Radio Frequency Emissions Compliance Report for AT&T Mobility

Site Name:	**Laguna Creek Trailhead**	**Site Structure Type:**	**Water Tank**
Address:	**Vineyard Road**	**Latitude:**	**38.462611**
	Sacramento, CA 95829	**Longitude:**	**-121.314692**
Report Date:	**February 13, 2024**	**Project:**	**New Build**

Compliance Statement

Based on information provided by AT&T Mobility and predictive modeling, the Laguna Creek Trailhead installation proposed by AT&T Mobility will be compliant with Radiofrequency Radiation Exposure Limits of 47 C.F.R. §§ 1.1307(b)(3) and 1.1310. RF alerting signage and restricting access to these areas to authorized personnel that have completed RF safety training is required for Occupational environment compliance. The proposed operation will not expose members of the General Public to hazardous levels of RF energy at ground level or in adjacent buildings. As predicted RF power densities will not exceed the FCC General Population limits, no mitigation action other than restricting access to the tower is required to achieve or maintain compliance.

Certification

I, David C. Cotton, Jr., am the reviewer and approver of this report and 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, specifically in accordance with FCC's OET Bulletin 65. I have reviewed this Radio Frequency Exposure Assessment report and believe it to be both true and accurate to the best of my knowledge.

David Charles Cotton, Jr.
Registered Professional Engineer (Electrical)
State of California, 18838

General Summary

The compliance framework is derived from the Federal Communications Commission (FCC) Rules and Regulations for preventing human exposure in excess of the applicable Maximum Permissible Exposure ("MPE") limits. At any location at this site, the power density resulting from each transmitter may be expressed as a percentage of the frequency-specific limits and added to determine if 100% of the exposure limit has been exceeded. The FCC Rules define two tiers of permissible exposure differentiated by the situation in which the exposure takes place and/or the status of the individuals who are subject to exposure. General Population / Uncontrolled exposure limits apply to those situations in which persons may not be aware of the presence of electromagnetic energy, where exposure is not employment-related, or where persons cannot exercise control over their exposure. Occupational / Controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment, have been made fully aware of the potential for exposure, and can exercise control over their exposure. Based on the criteria for these classifications, the FCC General Population limit is considered to be a level that is safe for continuous exposure time. The FCC General Population limit is 5 times more restrictive than the Occupational limits.

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In situations where the predicted MPE exceeds the General Population threshold in an accessible area as a result of emissions from multiple transmitters, FCC licensees that contribute greater than 5% of the aggregate MPE share responsibility for mitigation.

Table 1: FCC Limits

Frequency (MHz)	*Limits for General Population/ Uncontrolled Exposure*		*Limits for Occupational/ Controlled Exposure*	
	Power Density (mW/cm^2)	Averaging Time (minutes)	Power Density (mW/cm^2)	Averaging Time (minutes)
30-300	0.2	30	1	6
300-1500	f/1500	30	f/300	6
1500-100,000	1.0	30	5.0	6

f=Frequency (MHz)

Based on the computational guidelines set forth in FCC OET Bulletin 65, Waterford Consultants, LLC has developed software to predict the overall Maximum Permissible Exposure possible at any location given the spatial orientation and operating parameters of multiple RF sources. The power density in the Far Field of an RF source is specified by OET-65 Equation 5 as follows:

$$S = \frac{EIRP}{4 \cdot \pi \cdot R^2} \ (\mathrm{mW/cm^2})$$

where EIRP is the Effective Radiated Power relative to an isotropic antenna and R is the distance between the antenna and point of study. Additionally, consideration is given to the manufacturers' horizontal and vertical antenna patterns as well as radiation reflection. At any location, the predicted power density in the Far Field is the spatial average of points within a 0 to 6-foot vertical profile that a person would occupy. Near field power density is based on OET-65 Equation 20 stated as

$$S = \left(\frac{180}{\theta_{BW}}\right) \cdot \frac{100 \cdot P_{in}}{\pi \cdot R \cdot h} \ (\mathrm{mW/cm^2})$$

where P_{in} is the power input to the antenna, θ_{BW} is the horizontal pattern beamwidth and h is the aperture length.

Some antennas employ beamforming technology where RF energy allocated to each customer device is dynamically directed toward their location. In the analysis presented herein, predicted exposure levels are based on all beams at full utilization (i.e. full power) simultaneously focused in any direction. As this condition is unlikely to occur, the actual power density levels at ground and at adjacent structures are expected to be less that the levels reported below. These theoretical results represent maximum-case predictions as all RF emitters are assumed to be operating at 100% duty cycle.

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Analysis

AT&T Mobility proposes the following installation at this location:

- (P) (12) AT&T PANEL ANTENNAS
- (P) (12) RRUS REMOTE RADIO UNITS

The antennas will be mounted on an 80-foot Faux Water Tank with centerlines 72.25, 75, & 77.83 feet above ground level. Proposed antenna operating parameters are listed in Appendix A. Other appurtenances such as GPS antennas, RRUs and hybrid cable below the antennas are not sources of RF emissions. No other antennas are known to be operating in the vicinity of this site.

Figure 1: Antenna Locations

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Power density decreases significantly with distance from any antenna. The panel-type antennas to be employed at this site are highly directional by design and the orientation in azimuth and mounting elevation, as documented, serves to reduce the potential to exceed MPE limits at any location other than directly in front of the antennas. For accessible areas at ground level, the maximum predicted power density level resulting from all AT&T Mobility operations is 4.1406% of the FCC General Population limits. Incident at adjacent buildings depicted in Figure 1, the maximum predicted power density level resulting from all AT&T Mobility operations is 4.0972% of the FCC General Population limits. The proposed operation will not expose members of the General Public to hazardous levels of RF energy at ground level or in adjacent buildings. As predicted RF power densities will not exceed the FCC General Population limits, no mitigation action other than restricting access to the tank is required to achieve or maintain compliance. For areas on the tank that are predicted to exceed the General Population limits, Waterford Consultants, LLC recommends that AT&T Mobility post an RF alerting sign (Caution) on the access ladder to be visible upon approach by authorized climbers to provide notification of potential conditions above this level.

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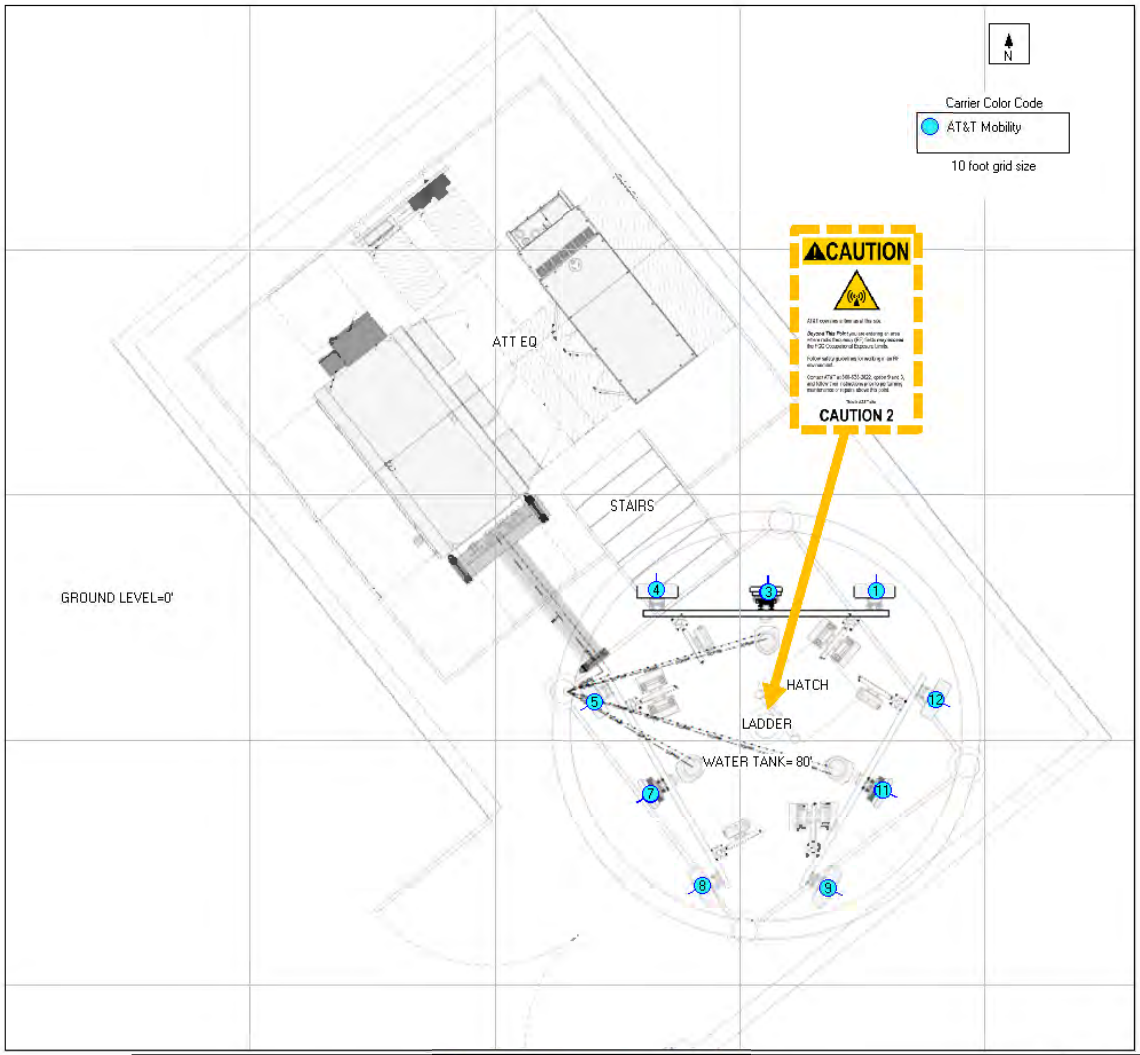
Compliance Requirement Diagram (Access Location)



Recommendations

AT&T Mobility Access Location
Caution 2 sign posted at the base of the ladder.

Materials –
[1] Caution 2 sign

Figure 2: Mitigation Recommendation

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Appendix A: Operating Parameters Considered in this Analysis

Ant #:	Carrier:	Manufacturer	Pattern:	Band (MHz):	Mech Az (deg):	Mech DT (deg):	H BW (deg):	Length (ft):	TPO (W):	Channels:	Loss (dB):	Gain (dBd):	ERP (W):	EIRP (W):	Rad Center (ft):
1	AT&T	QUINTEL	QD8612-3D V1 02DT	700	0	0	70	8	40	4	0	12.7109	2987	4900	75
1	AT&T	QUINTEL	QD8612-3D V1 02DT	850	0	0	61	8	40	4	0	13.2158	3355	5504	75
1	AT&T	QUINTEL	QD8612-3D V1 02DT	1900	0	0	60	8	40	4	0	15.249	5358	8791	75
1	AT&T	QUINTEL	QD8612-3D V1 02DT	2100	0	0	60	8	40	4	0	15.6024	5812	9536	75
2	AT&T	Ericsson	SON_AIR6419 TB 05.17.22 3500 AT&T	3500	0	0	13	2.4	54.2	1	0	23.45	11999	19686	77.83
3	AT&T	Ericsson	SON_AIR6449 NR TB 05.17.22 3700 AT&T	3700	0	0	11.7	2.8	108.4	1	0	23.45	23999	39372	72.25
4	AT&T	QUINTEL	QD868-2 V1 02DT	700	0	0	74	8	40	4	0	12.1945	2652	4351	75
4	AT&T	QUINTEL	QD868-2 V1 02DT	1900	0	0	62	8	40	4	0	14.7795	4809	7890	75
5	AT&T	QUINTEL	QD8612-3D V1 02DT	700	240	0	70	8	40	4	0	12.7109	2987	4900	75
5	AT&T	QUINTEL	QD8612-3D V1 02DT	850	240	0	61	8	40	4	0	13.2158	3355	5504	75
5	AT&T	QUINTEL	QD8612-3D V1 02DT	1900	240	0	60	8	40	4	0	15.249	5358	8791	75
5	AT&T	QUINTEL	QD8612-3D V1 02DT	2100	240	0	60	8	40	4	0	15.6024	5812	9536	75
6	AT&T	Ericsson	SON_AIR6419 TB 05.17.22 3500 AT&T	3500	240	0	13	2.4	54.2	1	0	23.45	11999	19686	77.83
7	AT&T	Ericsson	SON_AIR6449 NR TB 05.17.22 3700 AT&T	3700	240	0	11.7	2.8	108.4	1	0	23.45	23999	39372	72.25
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8	AT&T	QUINTEL	QD868-2 V1 02DT	1900	240	0	62	8	40	4	0	14.7795	4809	7890	75
9	AT&T	QUINTEL	QD8612-3D V1 02DT	700	120	0	70	8	40	4	0	12.7109	2987	4900	75
9	AT&T	QUINTEL	QD8612-3D V1 02DT	850	120	0	61	8	40	4	0	13.2158	3355	5504	75
9	AT&T	QUINTEL	QD8612-3D V1 02DT	1900	120	0	60	8	40	4	0	15.249	5358	8791	75
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11	AT&T	Ericsson	SON_AIR6449 NR TB 05.17.22 3700 AT&T	3700	120	0	11.7	2.8	108.4	1	0	23.45	23999	39372	72.25
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12	AT&T	QUINTEL	QD868-2 V1 02DT	1900	120	0	62	8	40	4	0	14.7795	4809	7890	75

Notes: Table depicts recommended operating parameters for AT&T Mobility proposed operations

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