Radio Frequency Emissions Compliance Report for AT&T Mobility

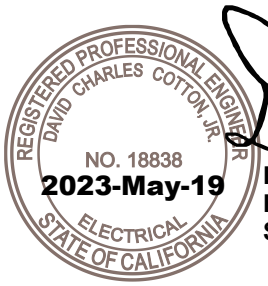
Site Name:	**CANC RLIN01**	**Site Structure Type:**	**Monopole**
Address:	**6941 7th Street**	**Latitude:**	**38.694551**
	Rio Linda, CA 95673	**Longitude:**	**-121.451216**
Report Date:	**May 18, 2023**	**Project:**	**New Build**

Compliance Statement

Based on information provided by AT&T Mobility and predictive modeling, the CANC RLIN01 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 at the base of the Monopole and restricting access to authorized climbers 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 structures.

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.

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.

7430 New Technology Way, Suite 150 Frederick, Maryland 21703 (703) 596-1022 Phone www.waterfordconsultants.com

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. This analysis includes a statistical factor reducing the actual power of the antenna system to 32% of maximum theoretical power to account for spatial distribution of users, network utilization, time division duplexing, and scheduling time. AT&T recommends the use of this factor based on a combination of guidance from its antenna system manufacturers, supporting international industry standards, industry publications, and its extensive experience.

7430 New Technology Way, Suite 150 Frederick, Maryland 21703 (703) 596-1022 Phone www.waterfordconsultants.com

Analysis

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

- INSTALL (15) ANTENNAS ON (12) MOUNT PIPES
- INSTALL (18) RADIOS

The antennas will be mounted on a 75-foot Monopole with centerlines 37, 79.12, 81, & 82.71 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

7430 New Technology Way, Suite 150 Frederick, Maryland 21703 (703) 596-1022 Phone www.waterfordconsultants.com

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 2.3622% of the FCC General Population limits. Incident at adjacent structures depicted in Figure 1, the maximum predicted power density level resulting from all AT&T Mobility operations is 37.0424% 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 structures.

Waterford Consultants, LLC recommends posting RF alerting signage with contact information (Caution 2B) at the base of the Monopole to inform authorized climbers of potential conditions near the antennas. These recommendations are depicted in Figure 2.

7430 New Technology Way, Suite 150 Frederick, Maryland 21703 (703) 596-1022 Phone www.waterfordconsultants.com

Compliance Requirement Diagram (Access Location)

Figure 2: Mitigation Recommendation

Recommendations

AT&T Mobility Access Location
Caution 2B posted at the base of the pole.

Materials –
1 Caution 2B Sign

7430 New Technology Way, Suite 150 Frederick, Maryland 21703 (703) 596-1022 Phone www.waterfordconsultants.com

Appendix A: Operating Parameters Considered in this Analysis

Antenna #:	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	80	0	70	8	40	4	0	12.7109	2987	4900	81
1	AT&T	QUINTEL	QD8612-3D V1 02DT	850	80	0	61	8	40	4	0	13.2158	3355	5504	81
1	AT&T	QUINTEL	QD8612-3D V1 02DT	1900	80	0	60	8	40	4	0	15.249	5358	8791	81
1	AT&T	QUINTEL	QD8612-3D V1 02DT	2100	80	0	60	8	40	4	0	15.6024	5812	9536	81
2	AT&T	Ericsson	SON_AIR6449 NR TB 05.17.22 3700 AT&T	3700	80	0	11.7	2.8	86.8	1	0	23.45	19199	31497	79.12
3	AT&T	Ericsson	SON_AIR6419 TB 05.17.22 3500 AT&T	3500	80	0	13	2.4	54.2	1	0	23.45	11999	19686	82.71
4	AT&T	QUINTEL	QD868-2 V1 02DT	700	80	0	74	8	40	4	0	12.1945	2652	4351	81
4	AT&T	QUINTEL	QD868-2 V1 02DT	1900	80	0	62	8	40	4	0	14.7795	4809	7890	81
5	AT&T	QUINTEL	QD8612-3D V1 02DT	700	320	0	70	8	40	4	0	12.7109	2987	4900	81
5	AT&T	QUINTEL	QD8612-3D V1 02DT	850	320	0	61	8	40	4	0	13.2158	3355	5504	81
5	AT&T	QUINTEL	QD8612-3D V1 02DT	1900	320	0	60	8	40	4	0	15.249	5358	8791	81
5	AT&T	QUINTEL	QD8612-3D V1 02DT	2100	320	0	60	8	40	4	0	15.6024	5812	9536	81
6	AT&T	Ericsson	SON_AIR6449 NR TB 05.17.22 3700 AT&T	3700	320	0	11.7	2.8	86.8	1	0	23.45	19199	31497	79.12
7	AT&T	Ericsson	SON_AIR6419 TB 05.17.22 3500 AT&T	3500	320	0	13	2.4	54.2	1	0	23.45	11999	19686	82.71
8	AT&T	QUINTEL	QD868-2 V1 02DT	700	320	0	74	8	40	4	0	12.1945	2652	4351	81
8	AT&T	QUINTEL	QD868-2 V1 02DT	1900	320	0	62	8	40	4	0	14.7795	4809	7890	81
9	AT&T	QUINTEL	QD8612-3D V1 02DT	700	200	0	70	8	40	4	0	12.7109	2987	4900	81
9	AT&T	QUINTEL	QD8612-3D V1 02DT	850	200	0	61	8	40	4	0	13.2158	3355	5504	81
9	AT&T	QUINTEL	QD8612-3D V1 02DT	1900	200	0	60	8	40	4	0	15.249	5358	8791	81
9	AT&T	QUINTEL	QD8612-3D V1 02DT	2100	200	0	60	8	40	4	0	15.6024	5812	9536	81
10	AT&T	Ericsson	SON_AIR6449 NR TB 05.17.22 3700 AT&T	3700	200	0	11.7	2.8	86.8	1	0	23.45	19199	31497	79.12
11	AT&T	Ericsson	SON_AIR6419 TB 05.17.22 3500 AT&T	3500	200	0	13	2.4	54.2	1	0	23.45	11999	19686	82.71
12	AT&T	QUINTEL	QD868-2 V1 02DT	700	200	0	74	8	40	4	0	12.1945	2652	4351	81
12	AT&T	QUINTEL	QD868-2 V1 02DT	1900	200	0	62	8	40	4	0	14.7795	4809	7890	81
13	AT&T	ANDREW	VHLP4-11	11000	0	0	1.5	4	0.2	1	0	38.7	1483	2432	37
14	AT&T	ANDREW	VHLP4-11	11000	180	0	1.5	4	0.2	1	0	38.7	1483	2432	37

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