AT&T Mobility • Proposed Node (No. CRAN_RSFR_NOVA0_013)
625 Arthur Street • Novato, California

Statement of Hammett & Edison, Inc., Consulting Engineers

The firm of Hammett & Edison, Inc., Consulting Engineers, has been retained on behalf of AT&T Mobility, a wireless telecommunications carrier, to evaluate the addition of a new node in its network in Novato, California, for compliance with municipal limits on sound levels from the installation.

Executive Summary

AT&T proposes to install an antenna and equipment on the utility pole sited in the public right-of-way near 625 Arthur Street in Novato. Noise from the proposed operation will comply with the City's pertinent noise limits.

Prevailing Standard

The City of Novato regulates noise from wireless communications facilities at §19.38.120 of its Municipal Code, which requires compliance with the noise limits in §19.22.070, in which Table 3-5 "Allowable Exterior Noise Levels" sets the following maximum noise limits at the property line of the noise source:

Type of Land Use	Day Limit *6 am to 10 pm*	Night Limit *10 pm to 6 am*
Residential	60 dBA	45 dBA
Commercial or Mixed-Use	70 dBA	60 dBA
Industrial or Manufacturing	70 dBA	70 dBA

Residential standards apply to sensitive receptors such as schools, hospitals, libraries, group care facilities, and convalescent homes. Noise measurements shall be made at the property line* of the noise source. Figure 1 attached describes the calculation methodology used to determine applicable noise levels for evaluation against the prevailing standard.

General Facility Requirements

Wireless telecommunications facilities ("cell sites") typically consist of two distinct parts: the electronic base transceivers (also called "radios"), that are connected to traditional wired telephone lines, and the antennas, that send wireless signals created by the radios out to be received by individual subscriber units. The radios are typically located on or at the base of the pole and are connected to the antennas by cables. Some radios require fans to cool the electronics inside. Some radios are integrated with the antennas as a single unit.

* Calculated at a height of 7 feet above ground for the limited purposes of this study.

Site & Facility Description

According to information provided by AT&T, including drawings by Modus, LLC, dated March 2, 2020, that carrier proposes to install a cylindrical antenna on top of the wood utility pole sited in the public right-of-way on the south side of Arthur Street in Novato, near the west entrance to the main parking lot at Novato High School, whose address is 625 Arthur Street. Two Ericsson radio units would be mounted lower on the pole, one Model 4415 and one Model 4426. The nearest property line is at the parking lot, about 7 feet away.

Study Results

Ericsson reports that the maximum noise level from either one Model 4415 or one Model 4426 unit is 39.0 dBA,† measured at a reference distance of 5 feet. The cylindrical antenna is passively cooled, generating no noise. The maximum calculated noise level at the nearest property line, for the continuous operation of both radios, is 36.1 dBA, which meets the City's most restrictive limit of 45 dBA.

Conclusion

Based on the information and analysis above, it is the undersigned's professional opinion that operation of this AT&T Mobility node in Novato will, under the conditions noted above, comply with the municipal standards limiting acoustic noise emission levels.

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, 2021. 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.

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707/996-5200

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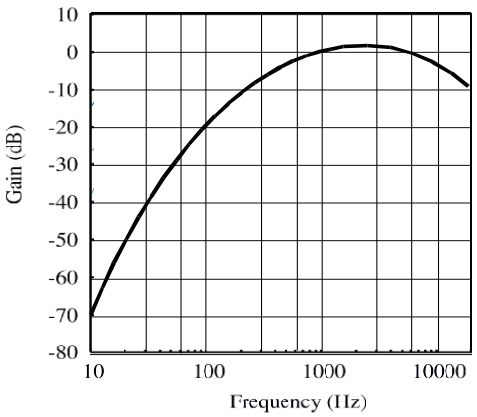
† Adjusted value based on manufacturer data, to reflect record high temperature of 107°F in Novato.

Noise Level Calculation Methodology

Most municipalities and other agencies specify noise limits in units of dBA, which is intended to mimic the reduced receptivity of the human ear to Sound Pressure ("L_P") at particularly low or high frequencies. This frequency-sensitive filter shape, shown in the graph to the right as defined in the International Electrotechnical Commission Standard No. 179, the American National Standards Institute Standard No. 5.1, and various other standards, is also incorporated into most calibrated field test equipment for measuring noise levels.



30 dBA	library
40 dBA	rural background
50 dBA	office space
60 dBA	conversation
70 dBA	car radio
80 dBA	traffic corner
90 dBA	lawnmower

The dBA units of measure are referenced to a pressure of 20 µPa (micropascals), which is the threshold of normal hearing. Although noise levels vary greatly by location and noise source, representative levels are shown in the box to the left.

Manufacturers of many types of equipment, such as air conditioners, generators, and telecommunications devices, often test their products in various configurations to determine the acoustical emissions at certain distances. This data, normally expressed in dBA at a known reference distance, can be used to determine the corresponding sound pressure level at any particular distance, such as at a nearby building or property line. The sound pressure drops as the square of the increase in distance, according to the formula:

$$L_P = L_K + 20 \log(D_K/D_P),$$

where L_P is the sound pressure level at distance D_p and L_K is the known sound pressure level at distance D_K.

Individual sound pressure levels at a particular point from several different noise sources cannot be combined directly in units of dBA. Rather, the units need to be converted to scalar sound intensity units in order to be added together, then converted back to decibel units, according to the formula:

where L_T is the total sound pressure level and L_1, L_2, etc are individual sound pressure levels.

$$L_T = 10 \log \left(10^{L_1/10} + 10^{L_2/10} + \ldots\right),$$

Certain equipment installations may include the placement of barriers and/or absorptive materials to reduce transmission of noise beyond the site. Noise Reduction Coefficients ("NRC") are published for many different materials, expressed as unitless power factors, with 0 being perfect reflection and 1 being perfect absorption. Unpainted concrete block, for instance, can have an NRC as high as 0.35. However, a barrier's effectiveness depends on its specific configuration, as well as the materials used and their surface treatment.