– City of Berkeley, California –
AT&T Mobility • 1321 Gilman Street • Small Cell No. CRAN_RSFR_SFOK8_013

Statement of Hammett & Edison, Inc., Consulting Engineers

The firm of Hammett & Edison, Inc., Consulting Engineers, has been retained on behalf of the City of Berkeley to evaluate the AT&T Mobility small cell (No. CRAN_RSFR_SFOK8_013) located in Berkeley, California, for compliance with appropriate guidelines limiting human exposure to radio frequency ("RF") electromagnetic fields.

Executive Summary

AT&T had installed a cylindrical antenna on the utility pole sited in the public right-of-way near 1321 Gilman Street in Berkeley. Its operation complied with the FCC guidelines limiting public exposure to RF energy.

Prevailing Exposure Standard

The U.S. Congress requires that the Federal Communications Commission ("FCC") evaluate its actions for possible significant impact on the environment. A summary of the FCC's exposure limits is shown in Figure 1. 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. The most restrictive FCC limit for exposures of unlimited duration to radio frequency energy for several wireless services are as follows:

Wireless Service Band	Transmit Frequency	"Uncontrolled" Public Limit	Occupational Limit (5 times Public)
Microwave (point-to-point)	1–80 GHz	1.0 mW/cm^2	5.0 mW/cm^2
Millimeter-wave	24–47 GHz	1.0	5.0
Part 15 (WiFi & other unlicensed)	2–6 GHz	1.0	5.0
CBRS (Citizens Broadband Radio)	3,550 MHz	1.0	5.0
BRS (Broadband Radio)	2,490 MHz	1.0	5.0
WCS (Wireless Communication)	2,305 MHz	1.0	5.0
AWS (Advanced Wireless)	2,110 MHz	1.0	5.0
PCS (Personal Communication)	1,930 MHz	1.0	5.0
Cellular	869 MHz	0.58	2.9
SMR (Specialized Mobile Radio)	854 MHz	0.57	2.85
700 MHz	716 MHz	0.48	2.4
600 MHz	617 MHz	0.41	2.05
[most restrictive frequency range]	30–300 MHz	0.20	1.0

Power line frequencies (60 Hz) are well below the applicable range of these standards, and there is considered to be no compounding effect from simultaneous exposure to power line and radio frequency fields.

General Facility Requirements

Small cells typically consist of two distinct parts: the electronic transceivers (also called "radios") that are connected to the traditional wired telephone lines, and the passive antennas that send the wireless signals created by the radios out to be received by individual subscriber units. The transceivers are typically mounted on the support pole or placed in a cabinet at ground level, and they are connected to the antennas by coaxial cables. Because of the short wavelength of the frequencies assigned by the FCC for wireless services, the antennas require line-of-sight paths for their signals to propagate well and so are installed at some height above ground. The antennas are designed to concentrate their energy toward the horizon, with very little energy wasted toward the sky or the ground. This means that it is generally not possible for exposure conditions to approach the maximum permissible exposure limits without being physically very near the antennas.

Site Description

The site was visited by Mr. Scott Walthard, a qualified field technician employed by Hammett & Edison, Inc., during normal business hours on June 21, 2021, a non-holiday weekday. AT&T had installed an omnidirectional antenna on top of the tall wood utility pole sited at the east corner of the intersection of Gilman and Neilson Streets, near the automotive repair shop at 1321 Gilman Street. Access to the antenna was restricted by its mounting location and height. Explanatory signs had been posted on the pole below the antenna. There were observed no other wireless telecommunications base stations located at this site or nearby.

Measurement Results

The measurement equipment used was a Narda Type NBM-520 Broadband Field Meter with Type EA-5091 Isotropic Electric Field Probe (Serial No. 01291) and a Wandel & Goltermann Type EMR-300 Radiation Meter with Type 8 Isotropic Electric Field Probe (Serial No. P-0036). The meters and probes were under current calibration by the manufacturer and together measure radio signals from 0.1 MHz to 50 GHz, which includes all frequencies authorized for use by AT&T. Measurements were made at ground near the site and with a bucket-truck below the lowest cables; the PG&E power lines precluded access to the antenna itself. At each test point, the measurement results were compared with applicable FCC standards. The maximum power density level observed for a person high on the pole was 2.8% of the applicable public limit. The maximum power density level observed for a person at ground near the site was 0.00066 mW/cm^2, which is 0.33% of the most restrictive public limit. The three-dimensional perimeter of RF levels equal to the public exposure limit did not reach any publicly accessible areas.

Recommended Compliance Measures

Due to its mounting location and height, the AT&T antenna was not accessible to the general public, and so no additional measures are necessary to comply with the FCC exposure guidelines for such persons.

Conclusion

Based on the information and analysis above, it is the undersigned's professional opinion that the AT&T Mobility small cell located near 1321 Gilman Street in Berkeley, California, as installed and operating at the time of the visit, complies with the FCC guidelines limiting exposure if the general public to radio frequency energy and, therefore, does not for this reason cause a significant impact on the environment.

Authorship

The undersigned author of this statement is a qualified Professional Engineer, holding California Registration Nos. E-13026 and M-20676, which expire on June 30, 2023. This work has been carried out under his direction, and all statements are true and correct of his own knowledge except, where noted, when data has been supplied by others, which data he believes to be correct.

William F. Hammett, P.E.
707/996-5200

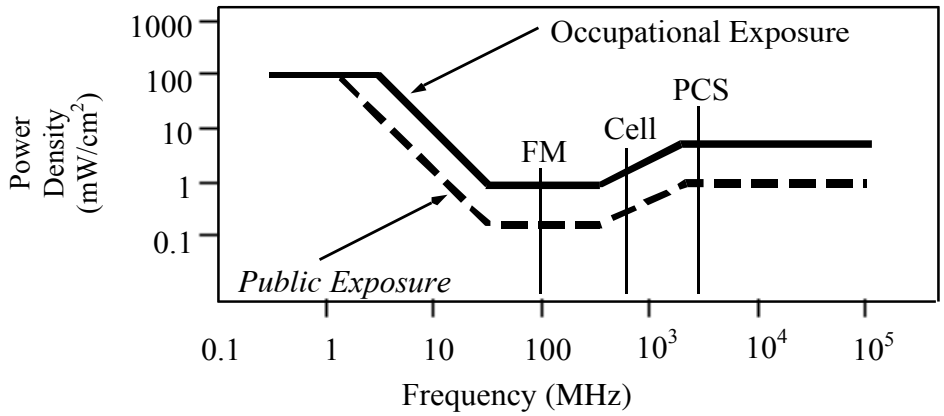
August 9, 2021

FCC Radio Frequency Protection Guide

The U.S. Congress required (1996 Telecom Act) the Federal Communications Commission ("FCC") to adopt a nationwide human exposure standard to ensure that its licensees do not, cumulatively, have a significant impact on the environment. The FCC adopted the limits from Report No. 86, "Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields," published in 1986 by the Congressionally chartered National Council on Radiation Protection and Measurements ("NCRP"). Separate limits apply for occupational and public exposure conditions, with the latter limits generally five times more restrictive. The more recent standard, developed by the Institute of Electrical and Electronics Engineers and approved as American National Standard ANSI/IEEE C95.1-2006, "Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz," includes similar limits. These limits apply for continuous exposures from all sources and are intended to provide a prudent margin of safety for all persons, regardless of age, gender, size, or health.

As shown in the table and chart below, separate limits apply for occupational and public exposure conditions, with the latter limits (in *italics* and/or dashed) up to five times more restrictive:

Frequency	Electromagnetic Fields (f is frequency of emission in MHz)					
Applicable Range (MHz)	Electric Field Strength (V/m)		Magnetic Field Strength (A/m)		Equivalent Far-Field Power Density (mW/cm^2)	
0.3 – 1.34	614	*614*	1.63	*1.63*	100	*100*
1.34 – 3.0	614	*823.8/ f*	1.63	*2.19/ f*	100	*180/ f^2*
3.0 – 30	1842/ f	*823.8/ f*	4.89/ f	*2.19/ f*	900/ f^2	*180/ f^2*
30 – 300	61.4	*27.5*	0.163	*0.0729*	1.0	*0.2*
300 – 1,500	$3.54\sqrt{f}$	*$1.59\sqrt{f}$*	$\sqrt{f}/106$	*$\sqrt{f}/238$*	f/300	*f/1500*
1,500 – 100,000	137	*61.4*	0.364	*0.163*	5.0	*1.0*



Higher levels are allowed for short periods of time, such that total exposure levels averaged over six or thirty minutes, for occupational or public settings, respectively, do not exceed the limits, and higher levels also are allowed for exposures to small areas, such that the spatially averaged levels do not exceed the limits. However, neither of these allowances is incorporated in the conservative calculation formulas in the FCC Office of Engineering and Technology Bulletin No. 65 (August 1997) for projecting field levels. Hammett & Edison has incorporated those formulas in a computer program capable of calculating, at thousands of locations on an arbitrary grid, the total expected power density from any number of individual radio frequency sources. The program allows for the inclusion of uneven terrain in the vicinity, as well as any number of nearby buildings of varying heights, to obtain more accurate projections.