. Instead, the rules are crafted to describe objective and measurable emissions exposure to protect the General Population and Occupational members, and the exposure is also assessed using a time averaging factor.

For the General Population, RF exposure is averaged over a 30-minute period at 100% of the emissions specified in the FCC rules. Because of time averaging, it is permissible for a member of the General Population to be exposed to 200% of the General Population limit for 15 minutes; 400% of the General Population limit for 7½ minutes, and so on.¹⁷ Occupational class members have the same exposure time averaging, but with different exposure levels and time limits.¹⁸

C. EXCEEDING THE GENERAL POPULATION/UNCONTROLLED EXPOSURE LIMIT

In some cases, a wireless siting project may by necessity be designed in a manner where the RF emissions will exceed the basic General Population exposure levels. Exceeding these pre-identified levels do *not* mean that the project will 'violate' the FCC rules, thus justifying project denial by the government.¹⁹ Rather, Section 4 of Bulletin 65 ("Controlling Exposure to RF Fields") provides various ways to handle this planning quandary. In this situation, planners will often turn to an expert radio frequency advisor to craft proper project conditions to ensure compliance with Bulletin 65.

III. FCC RULES FOR RF EMISSIONS SAFETY: GOOD ENOUGH TO FOLLOW?

A topic often raised by members of the public, and increasingly by some governments, is whether the FCC's RF emissions safety rules are sufficient to protect health today and over the long term. There are two basic responses to that inquiry; one is to examine how the FCC rules were developed, and the other is a discussion of law.

A. HOW THE FCC RF EMISSIONS SAFETY RULES WERE DEVELOPED

The FCC's original RF emissions rules, currently found at 47 C.F.R. § 1.1301 *et seq.*,²⁰ were developed to comply with the "[t]he National Environmental Policy Act of 1969 (NEPA) [which] requires agencies of the Federal Government to evaluate the effects of their actions on the quality of the human environment."²¹ To implement NEPA²² the Commission adopted RF safety rules in December, 1974.²³ In Bulletin 65, the Commission notes that its maximum permissible exposure ("MPE")

"...limits are based on exposure limits recommended by the National Council on Radiation Protection and Measurements (NCRP) and, over a wide range of frequencies, the exposure limits developed by the Institute of Electrical and Electronics Engineers, Inc. (IEEE) and adopted by the American National Standards Institute (ANSI) to replace the 1982 ANSI guidelines. Limits for localized absorption are based on recommendations of both ANSI/IEEE and NCRP.

The FCC's new guidelines are summarized in Appendix A [to Bulletin 65].

"In reaching its decision on adopting new guidelines the Commission carefully considered the large number of comments submitted in its rule-making proceeding, and particularly those submitted by the U.S. Environmental Protection Agency (EPA), the Food and Drug Administration (FDA) and other federal health and safety agencies. The new guidelines are based substantially on the recommendations of those agencies, and it is the Commission's belief that they represent a consensus view of the federal agencies responsible for matters relating to public safety and health.

"The FCC's limits, and the NCRP and ANSI/IEEE limits on which they are based, are derived from exposure criteria quantified in terms of specific absorption rate (SAR). The basis for these limits is a whole-body averaged SAR threshold level of 4 watts per kilogram (4 W/kg), as averaged over the entire mass of the body, above which expert organizations have determined that potentially hazardous exposures may occur. The new MPE limits are derived by incorporating safety factors that lead, in some cases, to limits that are more conservative than the limits originally adopted by the FCC in 1985. Where more conservative limits exist they do not arise from a fundamental change in the RF safety criteria for whole-body averaged SAR, but from a precautionary desire to protect subgroups of the general population who, potentially, may be more at risk.

"The new FCC exposure limits are also based on data showing that the human body absorbs RF energy at some frequencies more efficiently than at others...."²⁴

The FCC's multi-faceted approach to regulating exposure by frequency (based on signal absorption in the human body), and exposure by status (General Population versus Occupational), are illustrated by the following chart, Figure 1.²⁵

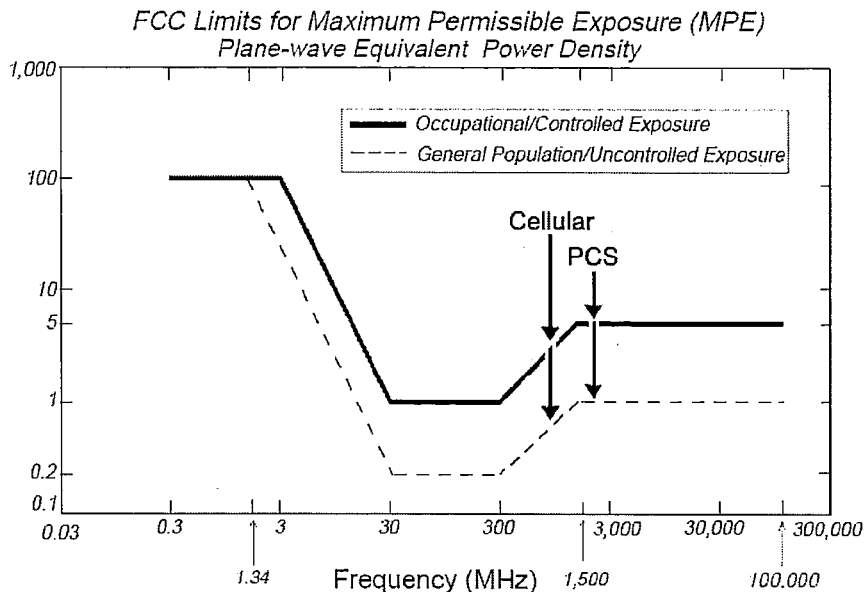


Figure 1. Note that this chart above uses logarithmic scales on both axes.

While some members of the public may believe that the development of the FCC’s RF emissions safety rules was an industry-controlled process, the Commission’s open, broad-based, and science-supported rules development process is a matter of public record.

B. FEDERAL PREEMPTION REQUIRES LOCAL GOVERNMENTS TO FOLLOW THE FCC RF EMISSIONS SAFETY STANDARDS

The second consideration regarding the sufficiency of the FCC rules is purely legal. As noted above, Congress delegated the sole national authority to the FCC to set these RF emissions safety rules. It is, therefore, not legally relevant that various lay and even some expert commenters suggest that the FCC’s rules are inadequate, or that the RF emissions safety standards adopted by other countries are better than those established by the FCC.

Because of the field preemption already discussed, in the United States local governments may only look to the FCC’s rules as the standards that must, by federal law, be applied in local government reviews of wireless applications.²⁶

Succinctly put, local governments look to the FCC RF emissions safety rules in 47 C.F.R. § 1.1301, *et seq.*, as described in Bulletin 65—and only those FCC sources—when considering government permitting actions connected with a wireless siting project. To look beyond those FCC rules is an

invitation to have a denial heard in federal court on an expedited basis, or before the FCC, and potentially to find the local government ordered to grant the permit sought by the wireless applicant.

IV. PRACTICE GUIDANCE TO EFFECTIVELY DEAL WITH RF EMISSIONS SAFETY MATTERS IN THE PERMITTING SETTING

A. THE FCC RF EMISSIONS SAFETY RULES EXPLAINED TO LOCAL GOVERNMENTS OFFICIALS

To effectively deal with the RF emissions questions that may be raised in the planning setting, planners and their attorneys must have a good grasp of the FCC rules, and their application in local zoning cases. Utilizing the text of the tome that is Bulletin 65, which contains a dense set of technically detailed explanations of the rules and their application, is daunting for non-engineers.

Bulletin 65 is so densely packed with RF engineering considerations required to assess planned and actual compliance with the rules that the Commission in 2000 released what might be called a near-English translation titled, “A Local Government Official’s Guide to Transmitting Antenna RF Emission Safety: Rules, Procedures, and Practical Guidance” (the “LSGAC Guide”).^{27, 28} As the Commission says on its web site, “The LSGAC and the FCC have developed this guide to aid local governmental officials and citizens in understanding safety issues related to radio-frequency emissions from telecommunications towers.”

The LSGAC Guide is available for downloading directly from the FCC at <http://www.fcc.gov/oet/rfsafety/>.

B. WIRELESS SITING APPLICATIONS AND RF EMISSIONS DISCLOSURE

Most wireless projects begin their life within the government planning setting with an application submittal by a wireless provider. That application process sets the table for the information that a local government initially solicits from the applicant. This is a vital part of the information called “substantial evidence”²⁹ in the “written record”³⁰ that a court can review if a project is denied, to see if the record supports the denial.

With regard to determining whether a wireless project will comply with the FCC RF emissions safety rules, in many cases this can easily be determined by directing the applicant to complete and submit the two-page form found in the LSGAC Guide at Appendix A. That simple form will in most cases disclose whether a wireless project plans to comply with the FCC RF emissions safety rules through what is called “categorical exclusion.” Projects that are categorically excluded usually incorporate certain technical and physical considerations that ensure that at ground level the RF exposure does not exceed the uncontrolled general population limits in the FCC rules.³¹

If the Appendix A form discloses that the site is not categorically excluded under the Commission’s rules, then a deeper and more formal evaluation of RF emissions safety planning is reasonable and appropriate, and should be called for by the government to ensure that the FCC regulations are met by means described in Bulletin 65.

In addition to using the LSGAC Guide Appendix A form, evaluation of the proposed RF emissions against the thresholds listed in Bulletin 65 Table 2 provides a handy way to determine whether a detailed RF emissions safety evaluation is required.

In lieu of the LSGAC Appendix A form, the local government planner may receive wireless carrier-developed forms, tables, and graphs to show planned compliance with the Bulletin 65 rules. In the case of higher power sites, or sites that are constructed where members of the general population may have occasion to pass in front of the antenna(s), a wireless carrier may employ an RF expert to provide a third-party opinion regarding RF emissions safety matters. In both cases, it may be necessary for the government planning agency

to select and retain its own RF emissions safety expert to review and interpret the carrier's documents and compliance assertions. It is common for the carrier to bear the reasonable cost of the government's expert, and many government planning codes provide for reimbursement for experts where the required skill set (i.e., RF emissions expertise) is not already available within the planning agency.

C. WIRELESS PROJECT REVIEWS BY LOCAL GOVERNMENTS AND THEIR THIRD-PARTY EXPERTS

In the nearly two decades that the author has been working with local governments evaluating wireless siting applications, one factor has emerged above all others in determining whether a government will be successful in planning wireless sites. The governments most successful in planning and permitting in this technically-challenging area share the common thread of having one or several planners on staff who are responsible for processing all of the wireless applications received by that agency. In this highly specialized and constantly evolving area of planning (and judicial and FCC rulings), those planners who regularly process wireless applications become the local experts. Experienced planners will guide wireless applicants through the local government process, identifying through experience what projects will most likely be approved with the least resistance, and which projects will face hurdles that may be overcome with simple plan modifications at an early stage.

The wireless industry most treasures any way of reducing "time-to-market" (the time from submitting an application to project approval and site activation of the new wireless site). Pragmatically, knowledgeable applicants will solicit the advice of their government project planner early and frequently through the process, and will make reasonable efforts to meet the planner at least half way, even when that means expending some up-front capital for aesthetic and technical changes to a proposed design.

The experienced government planner (and planners that have access to experts) will already know how to deal with most RF emissions safety questions that may come from the public or the government decision-makers. Dealing with those questions begins with proactively addressing them in the staff report.

D. STAFF REPORTS

The staff report to the decision-maker on a wireless project will tell the story of the project, from need to execution. Along the way, the

report should address in a clear and unambiguous manner how the applicant plans to comply with the FCC's RF emissions safety rules. Dealing with that question may be as simple as writing,

"Sec. X: Radio Frequency Emissions Safety Evaluation

"Congress has delegated national authority only to the FCC to set radio frequency safety standards in the United States. While Congress by law prohibits the Agency from setting our own RF emissions safety standards (or even adopting the FCC's as our own), Congress does permit the Agency to determine whether a proposed wireless project meets the required FCC Office of Engineering and Technology Bulletin 65 requirements for RF emissions safety.

"Staff [or our RF emissions safety expert] has received and reviewed XYZ Wireless's FCC LSGAC Guide Appendix A Form, attached as Exhibit 1 to this staff report. That form discloses that XYZ's proposed site will comply with the required FCC RF emissions safety standards because ... [insert, for example: the project proposed is a monopole and the lowest part of each transmitting antenna is at a height of at least 10 meters above ground level]. XYZ's wireless site provides for a design that ensures that RF emissions at ground level will not exceed the Bulletin 65 General Population/Uncontrolled emissions safety limit.

"Because the FCC form discloses that XYZ's site will comply with the Commission's RF emissions safety rules, staff has determined that no further inquiry is necessary or justified, and the Agency does not have a basis to deny or further condition the project because of concerns regarding RF emissions safety."

Of course, if the project is not categorically excluded and a more detailed RF safety analysis has been called for and evaluated, then the staff report should reflect the process, results, proposed conditions, and recommendations. Results and proposed conditions will usually be crafted with the assistance of the local government's RF emissions safety expert, and perhaps the local government's attorney or outside counsel.

A common permit condition for sites not categorically excluded by the FCC rules will be a requirement to place and maintain "RF

Notice" or "RF Warning" signs as referenced in Bulletin 65.³² Most carriers will notify the planner of the federally required need for that type of signage, so including signage requirements as a condition of approval is usually not an issue for a wireless site applicant. However, including those federal requirements as permit conditions will benefit a local government by allowing it to invoke the code compliance process to secure a timely resolution of a non-compliance by the wireless carrier permittee to avoid a permit revocation process.

Clearly, affirmatively and expertly addressing the issue of planned Bulletin 65 RF safety compliance in the staff report will help set the stage for the next step in the process, the public hearing.

Up to this point, the author has at no time used the dreaded term "radiation" save for a single mention in a quote above from Bulletin 65.³³ Industry and government speakers can substitute the equally accurate and less controversial term "emissions" for that other scary word. Avoidance of the unnecessary and potentially jarring use of the "R" word in discussions with the public and decision-makers, and within industry documents and staff reports, will help to focus the public discussion on FCC RF emissions safety compliance rather than perpetuate the perception of potential harm from the "R" word. If it is necessary to discuss RF emissions in greater detail, it is also accurate to describe wireless sites as transmitting "non-ionizing radio frequency emissions" from the antennas.³⁴

E. PUBLIC HEARINGS

In most jurisdictions, wireless projects (especially those in or immediately adjacent to residential areas) will be heard and decided at a public hearing. Depending on the local government's rules, there may be a single hearing officer, or a full panel of commissioners hearing the case. Yet, while every jurisdiction has its own rules about how wireless planning cases will be heard, there are many commonalities that can help us navigate this portion of the process.

The local government planner will usually introduce the project and describe it in overview terms to the decision-makers. Often the planner will reference or selectively read portions of the staff report, which the decision-makers and the public will most likely have already had an opportunity to review and digest.

It is at this stage, during the staff presentation, that it will be useful to discuss in some top-level detail the steps leading to the plan-

ner's determination regarding the applicant's planned compliance with the FCC RF emissions safety standards. Remember that staff did not need to use the "R" word in its report; the same holds true when the planner orally discusses the project during this presentation.

If decision-makers or the public use the "R" word, staff in response should simply use the term "radio frequency emissions" or "emissions." As appropriate, staff should remind the decision-makers that their authority is limited to reviewing the project for planned compliance with the FCC RF emissions safety rules, and to craft permit conditions to ensure that compliance.

Staff presentations are complete. The applicant has promoted the project. The public has had its chance to speak on the project. The applicant has offered its rebuttal and closing arguments in favor of the project. The decision-makers have closed the hearing and have discussed their views of the project. Finally, it is time for the decision-makers cast their vote. The project may be approved; sent back for additional consideration by staff; or denied. If the decision-makers vote to deny the project, or even to approve it with new conditions not be agreeable to the applicant,³⁵ what's next?

F. WRITTEN DECISIONS

The Telecom Act requires that a government's denial of a request to place, construct, or modify a personal wireless service facility be in writing and based on substantial evidence in a written record.³⁶ If the project will end up in a denial, it is most prudent to have the decision-makers cast their vote to deny the wireless project for reasons articulated at the hearing coupled with the directive to staff or the jurisdiction's attorney to bring back a written statement of the denial at the next meeting where the written denial is supported by substantial evidence in the written record and as discussed at the hearing. It is that written denial adopted, by the second and final vote of the same decision-makers, which will set out the legally sufficient reasons for the denial. It is that written decision of the final action which will be the one utilized by the wireless carrier seeking judicial or Commission review, so careful crafting is a must.

Although the language of the Telecom Act only requires that denials be in writing, it is possible that the decision makers will "approve" a project with conditions that the applicant will claim is tantamount to a denial. This is especially likely when conditions are added "on the fly" and sometimes inarticulately by the decision makers in the last moments of a contentious hours-long hearing. To deflect a potential claim

by an aggrieved applicant that the approval was really a cloaked denial, consider reducing the approval to writing, based on substantial evidence in a written record, and bringing that written approval back for a final vote at the next meeting of the decision makers. The drafting standards for this approval should mirror those for an outright denial for the obvious reasons.

It should now be apparent why developing the detailed written record regarding the wireless project from the onset is critical, why the collection of evidence during the planning stages is vital, and how the substantial evidence rule can come into play at the end of the process if the government's decision results in a project denial or even an approval.

G. "E" IS (ALSO) FOR "END GAME"

Congress's stated goal for the Telecom Act is "to promote competition and reduce regulation in order to secure lower prices and higher quality services for American telecommunications consumers and encourage the rapid deployment of new telecommunications technologies."³⁷ There are few who could successfully argue that Congressional intent has not been realized in varying degrees through the implementation of the Act resulting in more choices for telecom services at lower rates.

For local governments, the goal and obligation are to balance and respect the various requirements of the Telecom Act, especially as it relates to RF emissions safety, and to reach a decision that is based on zoning considerations, and planned compliance with the FCC rules as demonstrated by substantial evidence provided by the wireless carrier applicant (and sometimes independently evaluated by the government or its consultant).

For the wireless carriers, the goal and obligation are to ensure that they provide and disclose the RF emissions safety data to the local government planning agency in a meaningful manner, going beyond weightless statements such as "XYZ's project is designed to comply with all applicable rules and regulations."

Congress and the FCC have designed the laws and regulations to bring order to the RF emissions safety process. The Commission has given local governments and wireless carriers all of the tools needed to reach legal and rational decisions in this often-controversial subject area. It is up to all of the parties to cooperatively work to meet the goals of the Telecom Act within the RF emissions safety framework created by the FCC.

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This paper is a substantial California-specific expansion of a chapter written by the author for the National Association of Telecommunications Officers and Advisors (NATOA) e-publication, "Local Government Official's eGuide to Facilities Siting" available at <http://natoa.org> (last visited July 20, 2009).

The author wishes to acknowledge and thank Javan Rad, Esq., Assistant City Attorney for the City of Pasadena, California, and Robert Jystad, Esq. of the Channel Law Group for their careful and thoughtful review of and comments benefiting the utility of this paper.

ENDNOTES

1. Pub. L. No. 104-104, 110 Stat. 56 (codified as enacted and amended in scattered sections of 15 U.S.C., 18 U.S.C. and 47 U.S.C.).
2. "Within 180 days after the enactment of [the Telecom] 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." Sec. 704(b) of the Telecommunications Act of 1996, Pub. Law 104-104, 110 Stat. 56 (1996)
3. 47 U.S.C. §332 (C)(7)(B)(iv).
4. "... because the FCC has not mandated any procedure by which localities must determine compliance with its requirements, there can be no serious dispute but that the Town may require applicants to submit information pertaining to RF emissions in order to determine whether the FCC standards are met, i.e., it may require more than a statement of compliance." *New York SMSA Ltd. Partnership v. Town of Clarkstown*, 603 F. Supp. 2d 715, 730 (S.D.N.Y. 2009).

* Jonathan L. Kramer, Esq. is the principal of Kramer Telecom Law Firm, P.C. located in Los Angeles. He is a radio frequency engineer and telecommunications attorney. He has worked on behalf of local and state governments in the wireless siting and technology area for nearly 20 years. His firm's web sites are <http://TelecomLawFirm.com> and <http://CellularPCS.com>.

7. Note the inclusion of the word “Human” in the title of Bulletin 65, and referenced in the rules. The FCC only regulates human exposure to RF emissions. There are no federal government standards for RF emissions exposure to non-humans (e.g., fish, birds, or vegetation). It is highly unlikely that any state or local government will be successful in surviving a legal challenge if they attempt to regulate non-human radio frequency emissions. The likely claim will be that the regulation of non-human exposure to RF effectively also regulates human exposure, thus running afoul of the field preemption reserved to the FCC.
8. We talk about “planned compliance” with the FCC RF emissions safety rules because the wireless site under planning consideration has, in most cases, not yet been constructed.
9. 47 U.S.C. §332(c)(7)(B)(v) (“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.”) If the Commission finds that the petition has merit, it can order the state or local government to grant the permit sought by the wireless applicant.
10. Congress in §332(c)(7)(B)(v) does not limit RF emissions claims to be heard exclusively by the FCC. The courts are most frequently the venue of choice for the wireless industry because of the expedited hearing requirement in the same section which says, “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.” The RF emissions claim will typically be but one of several claims in a wireless provider’s complaint.
11. The complete citation should be to 47 U.S.C 332(c)(7)(iv) which says, “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.” Notice that this grant of State and local authority is also framed as a restriction.
12. Although Government Code § 65850.6 generally deals with collocation wireless sites, subsection (f) stands on its own and does not specifically reference or limit its application solely to wireless collocation sites.
13. The FCC’s definition in Bulletin 65 for this class is, “General population/uncontrolled exposure. For FCC purposes, applies to human exposure to RF fields when the general public is exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public always fall under this category when exposure is not employment-related.” Bulletin 65, pg. 3
14. Bulletin 65, pg. 78.
15. The FCC’s definition in Bulletin 65 for this class is, “Occupational/controlled exposure. For FCC purposes, applies to human exposure to RF fields when persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see definition above), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.” Bulletin 65, pg. 4.
16. The FCC’s differentiation between general population and occupational members is very strict and intentionally designed to protect the maximum number of people. Even the author, an RF emissions expert, is considered to be a member of the General Population under the FCC rules for virtually all wireless sites because of his inability to regulate his exposure at a particular wireless site not under his control.
17. Bulletin 65, pg. 10. As noted by the Commission, “It is important to note that

Endnotes continued from page 20

A Practical Guide to Radio Frequency Emissions Safety

5. For a more detailed analysis of RF safety evaluations, *see Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation*, 12 F.C.C.R 13494 (1997).
6. Bulletin 65, available at <http://www.fcc.gov/oet/rfsafety/> (last visited Feb. 5, 2009).

- for general population/uncontrolled exposures it is often not possible to control exposures to the extent that averaging times can be applied.”
18. *Id.* For the Occupational class, this exposure time limit is reduced to 6 minutes, but the permissible exposure is increased by a factor of 5 over that for the General Population. Five times the RF exposure for 1/5 of the time results in the same amount of exposure for both General Population and Occupational class members.
 19. Bulletin 65, pg. 11 says, in relevant part, “Another important point to remember concerning the FCC’s exposure guidelines is that they constitute exposure limits (not emission limits), and they are relevant only to locations that are accessible to workers or members of the public. Such access can be restricted or controlled by appropriate means such as the use of fences, warning signs, etc.....”
 20. See 47 C.F.R. § 1.1307 for Environmental Assessment rules.
 21. Bulletin 65, pg. 6
 22. National Environmental Policy Act of 1969, 42 U.S.C. § 4321, *et seq.*
 23. See 39 FR 34843 (Dec. 19, 1974).
 24. Bulletin 65, pgs. 7-8.
 25. Bulletin 65, pg. 68, Figure 1, annotated by the author to show the approximate locations of the cellular and PCS bands.
 26. It is worth noting that the author is unaware of any case challenging a private or public landlord’s right to set private RF emissions safety rules within the context of a lease contract or other legal right to use the landlord’s property. In a parallel case of field preemption by the FCC in the area of RF interference avoidance, the FCC fully preempts interference regulations by local governments in the zoning setting (See, “In the Matter of Petition of Cingular Wireless, LLC for a Declaratory Ruling that Provisions of the Anne Arundel County Zoning Ordinance Are Preempted as Impermissible Regulation of Radio Frequency Interference Reserved Exclusively to the Federal Communications Commission, *Memorandum Opinion and Order*”, 18 FCC Rcd. 13,126 (WTB: 2003)), but local governments may enter into lease agreements to achieve the same result when the government is the landlord (*Sprint Spectrum L.P. v. Mills*, 283 F.3d. 404 2d Cir. 2002)).
 27. The Guide was crafted by the FCC’s Local and State Government Advisory Committee chaired by well known local government telecommunications attorney and elected official Ken Fellman, Esq.
 28. By way of disclosure, the author of this paper co-authored, illustrated, and co-edited the LSGAC Guide for the Commission.
 29. “Judicial review under the substantial evidence standard, even at the summary judgment stage, is quite narrow and highly deferential to the local decision-making entity. [] The court is limited to reviewing only the administrative record to see if it contains substantial evidence to support the local board’s decision.” (Inline citation omitted) *T-Mobile Central, LLC v. Unified Government of Wyandotte County/Kansas City, Kan.*, 528 F. Supp. 2d 1128, 1131 (D. Kan. 2007).
 30. 47 U.S.C. § 332 (C)(7)(B)(iii). “Any decision by a State or local government or instrumentality thereof to deny a request to place, construct, or modify personal wireless service facilities shall be in writing and supported by substantial evidence contained in a written record.”
 31. “... categorical exclusions are *not* exclusions from *compliance* but, rather, exclusions from performing routine evaluations to demonstrate compliance.” (Bulletin 65, pg. 12) Categorical exclusion can be shown on the LSGAC Appendix A form if the wireless project is to be constructed on a free-standing antenna support (i.e., monopole, lattice tower, mono-tree, etc.) and the lowest portion of the transmitting antennas is at least 10 meters above ground level. Conversely, most wireless projects constructed on buildings will *not* be automatically deemed to be categorically excluded under the FCC rules even where the antennas are at least 10 meters above ground level.
 32. Bulletin 65 pg. 65 Reference [3] referring to American National Standards Institute (ANSI), “American National Standard Radio Frequency Radiation Hazard Warning Symbol,” ANSI C95.2. Various vendors sell these signs in English and other languages. One useful site for more information on RF signage is <http://rfsigns.com/placement.html> (no endorsement implied).
 33. In Section C(1), above.
 34. If in the rare case staff feels compelled to write on the subject on ionizing and non-ionizing radio frequency emissions from a proposed site, it is wise to have that portion of the report reviewed for accuracy by a qualified radiological health physicist, and to mention that review in the body of the staff report.
 35. Sometimes the decision-makers will “approve” a wireless project that it has substantially altered by conditions that a wireless carrier would argue amount to an effective denial. Where the project is altered and “approved” in this way, especially if the alteration occurs at the hearing, prudence calls for the decision to be reduced to writing, citing back to substantial evidence contained in a written record, and brought back to the decision makers at the next meeting for a final vote. This gives the government attorney time to properly craft the reasons for denial citing back to substantial evidence in the administrative record. The next section discusses this process in detail.
 36. 47 U.S.C. § 332 (C)(7)(B)(iii). “Any decision by a State or local government or instrumentality thereof to deny a request to place, construct, or modify personal wireless service facilities shall be in writing and supported by substantial evidence contained in a written record.”
 37. Preamble to Pub. L. No. 104-104. The reader is left to his or her own conclusions as to whether some or all of the stated goals have become reality.



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EXHIBIT 4

Hammett & Edison Radio Frequency Emissions Report
dated August 10, 2012 (revision to May 2, 2012 report)
(7 pages)

**Verizon Wireless • Proposed Base Station (Site No. 115535 “Montecito RELO”)
512 Santa Angela Lane • Montecito, California**

Statement of Hammett & Edison, Inc., Consulting Engineers

The firm of Hammett & Edison, Inc., Consulting Engineers, has been retained on behalf of Verizon Wireless, a personal wireless telecommunications carrier, to evaluate the base station (Site No. 115535 “Montecito RELO”) proposed to be located at 512 Santa Angela Lane in Montecito, California, for compliance with appropriate guidelines limiting human exposure to radio frequency (“RF”) electromagnetic fields.

Executive Summary

Verizon proposes to install directional panel antennas above the roof of the single-story telephone switch building located at 512 Santa Angela Lane in Montecito. The proposed operation will, together with the existing base station at the site, comply with the FCC guidelines limiting public exposure to RF energy.

Prevailing Exposure Standards

The U.S. Congress requires that the Federal Communications Commission (“FCC”) evaluate its actions for possible significant impact on the environment. A summary of the FCC’s exposure limits is shown in Figure 1. These limits apply for continuous exposures and are intended to provide a prudent margin of safety for all persons, regardless of age, gender, size, or health. The most restrictive FCC limit for exposures of unlimited duration to radio frequency energy for several personal wireless services are as follows:

Wireless Service	Frequency Band	Occupational Limit	Public Limit
Microwave (Point-to-Point)	5,000–80,000 MHz	5.00 mW/cm ²	1.00 mW/cm ²
BRS (Broadband Radio)	2,600	5.00	1.00
AWS (Advanced Wireless)	2,100	5.00	1.00
PCS (Personal Communication)	1,950	5.00	1.00
Cellular	870	2.90	0.58
SMR (Specialized Mobile Radio)	855	2.85	0.57
700 MHz	700	2.40	0.48
[most restrictive frequency range]	30–300	1.00	0.20

General Facility Requirements

Base stations typically consist of two distinct parts: the electronic transceivers (also called “radios” or “channels”) that are connected to the traditional wired telephone lines, and the passive antennas that send the wireless signals created by the radios out to be received by individual subscriber units. The transceivers are often located at ground level and are connected to the antennas by coaxial cables. A small antenna for reception of GPS signals is also required, mounted with a clear view of the sky.

**Verizon Wireless • Proposed Base Station (Site No. 115535 “Montecito RELO”)
512 Santa Angela Lane • Montecito, California**

Because of the short wavelength of the frequencies assigned by the FCC for wireless services, the antennas require line-of-sight paths for their signals to propagate well and so are installed at some height above ground. The antennas are designed to concentrate their energy toward the horizon, with very little energy wasted toward the sky or the ground. Along with the low power of such facilities, this means that it is generally not possible for exposure conditions to approach the maximum permissible exposure limits without being physically very near the antennas.

Computer Modeling Method

The FCC provides direction for determining compliance in its Office of Engineering and Technology Bulletin No. 65, “Evaluating Compliance with FCC-Specified Guidelines for Human Exposure to Radio Frequency Radiation,” dated August 1997. Figure 2 attached describes the calculation methodologies, reflecting the facts that a directional antenna’s radiation pattern is not fully formed at locations very close by (the “near-field” effect) and that at greater distances the power level from an energy source decreases with the square of the distance from it (the “inverse square law”). The conservative nature of this method for evaluating exposure conditions has been verified by numerous field tests.

Site and Facility Description

The site at 512 Santa Angela Lane in Montecito was visited by Mr. Kent A. Swisher, a qualified engineer employed by Hammett & Edison, Inc., during normal business hours on March 9, 2012. There were observed antennas for use by AT&T installed on the single-story Verizon switch building. The maximum power density level observed for a person at ground near the site was 0.0048 mW/cm², which is 2.4% of the most restrictive public limit, for the combined operation of the existing RF services at the site as installed and operating at that time. The location of this and other representative measured levels are shown in Figure 3. The measurement equipment used was a Wandel & Goltermann Type EMR-300 Radiation Meter with Type 18 Isotropic Electric Field Probe (Serial No. F-0034). The meter and probe were under current calibration by the manufacturer.

Based upon information provided by Verizon, including zoning drawings by SAC Wireless, dated February 20, 2012, it is proposed to install nine Andrew directional panel antennas – three Model HBXX-6516DS-VTM and six Model LNX-6513DS-VTM – behind the existing screen wall above the roof of the building. The antennas would be mounted with no downtilt at an effective height of about 21 feet above ground, 4 feet above the roof, and would be oriented in identical groups of three toward 120°T, 220°T, and 310°T, away from the building. The maximum effective radiated power in any direction would be 4,910 watts, representing simultaneous operation at 1,900 watts for PCS, 2,520 watts for cellular, and 490 watts for 700 MHz service.



**Verizon Wireless • Proposed Base Station (Site No. 115535 “Montecito RELO”)
512 Santa Angela Lane • Montecito, California**

Study Results

For a person anywhere at ground, the maximum RF exposure level due to the proposed Verizon operation by itself is calculated to be 0.051 mW/cm², which is 9.0% of the applicable public exposure limit. The maximum calculated cumulative level at ground, for the simultaneous operation of both carriers, is projected to be 9.5% of the public exposure limit, since the maximum levels from the two carriers’ operations do not coincide. The location of this and other representative calculated cumulative exposure levels are shown in Figure 3. It should be noted that these results include several “worst-case” assumptions and therefore are expected to overstate actual power density levels. Levels may exceed the applicable public exposure limit on the roof of the subject building, near the antennas.

Recommended Mitigation Measures

Due to their mounting locations, the Verizon antennas would not be accessible to the general public, and so no mitigation measures are necessary to comply with the FCC public exposure guidelines. To prevent occupational exposures in excess of the FCC guidelines, no access within 14 feet directly in front of the antennas themselves, such as might occur during maintenance work on the roof or screen wall, should be allowed while the base station is in operation, unless other measures can be demonstrated to ensure that occupational protection requirements are met. Posting explanatory warning signs* at the roof access hatch and on the screens in front of the antennas, such that the signs would be readily visible from any angle of approach to persons who might need to work within that distance, would be sufficient to meet FCC-adopted guidelines. Similar measures should already be in place for the other carrier at the site; the applicable keep-back distance for that carrier has not been determined as part of this study.

Conclusion

Based on the information and analysis above, it is the undersigned’s professional opinion that operation of the base station proposed by Verizon Wireless at 512 Santa Angela Lane in Montecito, California, will comply with the prevailing standards for limiting public exposure to radio frequency energy and, therefore, will not for this reason cause a significant impact on the environment. The highest calculated level in publicly accessible areas is much less than the prevailing standards allow for exposures of unlimited duration. This finding is consistent with measurements of actual exposure conditions taken at other operating base stations. Posting explanatory signs is recommended to establish compliance with occupational exposure limitations.

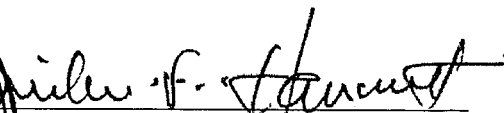
* Warning signs should comply with OET-65 color, symbol, and content recommendations. Contact information should be provided (e.g., a telephone number) to arrange for access to restricted areas. The selection of language(s) is not an engineering matter, and guidance from the landlord, local zoning or health authority, or appropriate professionals may be required.



Verizon Wireless • Proposed Base Station (Site No. 115535 "Montecito RELO")
512 Santa Angela Lane • Montecito, California

Authorship

The undersigned author of this statement is a qualified Professional Engineer, holding California Registration Nos. E-13026 and M-20676, which expire on June 30, 2013. This work has been carried out under his direction, and all statements are true and correct of his own knowledge except, where noted, when data has been supplied by others, which data he believes to be correct.



William F. Hammett, P.E.

707/996-5200

August 10, 2012



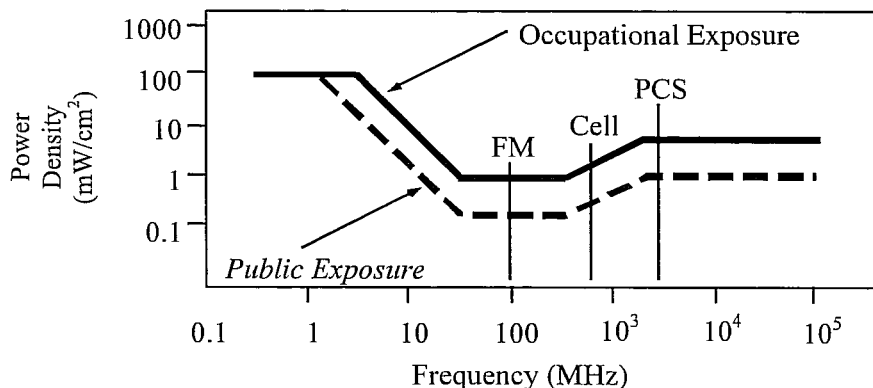
HAMMETT & EDISON, INC.
CONSULTING ENGINEERS
SAN FRANCISCO

FCC Radio Frequency Protection Guide

The U.S. Congress required (1996 Telecom Act) the Federal Communications Commission (“FCC”) to adopt a nationwide human exposure standard to ensure that its licensees do not, cumulatively, have a significant impact on the environment. The FCC adopted the limits from Report No. 86, “Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields,” published in 1986 by the Congressionally chartered National Council on Radiation Protection and Measurements (“NCRP”). Separate limits apply for occupational and public exposure conditions, with the latter limits generally five times more restrictive. The more recent standard, developed by the Institute of Electrical and Electronics Engineers and approved as American National Standard ANSI/IEEE C95.1-2006, “Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz,” includes similar limits. These limits apply for continuous exposures from all sources and are intended to provide a prudent margin of safety for all persons, regardless of age, gender, size, or health.

As shown in the table and chart below, separate limits apply for occupational and public exposure conditions, with the latter limits (in *italics* and/or dashed) up to five times more restrictive:

Frequency Applicable Range (MHz)	Electromagnetic Fields (<i>f</i> is frequency of emission in MHz)					
	Electric Field Strength (V/m)		Magnetic Field Strength (A/m)		Equivalent Far-Field Power Density (mW/cm ²)	
0.3 – 1.34	614	<i>614</i>	1.63	<i>1.63</i>	100	<i>100</i>
1.34 – 3.0	614	<i>823.8/f</i>	1.63	<i>2.19/f</i>	100	<i>180/f²</i>
3.0 – 30	1842/f	<i>823.8/f</i>	4.89/f	<i>2.19/f</i>	900/f ²	<i>180/f²</i>
30 – 300	61.4	<i>27.5</i>	0.163	<i>0.0729</i>	1.0	<i>0.2</i>
300 – 1,500	3.54√ <i>f</i>	<i>1.59√f</i>	√ <i>f</i> /106	<i>√f/238</i>	<i>f/300</i>	<i>f/1500</i>
1,500 – 100,000	137	<i>61.4</i>	0.364	<i>0.163</i>	5.0	<i>1.0</i>



Higher levels are allowed for short periods of time, such that total exposure levels averaged over six or thirty minutes, for occupational or public settings, respectively, do not exceed the limits, and higher levels also are allowed for exposures to small areas, such that the spatially averaged levels do not exceed the limits. However, neither of these allowances is incorporated in the conservative calculation formulas in the FCC Office of Engineering and Technology Bulletin No. 65 (August 1997) for projecting field levels. Hammett & Edison has built those formulas into a proprietary program that calculates, at each location on an arbitrary rectangular grid, the total expected power density from any number of individual radio sources. The program allows for the description of buildings and uneven terrain, if required to obtain more accurate projections.



RFR.CALC™ Calculation Methodology

Assessment by Calculation of Compliance with FCC Exposure Guidelines

The U.S. Congress required (1996 Telecom Act) the Federal Communications Commission (“FCC”) to adopt a nationwide human exposure standard to ensure that its licensees do not, cumulatively, have a significant impact on the environment. The maximum permissible exposure limits adopted by the FCC (see Figure 1) apply for continuous exposures from all sources and are intended to provide a prudent margin of safety for all persons, regardless of age, gender, size, or health. Higher levels are allowed for short periods of time, such that total exposure levels averaged over six or thirty minutes, for occupational or public settings, respectively, do not exceed the limits.

Near Field.

Prediction methods have been developed for the near field zone of panel (directional) and whip (omnidirectional) antennas, typical at wireless telecommunications base stations, as well as dish (aperture) antennas, typically used for microwave links. The antenna patterns are not fully formed in the near field at these antennas, and the FCC Office of Engineering and Technology Bulletin No. 65 (August 1997) gives suitable formulas for calculating power density within such zones.

For a panel or whip antenna, power density $S = \frac{180}{\theta_{BW}} \times \frac{0.1 \times P_{net}}{\pi \times D \times h}$, in mW/cm²,

and for an aperture antenna, maximum power density $S_{max} = \frac{0.1 \times 16 \times \eta \times P_{net}}{\pi \times h^2}$, in mW/cm²,

where θ_{BW} = half-power beamwidth of the antenna, in degrees, and

P_{net} = net power input to the antenna, in watts,

D = distance from antenna, in meters,

h = aperture height of the antenna, in meters, and

η = aperture efficiency (unitless, typically 0.5-0.8).

The factor of 0.1 in the numerators converts to the desired units of power density.

Far Field.

OET-65 gives this formula for calculating power density in the far field of an individual RF source:

power density $S = \frac{2.56 \times 1.64 \times 100 \times RFF^2 \times ERP}{4 \times \pi \times D^2}$, in mW/cm²,

where ERP = total ERP (all polarizations), in kilowatts,

RFF = relative field factor at the direction to the actual point of calculation, and

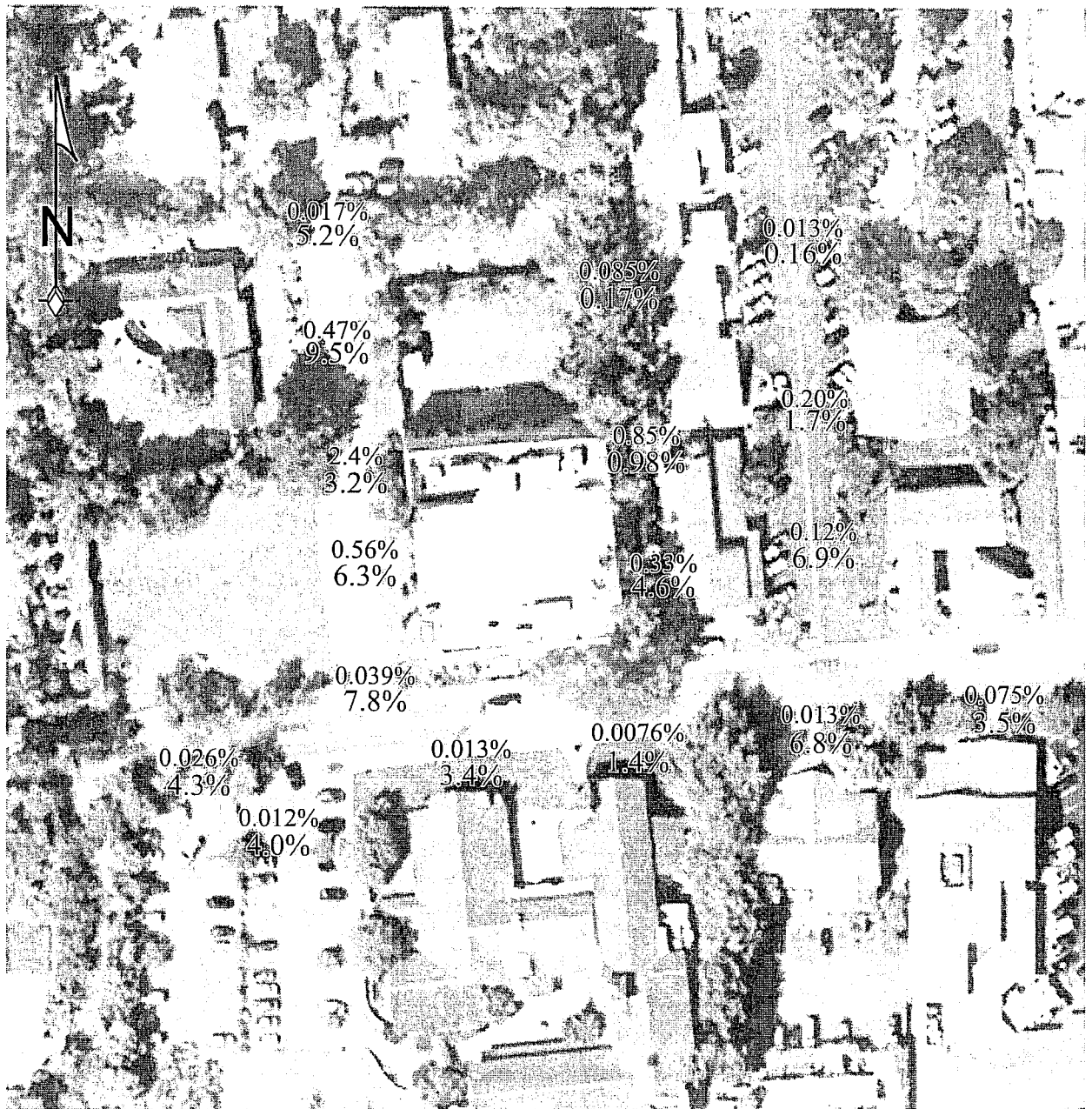
D = distance from the center of radiation to the point of calculation, in meters.

The factor of 2.56 accounts for the increase in power density due to ground reflection, assuming a reflection coefficient of 1.6 (1.6 x 1.6 = 2.56). The factor of 1.64 is the gain of a half-wave dipole relative to an isotropic radiator. The factor of 100 in the numerator converts to the desired units of power density. This formula has been built into a proprietary program that calculates, at each location on an arbitrary rectangular grid, the total expected power density from any number of individual radiation sources. The program also allows for the description of uneven terrain in the vicinity, to obtain more accurate projections.



Verizon Wireless • Proposed Base Station (Site No. 115535 “Montecito RELO”)
 512 Santa Angela Lane • Montecito, California

Representative Ambient Measurements
 and Calculated Exposure Levels



Aerial photo from Google Maps

RF exposure levels measured on March 9, 2012, (shown in black as percent of most restrictive public limit); maximum was 2.4%. Calculated cumulative levels including the existing AT&T operations shown in blue; maximum is 9.5% of public limit (see text for details).



June 12, 2012

Honorable Salud Carbajal, First District Supervisor
Santa Barbara County Board of Supervisors
123 East Anapamu Street
Santa Barbara, CA 93101

Dear Supervisor Carbajal,

I have been asked to review the proposed Verizon wireless antenna facility on Santa Angela Lane, in Montecito. It is County Case Number 12CPU-00000-00007. This proposal by Verizon would move the antennas from an existing wireless cell tower at the QAD campus in Summerland to the Verizon switching site directly behind the Village Post Office and businesses, across the street from El Montecito Presbyterian Church, and facing homes along Santa Angela Lane.

The radiofrequency report by Hammett & Edison Engineering, Inc. is deficient. The processing of this application has been conducted and approved by the Montecito Planning Commission predicated in part on a flawed analysis and prediction of RFR levels.

- We request the attached RFR Data Request Sheet be filled out by Verizon and provided to the community, so they may seek independent verification.
- The analysis combines measurements (from existing antennas) and computer modeling for the proposed antennas. It is an apples-and-oranges approach that minimizes RFR exposure levels. A computer modeling report should be done using the appropriate FCC OET 65 formulas for both sets (existing and proposed). The exposures will be far higher. The community deserves to know.
- The analysis by H&E switches to 'occupational' from 'uncontrolled public' safety limits when speaking about workers on the roofs, etc. Occupational limits allow five-times higher exposures for onsite workers as for offsite workers. Only onsite workers can be instructed in RFR safety, and signage about RFR hazards can be posted by the owner or lessee only on their own property.



To apply occupational safety limits to offsite workers on adjacent buildings, or to the occupants of or visitors to these offsite buildings is improper. Painters, maintenance people, construction workers, etc who are going to be working on the Village offices no more than 40'-50' from the antennas and at equal elevation must have their RFR exposures assessed using public safety limits. The H&E report concludes there will be no violations of FCC public safety standards, but this may change for people, including off-site workers, when the right standard for exposure is applied.

- Residents and business owners, and the Church and preschool staff and members, and the Montecito Library and Association office are near enough to this facility that full runout tables of power density versus distance should be calculated. This will allow each person in the adjacent area to review a complete report that tells what RFR emissions are predicted at their location. This information is not provided in the current information.

What Should Be Done?

The County should grant the appellants' appeal of Verizon's wireless facilities pending a full and complete assessment of RFR power density levels, and provide the community with information about RFR levels to which they will be exposed. This information should be requested from the applicant, and a revised report should be prepared and circulated. The RFR should be expressed in microwatts per centimeter squared, not in percent of the safety standard.

- antenna transmitter location
- the number of transmitters operating simultaneously
- the frequency of each transmitting antenna
- the number of channels (radios) per antenna

- the effective maximum radiated power (ERP) for each channel and the expected radiated power for each channel
- the direction of each antenna (show vertical plane pattern)
- downtilt of antennas should be taken into account in calculations



- a topographic map showing location of the site and of surrounding buildings
- the number of occupied stories and heights of each floor of buildings
- RFR contours should plot ERP at one meter and three meters above ground level, and establish AGL reference points to take ground elevation changes into account
- RFR runout tables to 0.01 microwatt per centimeter squared at ten foot intervals depicting the new project's maximum calculated power density should be provided. Contour maps showing power density at 100, 50, 20, 10, 5, 2, 1 0.1 and 0.01 $\mu\text{W}/\text{cm}^2$ contours for the proposed project should be provided.
- RFR runout tables to 0.01 microwatt per centimeter squared at ten foot intervals depicting all co-located antenna power density should be provided. Contour maps showing power density at 100, 50, 20, 10, 5, 2, 1 0, 0.1 and 0.01 $\mu\text{W}/\text{cm}^2$ should be provided for all co-located transmitting antennas.
- Information should be overlain on a land use map showing nearest uncontrolled public access, distance to occupied buildings and designated land use for each building (home, school, day-care, pre-school, hospital, convalescent hospital or home, commercial office, shopping mall, etc)

With this information, the community will be better prepared to determine the suitability of this site for an expanded wireless facility with a long lease, and which operates under a Conditional Use Permit that may run for many years. Thank you for this opportunity to comment.

Very sincerely,

Cindy Sage, MA
Sage Associates



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1920-2009

BY E-MAIL PA@MALLP.COM

July 26, 2012

Paul Albritton, Esq.
Mackenzie & Albritton, LLP
220 Sansome Street, 14th Floor
San Francisco, California 94104

Dear Paul:

As you requested, we have reviewed the letter dated June 12, 2012, from Sage Associates (“Sage”) regarding the proposed Verizon Wireless base station (Site No. 115535 “Montecito Relo”) located at 512 Santa Angela Lane in Montecito. Sage makes several inaccurate claims regarding our analysis, prediction, and report, dated May 2, 2012, which are discussed below:

1. Sage claims that combining measurements and modeling “... is an apples-and-oranges approach that minimizes RFR exposure levels” and that if only modeling were used then “The exposures will be far higher.” This is flawed reasoning. Certainly calculations based on the FCC formulas can be used to conservatively predict radio frequency (“RF”) exposure levels, but if the facility exists, then a more definitive assessment of the actual levels can be made via measurements. In fact, the County of Santa Barbara requires us to measure the existing levels and provide a map showing those levels along with the cumulative levels, combining the results from the measurements of the existing facility and the calculated levels for the proposed facility. These levels were provided in Figure 3 of our report. Further, the FCC has indicated that the use of measurements is the preferred method to determine actual RF exposure levels.
2. Sage claims that we apply occupational limits to workers on adjacent buildings. We do not. The occupational limit applies only to the subject building, where appropriate warning signs can be posted to inform workers of the potential for exposure above the FCC public limit. RF exposure levels at nearby buildings, including the two-story Village offices cited by Sage, were assessed against the FCC public exposure limit and were found to be below that limit.
3. Sage claims that individuals living or working nearby would not be able to determine RF exposure levels at their home or place of business. This is incorrect. Figure 3 of our report provides both the existing and the cumulative RF exposure levels in the vicinity of the site, allowing interested parties to quickly discern nearby levels.

Paul Albritton, Esq., page 2
July 26, 2012

4. Sage requests a significant amount of additional information, including “run-out tables” to $0.01 \mu\text{W}/\text{cm}^2$, which is more than 45,000 times below the applicable FCC standard. This additional information is irrelevant and misleading as it has no significance with respect to the determination of compliance of this site with the FCC standard. As Professional Engineers, we have evaluated the site and determined that it will comply with the FCC guidelines. Further, post-construction measurements, as required by the County of Santa Barbara, will allow field verification of compliance with the FCC standard.

We appreciate the opportunity to be of service. Please let us know if any questions arise on this matter.

Sincerely yours,



William F. Hammett

tm

cc: Mr. Edward Godfrey – BY E-MAIL EDWARD.GODFREY@VERIZONWIRELESS.COM
Mr. Jay Higgins – BY E-MAIL JAYH@CPDGINC.COM
Mr. David Mebane – BY E-MAIL DAVID.MEBANE@SACW.COM