California State University
SAN MARCOS

Safety, Health & Sustainability

California State University San Marcos San Marcos, California USA
Tel: *760-750-4502*

October 27, 2025

William Baron, District Manager
California Department of Industrial Relations
Occupational Health & Safety Administration
7575 Metropolitan Drive, Suite 207
San Diego, CA 92108

Re: Response to Complaint No. 2356280 – 5G RF Exposure Conditions
CSUSM, 333 S Twin Oaks Valley Rd, San Marcos, CA 92096

Dear Mr. Baron:
The California State University, San Marcos (CSUSM) facility located at 333 S Twin Oaks Valley Rd, San Marcos, CA 92096, is in receipt of Complaint number 2356280 dated October 2, 2025, alleging 5G RF Exposure to employees working on the roof. The Complaint letter was received by CSUSM on October 15, 2025, and has been posted in common areas accessible by all employees during their work shifts.
CSUSM has investigated the allegations in the complaint. The following is a discussion of the results of our investigation.

1. CCR T8 5085: Facility mechanics must work on the roof in the vicinity of the 5G cellular antennas and are thereby exposed to radiofrequency radiation because the antennas cannot be turned off.

CSUSM has contracted with an independent Health and Safety Consulting firm (Kasai Consulting) to assess the Occupational and General Population RF exposure levels on the roof in April 2024 and again in October 2025. The two reports indicated that employees were not exposed to RF energy densities exceeding regulatory limits in the unrestricted areas of the rooftop. In addition to these reports from Kasai, Verizon provided third party assessments (EBI Consulting) to the University pre and post construction of the towers on the roof of University Hall. Those reports dated 7/18/2023 and 1/12/2024 are contained within the response packet.
Also, per the CSUSM contract with Verizon, if CSUSM employees need access to areas inside the restricted boundary, then they would follow the standard operating procedure created for the campus. The procedure provides for and would then allow the antennas to be turned off by Verizon in this situation.

2. CCR T8 3203(4): Employer did not evaluate the radiofrequency exposure hazard of the 5G antennas by measuring the radiofrequency energy density in the vicinity of the 5G antennas.

See response 1.

3. CCR T8 5085(c): The employer did not post warning signs in the vicinity of the 5G antennas.

Prior to April 2024, CSUSM posted a warning sign at the locked entrance door to the rooftop and also placed warning signs on the restraint barrier system positioned on the rooftop to prevent people working on the rooftop from accidentally accessing areas of elevated RF energy (See photos in Annex A).
Attached to this letter are photographs of the rooftop postings and barriers.
If you have any questions regarding our investigation, please contact me at 760-750-4502 or rfrasca@csusm.edu.

CSUSM is committed to the safety and health of our campus community and compliance with Cal/OSHA requirements.

Appendix A: EBI Consulting Report dated July 18, 2023
Appendix B: EBI Consulting Report dated January 12, 2024
Appendix C: Kasai Consulting Report dated March 2023
Appendix D: Kasai Consulting Report dated October 2025
Appendix E: CSUSM Photos

Respectfully Submitted,

Regina M. Frasca, NRCC-CHO
Cal State University, San Marcos
Senior Director, Office of Safety, Health & Sustainability (SH&S)
Work Phone: 760-750-4502

Annex A – Photographs of Rooftop

Image 1: Locked Roof Entrance Posting

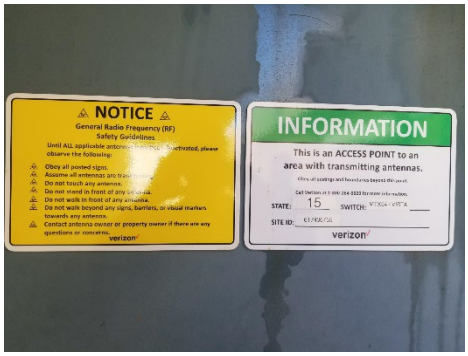


Image 2: Southwest Corner of building

Image 3: Northwest Corner Array

Image 4: Northeast Corner Array

Image 5: Southeast Corner of building

Image 6: Barrier Postings

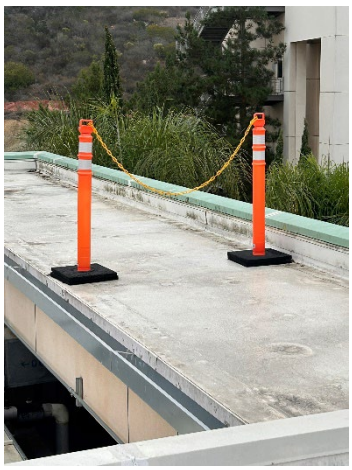
Image 7: Close up image of southwest barrier system

Image 8: Close up image northwest barrier system

Image 9: Close up image of northeast barrier system

Image 10: Close up image of northeast barrier system

Image 11: Close up image of southeast barrier system

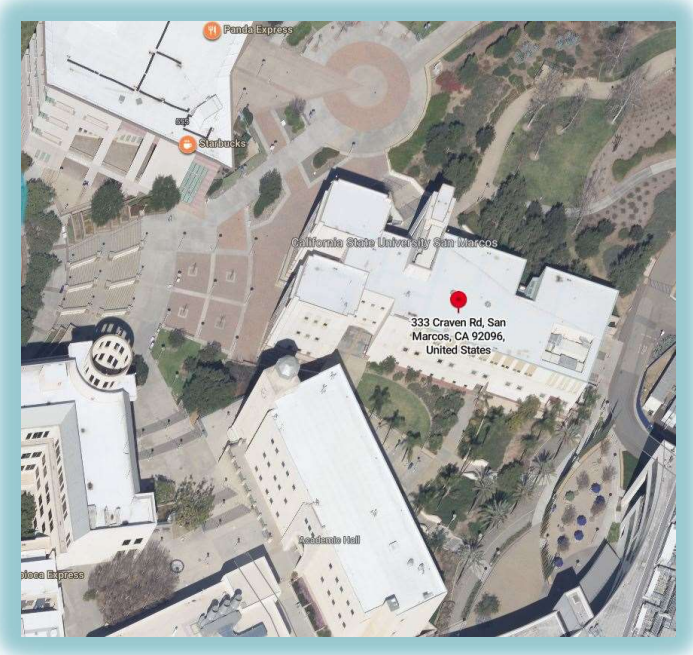


Appendix A: EBI Consulting Report dated July 18, 2023

Radio Frequency - Electromagnetic Energy (RF-EME) Jurisdictional Report

CSUSM Campus Temp
333 Twin Oaks Valley Rd
San Marcos, California 92096
San Diego County
33° 7' 43.43" N, -117° 9' 30.85" W NAD83

EBI Project No. 6223002808
July 18, 2023



Prepared for:

Verizon Wireless
15505 Sand Canyon Ave
Irvine, CA 92618

Prepared by:

EBI Consulting
environmental | engineering | due diligence

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APPENDICES

EXECUTIVE SUMMARY

Purpose of Report

EnviroBusiness Inc. (dba EBI Consulting) has been contracted by Verizon Wireless ("Verizon") to conduct radio frequency electromagnetic (RF-EME) modeling for Verizon Site: CSUSM Campus Temp located at 333 Twin Oaks Valley Rd in San Marcos, California to determine RF-EME exposure levels from proposed Verizon communications equipment at this site. As described in greater detail in Appendix C of this report, the Federal Communications Commission (FCC) has developed Maximum Permissible Exposure (MPE) Limits for the general public and for occupational activities. This report summarizes the results of RF-EME modeling in relation to relevant FCC RF-EME compliance standards for limiting human exposure to RF-EME fields.

Statement of Compliance

A site is considered out of compliance with FCC regulations if there are areas that exceed the FCC exposure limits and there are no RF hazard mitigation measures in place. Any carrier which has an installation that contributes more than 5% of the applicable MPE must participate in mitigating these RF hazards.

As presented in the sections below, based on worst-case predictive modeling, the worst-case emitted power density may exceed the FCC's general public limit near Verizon's proposed antennas at the main roof level. Modeling also indicates that the worst-case emitted power density may exceed the FCC's occupational limit near Verizon's proposed antennas at the main roof level. Additionally, there are areas where workers who may be elevated above the rooftop or ground may be exposed to power densities greater than the occupational limits. Therefore, workers should be informed about the presence and locations of antennas and their associated fields.

At the main rooftop level (nearest walking/working surfaces) to the Verizon antennas, the maximum power density generated by the Verizon antennas is approximately **5,787.13** percent of the FCC's general public limit (**1,157.43** percent of the FCC's occupational limit).

The composite exposure from the proposed Verizon Wireless antennas at this facility in all areas at the **Ground level** is found to be well below the General Population MPE limit in any publicly accessible areas.

Recommended control measures are outlined in Section 4.0 and within the Site Safety Plan (attached); Verizon should also provide procedures to shut down and lockout/tagout this wireless equipment in accordance with Verizon's standard operating protocol. Non-telecom workers who will be working in areas of exceedance are required to contact Verizon since only Verizon has the ability to lockout/tagout the facility, or to authorize others to do so.

1.0 INTRODUCTION

Radio frequency waves are electromagnetic waves from the portion of the electromagnetic spectrum at frequencies lower than visible light and microwaves. The wavelengths of radio waves range from thousands of meters to around 30 centimeters. These wavelengths correspond to frequencies as low as 3 cycles per second (or hertz [Hz]) to as high as one gigahertz (one billion cycles per second).

Personal Communication (PCS) facilities used by Verizon in this area will potentially operate within a frequency range of 700 to 5000 MHz. Facilities typically consist of: 1) electronic transceivers (the radios or cabinets) connected to wired telephone lines; and 2) antennas that send the wireless signals created by the transceivers to be received by individual subscriber units (PCS telephones). Transceivers are typically connected to antennas by coaxial cables.

Because of the short wavelength of PCS services, the antennas require line-of-site paths for good propagation, and are typically installed a distance above ground level. Antennas are constructed to concentrate energy towards the horizon, with as little energy as possible scattered towards the ground or the sky. This design, combined with the low power of PCS facilities, generally results in no possibility for exposure to approach Maximum Permissible Exposure (MPE) levels, with the exception of in areas in the immediate vicinity of the antennas.

MPE limits do not represent levels where a health risk exists, since they are designed to provide a substantial margin of safety. 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.

2.0 SITE DESCRIPTION

This project site includes the following proposed wireless telecommunication antennas on a rooftop located at 333 Twin Oaks Valley Rd in San Marcos, California.

Ant #	Sector	Operator	Antenna Make	Antenna Model	Technology and Frequency (MHz)	Azimuth (Degrees)	Mechanical Downtilt (Degrees)	Horizontal Beamwidth (Degrees)	Aperture (feet)	Total Power Input (Watts)	Transmitter Count	Antenna Gain (dBd)	Total ERP (Watts)	Total EIRP (Watts)
1	Alpha	Verizon	ERICSSON	SON_AIR6449 NR TB 03.24.21 3700 VZW	L-Sub6 3700	130	0	11	2.8	320	1	23.55	72468.62	118848.53
2	Alpha	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 700	LTE 700	130	0	65	8.0	80	2	13.2	1671.44	2741.16
2	Alpha	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 850	LTE/5G 850	130	0	62	8.0	80	2	13.53	1803.39	2957.56
2	Alpha	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 1900	LTE 1900	130	0	66	8.0	80	4	15.17	2630.81	4314.53
3	Alpha	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 700	LTE 700	130	0	65	8.0	80	2	13.2	1671.44	2741.16
3	Alpha	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 850	LTE/5G 850	130	0	62	8.0	80	2	13.53	1803.39	2957.56
3	Alpha	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 2100	AWS 2100	130	0	62	8.0	160	4	15.82	6111.11	10022.22
3	Alpha	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 2100	AWS3 2100	130	0	62	8.0	80	4	15.82	3055.55	5011.11
4	Alpha	Verizon	ERICSSON	KRE105281-1 3500	CBRS 3500	130	0	64	0.7	20	4	9.36	172.60	283.06
5	Beta	Verizon	ERICSSON	SON_AIR6449 NR TB 03.24.21 3700 VZW	L-Sub6 3700	210	0	11	2.8	320	1	23.55	72468.62	118848.53
6	Beta	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 700	LTE 700	210	0	65	8.0	80	2	13.2	1671.44	2741.16
6	Beta	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 850	LTE/5G 850	210	0	62	8.0	80	2	13.53	1803.39	2957.56
6	Beta	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 1900	LTE 1900	210	0	66	8.0	80	4	15.17	2630.81	4314.53
7	Beta	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 700	LTE 700	210	0	65	8.0	80	2	13.2	1671.44	2741.16
7	Beta	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 850	LTE/5G 850	210	0	62	8.0	80	2	13.53	1803.39	2957.56

Ant #	Sector	Operator	Antenna Make	Antenna Model	Technology and Frequency (MHz)	Azimuth (Degrees)	Mechanical Downtilt (Degrees)	Horizontal Beamwidth (Degrees)	Aperture (feet)	Total Power Input (Watts)	Transmitter Count	Antenna Gain (dBd)	Total ERP (Watts)	Total EIRP (Watts)
7	Beta	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 2100	AWS 2100	210	0	62	8.0	240	4	15.82	9166.66	15033.33
7	Beta	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 2100	AWS3 2100	210	0	62	8.0	80	4	15.82	3055.55	5011.11
8	Beta	Verizon	ERICSSON	KRE105281-1 3500	CBRS 3500	210	0	64	0.7	20	4	9.36	172.60	283.06
9	Gamma	Verizon	ERICSSON	SON_AIR6449 NR TB 03.24.21 3700 VZW	L-Sub6 3700	320	0	11	2.8	320	1	23.55	72468.62	118848.53
10	Gamma	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 700	LTE 700	320	0	65	8.0	80	2	13.2	1671.44	2741.16
10	Gamma	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 850	LTE/5G 850	320	0	62	8.0	80	2	13.53	1803.39	2957.56
10	Gamma	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 1900	LTE 1900	320	0	66	8.0	80	4	15.17	2630.81	4314.53
11	Gamma	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 700	LTE 700	320	0	65	8.0	80	2	13.2	1671.44	2741.16
11	Gamma	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 850	LTE/5G 850	320	0	62	8.0	80	2	13.53	1803.39	2957.56
11	Gamma	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 2100	AWS 2100	320	0	62	8.0	160	4	15.82	6111.11	10022.22
11	Gamma	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 2100	AWS3 2100	320	0	62	8.0	80	4	15.82	3055.55	5011.11
12	Gamma	Verizon	ERICSSON	KRE105281-1 3500	CBRS 3500	320	0	64	0.7	20	4	9.36	172.60	283.06
13	Delta	Verizon	ERICSSON	SON_AIR6449 NR TB 03.24.21 3700 VZW	L-Sub6 3700	10	0	11	2.8	320	1	23.55	72468.62	118848.53
14	Delta	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 700	LTE 700	10	0	65	8.0	80	2	13.2	1671.44	2741.16
14	Delta	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 850	LTE/5G 850	10	0	62	8.0	80	2	13.53	1803.39	2957.56
14	Delta	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 1900	LTE 1900	10	0	66	8.0	80	4	15.17	2630.81	4314.53
15	Delta	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 700	LTE 700	10	0	65	8.0	80	2	13.2	1671.44	2741.16
15	Delta	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 850	LTE/5G 850	10	0	62	8.0	80	2	13.53	1803.39	2957.56
15	Delta	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 2100	AWS 2100	10	0	62	8.0	160	4	15.82	6111.11	10022.22
16	Delta	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 2100	AWS3 2100	10	0	62	8.0	80	4	15.82	3055.55	5011.11
16	Delta	Verizon	ERICSSON	KRE105281-1 3500	CBRS 3500	10	0	64	0.7	20	4	9.36	172.60	283.06

• Note there are 4 Verizon antennas per sector at this site. For clarity, the different frequencies for each antenna are entered on separate lines.

Ant #	NAME	X	Y	Antenna Radiation Centerline	Z-Height Penthouse Roof Level	Z-Height Main Roof Level	Z-Height Adjacent South Building Roof	Z-Height Adjacent North Building Roof	Z-Height Ground
1	Verizon	366.0	140.5	71.0	-2.0	61.0	21.0	36.0	71.0
2	Verizon	364.1	137.3	71.0	-2.0	61.0	21.0	36.0	71.0
3	Verizon	363.7	136.3	71.0	-2.0	61.0	21.0	36.0	71.0
4	Verizon	360.4	133.5	71.0	-2.0	61.0	21.0	36.0	71.0
5	Verizon	144.7	102.7	71.0	-2.0	61.0	21.0	36.0	71.0
6	Verizon	142.4	105.0	71.0	-2.0	61.0	21.0	36.0	71.0
7	Verizon	141.0	105.5	71.0	-2.0	61.0	21.0	36.0	71.0
8	Verizon	136.8	108.3	71.0	-2.0	61.0	21.0	36.0	71.0
9	Verizon	134.5	124.7	71.0	-2.0	61.0	21.0	36.0	71.0
10	Verizon	136.3	127.9	71.0	-2.0	61.0	21.0	36.0	71.0
11	Verizon	137.3	129.3	71.0	-2.0	61.0	21.0	36.0	71.0
12	Verizon	140.5	131.7	71.0	-2.0	61.0	21.0	36.0	71.0

13	Verizon	354.3	159.7	71.0	-2.0	61.0	21.0	36.0	71.0
14	Verizon	358.5	158.7	71.0	-2.0	61.0	21.0	36.0	71.0
15	Verizon	359.0	158.7	71.0	-2.0	61.0	21.0	36.0	71.0
16	Verizon	362.7	158.3	71.0	-2.0	61.0	21.0	36.0	71.0

• Note the Z-Height represents the distance from the antenna centerline.

The above tables contain an inventory of proposed Verizon Antennas and other carrier antennas if sufficient information was available to model them. Note that EBI uses an assumed set of antenna specifications and powers for unknown and other carrier antennas for modeling purposes. The FCC guidelines incorporate two separate tiers of exposure limits that are based upon occupational/controlled exposure limits (for workers) and general population/uncontrolled exposure limits for members of the general public that may be exposed to antenna fields. While access to this site is considered uncontrolled, the analysis has considered exposures with respect to both controlled and uncontrolled limits as an untrained worker may access adjacent rooftop locations. Additional information regarding controlled/uncontrolled exposure limits is provided in Appendix C. Appendix B presents a site safety plan that provides a plan view of the rooftop with antenna locations.

3.0 WORST-CASE PREDICTIVE MODELING

EBI has performed theoretical MPE modeling using RoofMaster™ software to estimate the worst-case power density at the site's nearby broadcast levels resulting from operation of the antennas. RoofMaster™ is a widely-used predictive modeling program that has been developed by Waterford Consultants to predict RF power density values for rooftop and tower telecommunications sites produced by vertical collinear antennas that are typically used in the cellular, PCS, paging and other communications services. Using the computational methods set forth in Federal Communications Commission (FCC) Office of Engineering & Technology (OET) Bulletin 65, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields" (OET-65), RoofMaster™ calculates predicted power density in a scalable grid based on the contributions of all RF sources characterized in the study scenario. At each grid location, the cumulative power density is expressed as a percentage of the FCC limits. Manufacturer antenna pattern data is utilized in these calculations. RoofMaster™ models consist of the Far Field model as specified in OET-65 and an implementation of the OET-65 Cylindrical Model (Sula9). The models utilize several operational specifications for different types of antennas to produce a plot of spatially-averaged power densities that can be expressed as a percentage of the applicable exposure limit.

For this report, EBI utilized antenna and power data provided by Verizon and compared the resultant worst-case MPE levels to the FCC's occupational/controlled exposure limits outlined in OET Bulletin 65. The assumptions used in the modeling are based upon information provided by Verizon and information gathered from other sources. The parameters used for modeling are summarized in the Site Description antenna inventory table in Section 2.0.

There are no other wireless carriers with equipment installed at this site.

Based on worst-case predictive modeling, the worst-case emitted power density may exceed the FCC's general public limit within approximately 90 feet of Verizon's Sectors A, B, C and D antennas on the main roof level. Modeling also indicates that the worst-case emitted power density may exceed the FCC's occupational limit within approximately 40 feet of Verizon's Sectors A, B, C and D antennas on the main roof level. At the rooftop/ nearest walking/working surfaces to the Verizon antennas, the maximum power density generated by the Verizon antennas is approximately 5,787.13 percent of the FCC's general public limit (1,157.43 percent of the FCC's occupational limit).

The Site Safety Plan also presents areas where Verizon Wireless antennas contribute greater than 5% of the applicable MPE limit for a site. A site is considered out of compliance with FCC regulations if there are areas that exceed the FCC exposure limits and there are no RF hazard mitigation measures in place. Any carrier which has an installation that contributes more than 5% of the applicable MPE must participate in mitigating these RF hazards.

There are no modeled areas on the rooftop that exceed the FCC's limits for general public or occupational exposure in front of the other carrier antennas.

The inputs used in the modeling are summarized in the Site Description antenna inventory table in Section 2.0. A graphical representation of the RoofMaster™ modeling results is presented in Appendix B. Microwave dish antennas are designed for point-to-point operations at the elevations of the installed equipment rather than ground level coverage. The maximum power density generated by all carrier antennas, including microwaves and panel antennas, is included in the modeling results presented within this report.

4.0 MITIGATION/SITE CONTROL OPTIONS

EBI's modeling indicates that there are areas in front of the Verizon antennas that exceed the FCC standards for general public exposure. Modeling also indicates that the worst-case emitted power density does not exceed the FCC's occupational limit in front of the Verizon antennas. In order to alert people accessing the rooftop, a Guidelines sign and an NOC Information sign are recommended for installation at each access point to the rooftop. Additionally, Orange Warning signs are recommended for installation behind the antenna sled on the roof level. Blue Notice signs are also recommened on the proposed barriers on the sides of the Verizon Sectors B and D antennas. These signs must be placed in a conspicuous manner so that they are visible to any person approaching the barrier from any direction.

Barriers are recommended for installation when possible to block access to the areas in front of the antennas that exceed the FCC general public and/or occupational limits. Barriers may consist of rope, chain, or fencing. Painted stripes should only be used as a last resort. Barriers are recommended 6 feet on the side of Verizon Sector D antennas and 34 feet on the side of Verizon Sector B antennas at the roof level. Barriers are recommended for installation up to 6 feet to the edge of the eooftop as there are no no guard rail or parapet wall greater than 39 inches high.

These protocols and recommended control measures have been summarized and included with a graphic representation of the antennas and associated signage and control areas in a RF-EME Site Safety Plan, which is included as Appendix B. Individuals and workers accessing the rooftop should be provided with a copy of the attached Site Safety Plan, made aware of the posted signage and barriers, and signify their understanding of the Site Safety Plan.

To reduce the risk of exposure, EBI recommends that access to areas associated with the active antenna installation be restricted and secured where possible. All workers and individuals, including arborists and landscapers, accessing the rooftop along with nearby elevated structures or trees within areas exceeding the general public MPE must be made aware of the presence and locations of antennas and their associated fields, where applicable. Implementation of the signage and barriers recommended in the Site Safety Plan and in this report will bring this site into compliance with the FCC's rules and regulations.

5.0 SUMMARY AND CONCLUSIONS

EBI has prepared a Radiofrequency – Electromagnetic Energy (RF-EME) Compliance Report for telecommunications equipment installed by Verizon Site Number 617406755 located at 333 Twin Oaks

Valley Rd in San Marcos, California to determine worst-case predicted RF-EME exposure levels from wireless communications equipment installed at this site. This report summarizes the results of RF-EME modeling in relation to relevant Federal Communications Commission (FCC) RF-EME compliance standards for limiting human exposure to RF-EME fields.

As presented in the sections above, based on the FCC criteria, the worst-case emitted power density may exceed the FCC's general public limit within approximately 90 feet of Verizon's proposed antennas at the main roof level. Modeling also indicates that the worst-case emitted power density may exceed the FCC's occupational limit within approximately 40 feet of Verizon's proposed antennas at the main roof level.

Workers should be informed about the presence and locations of antennas and their associated fields. Recommended control measures are outlined in Section 4.0 and within the Site Safety Plan (attached); Verizon should also provide procedures to shut down and lockout/tagout this wireless equipment in accordance with Verizon's standard operating protocol. Non-telecom workers who will be working in areas of exceedance are required to contact Verizon since only Verizon has the ability to lockout/tagout the facility, or to authorize others to do so.

6.0 LIMITATIONS

This report was prepared for the use of Verizon Wireless. It was performed in accordance with generally accepted practices of other consultants undertaking similar studies at the same time and in the same locale under like circumstances. The conclusions provided by EBI are based solely on the information provided by the client. The observations in this report are valid on the date of the investigation. Any additional information that becomes available concerning the site should be provided to EBI so that our conclusions may be revised and modified, if necessary. This report has been prepared in accordance with Standard Conditions for Engagement and authorized proposal, both of which are integral parts of this report. No other warranty, expressed or implied, is made.

Appendix A

Certifications

Preparer Certification

I, Kobi Thompson, state that:

- I am an employee of EnviroBusiness Inc. (d/b/a EBI Consulting), which provides RF-EME safety and compliance services to the wireless communications industry.
- I have successfully completed RF-EME safety training, and I am aware of the potential hazards from RF-EME and would be classified "occupational" under the FCC regulations.
- I am fully aware of and familiar with the Rules and Regulations of both the Federal Communications Commissions (FCC) and the Occupational Safety and Health Administration (OSHA) with regard to Human Exposure to Radio Frequency Radiation.
- I have reviewed the data provided by the client and incorporated it into this Site Compliance Report such that the information contained in this report is true and accurate to the best of my knowledge.

Kobi Thompson

Reviewed and Approved by:

sealed 19jul2023

Michael McGuire
Electrical Engineer
mike@h2dc.com

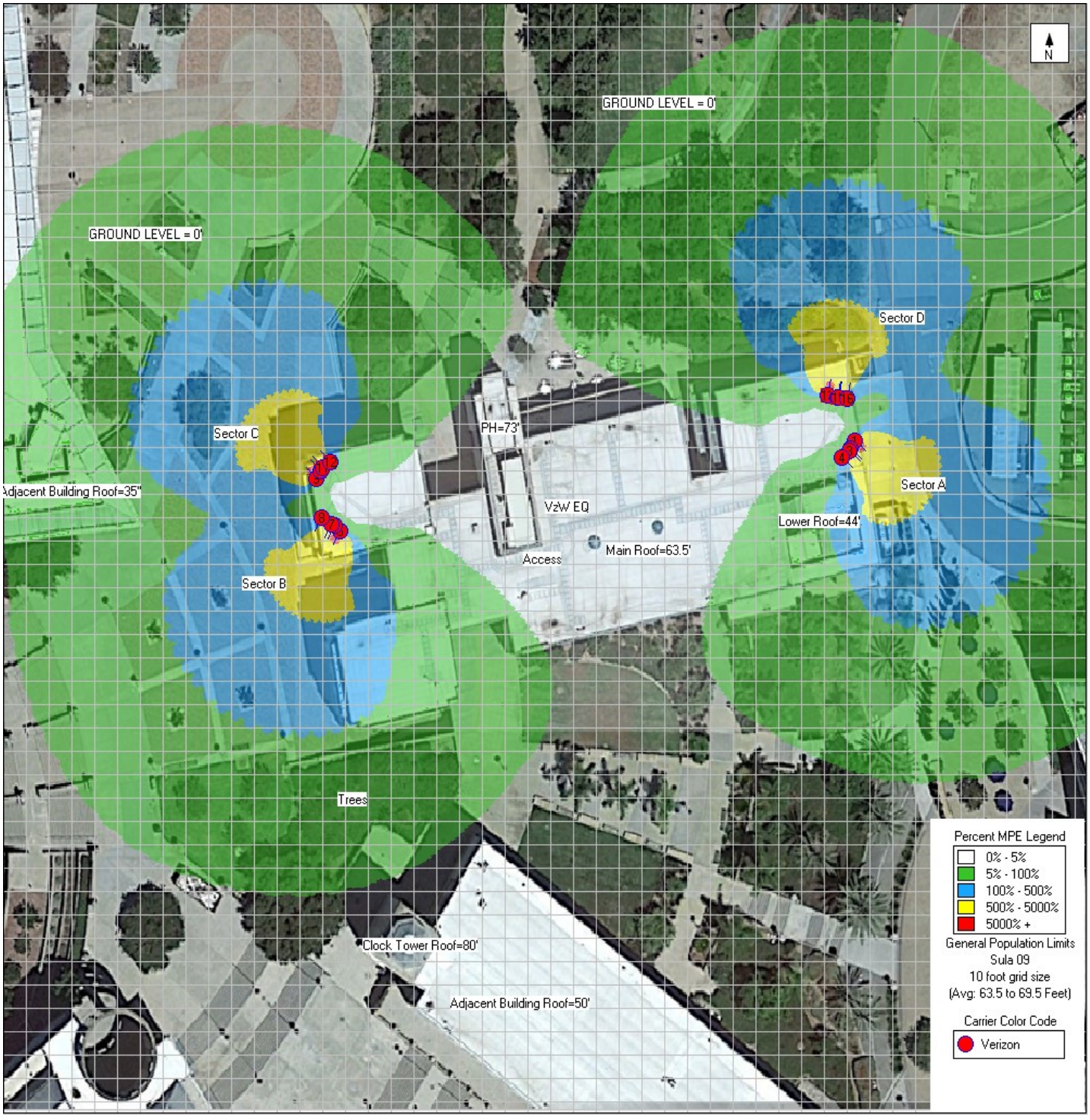
Note that EBI's scope of work is limited to an evaluation of the Radio Frequency – Electromagnetic Energy (RF-EME) field generated by the antennas and broadcast equipment noted in this report. The engineering and design of the building and related structures, as well as the impact of the antennas and broadcast equipment on the structural integrity of the building, are specifically excluded from EBI's scope of work.

Appendix B

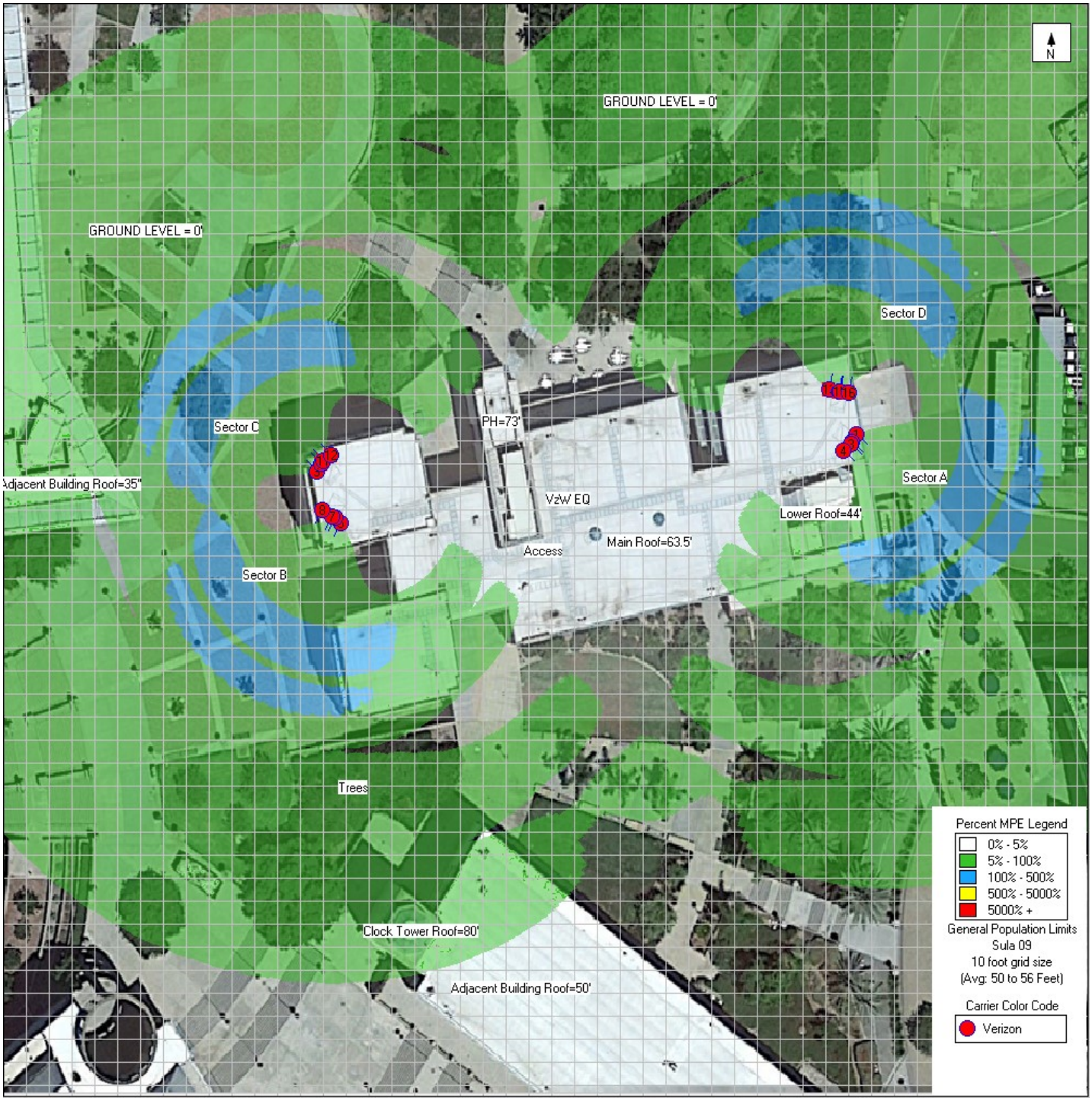
Radio Frequency Electromagnetic Energy

Safety Information and Signage Plans

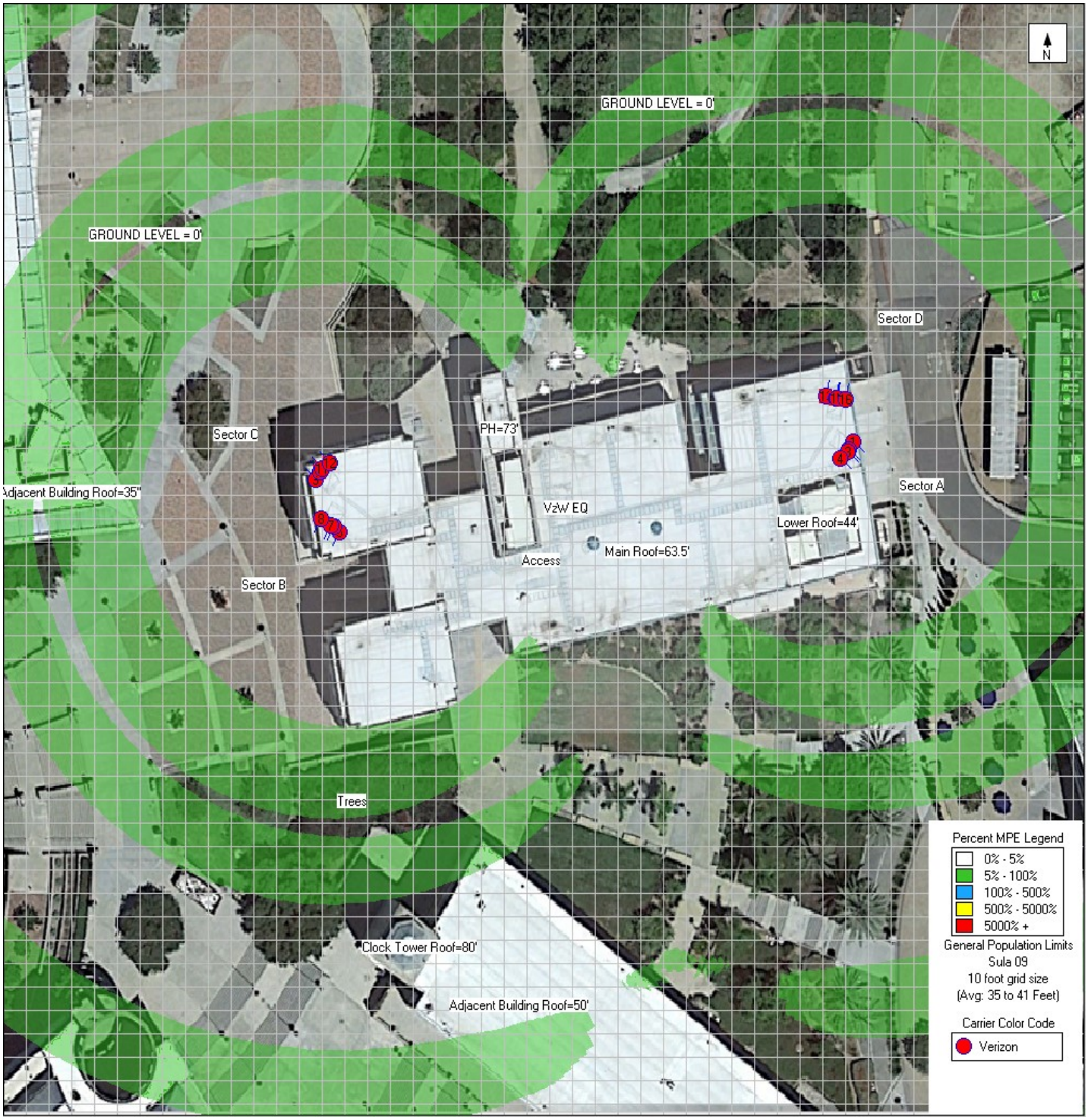
Nearest Walking Surface – Main Rooftop Level Simulation



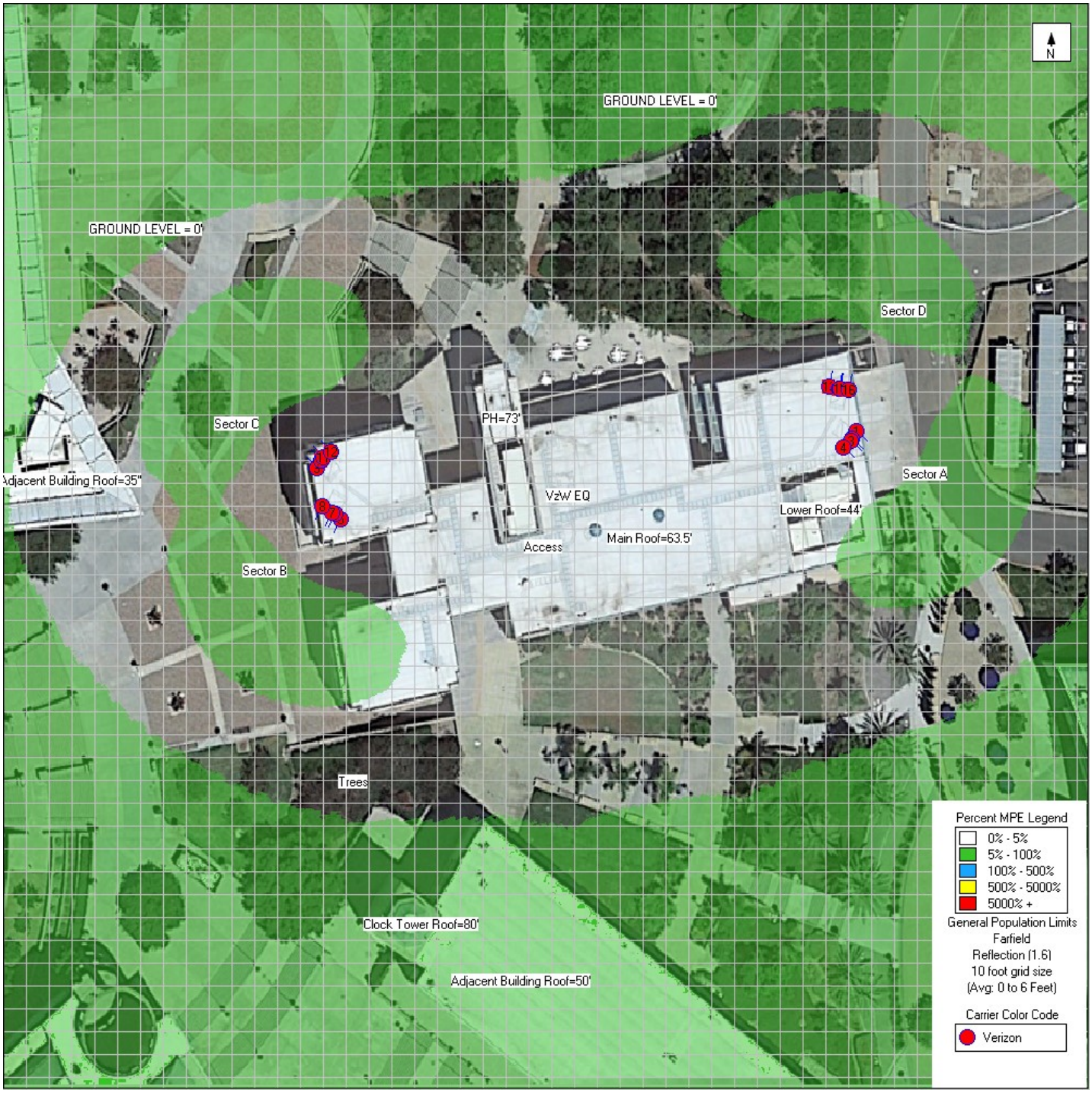
Adjacent South Building Rooftop

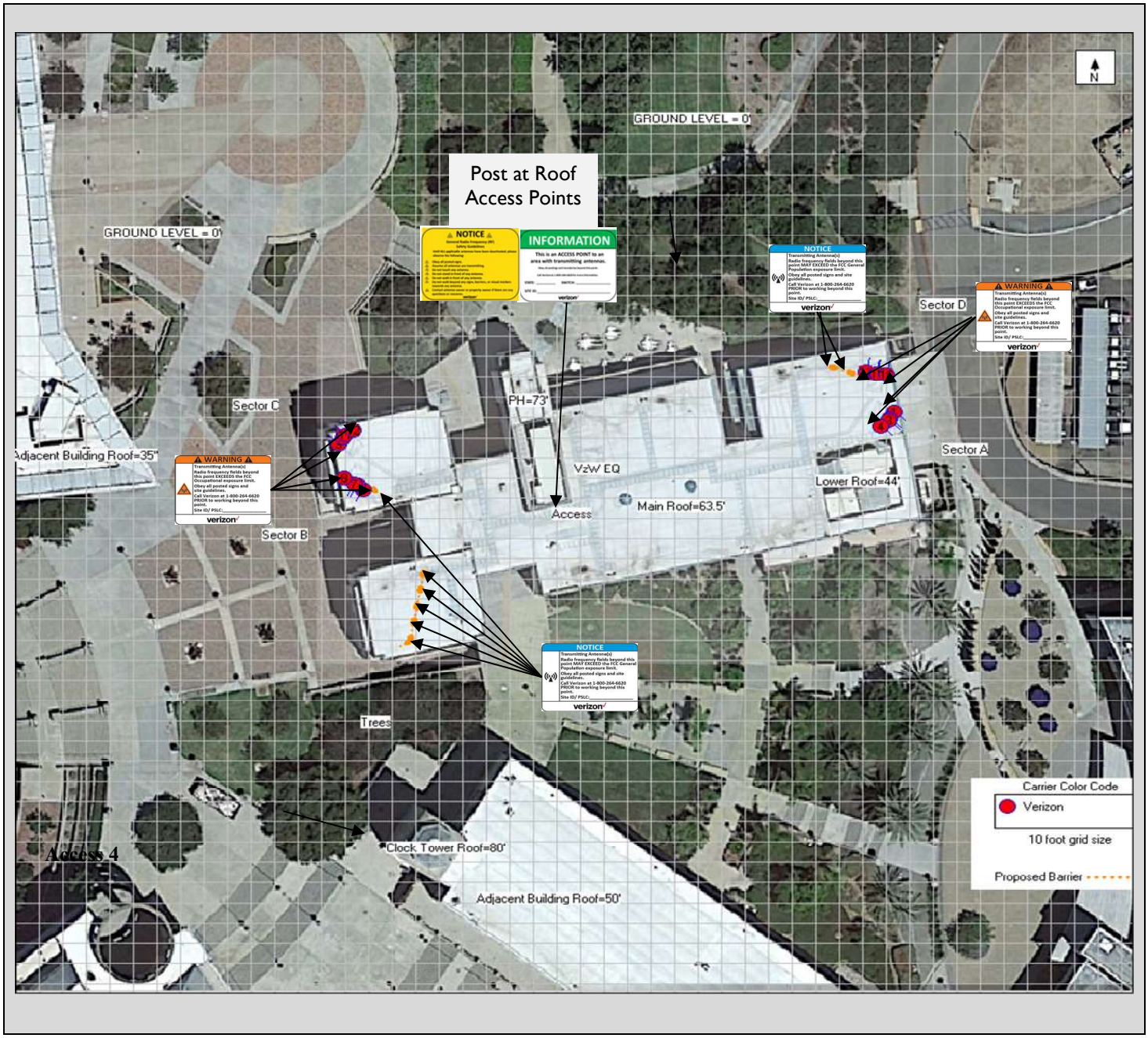


Adjacent Northwest Building Rooftop



Ground Level





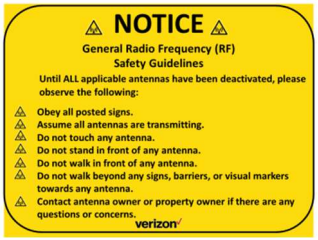
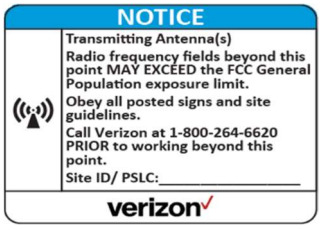
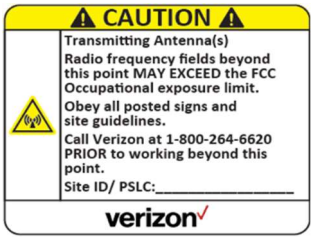
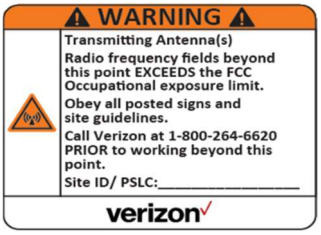
Sign	Posting Instructions	Required Signage / Mitigation
	Securely post at every point of access to the site in a manner conspicuous to all individuals entering thereon as indicated in the signage plan.	1 on each of the roof access doors
	Securely post at every point of access to the site in a manner conspicuous to all individuals entering thereon as indicated in the signage plan.	1 on each of the roof access doors
	Securely post on the proposed barrier in a manner conspicuous to all individuals entering thereon as indicated in the signage plan.	2 on approaching sides and front of barrier at Sector D 6 on approaching sides and front of barrier at Sector B

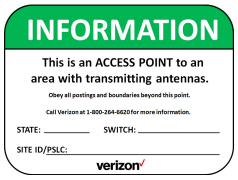
	N/A	N/A
	Securely post on the sides of the antenna sled in a manner conspicuous to all individuals entering thereon as indicated in the signage plan.	2 on approaching sides of Sector A 2 on approaching sides of Sector B 2 on approaching sides of Sector C 2 on approaching sides of Sector D

RF Signage and Safety Information

RF Signage

Areas or portions of any transmitter site may be susceptible to high power densities that could cause personnel exposures in excess of the FCC guidelines. These areas must be demarcated by conspicuously posted signage that identifies the potential exposure. Signage MUST be viewable regardless of the viewer's position.

GUIDELINES	Category Two - Notice	Category Three - Caution	Category Four - Warning
This sign will inform anyone of the basic precautions to follow when entering an area with transmitting radiofrequency equipment.	This sign indicates that RF emissions may exceed the FCC General Population MPE limit. • Sign Color Blue • Sign Signal Word "Notice"	This sign indicates that RF emissions may exceed the FCC Occupational MPE limit. • Sign Color Yellow • Sign Signal Word "Caution"	This sign indicates that RF emissions may exceed at least 10x the FCC Occupational MPE limit. • Sign Color Orange for Warning • Sign Signal Word "Warning"
			

Category One - Information	
Information signs are used as a means to provide contact information for any questions or concerns. They will include specific cell site identification information and the Verizon Wireless Network Operations Center phone number. • Sign Color Green • Sign Signal Word "Information"	

Physical Barriers

Physical barriers are control measures that require awareness and participation of personnel. Physical barriers are employed as an additional administration control to complement RF signage and physically demarcate an area in which RF exposure levels may exceed the FCC General Population limit. **Example:** chain-connected stanchions

Indicative Markers

Indicative markers are visible control measures that require awareness and participation of personnel, as they cannot physically prevent someone from entering an area of potential concern. Indicative markers are employed as an additional administration control to complement RF signage and visually demarcate an area in which RF exposure levels may exceed the FCC General Population limit. **Example:** paint stripes

Occupational Safety and Health Administration (OSHA) Requirements

A formal adopter of FCC Standards, OSHA stipulates that those in the Occupational classification must complete training in the following: RF Safety, RF Awareness, and Utilization of Personal Protective Equipment. OSHA also provides options for Hazard Prevention and Control:

Hazard Prevention	Control
• Utilization of good equipment • Enact control of hazard areas • Limit exposures • Employ medical surveillance and accident response	• Employ Lockout/Tag out • Utilize personal alarms & protective clothing • Prevent access to hazardous locations • Develop or operate an administrative control program

Appendix C

Federal Communications

Commission (FCC) Requirements

The FCC has established Maximum Permissible Exposure (MPE) limits for human exposure to Radiofrequency Electromagnetic (RF-EME) energy fields, 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 guidelines incorporate two separate tiers of exposure limits that are based upon occupational/controlled exposure limits (for workers) and general public/uncontrolled exposure limits for members of the general public.

Occupational/controlled exposure limits apply to situations in which 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 public/uncontrolled limits (see below), 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.

General public/uncontrolled exposure limits apply to situations in which the general public may be 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 would always be considered under this category when exposure is not employment-related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

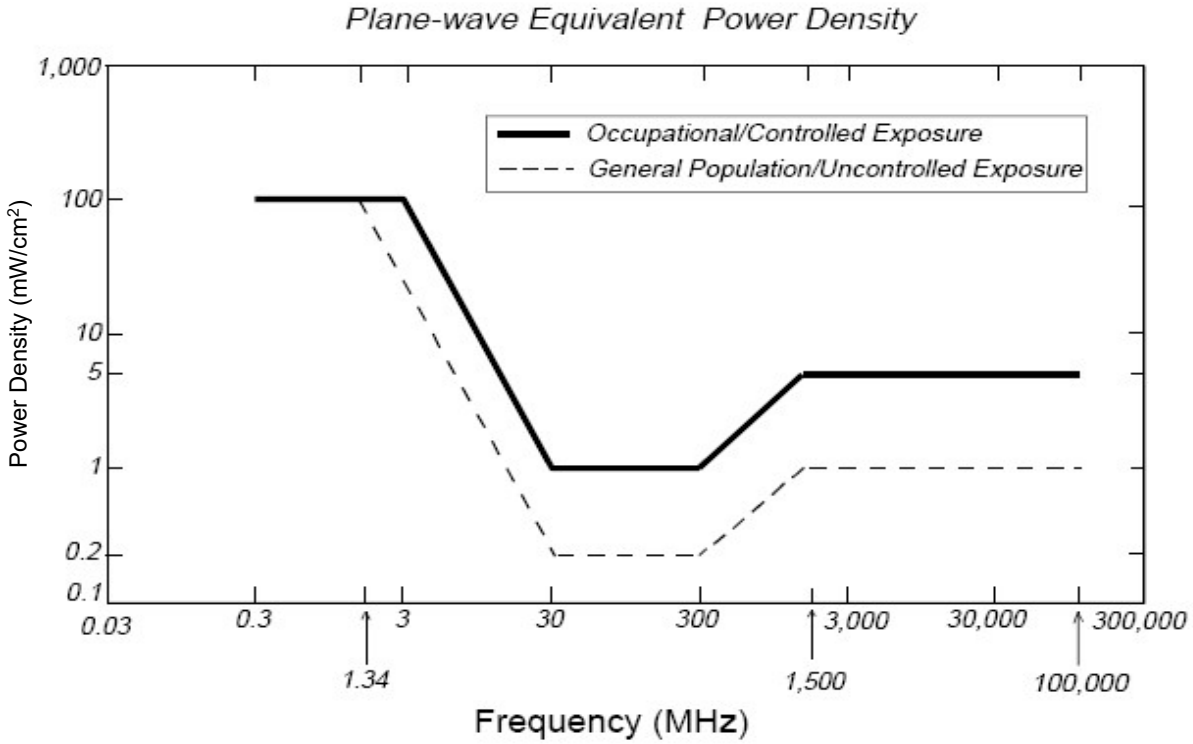
Table 1 and Figure 1 (below), which are included within the FCC's OET Bulletin 65, summarize the MPE limits for RF emissions. These limits are designed to provide a substantial margin of safety. They vary by frequency to take into account the different types of equipment that may be in operation at a particular facility and are "time-averaged" limits to reflect different durations resulting from controlled and uncontrolled exposures.

The FCC's MPEs are measured in terms of power (mW) over a unit surface area (cm^2). Known as the power density, the FCC has established for equipment operating at frequencies range from 300 Mhz to 1,500 Mhz the Occupational/Controlled limit of (f/300) mW/cm^2 where f is the Frequency in (MHz) and the General Population / Uncontrolled limit of (f/1500) mW/cm^2 where f is the Frequency in (MHz). For equipment operating at frequency ranges from 1900 MHz to 100,000 MHz, the FCC's occupational MPE is 5.0 mW/cm^2 and an uncontrolled MPE limit of 1.0 mW/cm^2. These limits are considered protective of these populations.

Table 1: 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
300-1,500	--	--	f/300	6
1,500-100,000	--	--	5	6
(B) Limits for General Public/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
300-1,500	--	--	f/1,500	30
1,500-100,000	--	--	1.0	30

f = Frequency in (MHz)
* Plane-wave equivalent power density

Figure 1. FCC Limits for Maximum Permissible Exposure (MPE)



MPE limits are designed to provide a substantial margin of safety. 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.

Personal Communication (PCS) facilities used by Verizon in this area will potentially operate within a frequency range of 700 to 2100 MHz. Facilities typically consist of: 1) electronic transceivers (the radios or cabinets) connected to wired telephone lines; and 2) antennas that send the wireless signals created by the transceivers to be received by individual subscriber units (PCS telephones). Transceivers are typically connected to antennas by coaxial cables.

Because of the short wavelength of PCS services, the antennas require line-of-site paths for good propagation, and are typically installed above ground level. Antennas are constructed to concentrate energy towards the horizon, with as little energy as possible scattered towards the ground or the sky. This design, combined with the low power of PCS facilities, generally results in no possibility for exposure to approach Maximum Permissible Exposure (MPE) levels, with the exception of areas directly in front of the antennas.

FCC Compliance Requirement

A site is considered out of compliance with FCC regulations if there are areas that exceed the FCC exposure limits and there are no RF hazard mitigation measures in place. Any carrier which has an installation that contributes more than 5% of the applicable MPE must participate in mitigating these RF hazards.

Appendix B: EBI Consulting Report dated January 12, 2024

Attachment 1

Radio Frequency - Electromagnetic Energy (RF-EME) Jurisdictional Report

CSUSM Campus Temp
333 Twin Oaks Valley Rd
San Marcos, California 92096
San Diego County
33° 7' 43.43" N, -117° 9' 30.85" W NAD83

EBI Project No. 6223002808
January 12, 2024

Prepared for:

Verizon Wireless
15505 Sand Canyon Ave
Irvine, CA 92618

Prepared by:

EBI Consulting
environmental | engineering | due diligence

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APPENDICES

EXECUTIVE SUMMARY

Purpose of Report

EnviroBusiness Inc. (dba EBI Consulting) has been contracted by Verizon Wireless ("Verizon") to conduct radio frequency electromagnetic (RF-EME) modeling for Verizon Site: CSUSM Campus Temp located at 333 Twin Oaks Valley Rd in San Marcos, California to determine RF-EME exposure levels from proposed Verizon communications equipment at this site. As described in greater detail in Appendix C of this report, the Federal Communications Commission (FCC) has developed Maximum Permissible Exposure (MPE) Limits for the general public and for occupational activities. This report summarizes the results of RF-EME modeling in relation to relevant FCC RF-EME compliance standards for limiting human exposure to RF-EME fields.

Statement of Compliance

A site is considered out of compliance with FCC regulations if there are areas that exceed the FCC exposure limits and there are no RF hazard mitigation measures in place. Any carrier which has an installation that contributes more than 5% of the applicable MPE must participate in mitigating these RF hazards.

As presented in the sections below, based on worst-case predictive modeling, the worst-case emitted power density may exceed the FCC's general public limit near Verizon's proposed antennas at the main roof level. Modeling also indicates that the worst-case emitted power density may exceed the FCC's occupational limit near Verizon's proposed antennas at the main roof level. Additionally, there are areas where workers who may be elevated above the rooftop or ground may be exposed to power densities greater than the occupational limits. Therefore, workers should be informed about the presence and locations of antennas and their associated fields.

At the main rooftop level (nearest walking/working surfaces) to the Verizon antennas, the maximum power density generated by the Verizon antennas is approximately **5,787.13** percent of the FCC's general public limit (**1,157.43** percent of the FCC's occupational limit).

The composite exposure from the proposed Verizon Wireless antennas at this facility in all areas at the **Ground level** is found to be well below the General Population MPE limit in any publicly accessible areas.

Recommended control measures are outlined in Section 4.0 and within the Site Safety Plan (attached); Verizon should also provide procedures to shut down and lockout/tagout this wireless equipment in accordance with Verizon's standard operating protocol. Non-telecom workers who will be working in areas of exceedance are required to contact Verizon since only Verizon has the ability to lockout/tagout the facility, or to authorize others to do so.

1.0 INTRODUCTION

Radio frequency waves are electromagnetic waves from the portion of the electromagnetic spectrum at frequencies lower than visible light and microwaves. The wavelengths of radio waves range from thousands of meters to around 30 centimeters. These wavelengths correspond to frequencies as low as 3 cycles per second (or hertz [Hz]) to as high as one gigahertz (one billion cycles per second).

Personal Communication (PCS) facilities used by Verizon in this area will potentially operate within a frequency range of 700 to 5000 MHz. Facilities typically consist of: 1) electronic transceivers (the radios or cabinets) connected to wired telephone lines; and 2) antennas that send the wireless signals created by the transceivers to be received by individual subscriber units (PCS telephones). Transceivers are typically connected to antennas by coaxial cables.

Because of the short wavelength of PCS services, the antennas require line-of-site paths for good propagation, and are typically installed a distance above ground level. Antennas are constructed to concentrate energy towards the horizon, with as little energy as possible scattered towards the ground or the sky. This design, combined with the low power of PCS facilities, generally results in no possibility for exposure to approach Maximum Permissible Exposure (MPE) levels, with the exception of in areas in the immediate vicinity of the antennas.

MPE limits do not represent levels where a health risk exists, since they are designed to provide a substantial margin of safety. 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.

2.0 SITE DESCRIPTION

This project site includes the following proposed wireless telecommunication antennas on a rooftop located at 333 Twin Oaks Valley Rd in San Marcos, California.

Ant #	Sector	Operator	Antenna Make	Antenna Model	Technology and Frequency (MHz)	Azimuth (Degrees)	Mechanical Downtilt (Degrees)	Horizontal Beamwidth (Degrees)	Aperture (feet)	Total Power Input (Watts)	Transmitter Count	Antenna Gain (dBd)	Total ERP (Watts)	Total EIRP (Watts)
1	Alpha	Verizon	ERICSSON	SON_AIR6449 NR TB 03.24.21 3700 VZW	L-Sub6 3700	130	0	11	2.8	320	1	23.55	72468.62	118848.53
2	Alpha	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 700	LTE 700	130	0	65	8.0	80	2	13.2	1671.44	2741.16
2	Alpha	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 850	LTE/5G 850	130	0	62	8.0	80	2	13.53	1803.39	2957.56
2	Alpha	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 1900	LTE 1900	130	0	66	8.0	80	4	15.17	2630.81	4314.53
3	Alpha	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 700	LTE 700	130	0	65	8.0	80	2	13.2	1671.44	2741.16
3	Alpha	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 850	LTE/5G 850	130	0	62	8.0	80	2	13.53	1803.39	2957.56
3	Alpha	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 2100	AWS 2100	130	0	62	8.0	160	4	15.82	6111.11	10022.22
3	Alpha	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 2100	AWS3 2100	130	0	62	8.0	80	4	15.82	3055.55	5011.11
4	Alpha	Verizon	ERICSSON	KRE105281-1 3500	CBRS 3500	130	0	64	0.7	20	4	9.36	172.60	283.06
5	Beta	Verizon	ERICSSON	SON_AIR6449 NR TB 03.24.21 3700 VZW	L-Sub6 3700	210	0	11	2.8	320	1	23.55	72468.62	118848.53
6	Beta	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 700	LTE 700	210	0	65	8.0	80	2	13.2	1671.44	2741.16
6	Beta	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 850	LTE/5G 850	210	0	62	8.0	80	2	13.53	1803.39	2957.56
6	Beta	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 1900	LTE 1900	210	0	66	8.0	80	4	15.17	2630.81	4314.53
7	Beta	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 700	LTE 700	210	0	65	8.0	80	2	13.2	1671.44	2741.16
7	Beta	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 850	LTE/5G 850	210	0	62	8.0	80	2	13.53	1803.39	2957.56

Ant #	Sector	Operator	Antenna Make	Antenna Model	Technology and Frequency (MHz)	Azimuth (Degrees)	Mechanical Downtilt (Degrees)	Horizontal Beamwidth (Degrees)	Aperture (feet)	Total Power Input (Watts)	Transmitter Count	Antenna Gain (dBd)	Total ERP (Watts)	Total EIRP (Watts)
7	Beta	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 2100	AWS 2100	210	0	62	8.0	240	4	15.82	9166.66	15033.33
7	Beta	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 2100	AWS3 2100	210	0	62	8.0	80	4	15.82	3055.55	5011.11
8	Beta	Verizon	ERICSSON	KRE105281-1 3500	CBRS 3500	210	0	64	0.7	20	4	9.36	172.60	283.06
9	Gamma	Verizon	ERICSSON	SON_AIR6449 NR TB 03.24.21 3700 VZW	L-Sub6 3700	320	0	11	2.8	320	1	23.55	72468.62	118848.53
10	Gamma	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 700	LTE 700	320	0	65	8.0	80	2	13.2	1671.44	2741.16
10	Gamma	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 850	LTE/5G 850	320	0	62	8.0	80	2	13.53	1803.39	2957.56
10	Gamma	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 1900	LTE 1900	320	0	66	8.0	80	4	15.17	2630.81	4314.53
11	Gamma	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 700	LTE 700	320	0	65	8.0	80	2	13.2	1671.44	2741.16
11	Gamma	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 850	LTE/5G 850	320	0	62	8.0	80	2	13.53	1803.39	2957.56
11	Gamma	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 2100	AWS 2100	320	0	62	8.0	160	4	15.82	6111.11	10022.22
11	Gamma	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 2100	AWS3 2100	320	0	62	8.0	80	4	15.82	3055.55	5011.11
12	Gamma	Verizon	ERICSSON	KRE105281-1 3500	CBRS 3500	320	0	64	0.7	20	4	9.36	172.60	283.06
13	Delta	Verizon	ERICSSON	SON_AIR6449 NR TB 03.24.21 3700 VZW	L-Sub6 3700	10	0	11	2.8	320	1	23.55	72468.62	118848.53
14	Delta	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 700	LTE 700	10	0	65	8.0	80	2	13.2	1671.44	2741.16
14	Delta	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 850	LTE/5G 850	10	0	62	8.0	80	2	13.53	1803.39	2957.56
14	Delta	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 1900	LTE 1900	10	0	66	8.0	80	4	15.17	2630.81	4314.53
15	Delta	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 700	LTE 700	10	0	65	8.0	80	2	13.2	1671.44	2741.16
15	Delta	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 850	LTE/5G 850	10	0	62	8.0	80	2	13.53	1803.39	2957.56
15	Delta	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 2100	AWS 2100	10	0	62	8.0	160	4	15.82	6111.11	10022.22
16	Delta	Verizon	COMMSCOPE	NHH-65C-R2B 00DT 2100	AWS3 2100	10	0	62	8.0	80	4	15.82	3055.55	5011.11
16	Delta	Verizon	ERICSSON	KRE105281-1 3500	CBRS 3500	10	0	64	0.7	20	4	9.36	172.60	283.06
17	Alpha	Unknown	CISCO	AIR-ANT2524V4C R 5800	5800	0	0	360	0.6	5	1	1.85	7.92	13
18	Beta	Unknown	DECIBEL	DB404 450	450	0	0	360	5.0	50	1	3.8	120	196.87

• Note there are 4 Verizon antennas per sector at this site. For clarity, the different frequencies for each antenna are entered on separate lines.

Ant #	NAME	X	Y	Antenna Radiation Centerline	Z-Height Clock Tower Building Level	Z-Height Penthouse Roof Level	Z-Height Main Roof Level	Z-Height Adjacent SE Building Roof	Z-Height Adjacent South Building Roof	Z-Height Adjacent Building Roof	Z-Height Ground
1	Verizon	366.0	140.5	71.0	-9.0	-2.0	7.5	-4.0	21.0	36.0	71.0
2	Verizon	364.1	137.3	71.0	-9.0	-2.0	7.5	-4.0	21.0	36.0	71.0
3	Verizon	363.7	136.3	71.0	-9.0	-2.0	7.5	-4.0	21.0	36.0	71.0
4	Verizon	360.4	133.5	71.0	-9.0	-2.0	7.5	-4.0	21.0	36.0	71.0
5	Verizon	144.7	102.7	71.0	-9.0	-2.0	7.5	-4.0	21.0	36.0	71.0
6	Verizon	142.4	105.0	71.0	-9.0	-2.0	7.5	-4.0	21.0	36.0	71.0
7	Verizon	141.0	105.5	71.0	-9.0	-2.0	7.5	-4.0	21.0	36.0	71.0
8	Verizon	136.8	108.3	71.0	-9.0	-2.0	7.5	-4.0	21.0	36.0	71.0
9	Verizon	134.5	124.7	71.0	-9.0	-2.0	7.5	-4.0	21.0	36.0	71.0
10	Verizon	136.3	127.9	71.0	-9.0	-2.0	7.5	-4.0	21.0	36.0	71.0

11	Verizon	137.3	129.3	71.0	-9.0	-2.0	7.5	-4.0	21.0	36.0	71.0
12	Verizon	140.5	131.7	71.0	-9.0	-2.0	7.5	-4.0	21.0	36.0	71.0
13	Verizon	354.3	159.7	71.0	-9.0	-2.0	7.5	-4.0	21.0	36.0	71.0
14	Verizon	358.5	158.7	71.0	-9.0	-2.0	7.5	-4.0	21.0	36.0	71.0
15	Verizon	359.0	158.7	71.0	-9.0	-2.0	7.5	-4.0	21.0	36.0	71.0
16	Verizon	362.7	158.3	71.0	-9.0	-2.0	7.5	-4.0	21.0	36.0	71.0
17	Unknown	129.3	123.7	69.0	-11.0	-4.0	5.5	-6.0	19.0	34.0	69.0
18	Unknown	226.4	113.0	76.0	-4.0	3.0	12.5	1.0	26.0	41.0	76.0

• Note the Z-Height represents the distance from the antenna centerline.

The above tables contain an inventory of proposed Verizon Antennas and other carrier antennas if sufficient information was available to model them. Note that EBI uses an assumed set of antenna specifications and powers for unknown and other carrier antennas for modeling purposes. The FCC guidelines incorporate two separate tiers of exposure limits that are based upon occupational/controlled exposure limits (for workers) and general population/uncontrolled exposure limits for members of the general public that may be exposed to antenna fields. While access to this site is considered uncontrolled, the analysis has considered exposures with respect to both controlled and uncontrolled limits as an untrained worker may access adjacent rooftop locations. Additional information regarding controlled/uncontrolled exposure limits is provided in Appendix C. Appendix B presents a site safety plan that provides a plan view of the rooftop with antenna locations.

EBI conducted a site visit on January 12, 2024 . At the time of the site visit, 2 other antennas were present on the rooftop. These other carriers were also included in the modeling analysis using elevations collected on site and assumed parameters. Appendix D contains site photos taken January 10, 2024 during the on-site survey. Appendix E presents a site plan indicating monitoring and antenna locations.

3.0 WORST-CASE PREDICTIVE MODELING

EBI has performed theoretical MPE modeling using RoofMaster™ software to estimate the worst-case power density at the site's nearby broadcast levels resulting from operation of the antennas. RoofMaster™ is a widely-used predictive modeling program that has been developed by Waterford Consultants to predict RF power density values for rooftop and tower telecommunications sites produced by vertical collinear antennas that are typically used in the cellular, PCS, paging and other communications services. Using the computational methods set forth in Federal Communications Commission (FCC) Office of Engineering & Technology (OET) Bulletin 65, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields" (OET-65), RoofMaster™ calculates predicted power density in a scalable grid based on the contributions of all RF sources characterized in the study scenario. At each grid location, the cumulative power density is expressed as a percentage of the FCC limits. Manufacturer antenna pattern data is utilized in these calculations. RoofMaster™ models consist of the Far Field model as specified in OET-65 and an implementation of the OET-65 Cylindrical Model (Sula9). The models utilize several operational specifications for different types of antennas to produce a plot of spatially-averaged power densities that can be expressed as a percentage of the applicable exposure limit.

For this report, EBI utilized antenna and power data provided by Verizon and compared the resultant worst-case MPE levels to the FCC's occupational/controlled exposure limits outlined in OET Bulletin 65. The assumptions used in the modeling are based upon information provided by Verizon and information gathered from other sources. The parameters used for modeling are summarized in the Site Description antenna inventory table in Section 2.0.

There were 2 other transmitting antennas installed at this site at the time of the site visit. *(See antenna table above)*

Based on worst-case predictive modeling, the worst-case emitted power density may exceed the FCC's general public limit within approximately 90 feet of Verizon's Sectors A, B, C and D antennas on the main roof level. Modeling also indicates that the worst-case emitted power density may exceed the FCC's occupational limit within approximately 40 feet of Verizon's Sectors A, B, C and D antennas on the main roof level. At the rooftop/ nearest walking/working surfaces to the Verizon antennas, the maximum power density generated by the Verizon antennas is approximately 5,787.13 percent of the FCC's general public limit (1,157.43 percent of the FCC's occupational limit).

The Site Safety Plan also presents areas where Verizon Wireless antennas contribute greater than 5% of the applicable MPE limit for a site. A site is considered out of compliance with FCC regulations if there are areas that exceed the FCC exposure limits and there are no RF hazard mitigation measures in place. Any carrier which has an installation that contributes more than 5% of the applicable MPE must participate in mitigating these RF hazards.

At the nearest walking/working surfaces to the Verizon antennas, the maximum power density generated by the Verizon antennas is approximately 5,787.13 percent of the FCC's general public limit (1,157.43 percent of the FCC's occupational limit). The composite exposure level from all carriers on this site is approximately 5,787.13 percent of the FCC's general public limit (1,157.43 percent of the FCC's occupational limit) at the nearest walking/working surface to each antenna.

The inputs used in the modeling are summarized in the Site Description antenna inventory table in Section 2.0. A graphical representation of the RoofMaster™ modeling results is presented in Appendix B. Microwave dish antennas are designed for point-to-point operations at the elevations of the installed equipment rather than ground level coverage. The maximum power density generated by all carrier antennas, including microwaves and panel antennas, is included in the modeling results presented within this report.

4.0 MITIGATION/SITE CONTROL OPTIONS

EBI's modeling indicates that there are areas in front of the Verizon antennas that exceed the FCC standards for general public exposure. Modeling also indicates that the worst-case emitted power density does exceed the FCC's occupational limit in front of the Verizon antennas. In order to alert people accessing the rooftop, a Guidelines sign and an NOC Information sign have been installed at each access point to the rooftop. Additionally, Orange Warning and Yellow Caution signs have been installed in front and behind the antenna sleds, respectively, on the roof level. Blue Notice signs have also recommened on the installed barriers on the sides of the Verizon Sectors A, B, C and D antennas. These signs have been placed in a conspicuous manner so that they are visible to any person approaching the barrier from any direction.

At the time of the site survey, it was noted that there were existing barriers in front of the Verizon Sectors A, B, C and D antennas. No additional barriers are recommended to comply with Verizon's guidance.

These protocols and recommended control measures have been summarized and included with a graphic representation of the antennas and associated signage and control areas in a RF-EME Site Safety Plan, which is included as Appendix B. Individuals and workers accessing the rooftop should be provided with a copy of the attached Site Safety Plan, made aware of the posted signage and barriers, and signify their understanding of the Site Safety Plan.

To reduce the risk of exposure, EBI recommends that access to areas associated with the active antenna installation be restricted and secured where possible. All workers and individuals, including arborists and landscapers, accessing the rooftop along with nearby elevated structures or trees within areas exceeding the general public MPE must be made aware of the presence and locations of antennas and their associated fields, where applicable. Implementation of the signage and barriers depicted in the Site Safety Plan and in this report will continue to bring this site into compliance with the FCC's rules and regulations.

5.0 SITE AND VICINITY SURVEY

RF-EME monitoring at 333 Twin Oaks Valley Rd in San Marcos, California. was conducted on January 10, 2024 .

Monitoring was performed using a Narda NBM-520 Electromagnetic Radiation Survey Meter, Serial #B-0496 with a Narda EA5091-shaped probe with a frequency range of 300kHz-50 GHz. The meter was last calibrated on November 29, 2017. This meter was programmed to measure the total power density for all electromagnetic radiation within the 300kHz-50GHz frequency range and report the power density as a percent of the FCC's controlled MPE. These monitoring locations and results are presented in Appendix E.

During this survey, the maximum spatially averaged reading recorded: 710.1% of the FCC's occupational MPE (3550.5% of the general public MPE) was encountered on the rooftop surface and in front of the Verizon's Sector B antennas. Proper mitigation and recommended control measures have been put in place to restrict individuals and workers accessing the rooftop to be exposed to the areas in excess of the MPE limits.

In addition, measurements were also taken at the top floor offices where no spatially averaged readings greater than 3.065% of the FCC's uncontrolled or general public MPE were encountered. A site plan depicting monitoring locations and measurements of power density can be found in Appendix E.

At the time of the site survey, it was noted that there was a yellow "Information" sign and a green "Information" sign on the access door to the roof to alert individuals of the presence of RF emitting equipment at the site. Also, as described in Section 4.0, the existing signage and barriers onsite comply with FCC and OSHA regulations for RF Safety.

6.0 SUMMARY AND CONCLUSIONS

EBI has prepared a Radiofrequency – Electromagnetic Energy (RF-EME) Compliance Report for telecommunications equipment installed by Verizon Site Number 617406755 located at 333 Twin Oaks Valley Rd in San Marcos, California to determine worst-case predicted RF-EME exposure levels from wireless communications equipment installed at this site. This report summarizes the results of RF-EME modeling in relation to relevant Federal Communications Commission (FCC) RF-EME compliance standards for limiting human exposure to RF-EME fields.

As presented in the sections above, based on the FCC criteria, the worst-case emitted power density may exceed the FCC's general public limit within approximately 90 feet of Verizon's proposed antennas at the main roof level. Modeling also indicates that the worst-case emitted power density may exceed the FCC's occupational limit within approximately 40 feet of Verizon's proposed antennas at the main roof level.

Workers should be informed about the presence and locations of antennas and their associated fields. Recommended control measures are outlined in Section 4.0 and within the Site Safety Plan (attached); Verizon should also provide procedures to shut down and lockout/tagout this wireless equipment in accordance with Verizon's standard operating protocol. Non-telecom workers who will be working in areas of exceedance are required to contact Verizon since only Verizon has the ability to lockout/tagout the facility, or to authorize others to do so.

7.0 LIMITATIONS

This report was prepared for the use of Verizon Wireless. It was performed in accordance with generally accepted practices of other consultants undertaking similar studies at the same time and in the same locale under like circumstances. The conclusions provided by EBI are based solely on the information provided by the client. The observations in this report are valid on the date of the investigation. Any additional information that becomes available concerning the site should be provided to EBI so that our conclusions may be revised and modified, if necessary. This report has been prepared in accordance with Standard Conditions for Engagement and authorized proposal, both of which are integral parts of this report. No other warranty, expressed or implied, is made.

Appendix A

Certifications

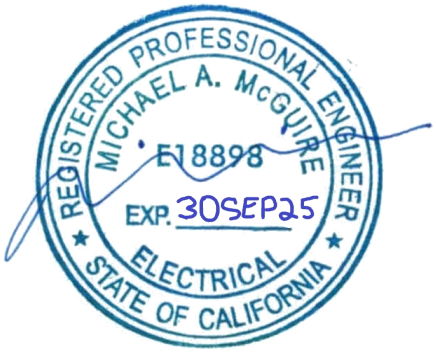
Preparer Certification

I, Kobi Thompson, state that:

- I am an employee of EnviroBusiness Inc. (d/b/a EBI Consulting), which provides RF-EME safety and compliance services to the wireless communications industry.
- I have successfully completed RF-EME safety training, and I am aware of the potential hazards from RF-EME and would be classified "occupational" under the FCC regulations.
- I am fully aware of and familiar with the Rules and Regulations of both the Federal Communications Commissions (FCC) and the Occupational Safety and Health Administration (OSHA) with regard to Human Exposure to Radio Frequency Radiation.
- I have reviewed the data provided by the client and incorporated it into this Site Compliance Report such that the information contained in this report is true and accurate to the best of my knowledge.

Kobi Thompson

Reviewed and Approved by:



sealed 12jan2024

Michael McGuire
Electrical Engineer
mike@h2dc.com

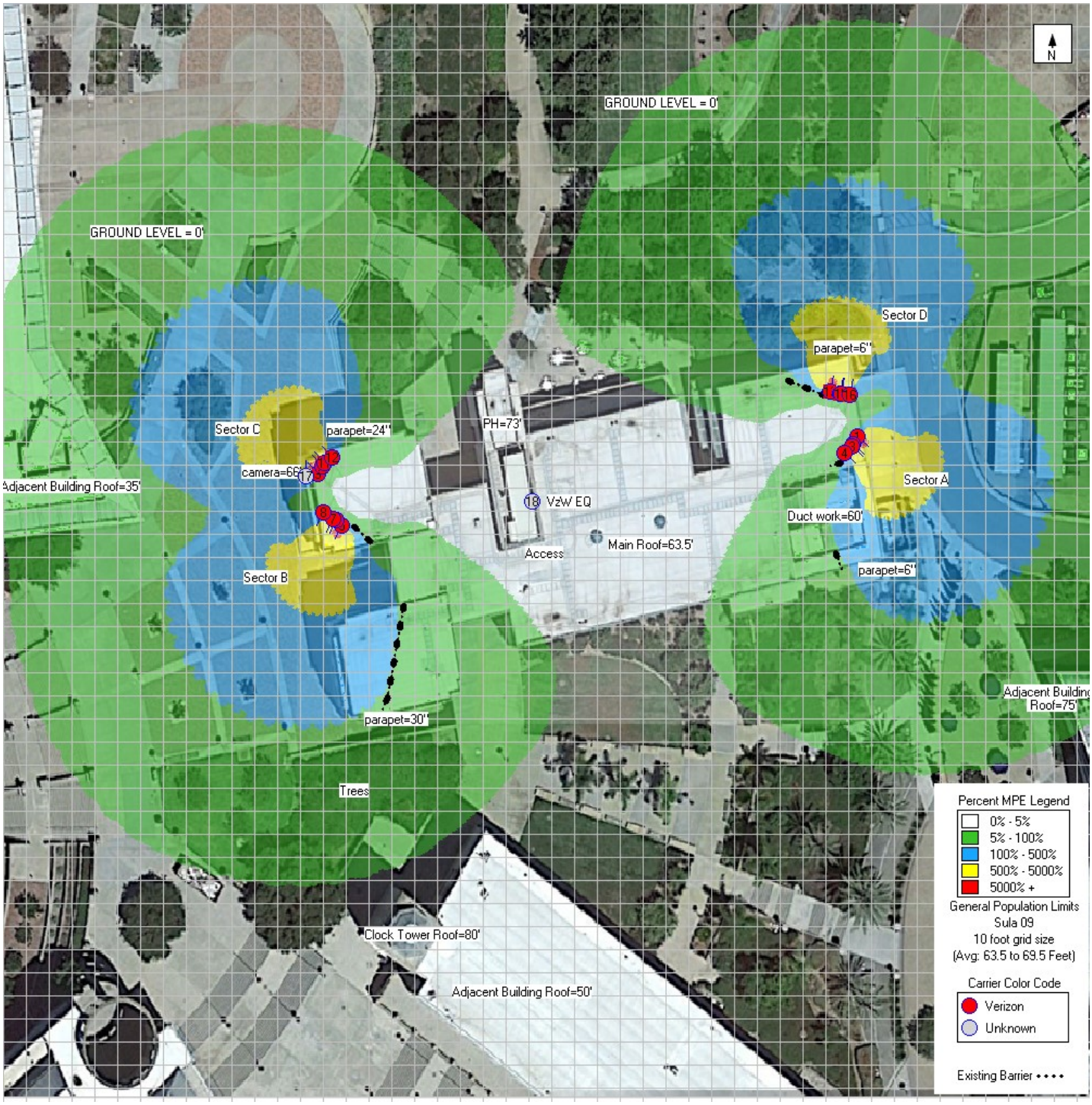
Note that EBI's scope of work is limited to an evaluation of the Radio Frequency – Electromagnetic Energy (RF-EME) field generated by the antennas and broadcast equipment noted in this report. The engineering and design of the building and related structures, as well as the impact of the antennas and broadcast equipment on the structural integrity of the building, are specifically excluded from EBI's scope of work.

Appendix B

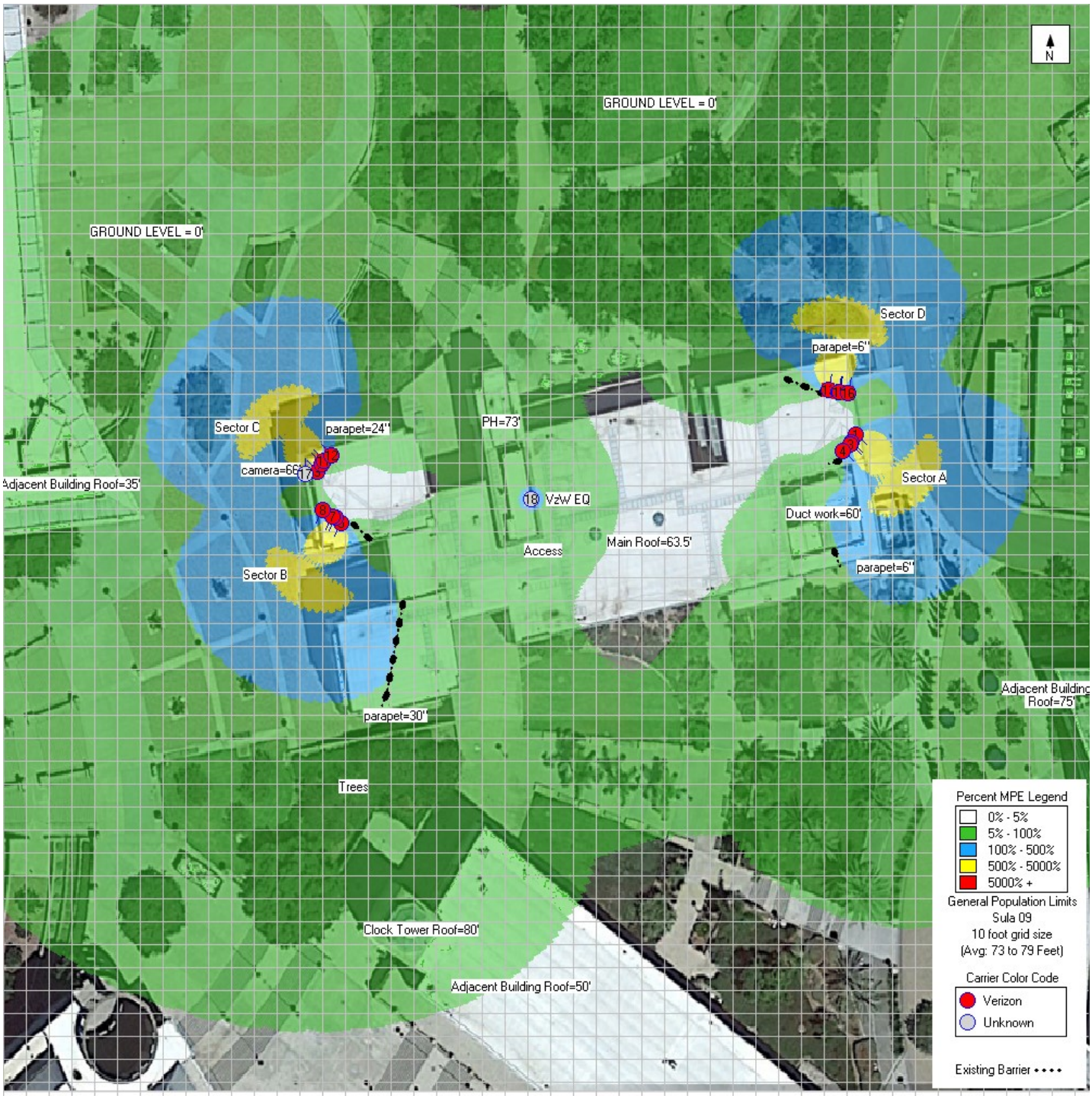
Radio Frequency Electromagnetic Energy

Safety Information and Signage Plans

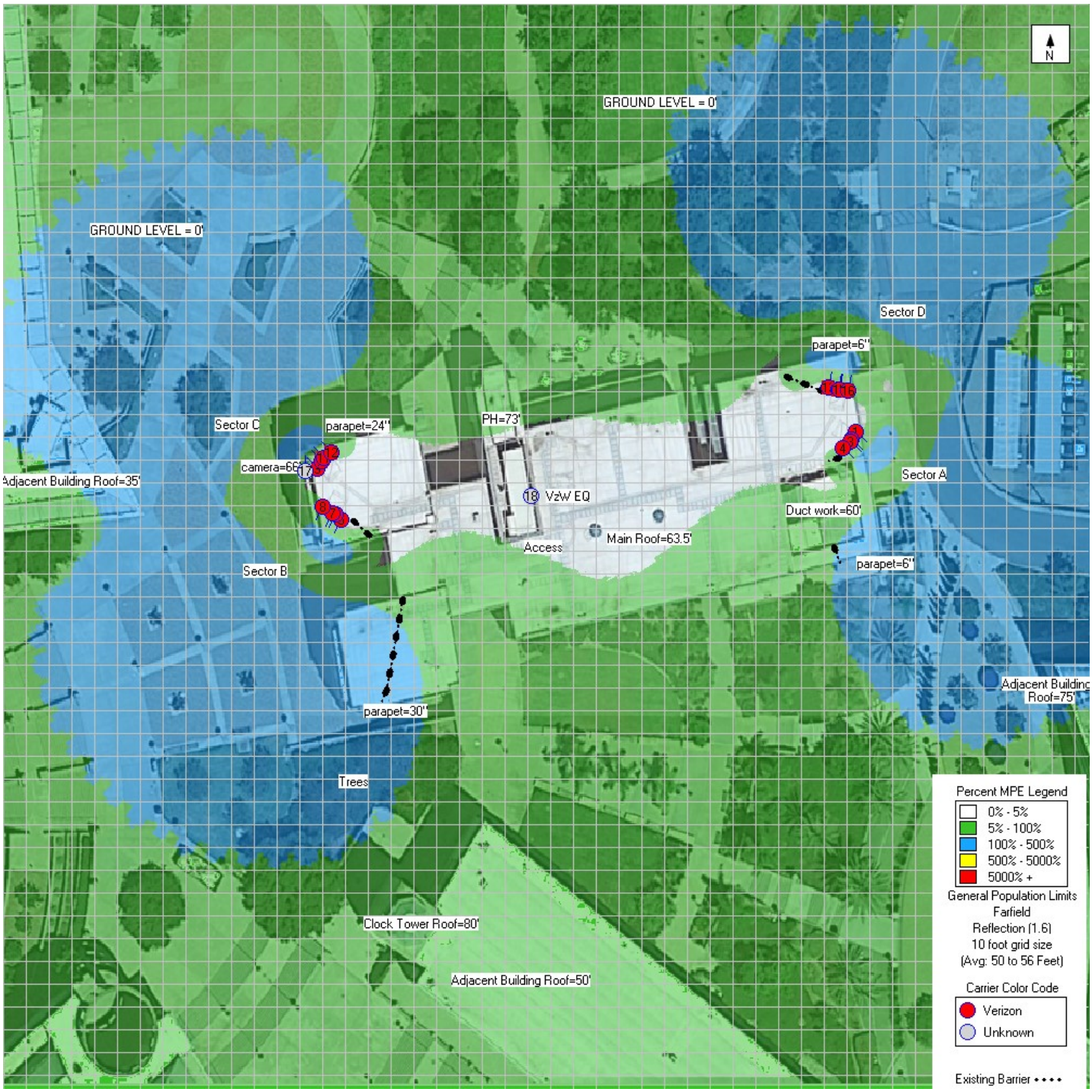
Nearest Walking Surface – Main Rooftop Level Simulation



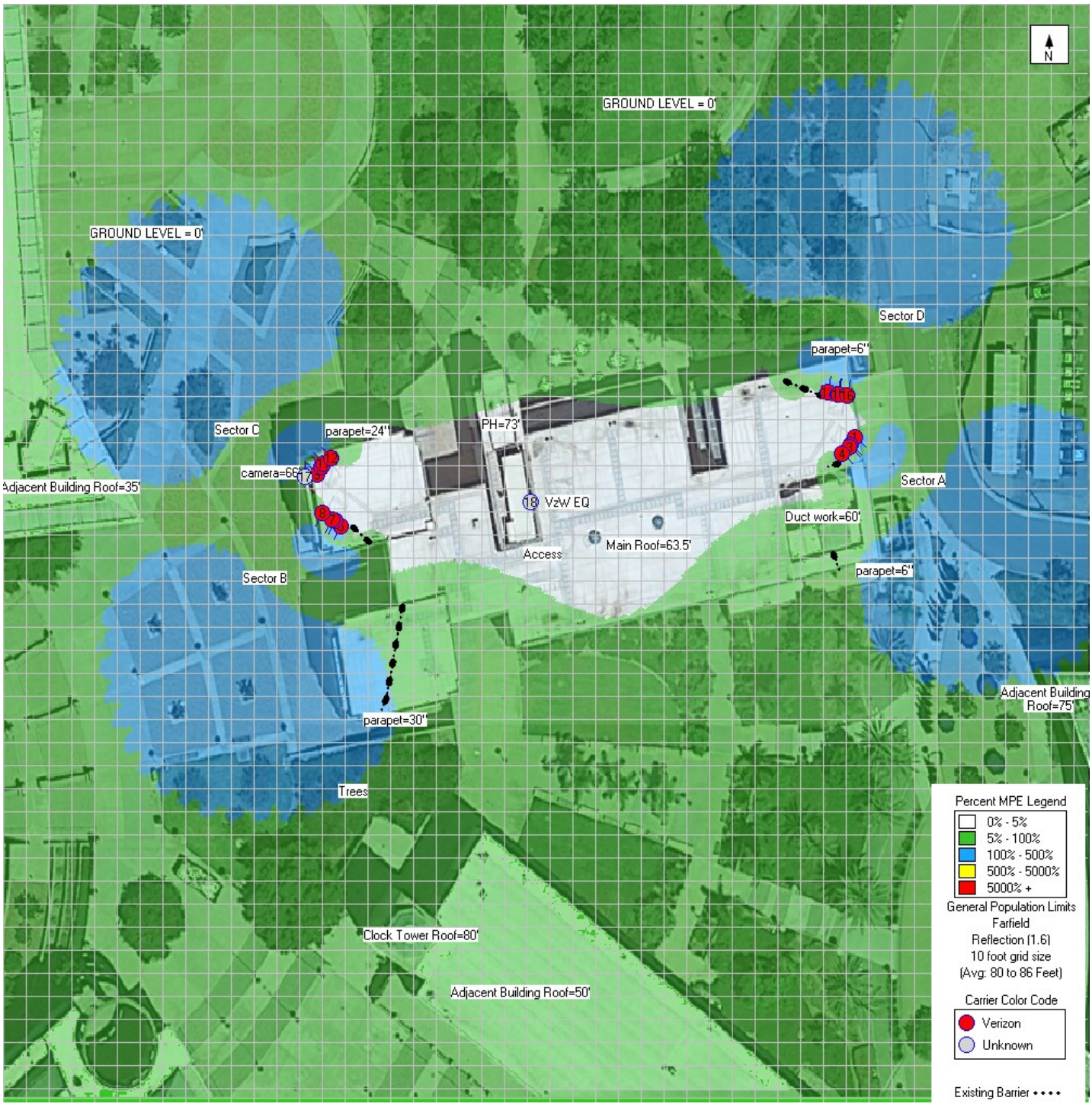
Adjacent Southeast Building Rooftop



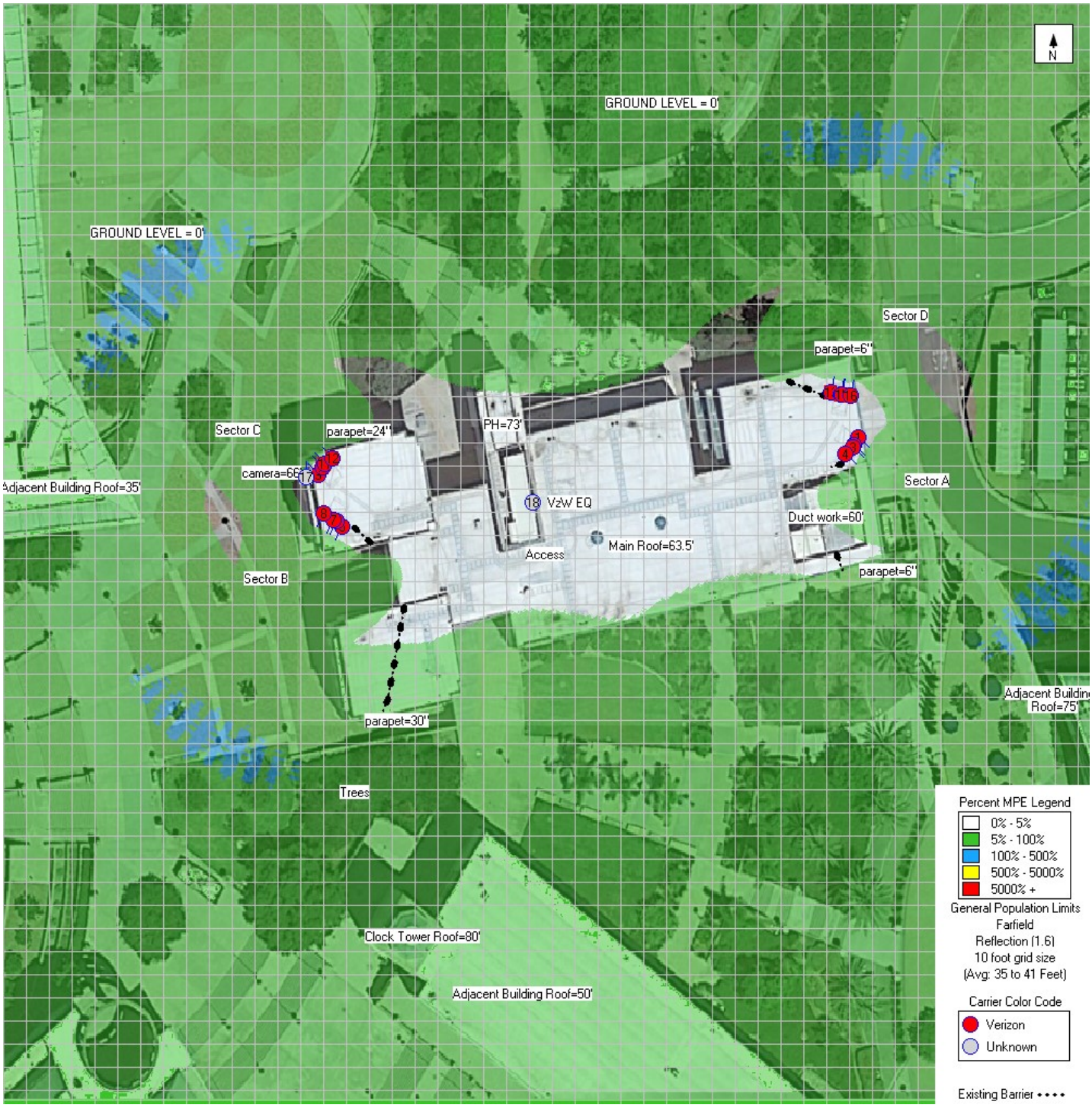
Adjacent South Building Rooftop



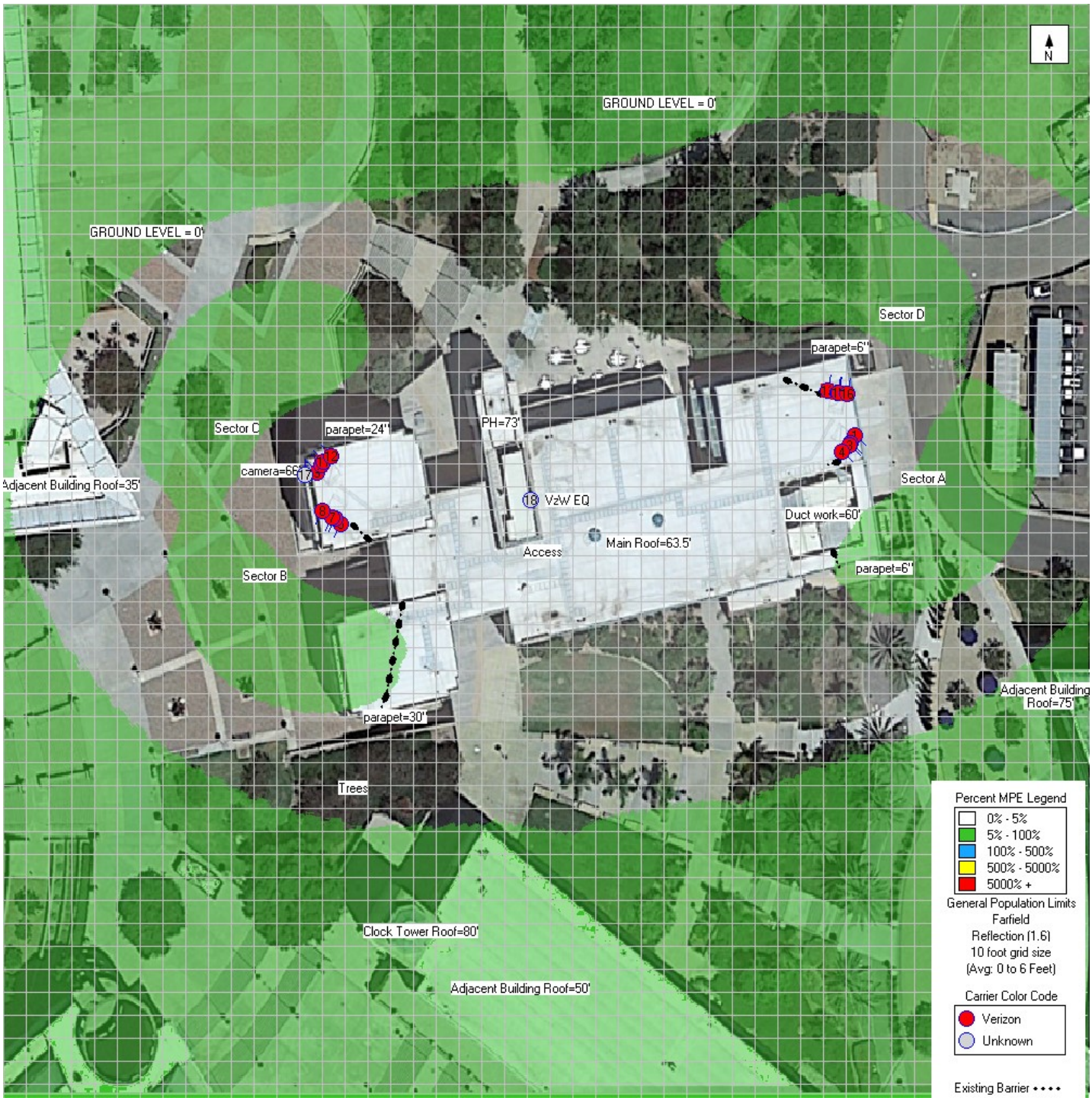
Adjacent South Clock Tower Building Roof Level

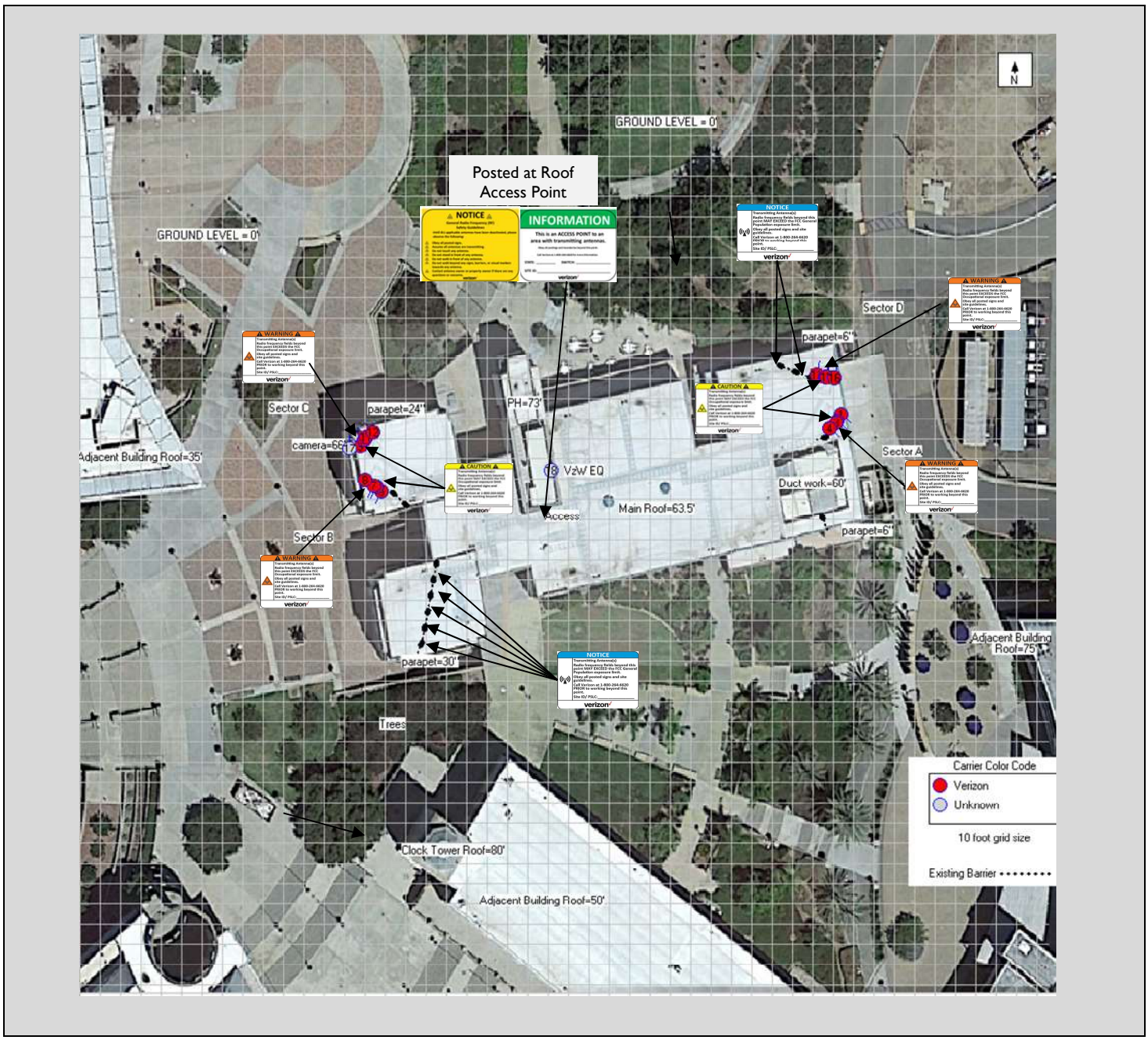


Adjacent Northwest Building Rooftop



Ground Level





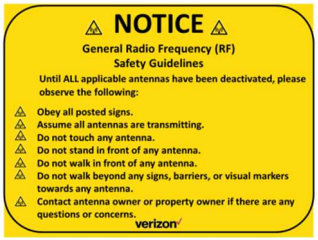
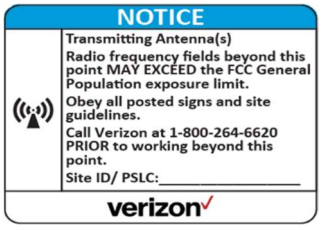
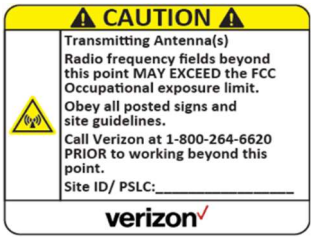
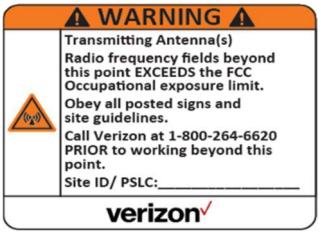
Sign	Posting Instructions	Required Signage / Mitigation
	N/A	N/A
	N/A	N/A
	N/A	N/A

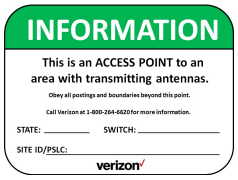
 CAUTION Transmitting Antenna(s) Radio frequency fields beyond this point MAY EXCEED the FCC Occupational exposure limit. Obey all posted signs and site guidelines. Call Verizon at 1-800-264-6620 PRIOR to working beyond this point. Site ID/ PSLC:_____ verizon	N/A	N/A
 WARNING Transmitting Antenna(s) Radio frequency fields beyond this point MAY EXCEED the FCC Occupational exposure limit. Obey all posted signs and site guidelines. Call Verizon at 1-800-264-6620 PRIOR to working beyond this point. Site ID/ PSLC:_____ verizon	N/A	N/A

RF Signage and Safety Information

RF Signage

Areas or portions of any transmitter site may be susceptible to high power densities that could cause personnel exposures in excess of the FCC guidelines. These areas must be demarcated by conspicuously posted signage that identifies the potential exposure. Signage MUST be viewable regardless of the viewer's position.

GUIDELINES	Category Two - Notice	Category Three - Caution	Category Four - Warning
This sign will inform anyone of the basic precautions to follow when entering an area with transmitting radiofrequency equipment.	This sign indicates that RF emissions may exceed the FCC General Population MPE limit. • Sign Color Blue • Sign Signal Word "Notice"	This sign indicates that RF emissions may exceed the FCC Occupational MPE limit. • Sign Color Yellow • Sign Signal Word "Caution"	This sign indicates that RF emissions may exceed at least 10x the FCC Occupational MPE limit. • Sign Color Orange for Warning • Sign Signal Word "Warning"
			

Category One - Information	
Information signs are used as a means to provide contact information for any questions or concerns. They will include specific cell site identification information and the Verizon Wireless Network Operations Center phone number. • Sign Color Green • Sign Signal Word "Information"	

Physical Barriers

Physical barriers are control measures that require awareness and participation of personnel. Physical barriers are employed as an additional administration control to complement RF signage and physically demarcate an area in which RF exposure levels may exceed the FCC General Population limit. **Example:** chain-connected stanchions

Indicative Markers

Indicative markers are visible control measures that require awareness and participation of personnel, as they cannot physically prevent someone from entering an area of potential concern. Indicative markers are employed as an additional administration control to complement RF signage and visually demarcate an area in which RF exposure levels may exceed the FCC General Population limit. **Example:** paint stripes

Occupational Safety and Health Administration (OSHA) Requirements

A formal adopter of FCC Standards, OSHA stipulates that those in the Occupational classification must complete training in the following: RF Safety, RF Awareness, and Utilization of Personal Protective Equipment. OSHA also provides options for Hazard Prevention and Control:

Hazard Prevention	Control
• Utilization of good equipment • Enact control of hazard areas • Limit exposures • Employ medical surveillance and accident response	• Employ Lockout/Tag out • Utilize personal alarms & protective clothing • Prevent access to hazardous locations • Develop or operate an administrative control program

Appendix C

Federal Communications

Commission (FCC) Requirements

The FCC has established Maximum Permissible Exposure (MPE) limits for human exposure to Radiofrequency Electromagnetic (RF-EME) energy fields, 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 guidelines incorporate two separate tiers of exposure limits that are based upon occupational/controlled exposure limits (for workers) and general public/uncontrolled exposure limits for members of the general public.

Occupational/controlled exposure limits apply to situations in which 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 public/uncontrolled limits (see below), 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.

General public/uncontrolled exposure limits apply to situations in which the general public may be 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 would always be considered under this category when exposure is not employment-related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

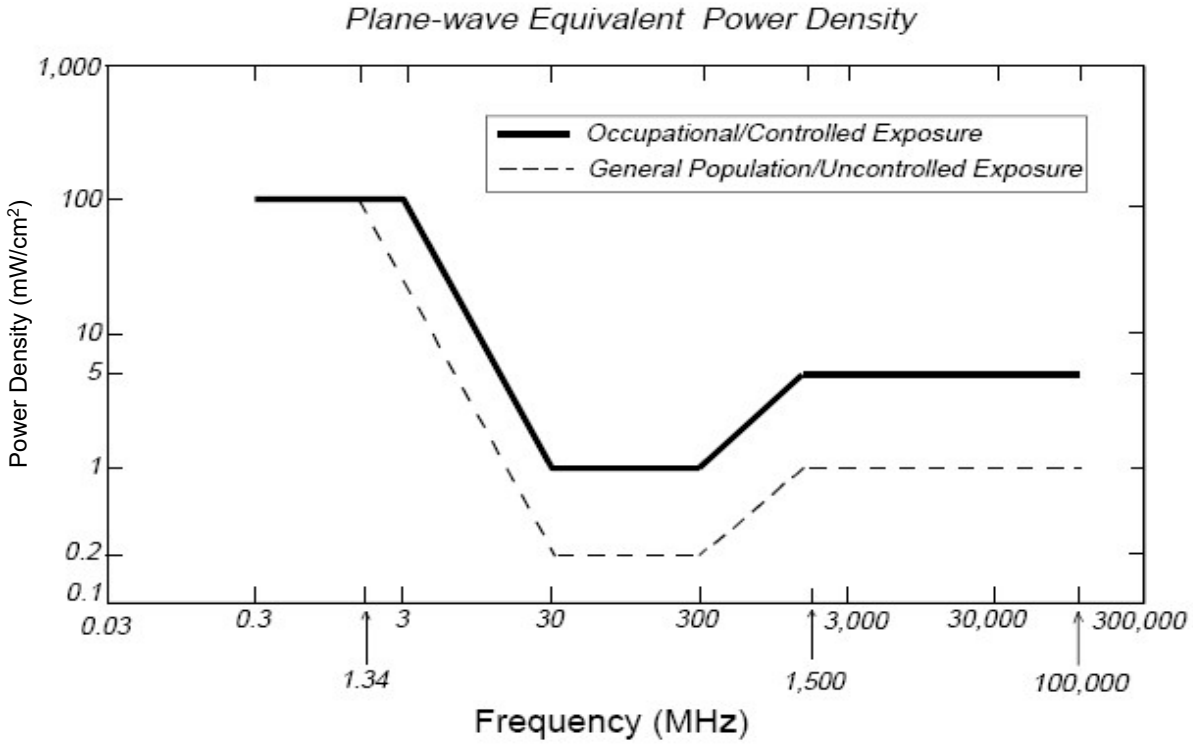
Table 1 and Figure 1 (below), which are included within the FCC's OET Bulletin 65, summarize the MPE limits for RF emissions. These limits are designed to provide a substantial margin of safety. They vary by frequency to take into account the different types of equipment that may be in operation at a particular facility and are "time-averaged" limits to reflect different durations resulting from controlled and uncontrolled exposures.

The FCC's MPEs are measured in terms of power (mW) over a unit surface area (cm^2). Known as the power density, the FCC has established for equipment operating at frequencies range from 300 Mhz to 1,500 Mhz the Occupational/Controlled limit of (f/300) mW/cm^2 where f is the Frequency in (MHz) and the General Population / Uncontrolled limit of (f/1500) mW/cm^2 where f is the Frequency in (MHz). For equipment operating at frequency ranges from 1900 MHz to 100,000 MHz, the FCC's occupational MPE is 5.0 mW/cm^2 and an uncontrolled MPE limit of 1.0 mW/cm^2. These limits are considered protective of these populations.

Table 1: 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
300-1,500	--	--	f/300	6
1,500-100,000	--	--	5	6
(B) Limits for General Public/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
300-1,500	--	--	f/1,500	30
1,500-100,000	--	--	1.0	30

f = Frequency in (MHz)
* Plane-wave equivalent power density

Figure 1. FCC Limits for Maximum Permissible Exposure (MPE)



MPE limits are designed to provide a substantial margin of safety. 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.

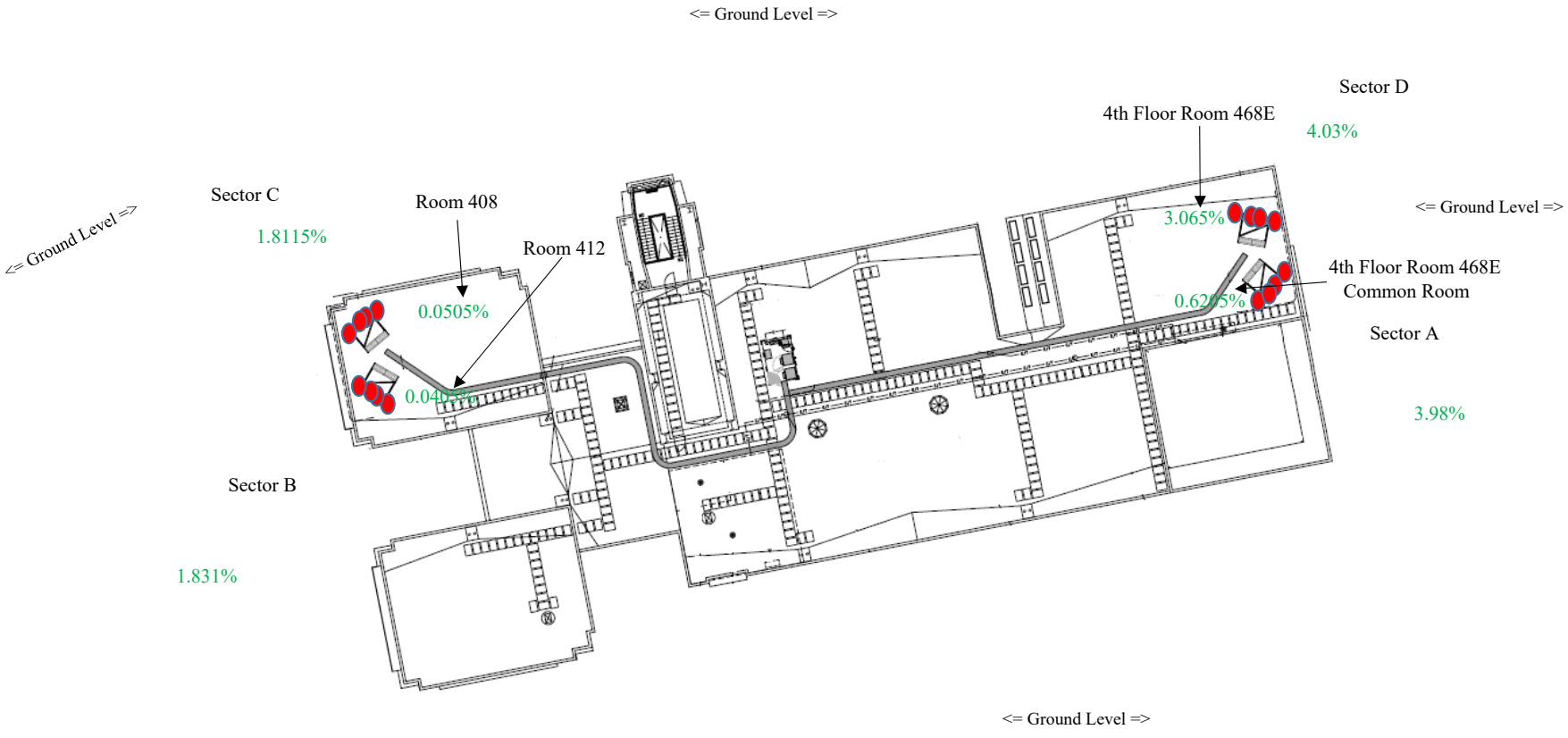
Personal Communication (PCS) facilities used by Verizon in this area will potentially operate within a frequency range of 700 to 2100 MHz. Facilities typically consist of: 1) electronic transceivers (the radios or cabinets) connected to wired telephone lines; and 2) antennas that send the wireless signals created by the transceivers to be received by individual subscriber units (PCS telephones). Transceivers are typically connected to antennas by coaxial cables.

Because of the short wavelength of PCS services, the antennas require line-of-site paths for good propagation, and are typically installed above ground level. Antennas are constructed to concentrate energy towards the horizon, with as little energy as possible scattered towards the ground or the sky. This design, combined with the low power of PCS facilities, generally results in no possibility for exposure to approach Maximum Permissible Exposure (MPE) levels, with the exception of areas directly in front of the antennas.

FCC Compliance Requirement

A site is considered out of compliance with FCC regulations if there are areas that exceed the FCC exposure limits and there are no RF hazard mitigation measures in place. Any carrier which has an installation that contributes more than 5% of the applicable MPE must participate in mitigating these RF hazards.

Ground and Top Floor Measurements



LEGEND
Verizon Antennas

Measurement Location Reference	% Gen Pop MPE
4th Floor Room 408	0.0505
4th Floor Room 412	0.0405
4th Floor Room 468E Common Room	0.6205
4th Floor Room 468E	3.065

1.	Site Overview

2.	Alternate Site Overview

3.	Rooftop Access Door (Locked)

4.	Rooftop Access Door RF Signage

5.	Verizon Equipment- No RF Signage

6.	Verizon Sector A Overview

7.	Verizon Sector A Alternate View

8.	Verizon Sector A Antennas

9.	Verizon Sector A Caution Sign

10.	Verizon Sector A Caution Sign Close Up

11.	Verizon Sector A 4’ Barrier

12.	Verizon Sector A 4’ Barrier Alternate View w/ Caution Sign

13.	Verizon Sector A Barrier Caution Sign Close Up

14.	Verizon Sector A 6’ Barrier w/ Caution Sign

15.	Verizon Sector A Barrier Caution Sign Close Up

16.	Verizon Sector A Warning Sign

17.	Verizon Sector A Barrier Warning Sign Close Up

18.	Verizon Sector A Broadcast Direction

19.	Verizon Sector A Ground View

20.	Verizon Sector A Ground View Close Up

21.	Verizon Sector B Overview

22.	Verizon Sector B Alternate View

23.	Verizon Sector B Antennas

24.	Verizon Sector B Caution Sign

25.	Verizon Sector B Caution Sign Close Up

26.	Verizon Sector B Warning Sign

27.	Verizon Sector B Warning Sign Close Up

28.	Verizon Sector B 13’ Barrier w/ Caution Sign

29.	Verizon Sector B Barrier Caution Sign Close Up

30.	Verizon Sector B 38’ Barrier w/ Notice Signs

31.	Verizon Sector B 38’ Barrier w/ Notice Signs

32.	Verizon Sector B 38’ Barrier w/ Notice Sign Close Up

33.	Verizon Sector B 38’ Barrier w/ Notice Sign Close Up

34.	Verizon Sector B Broadcast Direction

35.	Verizon Sector B Ground View

36.	Verizon Sector B Ground View Close Up

37.	Verizon Sector C Overview

38.	Verizon Sector C Antennas

39.	Verizon Sector C Caution Sign

40.	Verizon Sector C Caution Sign Close Up

41.	Verizon Sector C Broadcast Direction

42.	Verizon Sector C Ground View

43.	Verizon Sector C Ground View Close up

44.	Verizon Sector D Overview

45.	Verizon Sector D Caution Sign

46.	Verizon Sector D Caution Sign Close Up

47.	Verizon Sector D 14’ Barrier w/ Caution Sign

48.	Verizon Sector D 14’ Barrier w/ Caution Sign Close Up

49.	Verizon Sector D Ground View

50.	Verizon Sector D Ground View Close up

51.	4th Floor Measurement in Room 408 & 412, Below Sectors B & C

52.	

53.	

54.	

Appendix C: Kasai Consulting Report dated March 2023

Verizon Antenna Radiofrequency Survey

California State University San Marcos
333 S. Twin Oaks Valley Rd.
San Marcos, CA 92096

March 2023

Prepared by:

KasaiConsulting
An EHS Solutions Company

6670 Lemon Leaf Drive
Carlsbad, CA 92011

Table of Contents

Report Sections

List of Appendices

1.0 Scope

This report was prepared to document observations, findings, and recommendations from a survey of radiofrequency (RF) producing machines (Verizon antennas) conducted on April 3, 2024 at the California State University San Marcos (CSUSM) facility located at 333 S. Twin Oaks Valley Rd (Site). The specific tasks assigned to Kasai Consulting (Kasai) include:

- Evaluate occupational and general population exposure to electromagnetic radiation through a survey of accessible areas on the rooftop and top floor of University Hall located at the Site. It is understood that RF producing antennas generate non-ionizing radiation at a frequency between 450 MHz – 5800 MHz.
- Develop a map of affected area that demarcates areas where exposure to electromagnetic radiation from the Verizon antennas must be controlled.

2.0 Electromagnetic Radiation Survey

2.1. Standards

Non-ionizing radiation data was compared to the Federal Communications Commission's (FCC) Maximum Permissible Exposure (MPE) limits. The FCC MPE limits for the reported operating frequencies between 450 MHz – 5800 MHz of the surveyed antennas are detailed in Figure 1 and Table 1 below.

Figure 1. FCC Radiofrequency Maximum Permissible Exposure (MPE) Limits

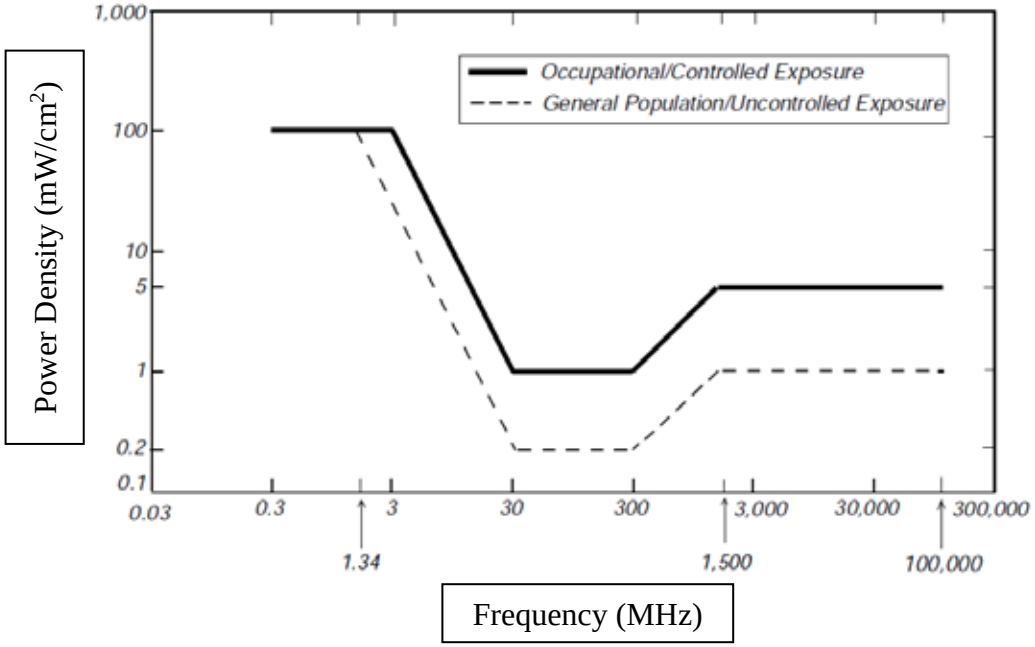


Table 2. FCC Radiofrequency Maximum Permissible Exposure (MPE) Limits (450-5800 MHz)

Frequency Range (MHz)	Electric Field Strength, E (V/m)	Magnetic Field Strength, H (A/m)	Power Density, S (mW/cm^2)	Averaging Time (minutes)
Occupational Exposure Limits				
300 – 1,500	-	-	f/300	6
1,500 – 100,000	-	-	5	6
General Population Exposure Limits				
300 – 1,500	-	-	f/1,500	30
1,500 – 100,000	-	-	1.0	30

2.2. Materials

The instrument used for the radiofrequency measurements was a Narda Broadband RF Field Strength Meter Model NBM-550-S (s/n E-0960) equipped with Narda Model EA5091 shaped probe (s/n 01157) with a frequency range of 300 kHz – 50 GHz. The instruments' recommended annual factory calibrations were last performed on February 12, 2024 and December 12, 2023 respectively (see **Appendix C**).

2.3. Sampling Strategy

Robert Schupp, MS and EHS Consultant of Kasai, conducted the electromagnetic radiation survey on April 3, 2024. The survey consisted of surveying accessible areas of the University Hall rooftop where the Verizon antennas are located. This included surveying areas outside of the existing barriers where CSUSM employees may be required to access under regular work duties. This survey also included surveying select areas of the top floor (4th floor) beneath the antennas and where electromagnetic radiation has the highest likelihood of being detected. Maximum spatial average readings were recorded. Measurements within the 4th floor office areas were taken as close to the ceiling as possible.

2.4. Results and Discussion

All electromagnetic measurements were recorded on April 3, 2024. Of the measurements taken, no measurements were found to exceed the FCC Occupational or General Population MPE limits.

The complete list of areas surveyed and the results may be found in **Appendix A**.

3.0 Conclusions and Recommendations

Based on the results of this survey and the observations made on-site, Kasai provides the following recommendations:

- Communicate the results of this survey to affected personnel.
- Implement permanent demarcation lines identified in **Appendix B** on the rooftop areas where personnel should not stand.
- Perform a similar survey on an annual basis to monitor accessible and occupied areas of University Hall rooftop and 4th floor office areas for possible electromagnetic radiation.

If you have any questions regarding this report, please feel free to call me at (760) 505-7158.

Regards,

Karl Kasai, MSPH, CIH
Principal Consultant

Reviewed by:

David Burcin, MSPH, CIH, CSP, CBSP
Principal Consultant

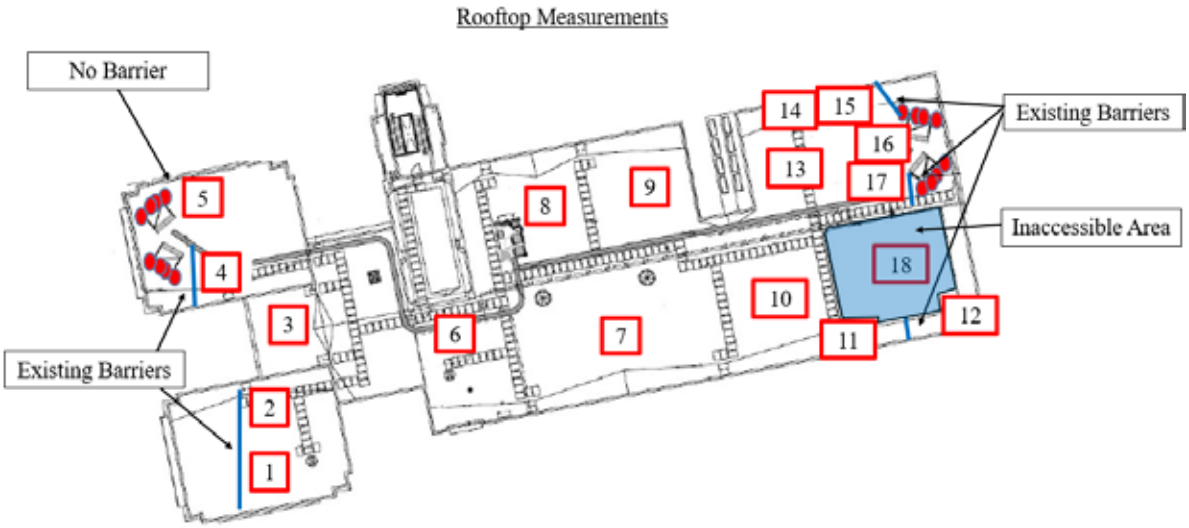
Appendix A: Electromagnetic Radiation Survey Results

Building	Location	Location ID (See Map 1)	Occupational MPE (%)	General Population (%)
University Hall	Rooftop	1	0.3559	1.780
University Hall	Rooftop	2	0.1846	0.9230
University Hall	Rooftop	3	0.0058	0.0290
University Hall	Rooftop	4	0.4459	2.230
University Hall	Rooftop	5	0.0430	0.2150
University Hall	Rooftop	6	0.0340	0.1700
University Hall	Rooftop	7	0.0237	0.1185
University Hall	Rooftop	8	0.0354	0.1770
University Hall	Rooftop	9	0.0223	0.1115
University Hall	Rooftop	10	0.0702	0.3510
University Hall	Rooftop	11	0.0573	0.2865
University Hall	Rooftop	12	0.9300	4.650
University Hall	Rooftop	13	0.0822	0.4110
University Hall	Rooftop	14	2.306	11.53
University Hall	Rooftop	15	8.261	41.31
University Hall	Rooftop	16	0.0855	0.4275
University Hall	Rooftop	17	0.0576	0.2880
University Hall	Rooftop*	18	0.0531	0.2655

*This reading was taken from the 4th floor mechanical room that is open to the rooftop

Building	Location	Room	Location ID (See Map 2)	Occupational MPE (%)	General Population (%)
University Hall	4th Floor	Mechanical	19	0.0072	0.0360
University Hall	4th Floor	Mechanical	20	0.0018	0.0090
University Hall	4th Floor	468 Common	21	0.0395	0.1975
University Hall	4th Floor	468E	22	0.0220	0.1100
University Hall	4th Floor	468D	23	0.0094	0.0470
University Hall	4th Floor	421	24	0.0340	0.1700
University Hall	4th Floor	411	25	0.3546	1.773
University Hall	4th Floor	407	26	0.4721	2.361
University Hall	4th Floor	408	27	0.2450	1.225
University Hall	4th Floor	412	28	0.1657	0.8285
University Hall	4th Floor	422	29	0.0802	0.4010
Markstein Hall	3rd Floor	Stairwell	30	0.1305	0.6525
Markstein Hall	4th Floor	Stairwell	31	0.1233	0.6165
Administration	6th Floor	Stairwell	32	0.1633	0.8165
University Hall	Ground	N/A	33	0.0101	0.0505
University Hall	Ground	N/A	34	0.0715	0.3575
University Hall	Ground	N/A	35	0.0235	0.1175
University Hall	Ground	N/A	36	0.0912	0.4560

Map 1


Rooftop Measurements
No Barrier
Existing Barriers
Existing Barriers
Inaccessible Area
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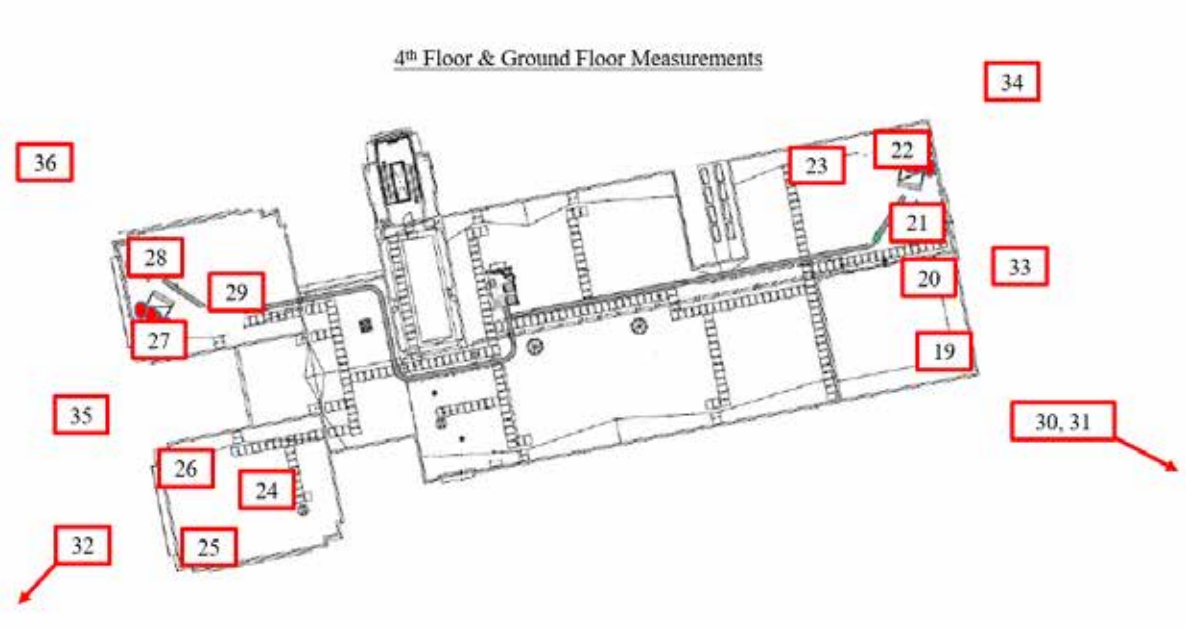
Map 2


4th Floor & Ground Floor Measurements
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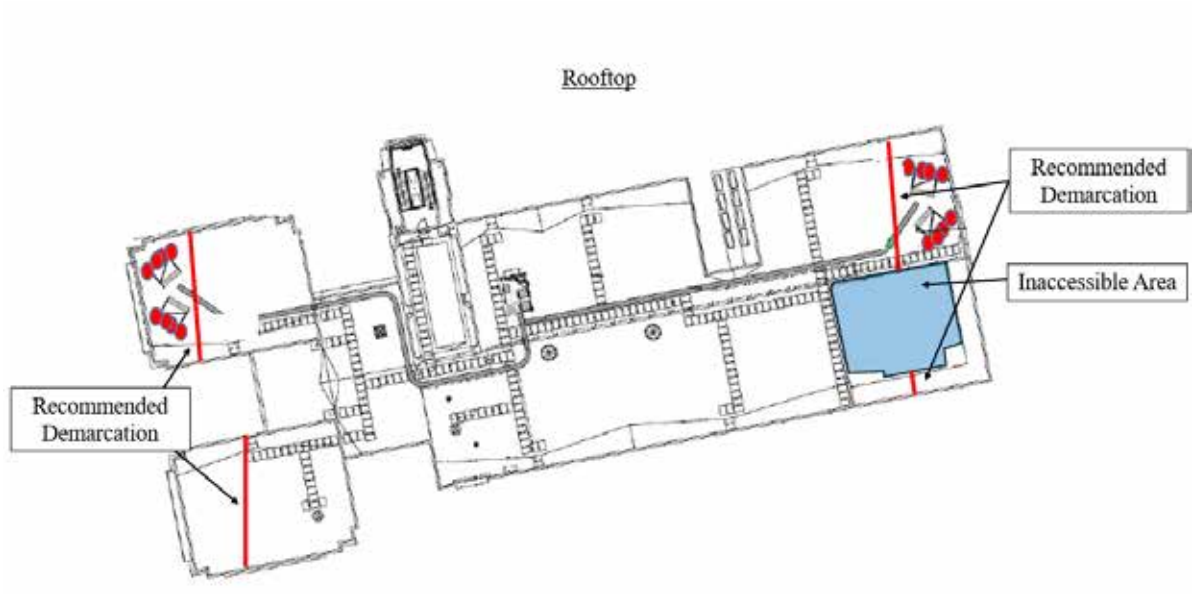
30, 31

Appendix B: Recommended Demarcation Lines


Rooftop
Recommended Demarcation
Inaccessible Area
Recommended Demarcation

Appendix C: Calibration Certificate

Advanced Test Equipment Corp.
Rentals • Sales • Calibration • Service

CALIBRATION CERTIFICATE

ATEC Asset ID
18075

Work Order
2024000667

Certificate Number: 2024000667-Rev1

Asset ID	18075	Initial Condition	In Tolerance
Manufacturer	Narda	Final Condition	In Tolerance
Model Number	NARD-NBM-550-S	Calibration Date	2/12/2024
Serial Number	E-0960	Due Date	2/12/2026
Description	100 kHz - 60 GHz Broadband Field Strength Meter (requires probes), screw ty	Temperature C°	21.1
		Humidity	37.3
		Procedure	2401-8700-00A and ATE 990313 Rev. Revision

Customer Name: Advanced Test Equipment Corporation
Customer Address: 10401 Roselle St San Diego , CA 92121
Comments:

This Calibration is traceable to the International System of Units (SI), through National Metrology Institutes (NIST, PTB, NRC, NPL, etc.), ratiometric techniques, or natural physical constants. This certificate applies only to the item identified and shall not be reproduced other than in full, without the specific written approval of Advanced Test Equipment Corporation (ATEC). The calibration has been completed in accordance with ATEC's Active Use Calibration System. ATEC conforms to the requirements of the Quality Management System registered to ISO 9001:2015 (QAS International; US2790).

Standards Used

Model	Manufacturer	Serial	Asset ID	Due Date
AGIL-34401A	Agilent Technologies	US36109164	23503	12/13/2024

Calibrated by: Samson Ande
Approved by: Javier Estrada

ATEC Corporation
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San Diego, CA 92121

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Facsimile 858-588-6570
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4/1/2024

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Advanced Test Equipment Corp.
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CALIBRATION CERTIFICATE

ATEC Asset ID
17997

Work Order
2024000116

Certificate Number: 2024000116-Rev1

Asset ID	17997	Initial Condition	In Tolerance
Manufacturer	Narda	Final Condition	In Tolerance
Model Number	NARD-EA5091	Calibration Date	12/12/2023
Serial Number	01157	Due Date	12/12/2025
Description	300kHz-50GHz Isotropic Probe, Shaped E-Field, FCC	Temperature C°	23 +/- 3
		Humidity	20-60
		Procedure	2402-8707-00A Rev. Revision

Customer Name: Advanced Test Equipment Corporation
Customer Address: 10401 Roselle St San Diego , CA 92121
Comments: Calibration performed by an Authorized Subcontractor.

This Calibration is traceable to the International System of Units (SI), through National Metrology Institutes (NIST, PTB, NRC, NPL, etc.), ratiometric techniques, or natural physical constants. This certificate applies only to the item identified and shall not be reproduced other than in full, without the specific written approval of Advanced Test Equipment Corporation (ATEC). The calibration has been completed in accordance with ATEC's Active Use Calibration System. ATEC conforms to the requirements of the Quality Management System registered to ISO 9001:2015 (QAS International; US2790).

Standards Used

Model	Manufacturer	Serial	Asset ID	Due Date
No standards recorded				

Calibrated by: William Swann
Approved by: Javier Estrada

ATEC Corporation
10401 Roselle St.
San Diego, CA 92121

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Facsimile 858-588-6570
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4/1/2024

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Appendix D: Kasai Consulting Report dated October 2025

Verizon Antenna Radiofrequency Survey

California State University San Marcos
333 S. Twin Oaks Valley Rd.
San Marcos, CA 92096

October 2025

Prepared by:

KasaiConsulting
An EHS Solutions Company

6670 Lemon Leaf Drive
Carlsbad, CA 92011

Table of Contents

Report Sections

List of Appendices

1.0 Scope

This report was prepared to document observations, findings, and recommendations from a survey of radiofrequency (RF) producing machines (Verizon antennas) conducted on October 20, 2025 at the California State University San Marcos (CSUSM) facility located at 333 S. Twin Oaks Valley Rd (Site). The specific tasks assigned to Kasai Consulting (Kasai) include:

- Re-evaluate occupational and general population exposure to electromagnetic radiation through a survey of accessible areas on the rooftop of University Hall located at the Site. It is understood that RF producing antennas generate non-ionizing radiation at a frequency between 450 MHz – 5800 MHz.

2.0 Electromagnetic Radiation Survey

2.1. Standards

Non-ionizing radiation data was compared to the Federal Communications Commission's (FCC) Maximum Permissible Exposure (MPE) limits. The FCC MPE limits for the reported operating frequencies between 450 MHz – 5800 MHz of the surveyed antennas are detailed in Figure 1 and Table 1 below.

Figure 1. FCC Radiofrequency Maximum Permissible Exposure (MPE) Limits

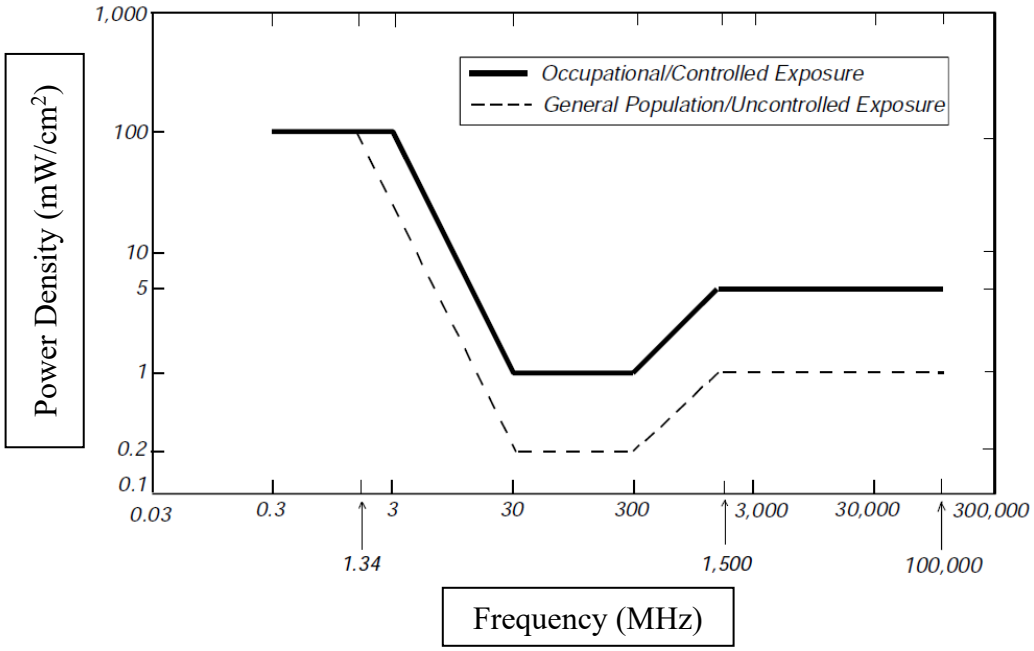


Table 2. FCC Radiofrequency Maximum Permissible Exposure (MPE) Limits (450-5800 MHz)

Frequency Range (MHz)	Electric Field Strength, E (V/m)	Magnetic Field Strength, H (A/m)	Power Density, S (mW/cm^2)	Averaging Time (minutes)
Occupational Exposure Limits				
300 – 1,500	-	-	f/300	6
1,500 – 100,000	-	-	5	6
General Population Exposure Limits				
300 – 1,500	-	-	f/1,500	30
1,500 – 100,000	-	-	1.0	30

2.2. Materials

The instrument used for the radiofrequency measurements was a Narda Broadband RF Field Strength Meter Model NBM-550-S (s/n E-0960) equipped with Narda Model EA5091 shaped probe (s/n B-0057) with a frequency range of 300 kHz – 50 GHz. The instruments' recommended annual factory calibrations were last performed on February 12, 2024 and May 29, 2025 respectively (see **Appendix C**).

2.3. Sampling Strategy

David Burcin, MSPH, CIH, CSP. CBSP and Principal Consultant of Kasai, conducted the electromagnetic radiation survey on October 20, 2025. The survey consisted of surveying accessible areas of the University Hall rooftop where the Verizon antennas are located. This included surveying areas outside of the existing barriers where CSUSM employees may be required to access under regular work duties. Maximum spatial average readings were recorded.

2.4. Findings and Results

All electromagnetic measurements were recorded on October 20, 2025. Of the measurements taken, no measurements were found to exceed the FCC Occupational or General Population MPE limits.

An initial rF survey was performed on April 3, 2024, of the Verizon antennas on the University Hall rooftop. Appendix A displays the initial survey and current survey measurements. Measured maximum Occupational MPE (%) and General Population (%) readings varied significantly from location to location from each survey.

Permanent demarcation lines on the rooftop areas where personnel should not enter have not been installed.

Several barrier posting signs have fallen off the chain barrier. Permanently secure the rF postings to all chain barriers on the roof.

Access to the University Hall rooftop is secured and can only be accessed through a normally locked door.

The complete list of areas surveyed and the results may be found in **Appendix A**.

3.0 Conclusions and Recommendations

Based on the results of this survey and the observations made on-site, Kasai provides the following recommendations:

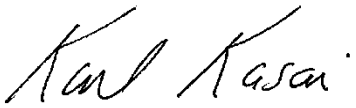
- Communicate the results of this survey to affected personnel.
- Implement permanent demarcation lines identified in **Appendix B** on the rooftop areas where personnel should not enter.
- Several barrier posting signs have fallen off the chain barrier. Permanently secure the rF postings to all chain barriers on the roof.
- As some rF readings have significantly increased since the last survey, perform a similar survey on an annual basis to monitor accessible areas of University Hall rooftop for possible exceedance of electromagnetic radiation occupational and general population exposure limits.
- Provide rooftop access awareness training to all employees working on the rooftops. At a minimum this training should include rF awareness, Fall Protection awareness, LOTO awareness and Electrical Safety awareness.

If you have any questions regarding this report, please feel free to call me at (760) 505-7158.

Regards,

David Burcin, MSPH, CIH, CSP, CBSP
Principal Consultant

Reviewed by:



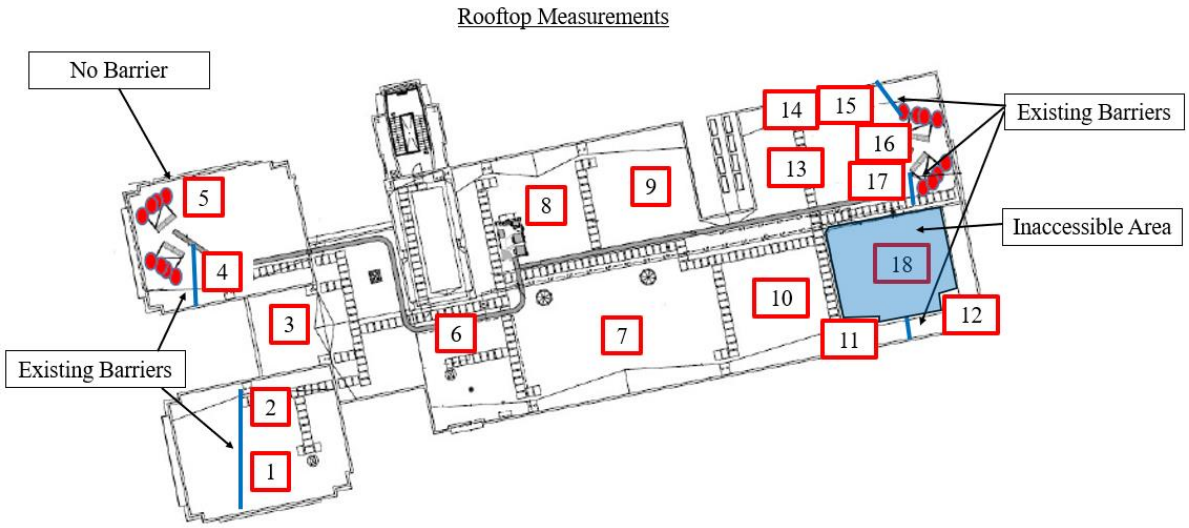
Karl Kasai, MSPH, CIH
Principal Consultant

Appendix A: Electromagnetic Radiation Survey Results

Building	Location	Location ID (See Map 1)	2024 Occupational MPE (%)	2024 General Population (%)	2025 Occupational MPE (%)	2025 General Population (%)
University Hall	Rooftop	1	0.3559	1.780	1.497	7.485
University Hall	Rooftop	2	0.1846	0.9230	1.910	9.55
University Hall	Rooftop	3	0.0058	0.0290	1.538	7.69
University Hall	Rooftop	4	0.4459	2.230	2.140	10.7
University Hall	Rooftop	5	0.0430	0.2150	2.243	11.215
University Hall	Rooftop	6	0.0340	0.1700	1.812	9.06
University Hall	Rooftop	7	0.0237	0.1185	1.736	8.68
University Hall	Rooftop	8	0.0354	0.1770	1.521	7.605
University Hall	Rooftop	9	0.0223	0.1115	1.402	7.01
University Hall	Rooftop	10	0.0702	0.3510	1.311	6.555
University Hall	Rooftop	11	0.0573	0.2865	1.243	6.215
University Hall	Rooftop	12	0.9300	4.650	6.077	30.385
University Hall	Rooftop	13	0.0822	0.4110	0.784	3.92
University Hall	Rooftop	14	2.306	11.53	6.837	34.185
University Hall	Rooftop	15	8.261	41.31	2.452	12.26
University Hall	Rooftop	16	0.0855	0.4275	0.767	3.835
University Hall	Rooftop	17	0.0576	0.2880	0.677	3.385
University Hall	Rooftop*	18	0.0531	0.2655	0.021	0.105

*This reading was taken from the 4th floor mechanical room that is open to the rooftop

Map 1


Rooftop Measurements
No Barrier
Existing Barriers
Existing Barriers
Inaccessible Area
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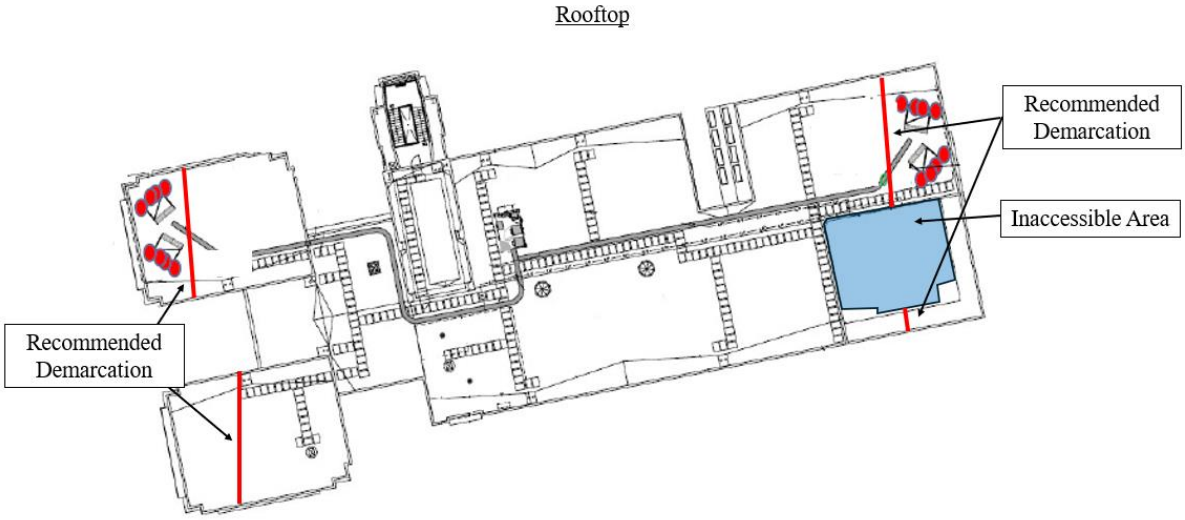
Appendix B: Recommended Demarcation Lines



Appendix C: Calibration Certificate

Advanced Test Equipment Corp.
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CALIBRATION CERTIFICATE

ATEC Asset ID
18075

Work Order
2024000667

Certificate Number: 2024000667-Rev3

Asset ID	18075	Initial Condition	In Tolerance
Manufacturer	Narda	Final Condition	In Tolerance
Model Number	NARD-NBM-550-S	Calibration Date	2/12/2024
Serial Number	E-0960	Due Date	2/12/2026
Description	100 kHz - 60 GHz Broadband Field Strength Meter (requires probes), screw ty	Temperature C°	21.1
		Humidity	37.3
		Procedure	2401-8700-00A and ATE 990313 Rev. Revision

Customer Name: Advanced Test Equipment Corporation
Customer Address: 10401 Roselle St San Diego , CA 92121
Comments:

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Standards Used

Model	Manufacturer	Serial	Asset ID	Due Date
AGIL-34401A	Agilent Technologies	US36109164	23503	12/13/2024

Calibrated by: Samson Ande
Approved by: Integration Admin

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6/4/2024
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Advanced Test Equipment Corp.
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CALIBRATION CERTIFICATE

ATEC Asset ID
42039

Work Order
2024028806

Certificate Number: 2024028806-Rev1

Asset ID	42039
Manufacturer	Narda
Model Number	NARD-EA5091
Serial Number	B-0057
Description	300kHz-50GHz Isotropic Probe, Shaped E-Field, FCC

Initial Condition	In Tolerance
Final Condition	In Tolerance
Calibration Date	5/29/2025
Due Date	5/29/2027
Temperature C°	23.35
Humidity	40.4
Procedure	2402-8707-00A Rev. Revision

Customer Name: Advanced Test Equipment Corp
Customer Address: 10401 Roselle St San Diego , CA 92121
Comments:

This Calibration is traceable to the International System of Units (SI), through National Metrology Institutes (NIST, PTB, NRC, NPL, etc.), ratiometric techniques, or natural physical constants. This certificate applies only to the item identified and shall not be reproduced other than in full, without the specific written approval of Advanced Test Equipment Corporation (ATEC). The calibration has been completed in accordance with ATEC's Active Use Calibration System. ATEC conforms to the requirements of the Quality Management System registered to ISO 9001:2015 (QAS International; US2790).

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8/7/2025

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Standards Used

Model	Manufacturer	Serial	Asset ID	Due Date
AGIL-8482A	Agilent Technologies	US37294790	23678	8/13/2025
AGIL-8648C-H09	Agilent Technologies	3623A03016	23699	4/4/2026
AGIL-8481A	Agilent Technologies	1234A03669	23708	6/18/2026
AGIL-8481A	Agilent Technologies	SD038423	24252	6/30/2025
AGIL-Q8486A	Agilent Technologies	3318A01745	24564	8/3/2025
AGIL-R752D	Teseq	390	24575	6/30/2025
ANRI-MG3696B-PKG01	Anritsu	062202	24576	9/16/2025
AGIL-N1913A	Agilent Technologies	MY50000389	24977	6/30/2025
AGIL-N1913A	Agilent Technologies	MY50000422	24978	6/30/2025
AGIL-N1914A	Agilent Technologies	MY50000397	24980	6/30/2025
AGIL-N1914A	Agilent Technologies	MY50000398	24983	6/30/2025
AGIL-N1914A	Agilent Technologies	MY50000399	24984	6/30/2025
AGIL-N8481A	Agilent Technologies	MY50340007	24985	6/28/2025
AGIL-N8481A	Agilent Technologies	MY50340002	24986	6/28/2025
AGIL-N8481A	Agilent Technologies	MY50340012	24987	6/30/2025
AGIL-N8481A	Agilent Technologies	MY50340010	24988	11/19/2025
AGIL-N8481A	Agilent Technologies	MY50340013	24989	6/30/2025
AGIL-N8481A	Agilent Technologies	MY50340005	24990	6/30/2025
AGIL-N8481A	Agilent Technologies	MY50340001	24992	11/21/2025
AGIL-R8486A	Agilent Technologies	2703A00606	24996	8/1/2025
IFI-ATT-28-100-6	Instruments for Industry (IFI)	G407108-01-0906	24999	6/30/2025
MILL-CL3-22-R2000	Millitech	256	25005	6/12/2025
NARD-1079	Narda	20115	25010	6/11/2025
NARD-3022	Narda	50484	25011	6/11/2025
NARD-757-10	Narda	34408	25025	6/11/2025
NARD-773-20	Narda	SD038434	25026	6/3/2025
AGIL-N1914A	Agilent Technologies	MY50001230	25841	6/30/2025
NARD-NBM-520	Narda	D-1507	27013	5/13/2027
NARD-779-10	Narda	04988	31802	6/11/2025
AGIL-E4419B	Agilent Technologies	GB43311925	33347	6/26/2026
AGIL-N1914A	Agilent Technologies	MY50000400	33419	6/30/2025
NARD-779-10	Narda	03054	33648	6/11/2025
NARD-3024	Narda	61242	33649	6/11/2025
NARD-3024	Narda	50157	33650	6/3/2025
RFLA-RFDDC2G18G30N	Lambda	23011000007	43958	6/11/2025
WERL-C6021-714	Werlatone	101767	47458	6/30/2025

Calibrated by: Aleya Boatwright Approved by: Dan Abad

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8/7/2025

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Appendix D: Image Library

Image 1: Roof Entrance Posting

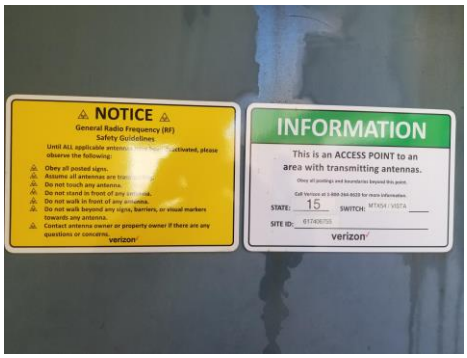


Image 2: Southwest Corner of building

Image 3: Northwest Corner of building

Image 4: Northeast Corner of building

Image 5: Southeast Corner of building

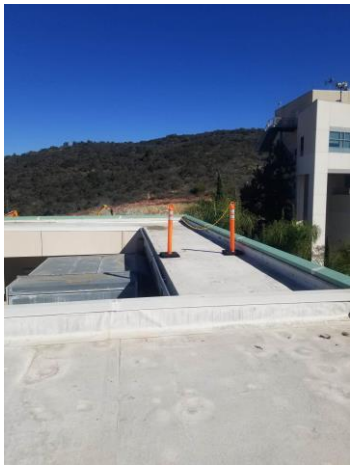
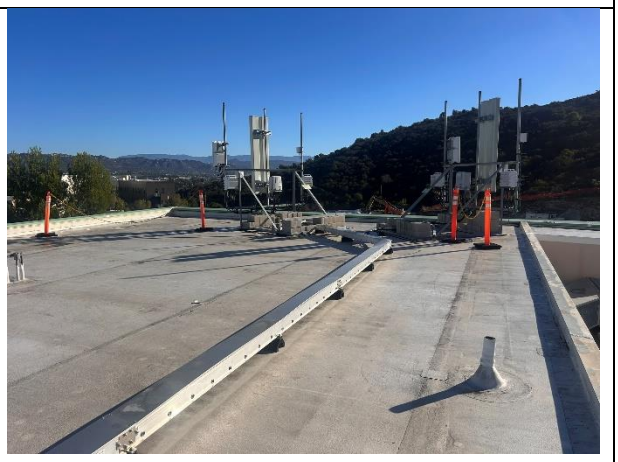
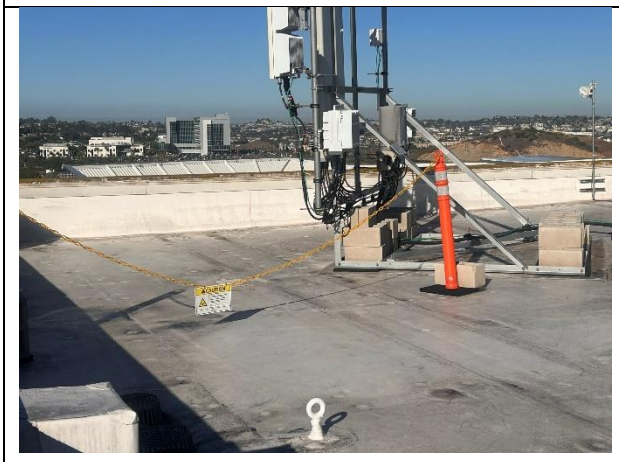


Image 6: Barrier Postings

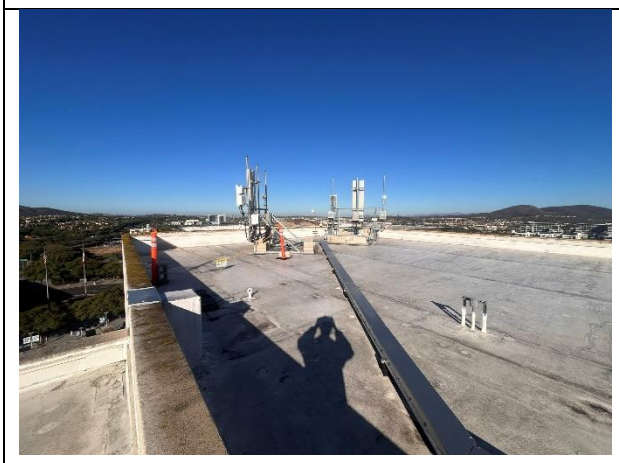
Appendix E: CSUSM Photos

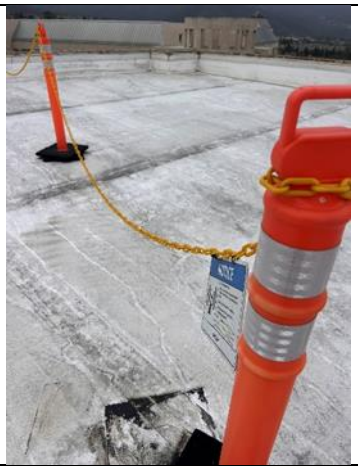
Photos taken by Safety, Health, and Sustainability
October 17, 2025 and October 27, 2025





Photos taken by Safety, Health, and Sustainability
October 17, 2025 and October 27, 2025





Photos taken by Safety, Health, and Sustainability
October 17, 2025 and October 27, 2025