

RADIO FREQUENCY - ELECTROMAGNETIC ENERGY (RF-EME) COMPLIANCE REPORT

Report Type: Antenna Modification/Theoretical

FCC COMPLIANT SITE

Site ID: SC09622B

Site Name: Grass Valley North

Address: 142 Olympia Park Rd. Grass Valley, CA 95945

Date of Calculation: April 18, 2025

Date of Report: April 18, 2025

Latitude: 39.234086 N

Longitude: -121.039156 W



Prepared By:

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1.0 Executive Summary / Report Summary

Purpose of Report

Global Technology Associates (GTA) has been contracted by T-Mobile to conduct radio frequency electromagnetic (RF-EME) modeling for T-Mobile site **SC09622B** located at **142 Olympia Park Rd. Grass Valley, CA 95945** to determine RF-EME exposure levels from existing and proposed T-Mobile wireless communications equipment at this site.

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. This report contains a detailed summary of the RF-EME analysis for the site. As described in greater detail in Section named **“Federal Communications Commission (FCC) Requirements”** of this report, the Federal Communications Commission (FCC) has developed Maximum Permissible Exposure (MPE) Limits for general population exposures and occupational exposures. 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.

T-Mobile Site Summary			
Site ID	SC09622B	Street Address	142 Olympia Park Rd.
Site Name	Grass Valley North	City, State, Zip	Grass Valley, CA 95945
Site Type	monopine	Latitude	39.234086 N
Classification	general population	Longitude	-121.039156 W
Access Restrictions	uncontrolled	Access Type	chain link fence gate
Site Description	all the antennas are mounted on the monopine		
Max Predictive RF-EME at T-Mobile Facility (General Population)	15.5% of FCC’s general population limit at ground level 18.3% of FCC’s general population limit (cumulative) at ground level		
Max Predictive RF-EME at Ground Level (General Population)	15.5% of FCC’s general population limit 18.3% of FCC’s general population limit (cumulative)		
Predictive RF-EME Analysis at T-Mobile Facility	The Proposed Antenna Configuration is In Compliance With FCC Rules & Regulations Upon Completion of the Recommendations.		

Table 1

A result of over 100% does not make a site out of compliance with FCC guidelines. For predicted EME over 100% of the applicable FCC limit, A mitigation plan (e.g. installation of signages and/or barriers/stripping to prevent the access) is required to consider the site compliant. Areas exceeding the FCC limit are presented with the barriers and appropriate signages. Accessible areas outside the demarcated are the safety zones that have predicted EME values below the FCC's limits. Installation of the recommended mitigation measures ensures that the site remains fully compliant. The predictions models antennas as if they are operating at full power, and this assumption yields a worst case scenario with more conservative results. On-site measurements may yield different results, as antennas do not always operate at full capacity.

Methodology

The site to be determined as the compliance is based on theoretical modeling using RoofView® modeling tool, appropriate RF signage placement recommendations, proposed antenna inventory as provided by T-Mobile in the construction drawings and the type & level of restricted access to the antennas at the site.

Compliance Statement

T-Mobile's operation at **142 Olympia Park Rd. Grass Valley, CA 95945** will comply with FCC rules and regulations upon completion of recommendations that includes the installation of appropriate RF Safety Signages and/or Barriers as described in Section 8.

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.

T-Mobile will be compliant when the following changes are implemented:

T-Mobile proposed Access Point Location

Ensure that 1 Guideline, 1 Information & 1 Notice signs are installed at the Access Point location, as depicted in the site map in the later sections of the report.

T-Mobile proposed Alpha Sector Location

1 Caution sign on the sector as depicted in the site map in the later sections of the report.
There is no need to install Barrier & Chain/Striping/Tapes enclosing this sector.

T-Mobile proposed Beta Sector Location

1 Caution sign on the sector as depicted in the site map in the later sections of the report.
There is no need to install Barrier & Chain/Striping/Tapes enclosing this sector.

T-Mobile proposed Gamma Sector Location

1 Caution sign on the sector as depicted in the site map in the later sections of the report.
There is no need to install Barrier & Chain/Striping/Tapes enclosing this sector.

T-Mobile proposed Equipment/BTS Location

Ensure that 1 Guideline, 1 Information & 1 Notice signs are installed at the Equipment/BTS location, as depicted in the site map in the later sections of the report.

2.0 MPE Calculations

For this MPE predictive analysis, GTA considered the area around the accessible areas of the T-Mobile antennas on the site to determine EME field strength levels with respect to the FCC's human exposure limits. Further GTA has identified any areas with higher levels exceeding FCC MPE limits and then determined spatially averaged field levels in areas with highest fields.

GTA has utilized computer generated modeling software RoofView® 4.15 to generate the compliance report.

Modeling & Input Assumptions

In this Site Compliance Report, it is assumed that

- All antennas are operating at full power at all times.
- The Antenna Inventory Table (Section 3) shows all transmitting antennas at the site.
- A 75% duty cycle and maximum radiated power for each antenna is assumed unless T-Mobile has specified otherwise.
- Obstructions like (screens, trees, buildings etc.) that would normally attenuate the signal are not taken into account.
- GTA obtained information used in this Compliance Report from T-Mobile which is considered reliable and believes them to be true and correct.
- Due to the complexity of some wireless sites, GTA performed this analysis and created this report utilizing best industry practices and due diligence. The scales and the determinations are based on the A&E drawings provided by T-Mobile.
- On a case-by-case basis, appropriate static gains and losses are considered while doing the simulations to simulate the closest field radiations of the antennas.
- Any active/live/radiating antenna configuration for the site and the premises is fully compliant per the FCC's regulations.

3.0 Antenna Inventory

ID	Technology	Antenna Make	Antenna Model	Azimuth (°)	Bottom of ANT from Ground (ft)
TMO S1A1	L600	CommScope	FFVV-65C-R2N23	40	89.00
TMO S1A1	N600	CommScope	FFVV-65C-R2N23	40	89.00
TMO S1A1	L700	CommScope	FFVV-65C-R2N23	40	89.00
TMO S1A1	L1900	CommScope	FFVV-65C-R2N23	40	89.00
TMO S1A1	N1900	CommScope	FFVV-65C-R2N23	40	89.00
TMO S1A1	N2100	CommScope	FFVV-65C-R2N23	40	89.00
TMO S1A4	N2500	ERICSSON	AIR6419 B41	40	91.49
TMO S2A2	L600	CommScope	FFVV-65C-R2N23	180	89.00
TMO S2A2	N600	CommScope	FFVV-65C-R2N23	180	89.00
TMO S2A2	L700	CommScope	FFVV-65C-R2N23	180	89.00
TMO S2A2	L1900	CommScope	FFVV-65C-R2N23	180	89.00
TMO S2A2	N1900	CommScope	FFVV-65C-R2N23	180	89.00
TMO S2A2	N2100	CommScope	FFVV-65C-R2N23	180	89.00
TMO S2A5	N2500	ERICSSON	AIR6419 B41	180	91.49
TMO S3A3	L600	CommScope	FFVV-65C-R2N23	290	89.00
TMO S3A3	N600	CommScope	FFVV-65C-R2N23	290	89.00
TMO S3A3	L700	CommScope	FFVV-65C-R2N23	290	89.00
TMO S3A3	L1900	CommScope	FFVV-65C-R2N23	290	89.00
TMO S3A3	N1900	CommScope	FFVV-65C-R2N23	290	89.00
TMO S3A3	N2100	CommScope	FFVV-65C-R2N23	290	89.00
TMO S3A6	N2500	ERICSSON	AIR6419 B41	290	91.49

Table 2

ID	Technology	Antenna Make	Antenna Model	Azimuth (°)	Bottom of ANT from Ground (ft)
OTH S1A7	LTE	Powerwave	7750	40	73.71
OTH S1A8	LTE	Powerwave	7750	40	73.71
OTH S1A9	LTE	Powerwave	7750	40	73.71
OTH S1A10	LTE	Powerwave	7750	40	73.71
OTH S2A11	LTE	Powerwave	7750	180	73.71
OTH S2A12	LTE	Powerwave	7750	180	73.71
OTH S2A13	LTE	Powerwave	7750	180	73.71
OTH S2A14	LTE	Powerwave	7750	180	73.71
OTH S3A15	LTE	Powerwave	7750	290	73.71
OTH S3A16	LTE	Powerwave	7750	290	73.71
OTH S3A17	LTE	Powerwave	7750	290	73.71
OTH S3A18	LTE	Powerwave	7750	290	73.71

Table 3

4.0 Federal Communications Commission (FCC) Requirements

The FCC has established Maximum Permissible Exposure (MPE) limits for human exposure to Radio frequency 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 population/uncontrolled exposure limits for members of the general population.

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 population/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 population/uncontrolled exposure limits apply to situations in which the general population 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 population 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.

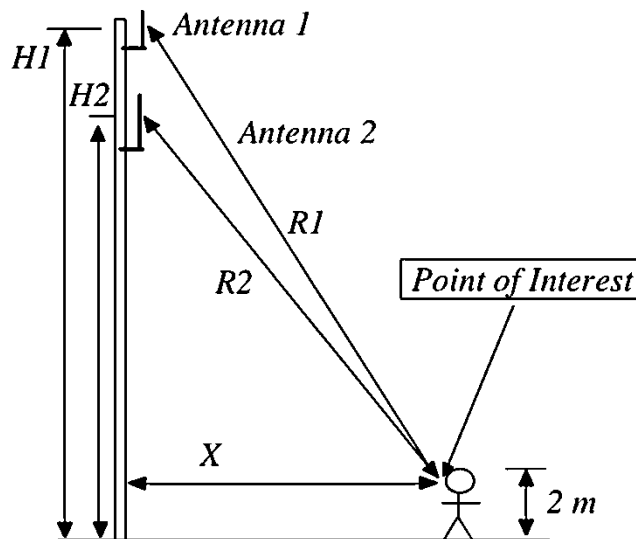


Figure 1

Table 4 and Figure 2 (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 (cm²). Known as the power density, the FCC has established an occupational MPE of 5 milliwatts per square centimeter (mW/cm²) and an uncontrolled MPE of 1 mW/cm² for equipment operating in the 1900 MHz frequency range. For the T-Mobile equipment operating at 800 MHz, the FCC’s occupational MPE is 2.66 mW/cm² and an uncontrolled MPE of 0.53 mW/cm². These limits are considered protective of these populations.

(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	6 4	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f ²)*	6
30-300	61.4	0.163	1	6
300-1,500	--	--	f/300	6
1,500-100,000	--	--	5	6
(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time [E] ² , [H] ² , or S (minutes)
0.3-1.34	6 4	1.63	(100)*	30
1.34-30	1842/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

Table 4

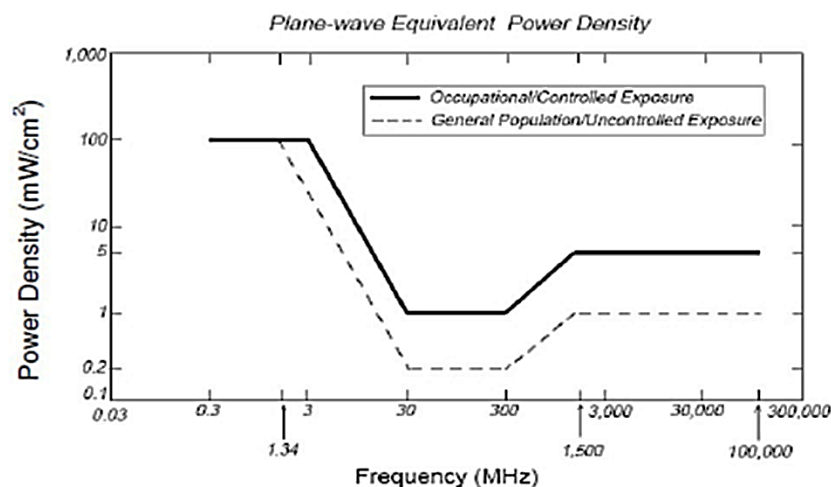


Figure 2

Based on the above, the most restrictive thresholds for exposures of unlimited duration to RF energy for several personal wireless services are summarized below:

Personal Wireless Service	Approximate Frequency	Occupational MPE	Public MPE
Personal Communication (PCS)	1,950 MHz	5.00 mW/cm ²	1.00 mW/cm ²
Cellular Telephone	870 MHz	2.90 mW/cm ²	0.58 mW/cm ²
Specialized Mobile Radio	855 MHz	2.85 mW/cm ²	0.57 mW/cm ²
Most Restrictive Freq. Range	30-300 MHz	1.00 mW/cm ²	0.20 mW/cm ²

Table 5

Personal Communication (PCS) facilities used by T-Mobile in this area operate within a frequency range of 600-2500 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.

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 100% of the applicable MPE must participate in mitigating these RF hazards.

5.0 Limitations

This report was prepared for the use of T-Mobile. 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 GTA are based solely on the information provided by T-Mobile. 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 GTA 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.

6.0 Safety Recommendations

Occupational Safety and Health Administration (OSHA) Requirements

OSHA requires that those in the Occupational classification must complete training in RF Safety, RF Awareness, and Utilization of Personal Protective Equipment. OSHA also provides options for Hazard Prevention and Control:

Hazard Prevention	Control
<ul style="list-style-type: none"> Utilization of good equipment Enact control of hazard areas Limit exposures Employ medical surveillance and accident response 	<ul style="list-style-type: none"> Employ Lockout/Tag out Utilize personal alarms & protective clothing Prevent access to hazardous locations Develop or operate an administrative control program

Table 6

RF Signage and Barriers

All RF signs should be obeyed by at all times.



Figure 3

If there are workers in an area with a sign that they do not understand, they can call the NOC Number at 877-611-5868 for guidance.

7.0 Federal Communications Commission (FCC) Limits

Contribution to Co-Located areas

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 to take corrective actions like installation of mitigation measures that ensures the site remains fully compliant. All co-located sites should have a separate 5% modeling that shows only T-Mobile antennas transmitting. This separate modeling indicates T-Mobile's contribution in all areas that is recognized to be greater 100% MPE limits.

Occupational Limits

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

General Population limits

Apply in situations in which the general population may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure. (Those without significant and documented RF Safety & Awareness training)

Controlled Environment

Applies to environments that are restricted or "controlled" in order to prevent access from members of the General Population classification.

Uncontrolled Environment

Applies to environments that are unrestricted or "uncontrolled" that allow access from members of the General Population classification.

Generic Values

The use of "Unknown" for an operator means the information with regard to the carrier, their FCC license and / or antenna information was not available. Generic values used as estimation for Effective Radiated Power (ERP) and antenna characteristics for unknown antennas.

8.0 Compliance Measures

The site needs the following mitigation and/or compliance plan.

The compliance determination is based on theoretical modeling, RF signage placement recommendations, proposed antenna inventory and the level of restricted access to the antennas at the site. At the time of our analysis, T-Mobile will be compliant with the FCC rules and regulations, as described in OET Bulletin 65 Installation of the recommended mitigation measures shown below, ensures that the site remains fully compliant.

On monopine :










Recommendations for Site Compliance	Signages on Access Points, Sectors & Equipment						Enclosing Sectors					
												
	Guidelines	NOC INFO	NOTICE	CAUTION	WARNING	NOTICE	CAUTION	WARNING	OC Length	GP Length	Striping	
Access Point(s)	✓ 1	✓ 1	✓ 1								Striping	
Sector Alpha				✓ 1							Striping	
Sector Beta				✓ 1							Striping	
Sector Gamma				✓ 1							Striping	
Equipment/BTS	✓ 1	✓ 1	✓ 1								Striping	
Total Signage	2	2	2	3	0	0	0	0	0 sq. ft.	0 sq. ft.	Total = 0 sq.ft.	

Table 7

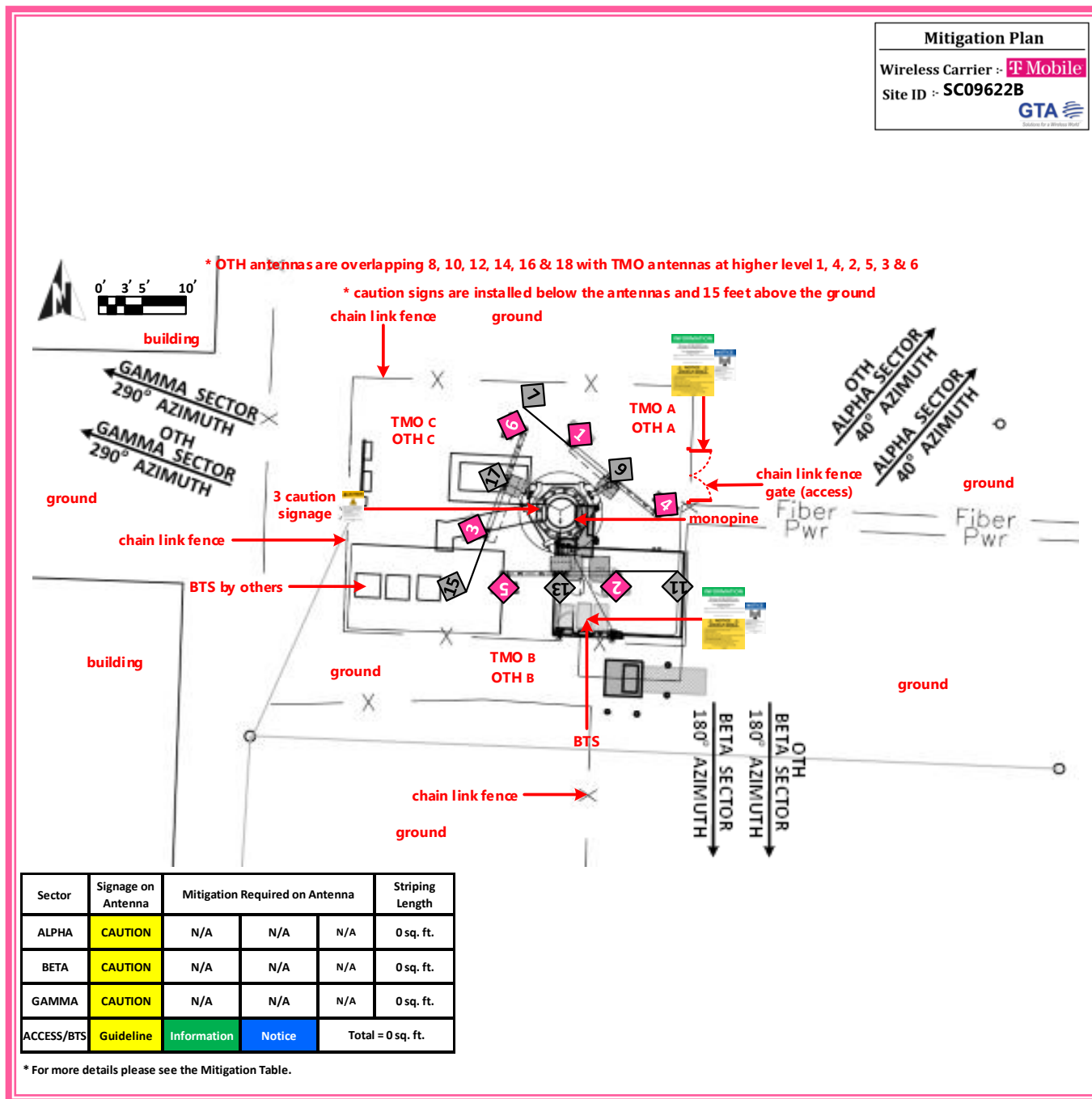
CAUTION: - The table above represents EVERY compliance item that MUST be implemented by the carrier at the site location; please see the Site Plan shown in diagram 1.

It is recommended to have periodic inspections of the components that are involved in radiation of RF energy. Periodic Electromagnetic Emission (EME) measurement should be conducted to reevaluate the RF radiation level at this site.

GTA recommends that T-Mobile and the authorized personal at the site take additional measures to ensure that persons accessing the roof/structure (for example, roofers or other maintenance workers) are informed of areas where RF levels exceed the FCC general population limit and made aware that these areas must be avoided to maintain compliance with FCC requirements. This is important especially when the placement of barriers, striping, taping or any other positive access control (areas of the roof that exceed the RF levels of general population limit) is not possible due to the physical construction or constraints or safety measures surrounding the antennas or on the roof/structure like sloped roof, tiled roof, chimney, steeples, cupolas, hilly terrain, etc.

It is further recommended to distribute this report to anyone accessing the roof/structure and ensuring the confirmation that it has been read and understood.

Diagram 1: Site Scale Plan



◆ T-Mobile Antennas
◆ Other Antennas

— Physical Measurement

Striping

ENTRY
Important Notes

Standard uses 'FCC exposure limits of 5.0 mW/cm2 for occupational and 1.0 mW/cm2 for general population'

9.0 Summary And Conclusions

GTA has prepared this Radiofrequency Emissions Compliance Report for the proposed T-Mobile telecommunications equipment at the site located at **142 Olympia Park Rd. Grass Valley, CA 95945**.

GTA has conducted theoretical modeling to estimate the worst-case power density from T-Mobile antennas to document potential MPE levels at this location and ensure that site control measures are adequate to meet FCC and OSHA requirements.

As presented in the preceding sections, based on worst-case predictive modeling, **there are no modeled exposures on any accessible ground-level walking/working surface** related to proposed equipment in the area that exceed the FCC's **general population** exposure limits at this site. Any of the modeled exposure areas exceeding the **general population** limits need to follow the mitigation/compliance plan proposed in the report in order to ensure that the site remains fully compliant. As such, the proposed T-Mobile project is in compliance with FCC rules and regulations. **Posting of the signages and the recommendations** presented in Section 8 **ensures that the site remains fully compliant with FCC rules and regulations**.

At ground-level the anticipated maximum predictive RF-EME at T-Mobile facility will be 15.5% of FCC's general population limit. This was determined through calculations along a radial from each sector taking full power values into account as well as actual vertical plane antenna gain values per the manufacturer-supplied specifications for gain. Based on worst-case predictive modeling, there are no areas at ground level related to the proposed antennas that exceed the FCC's occupational or general population exposure limits at this site. **At ground level, the maximum power density generated by the antennas is approximately 15.5% of FCC's general population limit (3.1% of the FCC's occupational limit).**

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.

Modeling indicates that there will be no accessible areas on the walking/working surfaces at the ground-level in front of the T-Mobile antennas that may exceed the FCC standards for general population and/or occupational exposure after implementation of mitigation measures. To reduce the risk of exposure and/or injury, GTA recommends that access to the **monopine** or areas associated with the active antenna installation or mitigation measures are restricted and secured where possible.

In order to alert any workers or general population potentially accessing the site, a blue Notice sign and/or yellow Caution sign and/or orange Warning sign based on the simulated exposure limits along with a yellow Guidelines sign are recommended for installation at the access to the rooftop/structure along with the barriers/stripping to exclude the RF radiations exceeding areas per the applicable limits.

10.0 Certification

This report has been prepared under the direction of the following Registered Professional Engineer:

I **Michael A. McGuire PE**, on the date indicated near my seal below hereby certify that:

I am registered as a Professional Engineer with License number listed below and that I am thoroughly familiar with the Regulations of the Federal Communication Commission (FCC), both in general and specifically as they apply to FCC guidelines for human exposure to Radiofrequency electromagnetic radiation and the EME predictive analysis for site identified as **SC09622B** located at **142 Olympia Park Rd. Grass Valley, CA 95945**, has performed on **April 18, 2025** in order to determine where there might be electromagnetic energy that is in excess of both the Controlled Environment and Uncontrolled Environment levels; and that I have thoroughly reviewed this Site Compliance Report and believe it to be true and accurate to the best of my knowledge.



sealed 18apr2025