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April 27, 2004

Via Hand Delivery

S. Derek Phelps
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Notice of Exempt Modification – Antenna Swap**
Roof-top Wireless Telecommunications Facility
W. Danbury – 18 Old Ridgebury Road, (Hilton Hotel) Danbury, CT

Dear Mr. Phelps:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains a wireless telecommunications facility at the Danbury Hilton Hotel, 18 Old Ridgebury Road, in Danbury. This facility consists of twelve (12) panel-type cellular antennas and an equipment shelter mounted on the roof of the building.

The Connecticut Siting Council ("the Council") approved the Hilton Hotel site in Petition No. 334 on October 20, 1994 and, as such, maintains continuing jurisdiction over the facility. Cellco now intends to modify its Hilton Hotel facility by replacing six (6) of the cellular antennas with six (6) PCS antennas. Attached behind Tab 1 are specifications for the existing cellular and proposed PCS antennas for the site.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Danbury Mayor, Mark D. Boughton.

As the Council knows, on May 23, 2003, Cellco acquired, from Northcoast Communications, a license to provide PCS service throughout Connecticut. The proposed modifications to the Hilton Hotel facility will allow Cellco to provide its customers in the Danbury area with enhanced wireless voice and data services.

The planned modifications to the Hilton Hotel facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The proposed modifications will not result in any increase in the overall height of the existing structure. Cellco's replacement antennas will be mounted at the same level as its existing antennas.

2. The proposed modifications will not affect associated equipment areas and will not require the extension of the site boundaries.

3. The proposed modifications will not increase noise levels at the facility by six decibels or more.

4. The proposed modifications will not result in radio frequency (RF) power density levels at the facility that exceed the Federal Communications Commission (FCC) adopted safety standard. Attached behind Tab 2 is a Report on Site RF Compliance prepared by Pinnacle Telecom Group. This report includes actual RF measurements around the Hilton Hotel facility and estimated RF emissions levels anticipated from the proposed PCS antennas.

For the foregoing reasons, Cellco respectfully submits that the proposed modifications to the above-referenced telecommunications facilities constitute an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Kenneth C. Baldwin

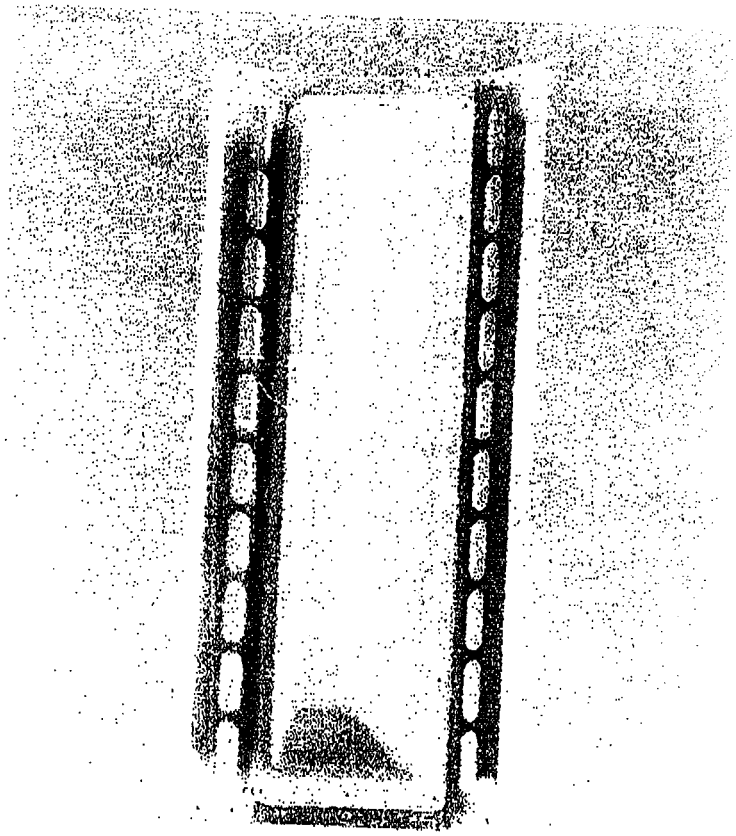
cc: Mark D. Boughton, Mayor, City of Danbury
Sandy M. Carter, Verizon Wireless

Swedcom Corporation

ALP 9209-N

Log-Periodic Reflector Antenna

92 Degrees 9 dBd



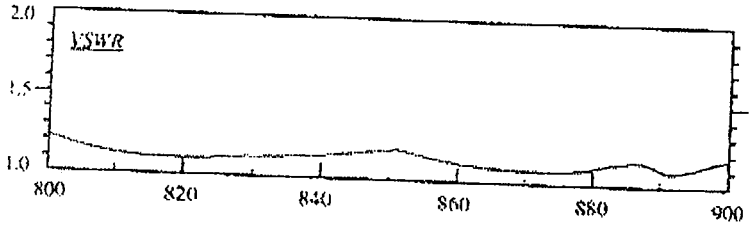
Features:

- ❑ **Broadbanded. (800-900 MHz)**
- ❑ **Low backlobe radiation. Front-to-back ratio better than 28 dB**
- ❑ **Low Intermodulation Products.**
- ❑ **Low Wind-load.**
- ❑ **Low weight.**
- ❑ **Small size.**
- ❑ **Rugged design.**

Please see the following pages including radiation patterns/tables for *ALP 9209-N.*

Electrical Specifications:

Frequency range:	806-896 MHz
Impedance:	50 ohm
Connector:	N-female or 7/8" EIA
VSWR:	Typ. 1.3:1 max 1.5:1
Polarization:	Vertical
Gain:	9 dBd
Front to back ratio:	>28 dB
Intermodulation: (2x25W):	IM3 >146 dB
	IM5 >153 dB
	IM7 & IM9 >163 dB
Power Rating:	500 W
H-Plane: -3 dB	95 °
E-Plane: -3 dB	30 °
Lightning Protection:	DC Grounded



Mechanical Specifications:

Overall Height:	26.8 in	(680 mm)
Width:	11.4 in	(290 mm)
Depth:	11.4 in	(290 mm)
Weight including brackets:	15.3 lbs	(6.9 Kg)
Rated wind velocity:	113 mph	(180 Km/h)
Wind Area (CxA/Front):	1.7 sq.ft	(0.16 sq.m)
Lateral thrust at rated wind **Worst case:**	260 N	

Materials:

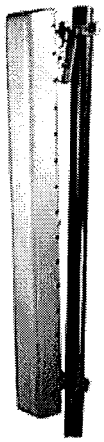
Radiating elements:	Aluminum
Element housing:	Grey PVC
Back-plate:	Aluminum
Mounting hardware	
clamps:	Hot dip galvanized steel
bolts:	Stainless steel

Manufactured by: Allgon System AB

Product Data Sheet for APL199014-42T2

Maximizer® Directional Panel Antenna

The Celwave® Maximizer series is a log periodic dipole array which uses a patent pending design to achieve a front-to-back ratio of 45 dB, the highest front-to-back ratio in the industry. Maximizers are available to cover ESMR, AMPS, PCS and DCS frequency ranges. They use RFS's patented monolithic CELlite® technology, which eliminates cable and soldered joints to reduce the possibility of intermodulation products. The CELlite technology assures high reliability and excellent repeatability of electrical characteristics. The cellular Maximizers are available in 65°, 80° and 90° horizontal beamwidths and the PCS/DCS Maximizers are available in 65° and 90° horizontal beamwidths.



Product Specifications	
Frequency Band	PCS 1900 (1850-1990 MHz)
Horizontal Pattern	Directional
Antenna Type	Panel Log Periodic
Electrical Down Tilt Option	Fixed
Gain, dBi (dBd)	16.14 (14)
Frequency Range, MHz	1850-1990
Connector Type	7-16 DIN Female
Connector Location	Back
Mount Type	Downtilt
Electrical Downtilt, deg	2
Horizontal Beamwidth, deg	90
Mounting Hardware	APM21-3
Rated Wind Speed, km/h (mph)	200 (125)
VSWR	< 1.3:1
Vertical Beamwidth, deg	7
1st Null Fill, dB	> -15
Null Fill, dB	> -15
1st Upper Sidelobe Suppression, dB	> 18
Upper Sidelobe Suppression, dB	> 18
Polarization	Vertical
Front-To-Back Ratio, dB	45

RADIO FREQUENCY SYSTEMS

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Maximizer® Directional Panel Antenna

Maximum Power Input, W	500
Lightning protection	Direct Ground
3rd Order IMP @ 2 x 43 dBm, dBc	<-143
Dimensions - HxWxD, mm (in)	1219 x 102 x 102 (48 x 4 x 4)
Weight w/o Mtg. Hardware, kg (lb)	3 (6)
Weight w/ Mtg. Hardware, kg (lb)	3.6 (8)
Radiating Element Material	Aluminum Alloy
Radome Material	UV Stabilized High Impact ABS
Reflector Material	5052-H32 Aluminum
Max Wind Loading Area, m^2 (ft^2)	0.093 (1)
Maximum Thrust @ Rated Wind, N (lbf)	237 (53.3)
Side Wind Loading Area, m^2 (ft^2)	0.124 (1.33)
Side Thrust @ Rated Wind, N (lbf)	237 (53.3)
Shipping Weight, kg (lb)	7.7 (17)
Shipping Dimensions of Accessory - HxWxD, m (ft)	Packed w/antenna
Shipping Mode	UPS
Packing Dimensions, HxWxD, mm (in)	1422 x 305 x 203 (56 x 12 x 8)
Survival Wind Speed, km/h (mph)	200 (125)

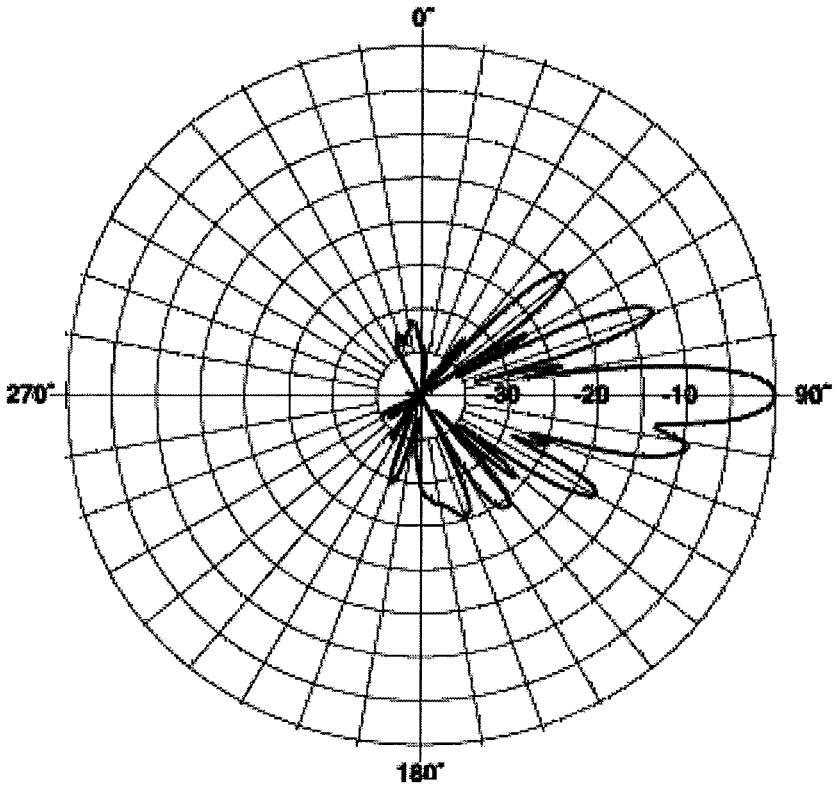
Features/Benefits

- **45 dB front-to-back ratio reduces co-channel interference.**
- **Monolithic construction reduces IM.**
- **No solder joints, high reliability.**
- **Surface treated components prevent galvanic corrosion.**
- **UV stabilized radome assures long life without radome deterioration due to UV exposure.**

Maximizer® Directional Panel Antenna

Vertical Pattern

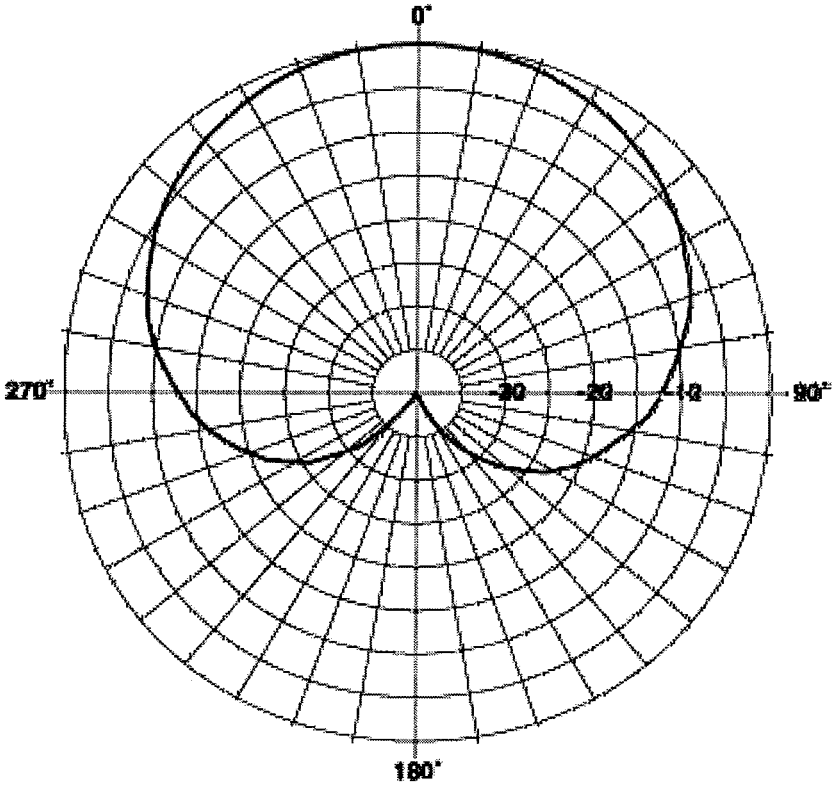
(This is a general representation of the antenna family pattern. For the latest detailed pattern contact Applications Engineering. You may also download the CELplot(TM) pattern reader and antenna pattern data fields from our website.)



Maximizer® Directional Panel Antenna

Horizontal Pattern

(This is a general representation of the antenna family pattern. For the latest detailed pattern contact Applications Engineering. You may also download the CELplot(TM) pattern reader and antenna pattern data fields from our website.)



PINNACLE TELECOM GROUP
Consulting and Engineering Services

REPORT ON SITE RF COMPLIANCE

VERIZON WIRELESS

W. DANBURY

April 8, 2004

14 RIDGEDALE AVENUE, SUITE 262 • CEDAR KNOLLS, NJ 07927 • 973-451-1630

Contents

Introduction and Summary

At the request of Verizon Wireless, Pinnacle Telecom Group has prepared an independent assessment of potential radiofrequency (RF) exposure and FCC compliance related to an existing wireless base station antenna facility on a building rooftop located at 18 Old Ridgebury Road in Danbury, CT. Verizon Wireless identifies the site as W Danbury. On-site measurements were previously performed by Pinnacle Telecom Group on July 15, 2003.

Verizon Wireless is licensed by the FCC to provide cellular radio service, using the 800 MHz frequency band and currently operates 12 panel antennas mounted on the subject rooftop. Verizon is proposing to now provide PCS service using the 1900 MHz frequency band.

FCC regulations require an assessment and assurance of compliance with specified maximum permissible exposure (MPE) limits whenever technical modifications are made to a site, which includes the addition or modification of antennas. The assessment of compliance may involve on-site measurements, an office-based mathematical analysis, or a combination of the two. The latter was used in this case.

The results of the analysis of RF compliance for Verizon's proposed antenna operation are as follows:

- RF measurements performed at street level around the site indicated the highest existing RF level is 0.05 percent of the FCC limit for continuous exposure of the general population. A mathematical analysis of the effects of Verizon's proposed antenna operation indicates a worst-case incremental contribution of approximately 0.0218 percent of the same exposure limit.
- Taking the most conservative approach, if the worst-case incremental contribution associated with the antenna modification is added to the worst-case measurement result (even if they do not occur at the same point), the new worst-case exposure level at street level would be 0.0718 percent – still more than 1,390 times below the limit.

- A further analysis of potential exposure on the roof indicates that the worst-case incremental RF level on the roof will be 1.7563 percent of the applicable FCC limit for occupational exposure.
- Again taking the conservative approach, if the worst-case incremental contribution associated with the antenna modification is added to the worst-case measurement result on the rooftop, the new worst-case exposure level would be 10.4563 percent – still more than nine times below the limit.

Therefore, with the modification to the Verizon antenna operation, the site will remain in full compliance with the FCC's regulations concerning potential human exposure to RF fields.

In addition, Appendix A provides a site map, photographs taken the day of the measurements and antenna data, Appendix B provides a description of the measurement equipment and procedures, Appendix C provides background on the FCC limits for RF exposure and Appendix D provides a list of key FCC references on RF exposure and site compliance.

The remainder of this report provides technical data on the proposed antenna operation, a brief description of the measurements performed, a mathematical analysis of Verizon's proposed operation using standard engineering formulas provided by the FCC, an analysis of those results with respect to RF compliance, and a certification of site compliance.

Technical Data

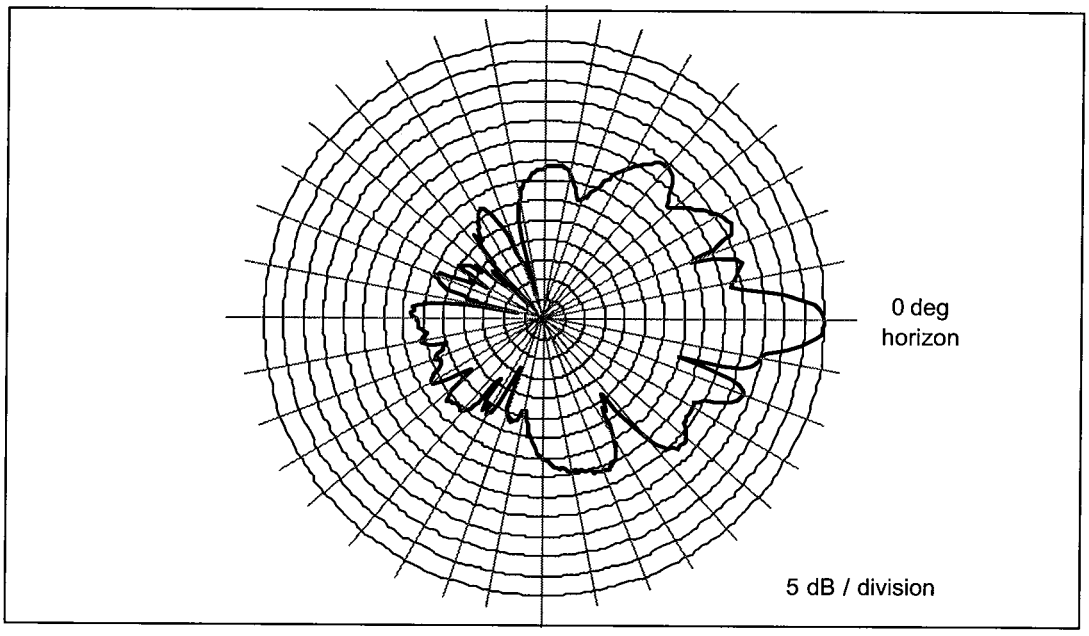
Relevant data for the proposed Verizon antenna operation at the site is summarized in the table on the next page.

Verizon Wireless – Technical Parameters	
Transmitting Frequency Band	1900 MHz
Antenna Height (AGL)	Sector A: 108 ft. Sector B: 123 ft. Sector C: 86 ft.
Antenna Type	panel
Antenna Manufacturer	RFS / Celwave
Antenna Model	APL199014-42T2
Antenna Major Dimension	48 in.
Antenna Gain (max.)	14 dBd
Beam Tilt	0°
Antenna Line Loss	2 dB
Transmitter Power per RF Channel per Tx	16 watts
RF Channels per Tx	3
Antenna Mounting Height Above Roof	Sectors A & C: 5 ft. Sector B: 14 ft.

Directional panel antennas, such as are proposed here, are designed to radiate RF energy primarily in one sector of the horizon, and most of the RF energy is emitted in the horizontal plane. A small fraction of the RF energy is radiated below that plane and toward the ground around the facility in question, and the particulars of that characteristic are used in calculating the relative strength of potential exposure levels at street level around an antenna operation.

A diagram illustrating the vertical-plane radiation pattern of the antennas to be used by Verizon is shown on the next page. Note that in these types of antenna radiation pattern diagrams, the antenna is effectively pointed at the three o'clock position, and where the antenna pattern reads 20 dB the relative RF energy emitted at the corresponding downward angle is $1/100^{th}$ of the maximum that occurs at 0 degrees; at the 30 dB point, it is $1/1000^{th}$ of the maximum.

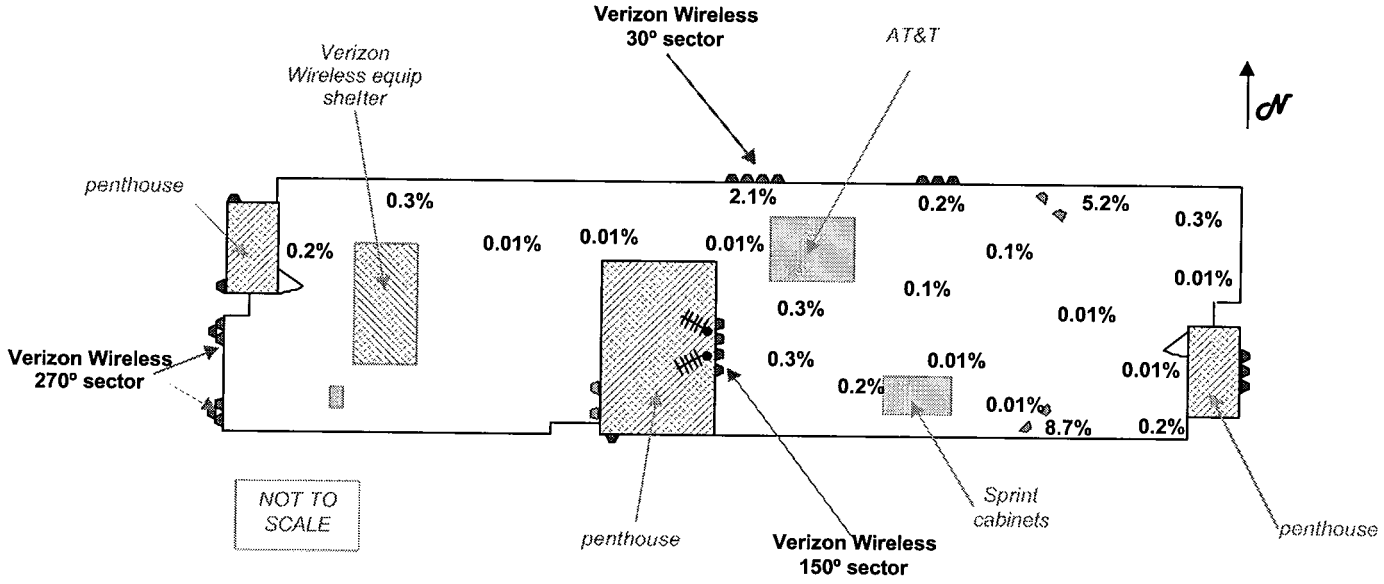
RFS / Celwave APL199014-42T2 Antenna – Vertical-Plane Radiation Pattern



On-Site Measurements

RF measurements were performed on July 15, 2003, in order to determine the pre-existing RF effects on the rooftop and at street level around the building, and to certify site compliance with the FCC regulations concerning human exposure to RF fields.

The results of the on-site measurements, expressed as a percentage of the FCC occupational MPE limit, are overlaid on the plan view sketch on the next page.



Technical Analysis

Assessment of RF compliance involves an analysis of potential RF exposure levels in accessible areas, and comparison of those levels with the applicable FCC limits for maximum permissible exposure.

The FCC's regulations describe two tiers of MPE limits, one for "controlled" situations (i.e., where an individual with RF safety training can exercise control of the exposure), and a stricter one for the presumably "uncontrolled" exposure that involves the general public.

In addition, OSHA requires employers to provide appropriate RF safety training for individuals whose work brings them into frequent contact with wireless antenna sites. Access to antenna sites is often restricted to ensure only RF-safety-trained people can get close to antennas.

In this case, the rooftop itself is access-restricted and considered a "controlled" area, and the FCC's occupational MPE limit applies. At street level around the building, the stricter limit for the general population applies.

The subsections that follow will address both areas of interest.

Street-Level Analysis

In the far field, the RF levels are directly proportional to the total antenna input power and the relative antenna gain (focusing effect) in the downward direction of interest – and the levels are inversely proportional to the square of the straight-line distance to the antenna.

Conservative calculations also assume the potential RF exposure is enhanced by reflection of the RF energy from the ground. (Our calculations will assume a 100% "perfect" reflection, the absolute worst-case approach.)

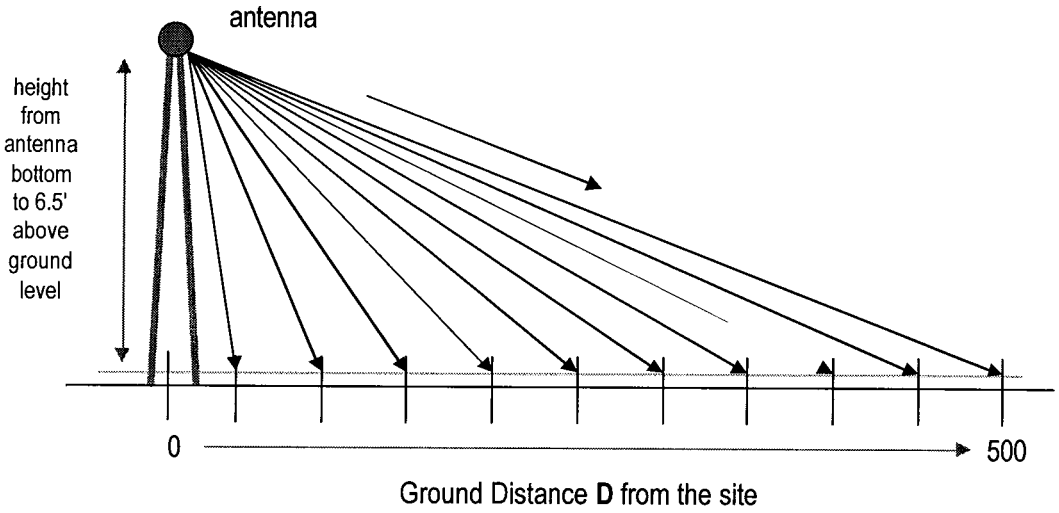
According to the FCC, the applicable formula for far-field calculations is as follows:

$$MPE\% = (100 * TxPower * 10^{(Gmax-Vdisc/10)} * 4) / (MPE * 4\pi * R2)$$

where

MPE%	=	RF level, expressed as a percentage of the FCC MPE limit
100	=	factor to convert to a percentage
TxPower	=	maximum power into antenna, watts
$10^{(Gmax-Vdisc/10)}$	=	numeric equivalent of the relative antenna gain in the downward direction of interest, with Gmax (maximum gain)and Vdisc (vertical-plane discrimination) values, in decibels, taken from the antenna manufacturer's specifications; the reference point for the angular calculations is either 0 degrees (the horizon), or the mechanical downtilt angle of the antennas
4	=	the factor to account for a 100-percent-efficient energy reflection from the ground, and the squared relationship between RF field strength and power density ($2^2 = 4$)
MPE	=	FCC general population MPE limit, $1.0 mW/cm^2$
R	=	lateral distance from the RF source to the point of interest, centimeters

Although the calculations are performed using centimeter units, the results are more clearly presented using feet as the distance unit. The far-field calculations of RF power density are typically performed out to a distance of 500 feet from the site (see diagram below), with recognition that beyond the first few hundred feet the RF levels always decrease with increasing distance. Within the first few hundred feet, the calculated RF levels reflect not just distance, but the relative antenna radiation pattern discrimination at different downward angles.



At each point along the ground, a calculation is made of the MPE% figure that results at an assumed human height of 6 feet, 6 inches. (That height is conservatively assumed to cover more than 99.9 percent of the population.)

Note that the following conservative methodology and assumptions are incorporated into the MPE% calculations:

1. The antennas are assumed to be operating continuously at maximum power.
2. The directional antennas are hypothetically assumed to be pointed directly overhead any and all points of interest at ground level, ignoring the effects of antenna discrimination in the horizontal plane.
3. The calculations intentionally minimize the distance factor (R) by

assuming a 6'6" human and performing the calculations from the bottom (rather than the centerline) of the antenna.

4. The potential RF exposure at ground level is assumed to be 100-percent enhanced (increased) via a "perfect" field reflection from the ground itself.

The net result of these assumptions is to significantly overstate the calculated RF exposure levels relative to the levels that will actually occur – and the purpose of this conservatism is to allow very "safe-side" conclusions about compliance.

According to the FCC, when directional antennas are used for sectorized coverage of the horizon, as is the case here, the far field calculations employ the parameters of a single sector – because the contributions of the antennas facing in other directions (the other sectors) are insignificant. The calculations, however, assume the antennas in one sector are always hypothetically pointed directly overhead the point of interest on the ground; this conservatively ignores the signal-reducing effects of the horizontal-plane directionality of the antenna.

Applying technical data for the proposed Verizon Wireless 1900 MHz system to the far-field formula yields the MPE% results in the table on the following page, with the worst-case result highlighted in bold. In order to be overly conservative, the lowest mounting height (86 feet) was applied to all sectors.

Ground Distance (ft)	Verizon 1900 MHz MPE%
0	0.0024
20	0.0067
40	0.0044
60	0.0004
80	0.0161
100	0.0072
120	0.0043
140	0.0041
160	0.0123
180	0.0207
200	**0.0218**
220	0.0119
240	0.0013
260	0.0002
280	0.0021
300	0.0055
320	0.0079
340	0.0092
360	0.0083
380	0.0080
400	0.0078
420	0.0071
440	0.0089
460	0.0082
480	0.0075
500	0.0130

As indicated in the table, the worst-case calculated RF level is only 0.0218 percent of the FCC MPE limit for continuous RF exposure of the general public. When this worst-case incremental contribution is directly added to the earlier worst-case measured result of 0.05 percent, the new total is 0.0718 percent, which is more than 1,390 times below the limit for continuous human exposure. Therefore, far-field compliance is achieved.

Rooftop Analysis

The applicable FCC formula for "near-field" exposure on a roof close to antennas is as follows:

$$MPE\% = (100 * TxPower * M * 10^{-Hdisc/10} * B) / (MPE * 360°/BW * 2\pi * L * R)$$

where

MPE%	=	RF level, expressed as a percentage of the FCC general public MPE limit
100	=	factor to convert to a percentage
TxPower	=	maximum power into antenna, in milliwatts (1 watt is equivalent to 1,000 milliwatts)
M	=	factor to account for antenna mounting height relative to nearby standing level
$10^{-Hdisc/10}$	=	factor to account for the horizontal radiation characteristic of directional antennas, taken from the antenna manufacturer's specifications (which use decibel, or dB, references, and for which $10^{-HDisc/10}$ is the equivalent numeric factor)
MPE	=	FCC occupational MPE limit
BW	=	manufacturer-specified antenna half-power (3 dB) horizontal-plane beamwidth, in degrees
L	=	antenna major dimension (in this case, length), in centimeters (1 foot = 30.48 centimeters)
R	=	horizontal distance from the antenna to the point of interest, in centimeters

The table below lists the results of the calculations for the front, rear and sides of the Verizon antennas.

Distance (ft.)	MPE% -- Front of Antennas	MPE% -- Side of Antennas	MPE% -- Rear of Antennas
1	1.7563	0.0844	0.0008
2	0.8781	0.0422	0.0004
3	0.5854	0.0281	0.0003
4	0.4391	0.0211	0.0002
5	0.3513	0.0169	0.0002
6	0.2927	0.0141	0.0001
7	0.2509	0.0121	0.0001
8	0.2195	0.0106	0.0001
9	0.1951	0.0094	0.0001
10	0.1756	0.0084	0.0001

As indicated, the worst-case calculated incremental exposure is at one foot directly in front of the proposed antennas. If we conservatively ignore the fact that the calculated and measured worst-case results occur in different spots on the roof and directly add the two figures (1.7563 percent calculated, 8.7 percent measured), the sum is 10.4563 percent – still below the FCC limit, and thus the rooftop remains in compliance with the regulations.

Compliance Conclusion

As described, even under the most conservative analytical approach, the potential RF exposure levels from all antennas at the site, with the addition of the Verizon 1900 MHz antenna operation, are lower than the applicable FCC limits. Therefore, the site will remain in compliance with the applicable FCC RF exposure regulations.

Certification of Site Compliance

The undersigned, under pain and penalty of perjury, hereby certify as follows:

1. We have read and fully understand the FCC regulations concerning RF safety and the control of human exposure to RF fields (47 CFR 1.1301 *et seq*).
2. The equipment used to perform the RF measurements described herein is appropriate to the task, and calibration of its accuracy has been performed within the past 12 months as recommended by the manufacturer.
3. The on-site RF measurements described herein were performed in a manner consistent with industry standards.
4. To the best of our knowledge, the statements and information disclosed in this report are true, complete and accurate.
5. The analysis of site RF compliance provided herein is consistent with the applicable FCC regulations, additional guidelines issued by the FCC, and industry practice.
6. The results of the analysis indicate that the subject site is in full compliance with the FCC regulations concerning RF exposure.

Patricia A. Stankovich — 4/8/04

Patricia A. Stankovich
Manager-RF Compliance
Pinnacle Telecom Group, LLC

Daniel J. Collins — 4/8/04

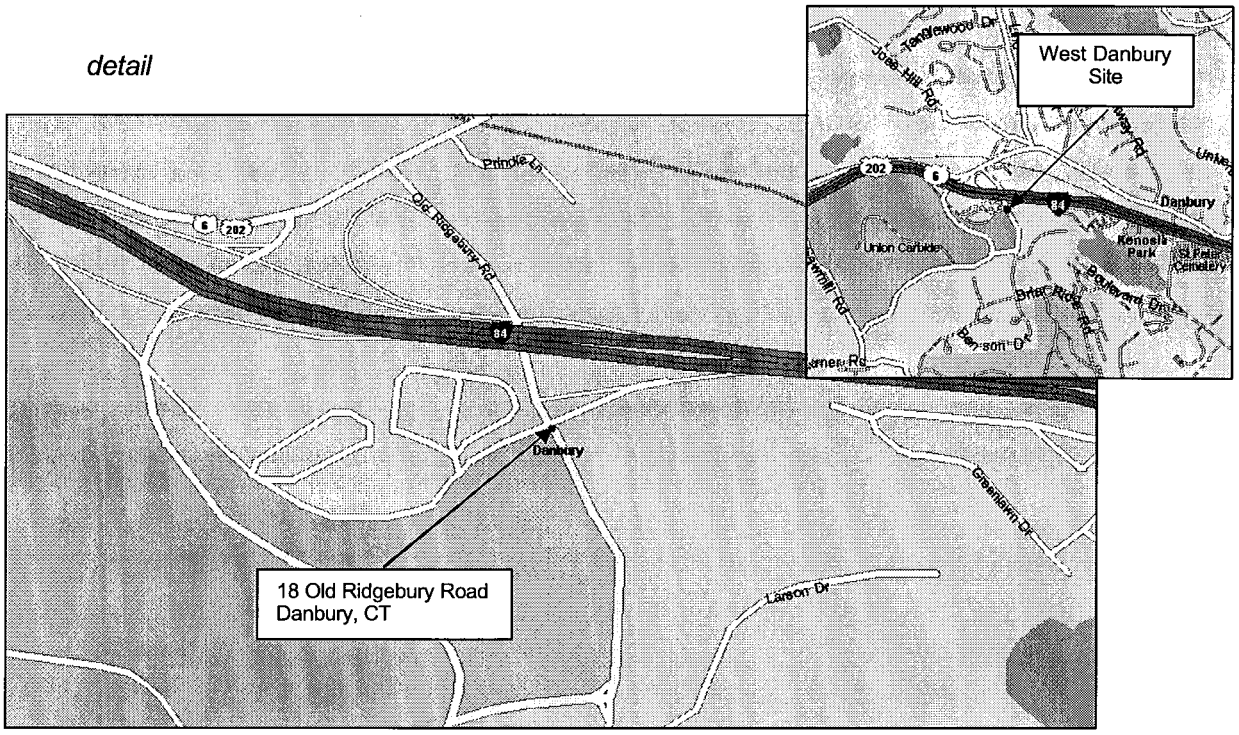
Daniel J. Collins
Chief Technical Officer
Pinnacle Telecom Group, LLC

Appendix A: Site Map, Photographs and Antenna Data

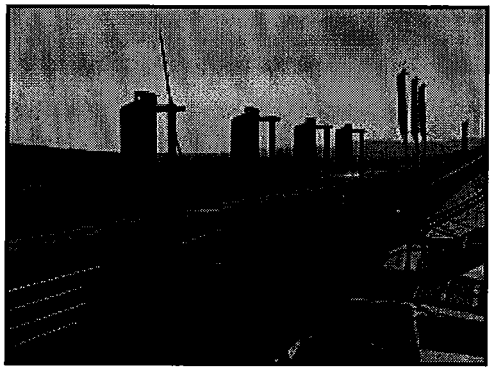
The Verizon Wireless West Danbury site is located at 18 Old Ridgebury Road in Danbury, CT, as illustrated in the maps below.

overview

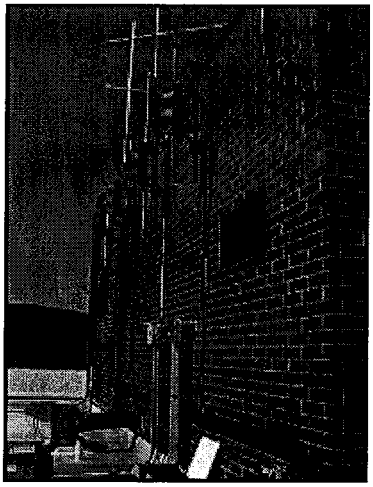
detail



The following page provides copies of photographs taken of the site on the day the measurements were performed.

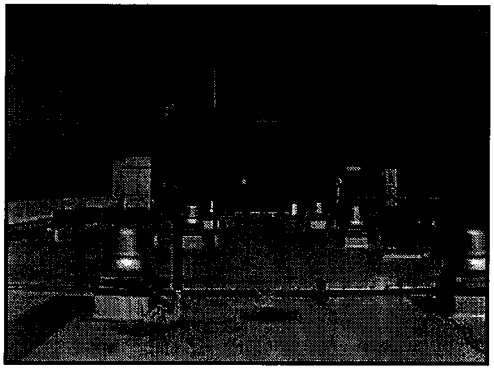


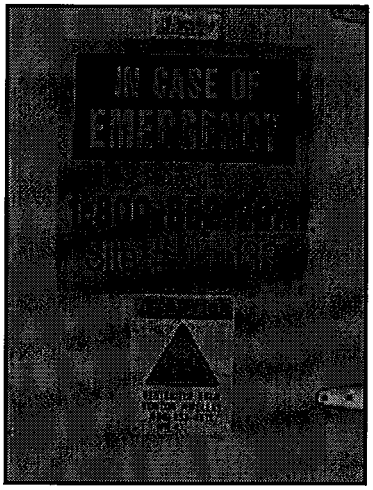
Verizon Wireless 30° sector

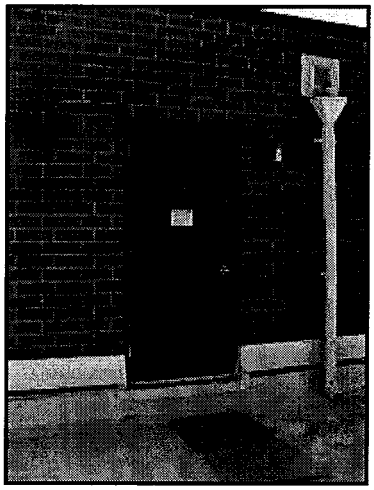


Verizon Wireless 150° sector

Verizon Wireless 270° sector







The following table provides antenna detail for the West Danbury site.

Ant #	Z (ft)	Type	Dim. (ft)	Mfr	Model	Freq	Tilt	Azimuth	Licensee
1	5	panel	2	Allgon	7130.14.05.00	806-896	0°	30°	Verizon
2	5	panel	2	Allgon	7130.14.05.00	806-896	0°	30°	Verizon
3	5	panel	2	Allgon	7130.14.05.00	806-896	0°	30°	Verizon
4	5	panel	2	Allgon	7130.14.05.00	806-896	0°	30°	Verizon
5	14	panel	2	Allgon	7130.14.05.00	806-896	0°	150°	Verizon
6	14	panel	2	Allgon	7130.14.05.00	806-896	0°	150°	Verizon
7	14	panel	2	Allgon	7130.14.05.00	806-896	0°	150°	Verizon
8	14	panel	2	Allgon	7130.14.05.00	806-896	0°	150°	Verizon
9	5	panel	2	Allgon	7130.14.05.00	806-896	0°	270°	Verizon
10	5	panel	2	Allgon	7130.14.05.00	806-896	0°	270°	Verizon
11	5	panel	2	Allgon	7130.14.05.00	806-896	0°	270°	Verizon
12	5	panel	2	Allgon	7130.14.05.00	806-896	0°	270°	Verizon
13	5	panel	5	Decibel	Unidentified	1900	6°	---	Sprint
14	5	panel	5	Decibel	Unidentified	1900	6°	---	Sprint
15	5	panel	5	Decibel	Unidentified	1900	6°	---	Sprint
16	5	panel	5	Decibel	Unidentified	1900	6°	---	Sprint
17	18	panel	5	Decibel	Unidentified	1900	0°	---	Sprint
18	18	panel	5	Decibel	Unidentified	1900	0°	---	Sprint
19	6.5	panel	4	Allgon	7262.01	Unknown	2°	---	AT&T
20	6.5	panel	4	Allgon	7262.01	Unknown	2°	---	AT&T
21	6.5	panel	4	Allgon	7262.01	Unknown	2°	---	AT&T
22	5	panel	4	Allgon	7262.01	Unknown	0°	---	AT&T
23	5	panel	4	Allgon	7262.01	Unknown	0°	---	AT&T
24	5	panel	4	Allgon	7262.01	Unknown	0°	---	AT&T
25	-2	panel	4	EMS Wireless	Unidentified	Unknown	0°	---	AT&T
26	-2	panel	4	EMS Wireless	Unidentified	Unknown	0°	---	AT&T
27	5.5	panel	4	EMS Wireless	Unidentified	1900	0°	---	T-Mobile
28	12	panel	4	EMS Wireless	Unidentified	1900	0°	---	T-Mobile
29	5.5	panel	4	EMS Wireless	Unidentified	1900	0°	---	T-Mobile
30	17	yagi	6	Unidentified	Unidentified	Unknown	---	---	Unidentified
31	20	yagi	6	Unidentified	Unidentified	Unknown	---	---	Unidentified
32	21	whip	6	Unidentified	Unidentified	Unknown	---	---	Unidentified
33	19	whip	8	Unidentified	Unidentified	Unknown	---	---	Unidentified

Appendix B: Measurement Equipment and Procedure

The RF exposure measurements were performed using a Narda model 8722 RF probe and Narda model 8715 RF meter. Both the probe and meter are capable of broadband RF measurements, covering a range of 300 kHz to 50 GHz. The measuring equipment is designed to automatically register all RF levels within the frequency range and report them as percentages of the FCC's overall occupational MPE limit.

Measurements of RF exposure levels were performed on the rooftop and at ground level around the site. In order to ensure "safe-side" results, maximum RF spot-levels were measured and reported in all areas.

Appendix C: Background on the FCC RF Exposure Limits

As directed by the Telecommunications Act of 1996, the FCC has established limits for maximum continuous human exposure to RF fields.

The FCC maximum permissible exposure (MPE) limits represent the consensus of federal agencies and independent experts responsible for RF safety matters. Those agencies include the National Council on Radiation Protection and Measurements (NCRP), the Occupational Health and Safety Administration (OSHA), the National Institute for Occupational Safety and Health (NIOSH), the American National Standards Institute (ANSI), the Environmental Protection Agency (EPA), and the Food and Drug Administration (FDA). In formulating its guidelines, the FCC also considered input from the public and technical community – notably the Institute of Electrical and Electronics Engineers (IEEE).

The FCC's RF exposure guidelines are incorporated in Section 1.301 *et seq* of its Rules and Regulations (47 CFR 1.1301-1.1310). Those guidelines specify MPE limits for both occupational and general population exposure.

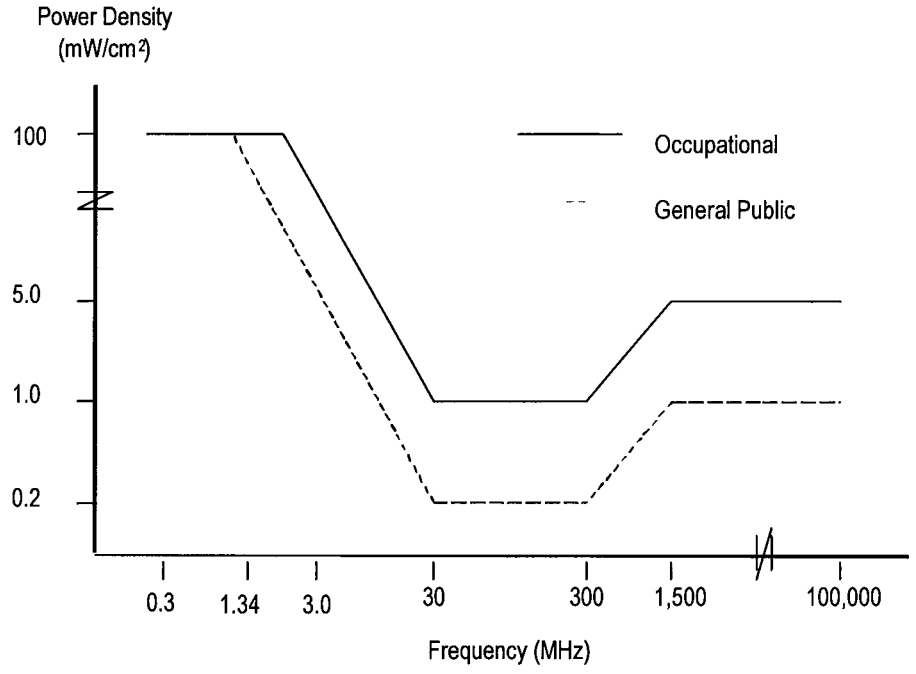
The specified continuous exposure MPE limits are based on known variation of human body susceptibility in different frequency ranges, and a Specific Absorption Rate (SAR) of 4 watts per kilogram, which is universally considered to accurately represent human capacity to dissipate incident RF energy (in the form of heat). The occupational MPE guidelines incorporate a safety factor of 10 or greater with respect to RF levels known to represent a health hazard, and an additional safety factor of five is applied to the MPE limits for general population exposure. Thus, the general population MPE limit has a built-in safety factor of more than 50. Continuous exposure at levels equal to or below the applicable MPE limits is considered to result in no adverse health effects on humans.

The reason for *two* tiers of MPE limits is based on an understanding and assumption that members of the general public are unlikely to have had appropriate RF safety training and may not be aware of the exposures they receive; occupational exposure in controlled environments, on the other hand, is assumed to involve individuals who have had such training, are aware of the exposures, and know how to maintain a safe personal work environment.

The FCC's RF exposure limits are expressed in two equivalent forms, using alternative units of field strength (expressed in volts per meter, or V/m), and power density (expressed in milliwatts per square centimeter, or mW/cm^2). The table on the next page lists the FCC limits for both occupational and general population exposures, using the mW/cm^2 reference, for the different radio frequency ranges.

Frequency Range (F) (MHz)	Occupational Exposure (mW/cm^2)	General Public Exposure (mW/cm^2)
0.3 - 1.34	100	100
1.34 - 3.0	100	$180 / F^2$
3.0 - 30	$900 / F^2$	$180 / F^2$
30 - 300	1.0	0.2
300 - 1,500	F / 300	F / 1500
1,500 - 100,000	5.0	1.0

The diagram below provides a graphical illustration of both the FCC's occupational and general population MPE limits.



Because the FCC's RF exposure limits are frequency-shaped, the exact MPE limits applicable to the instant situation depend on the frequency range used by the systems of interest.

The most appropriate method of determining RF compliance is to calculate the RF power density attributable to a particular system and compare that to the MPE limit applicable to the operating frequency in question. The result is usually expressed as a percentage of the MPE limit.

For potential exposure from multiple systems, the respective percentages of the MPE limits are added, and the total percentage compared to 100 (percent of the limit). If the result is less than 100, the total exposure is in compliance; if it is more than 100, exposure mitigation measures are necessary to achieve compliance.

Appendix D: FCC References

47 CFR, FCC Rules and Regulations, Part 1 (Practice and Procedure), Section 1.1310 (Radiofrequency radiation exposure limits).

47 CFR, FCC Rules and Regulations, Part 22 (Public Mobile Services).

47 CFR, FCC Rules and Regulations, Part 24 (Personal Communications Services).

FCC Second Memorandum Opinion and Order and Notice of Proposed Rulemaking (FCC 97-303), *In the Matter of Procedures for Reviewing Requests for Relief From State and Local Regulations Pursuant to Section 332(c)(7)(B)(v) of the Communications Act of 1934 (WT Docket 97-192), Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation (ET Docket 93-62), and Petition for Rulemaking of the Cellular Telecommunications Industry Association Concerning Amendment of the Commission's Rules to Preempt State and Local Regulation of Commercial Mobile Radio Service Transmitting Facilities*, released August 25, 1997.

FCC First Memorandum Opinion and Order, ET Docket 93-62, *In the Matter of Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation*, released December 24, 1996.

FCC Report and Order, ET Docket 93-62, *In the Matter of Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation*, released August 1, 1996.

FCC Office of Engineering and Technology (OET) Bulletin 65, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields", Edition 97-01, August 1997.

FCC Office of Engineering and Technology (OET) Bulletin 56, "Questions and Answers About Biological Effects and Potential Hazards of RF Radiation", edition 4, August 1999.

"RF Field Measurements for Antenna Sites", (video), Richard Tell Associates Inc., 1997.

"EME Awareness for Antenna Site Safety", (video), Motorola (produced in association with Richard Tell Associates Inc.), 1997.