T-Mobile West LLC • Proposed Base Station (Site No. SV00797A)
4591½ Park Granada • Calabasas, California

Statement of Hammett & Edison, Inc., Consulting Engineers

The firm of Hammett & Edison, Inc., Consulting Engineers, has been retained on behalf of T-Mobile West LLC, a personal telecommunications carrier, to evaluate the base station (Site No. SV00797A) proposed to be located at 4591½ Park Granada in Calabasas, California, for compliance with appropriate guidelines limiting sound levels from the installation.

Executive Summary

T-Mobile proposes to install a new wireless telecommunications base station, consisting of equipment cabinets, a back-up generator, and a radome on a tall pole, to be sited on Park Granada opposite Park Capri in Calabasas. Noise levels from the equipment operations will comply with the pertinent noise limits.

Prevailing Standard

The City of Calabasas sets forth limits on sound levels in Chapter 17.20.160 (Noise) of its Municipal Code, including the following hourly average limits in Table 3-1 for noise in the following zoning districts, assessed at the adjacent property lines:

Zone	Daytime *7 am to 10 pm*	Nighttime *10 pm to 7am*
Residential – RR, RC, HM, OS	60 dBA	50 dBA
Residential – RS, RM, RMH	65	50
Residential – weekend (8 am, not 7 am)	60	50
Non-Residential	65	60
Recreation (with active areas)	70	60

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 transceiver stations ("BTS" or "cabinets") that are connected to traditional wired telephone lines, and the antennas that wireless signals created by the BTS out to be received by individual subscriber units. The BTS are often located outdoors at ground level and are connected to the antennas by coaxial cables. The BTS typically require environmental units to cool the electronics inside. Such cooling is often integrated into the BTS, although external air conditioning may be installed, especially when the BTS are housed within a larger enclosure.

Most cell sites have back-up battery power available, to run the base station for some number of hours in the event of a power outage. Many sites have back-up power generators installed, to run the station during an extended power outage.

Site & Facility Description

Based upon information provided by T-Mobile, including zoning drawings by Synergy Development Services, Inc., dated May 24, 2016, that carrier proposes to install several equipment cabinets in the public right-of-way located on the north side of Park Granada opposite the start of Park Capri. The one equipment cabinet with active cooling fans is an Ericsson Model RBS6102, with the optional second "climate unit" from the manufacturer. The nearest property line is to the northwest, less than a foot from the equipment area; that parcel is zoned "Open Space - Development Restricted." The nearest developed areas are located about 95 feet to the southeast, across Park Granada.

T-Mobile proposes to replace the streetlight in the middle divider of Park Granada with a new streetlight at the same location, fitted with antennas on top of the pole. This portion of the base station is passive, generating no noise.

Study Results

Ericsson reports that the maximum noise level from its cabinet is 53 dBA,* measured at a reference distance of 1 meter. The applicable 60 dBA daytime limit, for the simultaneous operation of all fans in the cabinet, is calculated to be met at a distance of about 1½ feet from the equipment cabinet, that is, extending just over half a foot into the adjacent parcel. The applicable 50 dBA nighttime limit is met at a distance of about 5 feet from the equipment cabinet, that is, extending about 4 feet into the adjacent parcel, at a time when no use of the "Open Space" area would be expected. As shown in Figure 2, this represents a *de minimis* intrusion into the undeveloped area.

At the developed areas across Park Granada, the maximum calculated noise level is 24 dBA, well below the City's most restrictive limits.

Conclusion

Based on the information and analysis above, it is the undersigned's professional opinion that the operation of the T-Mobile West LLC base station proposed to be located at 4591½ Park Granada in Calabasas, California, will substantially comply with the City's requirements for limiting acoustic noise emission levels.

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* At a reference temperature of 25°C (77°F)

Authorship

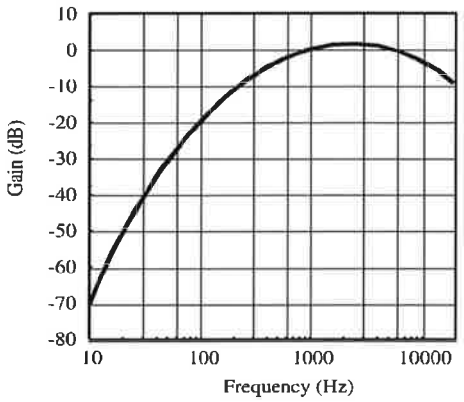
The undersigned author of this statement is a qualified Professional Engineer, holding California Registration Nos. E-13026 and M-20676, which expire on June 30, 2017. This work has been carried out under his direction, and all statements are true and correct of his own knowledge except, where noted, when data has been supplied by others, which data he believes to be correct.

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

June 30, 2016

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.

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Site Location and Adjacent Properties