

**The Derna Group, LLC  
on behalf of Verizon Wireless  
Site ID – 160874\_ATC #414135  
Assessment Purpose – L-Sub6  
Site Name – Tassajara Lawrence  
Site Compliance Report**

**1505 Finley Road  
Pleasanton, CA 94588**

Latitude: N37-48-03.60  
Longitude: W121-51-52.56  
Structure Type: Mono-Eucalyptus

Report generated date: November 22, 2021  
Report by: Benjamin Schnable  
Customer Contact: Tanner Young

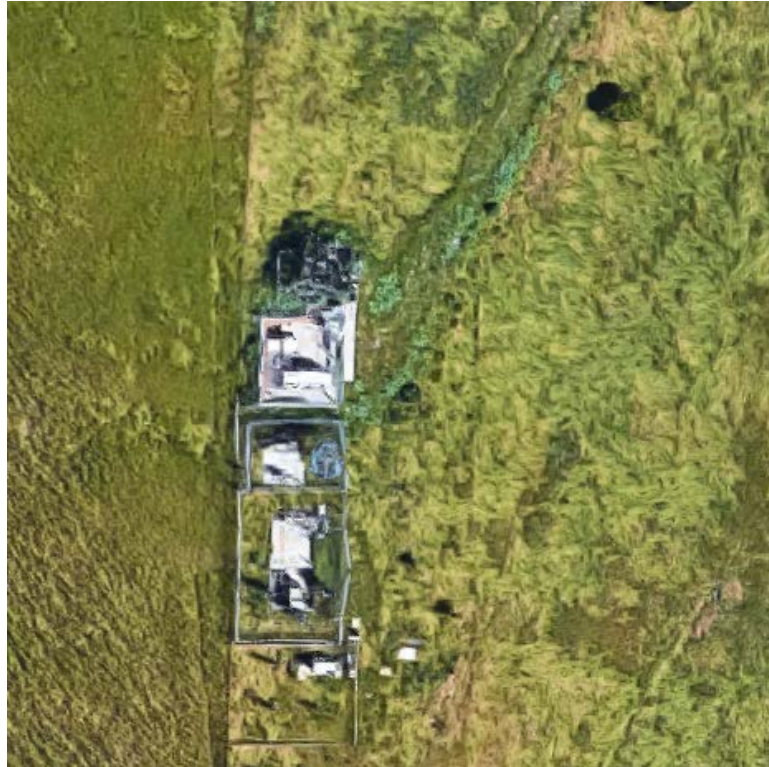
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**Verizon Wireless will be compliant upon  
completion of the remediation identified  
in Section 2.2.**

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on 12/07/2021  
By Contra Costa County  
Department of Conservation and Development  
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**The Derna Group, LLC  
on behalf of Verizon Wireless  
Tassajara Lawrence - 160874\_ATC #414135  
Radio Frequency (RF) Site Compliance Report**



**1505 Finley Road, Pleasanton, CA 94588**



## Table of Contents

<b>1</b>	<b>EXECUTIVE SUMMARY</b> .....	<b>3</b>
<b>2</b>	<b>SITE COMPLIANCE</b> .....	<b>4</b>
	2.1 SITE COMPLIANCE STATEMENT.....	4
	2.2 ACTIONS FOR SITE COMPLIANCE.....	4
<b>3</b>	<b>ANALYSIS</b> .....	<b>5</b>
	3.1 RF EXPOSURE DIAGRAM .....	5
<b>4</b>	<b>ANTENNA INVENTORY</b> .....	<b>9</b>
<b>5</b>	<b>REVIEWER CERTIFICATION</b> .....	<b>12</b>
	<b>APPENDIX A – STATEMENT OF LIMITING CONDITIONS</b> .....	<b>13</b>
	<b>APPENDIX B – ASSUMPTIONS AND DEFINITIONS</b> .....	<b>14</b>
	GENERAL MODEL ASSUMPTIONS.....	14
	DEFINITIONS.....	15
	<b>APPENDIX C – RULES &amp; REGULATIONS</b> .....	<b>17</b>
	EXPLANATION OF APPLICABLE RULES AND REGULATIONS.....	17
	OCCUPATIONAL ENVIRONMENT EXPLAINED.....	17
	<b>APPENDIX D – GENERAL SAFETY RECOMMENDATIONS</b> .....	<b>18</b>
	ADDITIONAL INFORMATION .....	19
	<b>APPENDIX E – REGULATORY BASIS</b> .....	<b>20</b>
	FCC RULES AND REGULATIONS .....	20
	<b>APPENDIX F – SAFETY PLAN AND PROCEDURES</b> .....	<b>22</b>

## 1 Executive Summary

The Derna Group, LLC on behalf of Verizon Wireless has contracted with Site Safe, LLC (Sitesafe), an independent Radio Frequency (RF) regulatory and engineering consulting firm, to determine whether the proposed communications site, 160874\_ATC #414135 - Tassajara Lawrence, located at 1505 Finley Road, Pleasanton, CA, is in compliance with Federal Communications Commission (FCC) rules and regulations for RF exposure.

This report contains a detailed summary of the RF environment at the site including:

- Diagram of the site
- Inventory of the make / model of all antennas
- Theoretical MPE based on modeling

This report addresses exposure to radio frequency electromagnetic fields in accordance with FCC rules and regulations for all individuals, classified in two groups, "Occupational or Controlled" and "General Public or Uncontrolled."

**Verizon Wireless will be compliant** with FCC rules and regulations, as described in OET Bulletin 65, **upon implementation of the proposed remediation**. The corrective actions needed to make this site compliant are located in Section 2.2.

Verizon Wireless proposes to make modifications to an existing site. The proposed antennas are noted as "Proposed" in the antenna table under Section 4.

This document and the conclusions herein are based on the information provided by Verizon Wireless.

If you have any questions regarding RF safety and regulatory compliance, please do not hesitate to contact Sitesafe's Customer Support Department at (703) 276-1100.

## 2 Site Compliance

### 2.1 Site Compliance Statement

Upon evaluation of the cumulative RF exposure levels from all operators at this site, Sitesafe has determined that:

**Verizon Wireless will be compliant** with FCC rules and regulations, as described in OET Bulletin 65, **upon implementation of the proposed remediation**. The corrective actions needed to make this site compliant are located in Section 2.2.

The compliance determination is based on theoretical modeling, RF signage placement recommendations, proposed antenna inventory and/or the level of restricted access to the antennas at the site. Any deviation from the proposed Verizon Wireless deployment plan could result in the site being rendered non-compliant upon further evaluation.

### 2.2 Actions for Site Compliance

Based on common industry practice and our understanding of FCC and OSHA requirements, this section provides a statement of recommendations for site compliance. If required, RF alert signage recommendations have been proposed based on theoretical analysis of MPE levels. Where applicable, barriers can consist of locked doors, fencing, railing, rope, chain, paint striping or tape, combined with RF alert signage.

Verizon Wireless will be compliant if the following changes are implemented:

#### **Verizon Wireless Proposed Alpha Sector Location**

Install a barrier that is 67' long with 5 Notice signs, as depicted in the site map.  
Install a barrier that is 58' long with 4 Notice signs, as depicted in the site map.

#### **Verizon Wireless Proposed Beta Sector Location**

Install a barrier that is 46' long with 3 Notice signs, as depicted in the site map.

#### **Verizon Wireless Proposed Gamma Sector Location**

Install a barrier that is 46' long with 3 Notice signs, as depicted in the site map.

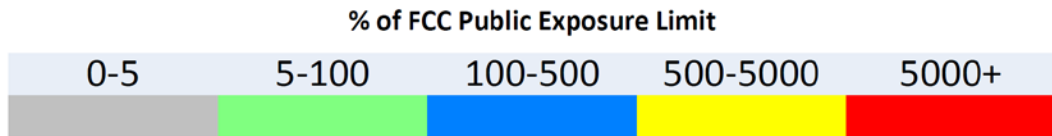
**Note:** Sitesafe recommends reducing transmit powers or raising antenna heights to reduce exposure levels on the ground.

### 3 Analysis

#### 3.1 RF Exposure Diagram

The RF diagram(s) below display theoretical percentage of the Maximum Permissible Exposure for all systems at the site. These diagrams use modeling as prescribed in OET Bulletin 65 and assumptions detailed in Appendix B.

The key at the bottom of each diagram indicates if percentages displayed are referenced to FCC **General Public** Maximum Permissible Exposure (MPE) limits. Color coding on the diagram is as follows:



This table displays the maximum theoretical percentage of the FCC’s General Public MPE limits:

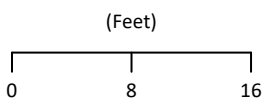
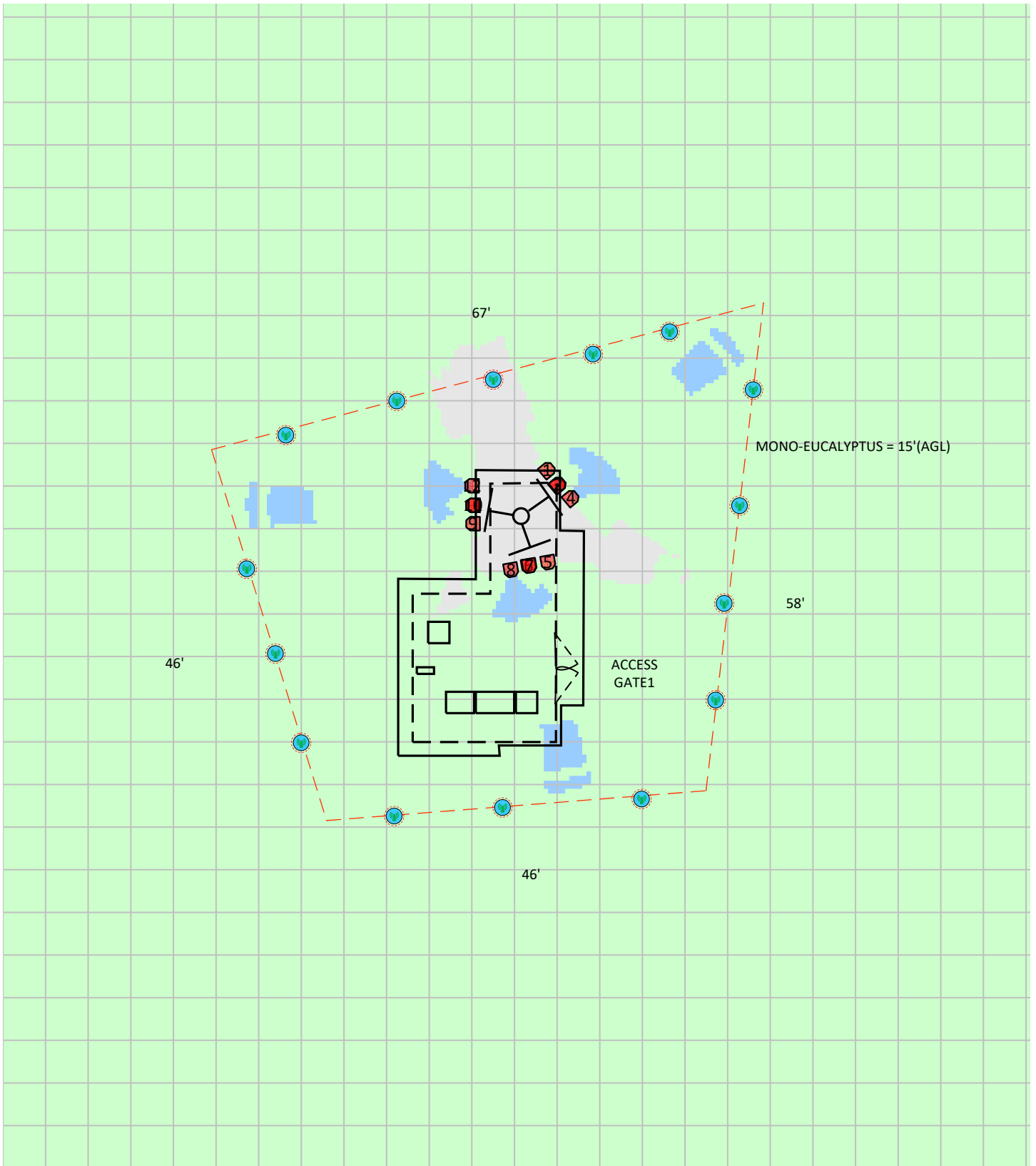
	General Public Levels:	
Exposure Type:	Maximum	Spatial Average
Reference Level:	Antenna	Ground
<b>Verizon Wireless:</b>	35,156.5%	199.4%
<b>Composite:</b>	35,156.5%	199.4%

Note: On the diagrams shown below, each level is marked with a height. For all diagrams that are marked as *Spatially Averaged*, the modeling program will spatially average the exposure within the area six feet above each set level. This provides an accurate spatial average of the percentage of the FCC’s MPE limits within an accessible area.

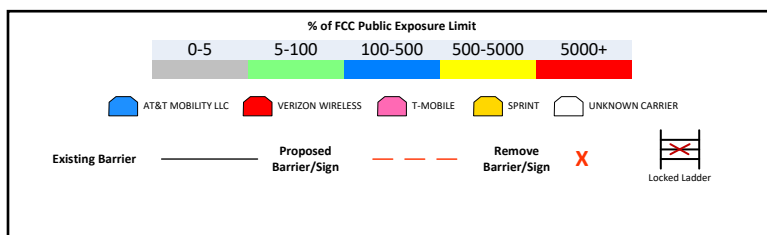
In the RF exposure simulations below, all heights are reflected with respect to ground level. Each different area, rooftop, or platform level is labeled with its height relative to the main site level. Exposure is calculated appropriately based on the relative height and location of that area to all antennas. The analyzed elevations in the RF exposure simulations are as follows:

- GROUND LEVEL = 0'

# RF Exposure Simulation For: Tassajara Lawrence Composite View

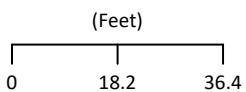
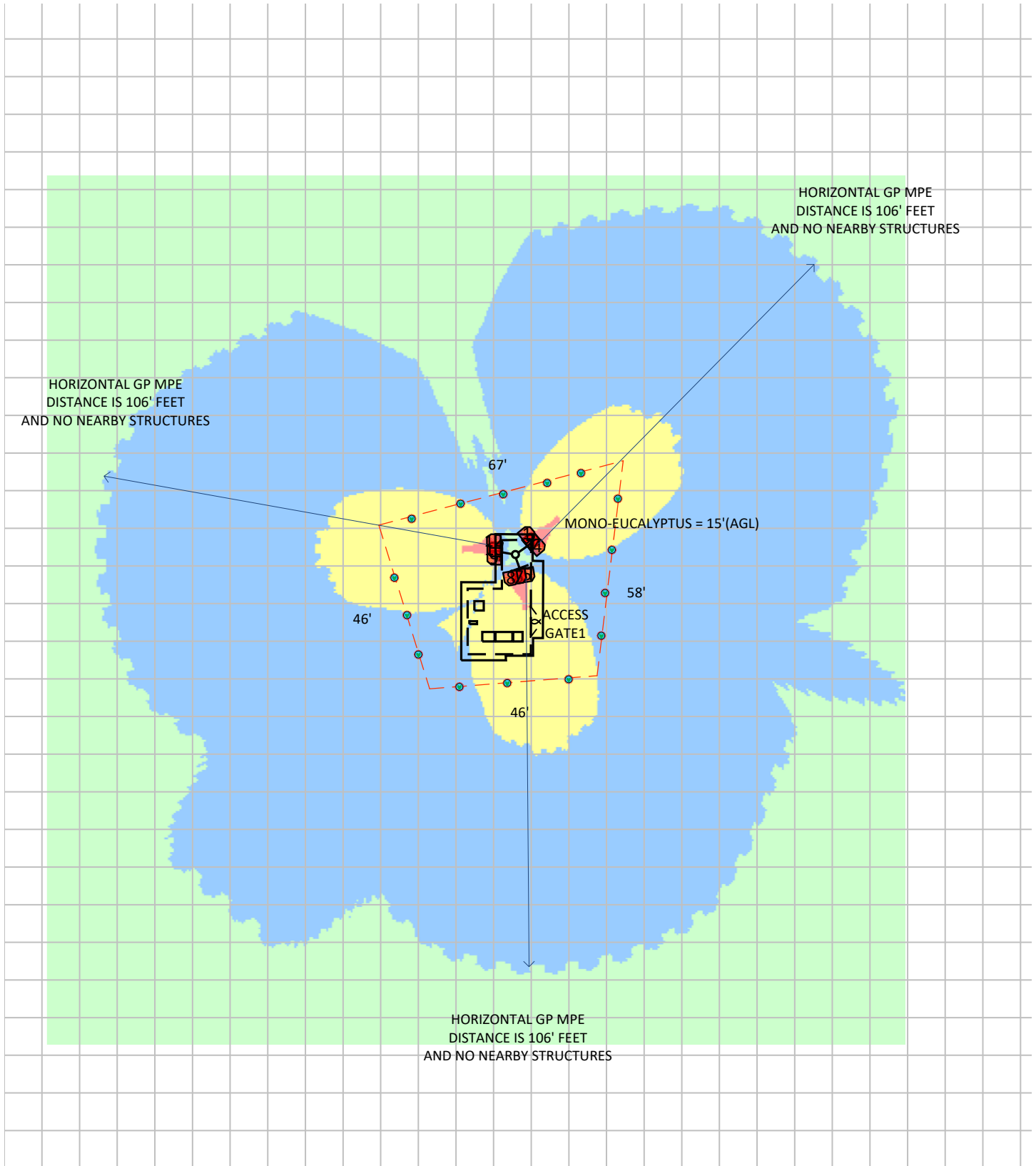


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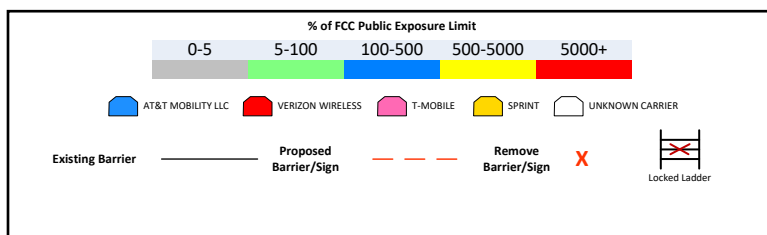


Sitesafe OET-65 Model  
Near Field Boundary:  
1.5 \* Aperture  
Reflection Factor: 1  
Spatially Averaged

RF Exposure Simulation For: Tassajara Lawrence  
 Antenna Level – Verizon Centerline = 14.5'(AGL)

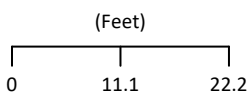
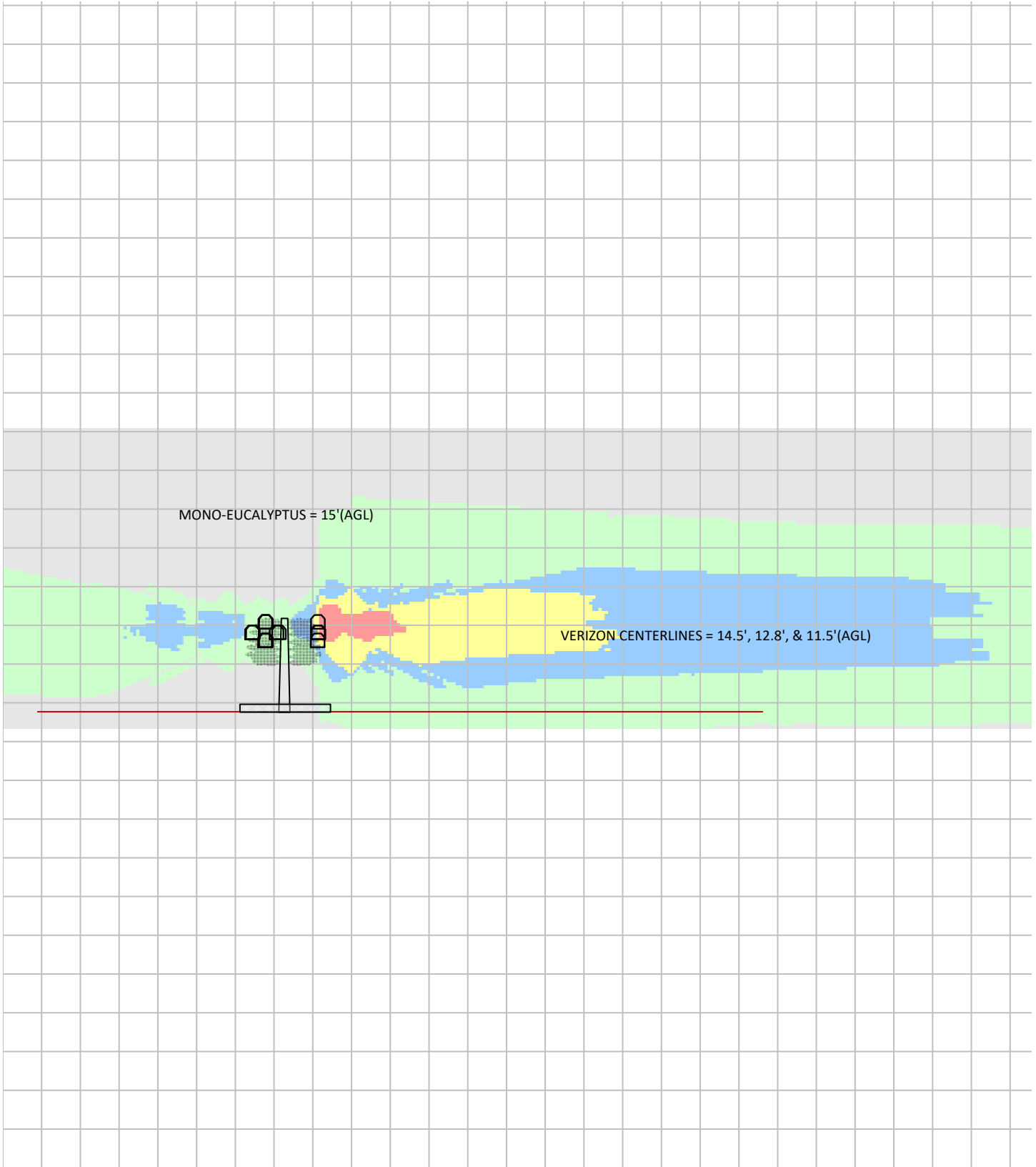


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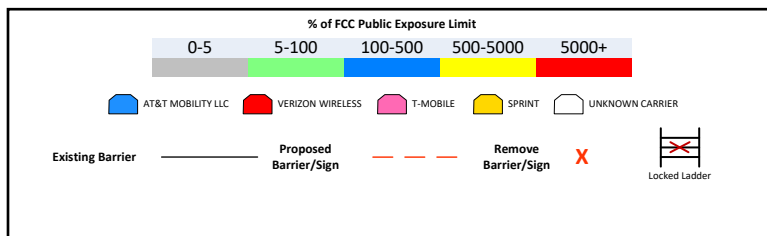


Sitesafe OET-65 Model  
 Near Field Boundary:  
 1.5 \* Aperture  
 Reflection Factor: 1  
 Spatially Averaged

# RF Exposure Simulation For: Tassajara Lawrence Elevation View



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Sitesafe OET-65 Model  
Near Field Boundary:  
1.5 \* Aperture  
Reflection Factor: 1  
Single Level (0)

## 4 Antenna Inventory

The Antenna Inventory shows all transmitting antennas at the site. This inventory was provided by the customer and was utilized by Sitesafe to perform theoretical modeling of RF exposure. The inventory coincides with the site diagrams in this report, identifying each antenna's location at 160874\_ATC #414135 - Tassajara Lawrence. The antenna information collected includes the following information:

- Licensee or wireless operator name
- Frequency or frequency band
- Transmitter power – Transmitter Power Output ("TPO"), Effective Radiated Power ("ERP"), or Equivalent Isotropic Radiated Power ("EIRP")
- Antenna manufacturer make, model, and gain



The following antenna inventory was provided by the customer and was utilized to create the site model diagrams:

Ant ID	Operator	Antenna Make and Model	Ant Type	TX Freq (MHz)	Technology	Az (Deg)	Horizontal Beamwidth (Deg)	Ant Length (ft)	Ant Gain (dBd)	Power	Power Type	Power Units	TX Count	Misc Loss	Total ERP (Watts)	Z (ft)	MDT (Deg)	EDT (Deg)
1	VERIZON WIRELESS (Proposed)	Commscope NHH-65B-R2B	Panel	850	CDMA	50	60.0	6	12.86	20.00	TPO	Watt	4	0.00	1545.6	12.8	0	0
1	VERIZON WIRELESS (Proposed)	Commscope NHH-65B-R2B	Panel	1900	LTE	50	69.0	6	15.76	40.00	TPO	Watt	4	0.00	6027.3	12.8	0	0
2	VERIZON WIRELESS (Proposed)	Ericsson KRE105105281	Panel	3550	LTE/CBRS	50	65.0	0.7	9.41	5.00	TPO	Watt	4	0.00	174.6	11.5	0	0
3	VERIZON WIRELESS (Proposed)	Ericsson AIR6449	Panel	3700	5G	50	12.0	2.8	23.55	80.00	TPO	Watt	4	0.00	72468.6	14.5	0	0
4	VERIZON WIRELESS (Proposed)	Commscope NNHH-65B-R4	Panel	2100	LTE/AWS1	50	62.0	6	14.76	40.00	TPO	Watt	2	0.00	2393.8	12.8	0	0
4	VERIZON WIRELESS (Proposed)	Commscope NNHH-65B-R4	Panel	2100	LTE/AWS3	50	62.0	6	14.76	40.00	TPO	Watt	2	0.00	2393.8	12.8	0	0
4	VERIZON WIRELESS (Proposed)	Commscope NNHH-65B-R4	Panel	850	LTE	50	64.0	6	12.76	40.00	TPO	Watt	2	0.00	1510.4	12.8	0	0
4	VERIZON WIRELESS (Proposed)	Commscope NNHH-65B-R4	Panel	850	5G	50	64.0	6	12.76	40.00	TPO	Watt	2	0.00	1510.4	12.8	0	0
4	VERIZON WIRELESS (Proposed)	Commscope NNHH-65B-R4	Panel	751	LTE	50	66.0	6	11.46	40.00	TPO	Watt	4	0.00	2239.3	12.8	0	0
5	VERIZON WIRELESS (Proposed)	Commscope NHH-65B-R2B	Panel	850	CDMA	170	60.0	6	12.86	20.00	TPO	Watt	4	0.00	1545.6	12.8	0	0
5	VERIZON WIRELESS (Proposed)	Commscope NHH-65B-R2B	Panel	1900	LTE	170	69.0	6	15.76	40.00	TPO	Watt	4	0.00	6027.3	12.8	0	0
6	VERIZON WIRELESS (Proposed)	Ericsson KRE105105281	Panel	3550	LTE/CBRS	170	65.0	0.7	9.41	5.00	TPO	Watt	4	0.00	174.6	11.5	0	0
7	VERIZON WIRELESS (Proposed)	Ericsson AIR6449	Panel	3700	5G	170	12.0	2.8	23.55	80.00	TPO	Watt	4	0.00	72468.6	14.5	0	0
8	VERIZON WIRELESS (Proposed)	Commscope NNHH-65B-R4	Panel	751	LTE	170	66.0	6	11.46	40.00	TPO	Watt	4	0.00	2239.3	12.8	0	0
8	VERIZON WIRELESS (Proposed)	Commscope NNHH-65B-R4	Panel	850	LTE	170	64.0	6	12.76	40.00	TPO	Watt	2	0.00	1510.4	12.8	0	0
8	VERIZON WIRELESS (Proposed)	Commscope NNHH-65B-R4	Panel	850	5G	170	64.0	6	12.76	40.00	TPO	Watt	2	0.00	1510.4	12.8	0	0
8	VERIZON WIRELESS (Proposed)	Commscope NNHH-65B-R4	Panel	2100	LTE/AWS1	170	62.0	6	14.76	40.00	TPO	Watt	2	0.00	2393.8	12.8	0	0
8	VERIZON WIRELESS (Proposed)	Commscope NNHH-65B-R4	Panel	2100	LTE/AWS3	170	62.0	6	14.76	40.00	TPO	Watt	2	0.00	2393.8	12.8	0	0



Ant ID	Operator	Antenna Make and Model	Ant Type	TX Freq (MHz)	Technology	Az (Deg)	Horizontal Beamwidth (Deg)	Ant Length (ft)	Ant Gain (dBd)	Power	Power Type	Power Units	TX Count	Misc Loss	Total ERP (Watts)	Z (ft)	MDT (Deg)	EDT (Deg)
9	VERIZON WIRELESS (Proposed)	Commscope NHH-65B-R2B	Panel	850	CDMA	270	60.0	6	12.86	20.00	TPO	Watt	4	0.00	1545.6	12.8	0	0
9	VERIZON WIRELESS (Proposed)	Commscope NHH-65B-R2B	Panel	1900	LTE	270	69.0	6	15.76	40.00	TPO	Watt	4	0.00	6027.3	12.8	0	0
10	VERIZON WIRELESS (Proposed)	Ericsson KRE105105281	Panel	3550	LTE/CBRS	270	65.0	0.7	9.41	5.00	TPO	Watt	4	0.00	174.6	11.5	0	0
11	VERIZON WIRELESS (Proposed)	Ericsson AIR6449	Panel	3700	5G	270	12.0	2.8	23.55	80.00	TPO	Watt	4	0.00	72468.6	14.5	0	0
12	VERIZON WIRELESS (Proposed)	Commscope NNHH-65B-R4	Panel	751	LTE	270	66.0	6	11.46	40.00	TPO	Watt	4	0.00	2239.3	12.8	0	0
12	VERIZON WIRELESS (Proposed)	Commscope NNHH-65B-R4	Panel	850	LTE	270	64.0	6	12.76	40.00	TPO	Watt	2	0.00	1510.4	12.8	0	0
12	VERIZON WIRELESS (Proposed)	Commscope NNHH-65B-R4	Panel	850	5G	270	64.0	6	12.76	40.00	TPO	Watt	2	0.00	1510.4	12.8	0	0
12	VERIZON WIRELESS (Proposed)	Commscope NNHH-65B-R4	Panel	2100	LTE/AWS1	270	62.0	6	14.76	40.00	TPO	Watt	2	0.00	2393.8	12.8	0	0
12	VERIZON WIRELESS (Proposed)	Commscope NNHH-65B-R4	Panel	2100	LTE/AWS3	270	62.0	6	14.76	40.00	TPO	Watt	2	0.00	2393.8	12.8	0	0

Note: The Z reference indicates antenna height above ground level (AGL). ERP values provided by the client and used in the modeling may be greater than are currently deployed. For additional modeling information, refer to Appendix B. Proposed equipment is tagged as *(Proposed)* under Operator or Antenna Make and Model.

## 5 Reviewer Certification

The reviewer whose signature appears below hereby certifies and affirms:

That I am an employee of Site Safe, LLC, in Vienna, Virginia, at which place the staff and I provide RF compliance services to clients in the wireless communications industry; and

That I am thoroughly familiar with the Rules and Regulations of the Federal Communications Commission (FCC) as well as the regulations of the Occupational Safety and Health Administration (OSHA), both in general and specifically as they apply to the FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields; and

That I have thoroughly reviewed this Site Compliance Report and believe it to be true and accurate to the best of my knowledge as assembled by and attested to by Benjamin Schnable.

November 23, 2021



Anthony Handley



## Appendix A – Statement of Limiting Conditions

Sitesafe will not be responsible for matters of a legal nature that affect the site or property.

Due to the complexity of some wireless sites, Sitesafe performed this analysis and created this report utilizing best industry practices and due diligence. Sitesafe cannot be held accountable or responsible for anomalies or discrepancies due to actual site conditions (i.e. mislabeling of antennas or equipment, inaccessible cable runs, inaccessible antennas or equipment, etc.) or information or data supplied by Verizon Wireless, the site manager, or their affiliates, subcontractors or assigns.

Sitesafe has provided computer generated model(s) in this Site Compliance Report to show approximate dimensions of the site, and the model is included to assist the reader of the compliance report to visualize the site area, and to provide supporting documentation for Sitesafe's recommendations.

Sitesafe may note in the Site Compliance Report any adverse physical conditions, such as needed repairs, observed during the survey of the subject property or that Sitesafe became aware of during the normal research involved in performing this survey. Sitesafe will not be responsible for any such conditions that do exist or for any engineering or testing that might be required to discover whether such conditions exist. Because Sitesafe is not an expert in the field of mechanical engineering or building maintenance, the Site Compliance Report must not be considered a structural or physical engineering report.

Sitesafe obtained information used in this Site Compliance Report from sources that Sitesafe considers reliable and believes them to be true and correct. Sitesafe does not assume any responsibility for the accuracy of such items that were furnished by other parties. When conflicts in information occur between data provided by a second party and physical data collected by Sitesafe, the physical data will be used.

## Appendix B – Assumptions and Definitions

### General Model Assumptions

In this site compliance report, it is assumed that all antennas are operating at **full power at all times**. Software modeling was performed for all transmitting antennas located on the site. Sitesafe has further assumed a 100% duty cycle and maximum radiated power.

The site has been modeled with these assumptions to show the maximum RF energy density. Sitesafe believes this to be a *worst-case* analysis, based on best available data. Areas modeled to predict exposure greater than 100% of the applicable MPE level may not actually occur but are shown as a *worst-case* prediction that could be realized real time. Sitesafe believes these areas to be safe for entry by occupationally trained personnel utilizing appropriate personal protective equipment (in most cases, a personal monitor).

Thus, at any time, if power density measurements were made, we believe the real-time measurements would indicate levels below those depicted in the RF exposure diagram(s) in this report. By modeling in this way, Sitesafe has conservatively shown exclusion areas – areas that should not be entered without the use of a personal monitor, carriers reducing power, or performing real-time measurements to indicate real-time exposure levels.

## Definitions

**5% Rule** – The rules adopted by the FCC specify that, in general, at multiple transmitter sites actions necessary to bring the area into compliance with the guidelines are the shared responsibility of all licensees whose transmitters produce field strengths or power density levels at the area in question in excess of 5% of the exposure limits. In other words, any wireless operator that contributes 5% or greater of the MPE limit in an area that is identified to be greater than 100% of the MPE limit is responsible for taking corrective actions to bring the site into compliance.

**Compliance** – The determination of whether a site complies with FCC standards with regards to Human Exposure to Radio Frequency Electromagnetic Fields from transmitting antennas.

**Decibel (dB)** – A unit for measuring power or strength of a signal.

**Duty Cycle** – The percent of pulse duration to the pulse period of a periodic pulse train. Also, may be a measure of the temporal transmission characteristic of an intermittently transmitting RF source such as a paging antenna by dividing average transmission duration by the average period for transmission. A duty cycle of 100% corresponds to continuous operation.

**Effective (or Equivalent) Isotropic Radiated Power (EIRP)** – The product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna.

**Effective Radiated Power (ERP)** – The product of the power supplied to the antenna and the antenna gain in a given direction relative to a half-wave dipole antenna.

**Gain (of an antenna)** – The ratio, usually expressed in decibels, of the power required at the input of a loss-free reference antenna to the power supplied to the input of the given antenna to produce, in a given direction, the same field strength or the same power density at the same distance. When not specified otherwise, the gain refers to the direction of maximum radiation. Gain may be considered for a specified polarization. Gain may be referenced to an isotropic antenna (dBi) or a half-wave dipole (dBd) antenna.

**General Population/Uncontrolled Environment** – Defined by the FCC as an area where RF exposure may occur to persons who are *unaware* of the potential for exposure and who have no control over their exposure. General Population is also referenced as General Public.

**Generic Antenna** – For the purposes of this report, the use of “Generic” as an antenna model means the antenna information was not provided and could not be obtained while on site. In the event of unknown information, Sitesafe will use its industry specific knowledge of antenna models to select a worst-case scenario antenna to model the site.

**Isotropic Antenna** – An antenna that is completely non-directional. In other words, an antenna that radiates energy equally in all directions.

**Maximum Measurement** – This measurement represents the single largest measurement recorded when performing a spatial average measurement.

**Maximum Permissible Exposure (MPE)** – The rms and peak electric and magnetic field strength, their squares, or the plane-wave equivalent power densities associated with these fields to which a person may be exposed without harmful effect and with acceptable safety factor.

**Occupational/Controlled Environment** – Defined by the FCC as an area where RF exposure may occur to persons who are **aware** of the potential for exposure as a condition of employment or specific activity and can exercise control over their exposure.

**OET Bulletin 65** – Technical guideline developed by the FCC’s Office of Engineering and Technology to determine the impact of RF exposure on humans. The guideline was published in August 1997.

**OSHA (Occupational Safety and Health Administration)** – Under the Occupational Safety and Health Act of 1970, employers are responsible for providing a safe and healthy workplace for their employees. OSHA’s role is to promote the safety and health of America’s working men and women by setting and enforcing standards; providing training, outreach and education; establishing partnerships; and encouraging continual process improvement in workplace safety and health. For more information, visit [www.osha.gov](http://www.osha.gov).

**Radio Frequency Exposure or Electromagnetic Fields** – Electromagnetic waves that are propagated from antennas through space.

**Spatial Average Measurement** – A technique used to average a minimum of ten (10) measurements taken in a ten (10) second interval from zero (0) to six (6) feet. This measurement is intended to model the average energy a 6-foot tall human body will absorb while present in an electromagnetic field of energy.

**Transmitter Power Output (TPO)** – The radio frequency output power of a transmitter’s final radio frequency stage as measured at the output terminal while connected to a load.

## Appendix C – Rules & Regulations

### Explanation of Applicable Rules and Regulations

The FCC has set forth guidelines in OET Bulletin 65 for human exposure to radio frequency electromagnetic fields. Specific regulations regarding this topic are listed in Part 1, Subpart I, of Title 47 in the Code of Federal Regulations. Currently, there are two different levels of MPE - General Public MPE and Occupational MPE. An individual classified as Occupational can be defined as an individual who has received appropriate RF training and meets the conditions outlined below. General Public is defined as anyone who does not meet the conditions of being Occupational. FCC and OSHA Rules and Regulations define compliance in terms of total exposure to total RF energy, regardless of location of or proximity to the sources of energy.

It is the responsibility of all licensees to ensure these guidelines are maintained at all times. It is the ongoing responsibility of all licensees composing the site to maintain ongoing compliance with FCC rules and regulations. Individual licensees that contribute less than 5% MPE to any total area out of compliance are not responsible for corrective actions.

OSHA has adopted and enforces the FCC's exposure guidelines. A building owner or site manager can use this report as part of an overall RF Health and Safety Policy. It is important for building owners/site managers to identify areas in excess of the General Population MPE and ensure that only persons qualified as Occupational are granted access to those areas.

### Occupational Environment Explained

The FCC definition of Occupational exposure limits apply to persons who:

- are exposed to RF energy as a consequence of their employment;
- have been made aware of the possibility of exposure; and
- can exercise control over their exposure.

OSHA guidelines go further to state that persons must complete RF Safety Awareness training and must be trained in the use of appropriate personal protective equipment.

In order to consider this site an Occupational Environment, the site must be controlled to prevent access by any individuals classified as the General Public. Compliance is also maintained when any non-occupational individuals (the General Public) are prevented from accessing areas indicated as Red or Yellow in the attached RF exposure diagram. In addition, a person must be aware of the RF environment into which they are entering. This can be accomplished by an RF Safety Awareness class, and by appropriate written documentation such as this Site Compliance Report.

All Verizon Wireless employees who require access to this site must complete RF Safety Awareness training and must be trained in the use of appropriate personal protective equipment.

## Appendix D – General Safety Recommendations

The following are *general recommendations* appropriate for any site with accessible areas in excess of 100% General Public MPE. These recommendations are not specific to this site. These are safety recommendations appropriate for typical site management, building management, and other tenant operations.

1. All individuals needing access to the main site (or the area indicated to be in excess of General Public MPE) should wear a personal protective monitor (PPM), successfully complete proper RF Safety Awareness training, and have and be trained in the use of appropriate personal protective equipment.
2. All individuals needing access to the main site should be instructed to read and obey all posted placards and signs.
3. The site should be routinely inspected and this or similar report updated with the addition of any antennas or upon any changes to the RF environment including:
  - adding new antennas that may have been located on the site
  - removing of any existing antennas
  - changes in the radiating power or number of RF emitters
4. Post the appropriate **NOTICE**, **CAUTION**, or **WARNING** sign at the main site access point(s) and other locations as required. Note: Please refer to RF Exposure Diagrams in Section 3.1 to inform everyone who has access to this site that beyond posted signs there may be levels in excess of the limits prescribed by the FCC. In addition to RF Advisory Signage, a RF Guideline Signage is recommended to be posted at the main site access point(s). The signs below are examples of signs meeting FCC guidelines.



5. Ensure that the site door remains locked (or appropriately controlled) to deny access to the general public if deemed as policy by the building/site owner.
6. For a General Public environment the five color levels identified in this analysis can be interpreted in the following manner:
  - Gray represents areas predicted to be at 5% or less of the General Public MPE limits. *The General Public can access these areas with no restrictions.*

- Green represents areas predicted to be between 5% and 100% of the General Public MPE limits. *The General Public can access these areas with no restrictions.*
- Blue represents areas predicted to be between 100% and 500% of the General Public MPE limits. *The General Public should be restricted from accessing these areas.*
- Yellow represents areas predicted to be between 500% and 5000% of the General Public MPE limits. *The General Public should be restricted from accessing these areas.*
- Red represents areas predicted to be greater than 5000% of the General Public MPE limits. *The General Public should be restricted from accessing these areas.*

7. For an Occupational environment the five color levels identified in this analysis can be interpreted in the following manner:

- Gray represents areas predicted to be at 1% or less of the Occupational MPE limits. *Workers can access these areas with no restrictions.*
- Green represents areas predicted to be between 1% and 20% of the Occupational MPE limits. *Workers can access these areas with no restrictions.*
- Blue represents areas predicted to be between 20% and 100% of the Occupational MPE limits. Workers can access these areas assuming they have basic understanding of EME awareness and RF safety procedures and understand how to limit their exposure.
- Yellow represents areas predicted to be between 100% and 1000% of the Occupational MPE limits. Workers can access these areas assuming they have basic understanding of EME awareness and RF safety procedures and understand how to limit their exposure. Transmitter power reduction and/or time-averaging may be required.
- Red represents areas predicted to be greater than 1000% of the Occupational MPE limits. These areas are not safe for workers to be in for prolonged periods of time. Special procedures must be adhered to, such as lockout/tagout or transmitter power reduction, to minimize worker exposure to EME.

8. Use of a Personal Protective Monitor (PPM): When working around antennas, Sitesafe strongly recommends the use of a PPM. Wearing a PPM will properly forewarn the individual prior to entering an RF exposure area.

Keep a copy of this report available for all persons who must access the site. They should read this report and be aware of the potential hazards with regards to RF and MPE limits.

### **Additional Information**

Additional RF information is available at the following sites:

<https://www.fcc.gov/general/radio-frequency-safety-0>

<https://www.fcc.gov/engineering-technology/electromagnetic-compatibility-division/radio-frequency-safety/faq/rf-safety>

OSHA has additional information available at:

<https://www.osha.gov/SLTC/radiofrequencyradiation/index.html>

## Appendix E – Regulatory Basis

### FCC Rules and Regulations

In 1996, the Federal Communications Commission (FCC) adopted regulations for evaluating the effects of RF exposure in 47 CFR § 1.1307 and 1.1310. The guideline from the FCC Office of Engineering and Technology is Bulletin 65 (“OET Bulletin 65”), *Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields*, Edition 97-01, published August 1997. Since 1996 the FCC periodically reviews these rules and regulations as per their congressional mandate.

FCC regulations define two separate tiers of exposure limits: Occupational or “Controlled environment” and General Public or “Uncontrolled environment”. The General Public limits are generally five times more conservative or restrictive than the Occupational limits. The General Public limits apply to *accessible* areas where workers or the general public may be exposed to Radio Frequency (RF) electromagnetic fields.

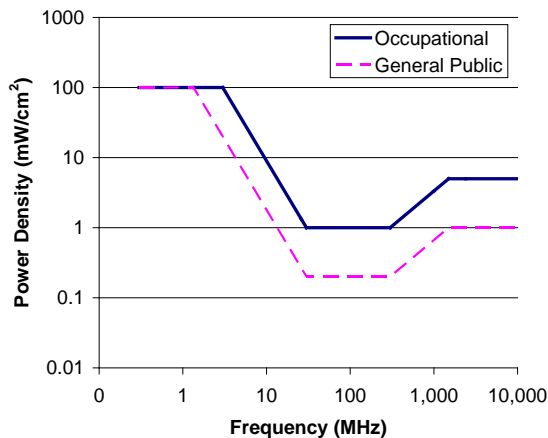
Occupational or Controlled limits apply in situations in which persons are exposed as a consequence of their employment and where those persons exposed have been made fully aware of the potential for exposure and can exercise control over their exposure.

An area is considered a Controlled environment when access is limited to these aware personnel. Typical criteria are restricted access (i.e. locked or alarmed doors, barriers, etc.) to the areas where antennas are located coupled with proper RF hazard signage. A site with Controlled environments is evaluated with Occupational limits.

All other areas are considered Uncontrolled environments. If a site has no access controls or no RF hazard signage it is evaluated with General Public limits.

The theoretical modeling of the RF electromagnetic fields has been performed in accordance with OET Bulletin 65. The Maximum Permissible Exposure (MPE) limits utilized in this analysis are outlined in the following diagram:

**FCC Limits for Maximum Permissible Exposure (MPE)**  
Plane-wave Equivalent Power Density



**Limits for Occupational/Controlled Exposure (MPE)**

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

**Limits for General Population/Uncontrolled Exposure (MPE)**

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

f = frequency in MHz

\*Plane-wave equivalent power density

## Appendix F – Safety Plan and Procedures

The following items are general safety recommendations that should be administered on a site by site basis as needed by the carrier.

**General Maintenance Work:** Any maintenance personnel required to work immediately in front of antennas and / or in areas indicated as above 100% of the Occupational MPE limits should coordinate with the wireless operators to disable transmitters during their work activities.

**Training and Qualification Verification:** All personnel accessing areas indicated as exceeding the General Population MPE limits should have a basic understanding of EME awareness and RF Safety procedures when working around transmitting antennas. Awareness training increases a worker's understanding to potential RF exposure scenarios. Awareness can be achieved in a number of ways (e.g. videos, formal classroom lecture or internet-based courses).

**Physical Access Control:** Access restrictions to transmitting antennas locations is the primary element in a site safety plan. Examples of access restrictions are as follows:

- Locked door or gate
- Alarmed door
- Locked ladder access
- Restrictive Barrier at antenna (e.g. Chain link with posted RF Sign)

**RF Signage:** Everyone should obey all posted signs at all times. RF signs play an important role in properly warning a worker prior to entering into a potential RF Exposure area.

**Assume all antennas are active:** Due to the nature of telecommunications transmissions, an antenna transmits intermittently. Always assume an antenna is transmitting. Never stop in front of an antenna. If you have to pass by an antenna, move through as quickly and safely as possible thereby reducing any exposure to a minimum.

**Site RF Exposure Diagram(s):** Section 3 of this report contains RF Diagram(s) that outline various theoretical Maximum Permissible Exposure (MPE) areas at the site. The modeling is a worst-case scenario assuming a duty cycle of 100% for each transmitting antenna at full power. This analysis is based on one of two access control criteria: General Public criteria means the access to the site is uncontrolled and anyone can gain access. Occupational criteria means the access is restricted and only properly trained individuals can gain access to the antenna locations.