Radio Frequency – Electromagnetic Energy (RF-EME) Compliance Report

Site No. 9CAB009081
Arizona Avenue and Vienna Drive
Milpitas, California 95035
Santa Clara County
37.451014; -121.904897 NAD83
Light Pole

EBI Project No. 6216001958
April 19, 2016

Prepared for:

California Transmission Network
2955 Red Hill Ave, Suite 200
Costa Mesa, CA 92626

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CITY OF MILPITAS
PLANNING DIVISION

Prepared by:

EBI Consulting
environmental | engineering | due diligence

EXECUTIVE SUMMARY

Purpose of Report

EnviroBusiness Inc. (dba EBI Consulting) has been contracted by California Transmission Network to conduct radio frequency electromagnetic (RF-EME) modeling for California Transmission Network Site 9CAB009081 located at Arizona Avenue and Vienna Drive in Milpitas, California to determine RF-EME exposure levels from proposed California Transmission Network wireless communications equipment at this site. As described in greater detail in Appendix A of this report, the Federal Communications Commission (FCC) has developed Maximum Permissible Exposure (MPE) Limits for general public exposures and occupational exposures. This report summarizes the results of RF-EME modeling in relation to relevant FCC RF-EME compliance standards for limiting human exposure to RF-EME fields.

This report contains a detailed summary of the RF EME analysis for the site.

This document addresses the compliance of California Transmission Network's proposed transmitting facilities independently at the site.

Modeling results included in this report are based on drawings dated January 26, 2016 as provided to EBI Consulting. Subsequent changes to the drawings or site design may yield changes in the MPE levels or FCC Compliance recommendations.

Maximum Permissible Exposure (MPE) Summary			
Location	**% of FCC General Public/Uncontrolled Exposure Limit**	**% of FCC Occupational/Controlled Exposure Limit**	**Power Density (mW/cm^2)**
California Transmission Network Equipment			
Ground	0.40	0.08	0.004

Statement of Compliance

Based on worst-case predictive modeling, there are no modeled exposures on any accessible ground-level walking/working surface related to California Transmission Network's proposed equipment in the area that exceed the FCC's occupational and/or general public exposure limits at this site. As such, the proposed California Transmission Network project is in compliance with FCC rules and regulations.

Signage is recommended at the site as presented in Section 9.0. Posting of the signage brings the site into compliance with FCC rules and regulations.

1.0 Location of all Existing Antennas and Facilities and Existing RF Levels

California Transmission Network proposes the installation of one (1) omni wireless telecommunication antenna on a light pole in Milpitas, California. The proposed site will have a total of one (1) omni California Transmission Network antenna at the site.

There are no collocated carriers on the light pole.

2.0 Location or all approved (but not installed) antennas and facilities and Expected RF Levels from the Approved Facilities

There are no antennas or facilities that are approved and not installed based on information provided to EBI and California Transmission Network at the time of this report.

3.0 Number and Types of Wireless Telecommunication Sites (WTS) within 100 Feet of the proposed Site

Based on aerial photography review, there are no other Wireless Telecommunication Service (WTS) sites observed within 100 feet of the proposed site.

4.0 Location and Number of the California Transmission Network Antennas and Back-up Facilities per Structure and Number and Location of Other Telecommunication Facilities on the Property

California Transmission Network proposes the installation of one (1) wireless telecommunication antenna on a light pole in Milpitas, California. The proposed site will have a total of one (1) California Transmission Network antenna at the site.

There is one sector proposed at this site with one antenna in that sector. The antenna is transmitting omnidirectionally in the 850 Mhz Frequency range. The bottom of the antenna will be 25 feet above the ground level.

There are no collocated carriers on the light pole.

5.0 Power Rating for all Existing and Proposed Backup Equipment Subject to the Application

The operating power of each frequency, for modeling purposes, was assumed to be the following:

California Transmission Network Operating Powers Per Sector		
Frequency (MHz)	**Power (Watts)**	**# of Transmitters**
2496	5	2

Additional transmitter information used in the modeling of California Transmission Network antennas is summarized in the RoofView® export file presented in Appendix C.

6.0 Total Number of Watts per Installation and the Total Number of Watts for All Installations on the Structure

The Effective Radiated Power (ERP) for each carrier and frequency is summarized below:

Effective Radiated Power (ERP) per Frequency	
Frequency (MHz)	**ERP (Watts)**
2496	43

7.0 Preferred Method of Attachment of Proposed Antenna with Plot or Roof Plan including: Directionality of Antennas, Height of Antennas above Nearest Walking Surface, Discuss Nearby Inhabited Buildings

Based on the information provided to EBI, the proposed antenna is to be operating in the direction, frequency, and height mentioned in section 4.0 above.

8.0 Estimated Ambient Radio Frequency Fields for the Proposed Site

Based on worst-case predictive modeling, there are no modeled exposures on any accessible ground-level walking/working surface related to California Transmission Network's proposed equipment in the area that exceed the FCC's occupational and/or general public exposure limits at this site. As such, the proposed California Transmission Network project is in compliance with FCC rules and regulations.

Maximum Permissible Exposure (MPE) Summary			
Location	**% of FCC General Public/Uncontrolled Exposure Limit**	**% of FCC Occupational/Controlled Exposure Limit**	**Power Density (mW/cm^2)**
California Transmission Network Equipment			
Ground	0.40	0.08	0.004

The inputs used in the modeling are summarized in the RoofView® export file presented in Appendix C.

9.0 Signage at the Facility Identifying all WTS Equipment and Safety Precautions for People Nearing the Equipment as may be Required by the Applicable FCC Adopted Standards (Discuss Signage for Those who Speak Languages Other than English)

Signs are the primary means for control of access to areas where RF exposure levels may potentially exceed the MPE. However, it is not recommended that signage be placed in highly public areas where there are no exposures above the FCC general public limits. Installing signage should follow carrier and local jurisdiction requirements. There are no exposures above the FCC limits in front of the proposed antennas and therefore barriers are not recommended.

Workers that are elevated above the ground may be exposed to power densities greater than the occupational limit. Workers should be informed about the presence of antennas and their associated fields and practice RF Safety Procedures.

Access to this site is accomplished by walking up to the light pole. Access to the antennas is gained via a lift or climbing with fall protection and therefore the antennas are considered not accessible to the general public.

10.0 Statement on Who Produced This Report and Qualifications

Please see the certifications attached in Appendix B below.

11.0 Limitations

This report was prepared for the use of California Transmission Network. It was performed in accordance with generally accepted practices of other consultants undertaking similar studies at the same time and in the same locale under like circumstances. The conclusions provided by EBI are based solely on the information provided by the client. The observations in this report are valid on the date of the investigation. Any additional information that becomes available concerning the site should be provided to EBI so that our conclusions may be revised and modified, if necessary. This report has been prepared in accordance with Standard Conditions for Engagement and authorized proposal, both of which are integral parts of this report. No other warranty, expressed or implied, is made.

12.0 Summary and Conclusions

EBI has prepared this Radiofrequency Emissions Compliance Report for the proposed California Transmission Network telecommunications equipment at the site located at Arizona Avenue and Vienna Drive in Milpitas, California.

EBI has conducted theoretical modeling to estimate the worst-case power density from proposed California Transmission Network antennas to document potential MPE levels at this location and ensure that site control measures are adequate to meet FCC and OSHA requirements. As presented in the preceding sections, based on worst-case predictive modeling, there are no modeled exposures on any accessible ground-level walking/working surface related to California Transmission Network's proposed equipment in the area that exceed the FCC's occupational and/or general public exposure limits at this site. As such, the proposed California Transmission Network project is in compliance with FCC rules and regulations.

Signage is recommended at the site as presented in Section 9.0. Posting of the signage brings the site into compliance with FCC rules and regulations.

Appendix A

Federal Communications Commission (FCC) Requirements

The FCC has established Maximum Permissible Exposure (MPE) limits for human exposure to Radiofrequency Electromagnetic (RF-EME) energy fields, based on exposure limits recommended by the National Council on Radiation Protection and Measurements (NCRP) and, over a wide range of frequencies, the exposure limits developed by the Institute of Electrical and Electronics Engineers, Inc. (IEEE) and adopted by the American National Standards Institute (ANSI) to replace the 1982 ANSI guidelines. Limits for localized absorption are based on recommendations of both ANSI/IEEE and NCRP.

The FCC guidelines incorporate two separate tiers of exposure limits that are based upon occupational/controlled exposure limits (for workers) and general public/uncontrolled exposure limits for members of the general public.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/ controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general public/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

General public/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment-related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Table 1 and Figure 1 (below), which are included within the FCC's OET Bulletin 65, summarize the MPE limits for RF emissions. These limits are designed to provide a substantial margin of safety. They vary by frequency to take into account the different types of equipment that may be in operation at a particular facility and are "time-averaged" limits to reflect different durations resulting from controlled and uncontrolled exposures.

The FCC's MPEs are measured in terms of power (mW) over a unit surface area (cm^2). Known as the power density, the FCC has established an occupational MPE of 5 milliwatts per square centimeter (mW/cm^2) and an uncontrolled MPE of 1 mW/cm2 for equipment operating in the 1900 MHz frequency range. For the California Transmission Network equipment operating at 800 MHz, the FCC's occupational MPE is 2.66 mW/cm^2 and an uncontrolled MPE of 0.53 mW/cm^2. These limits are considered protective of these populations.

Table 1: Limits for Maximum Permissible Exposure (MPE)

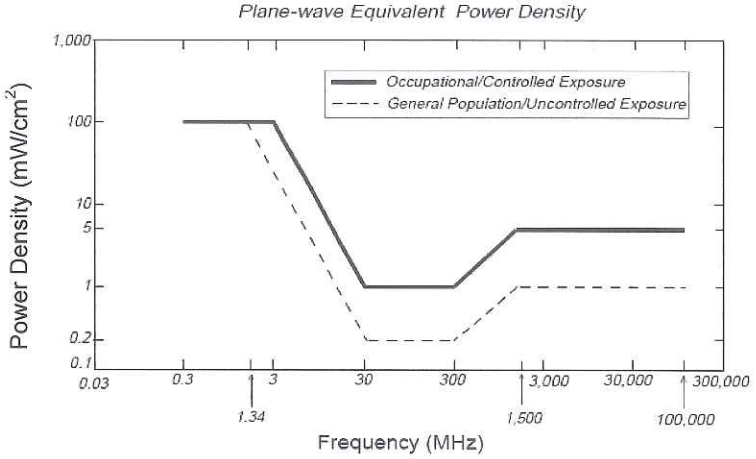
(A) Limits for Occupational/Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $[E]^2$, $[H]^2$, or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-1,500	--	--	f/300	6
1,500-100,000	--	--	5	6

(B) Limits for General Public/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (E) (V/m)**	**Magnetic Field Strength (H) (A/m)**	**Power Density (S) (mW/cm^2)**	**Averaging Time $[E]^2$, $[H]^2$, or S (minutes)**
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-1,500	--	--	f/1,500	30
1,500-100,000	--	--	1.0	30

f = Frequency in (MHz)
* Plane-wave equivalent power density

Figure 1. FCC Limits for Maximum Permissible Exposure (MPE)



Based on the above, the most restrictive thresholds for exposures of unlimited duration to RF energy for several personal wireless services are summarized below:

Personal Wireless Service	Approximate Frequency	Occupational MPE	Public MPE
Personal Communication (PCS)	1,950 MHz	5.00 mW/cm^2	1.00 mW/cm^2
Cellular Telephone	870 MHz	2.90 mW/cm^2	0.58 mW/cm^2
Specialized Mobile Radio	855 MHz	2.85 mW/cm^2	0.57 mW/cm^2
Most Restrictive Freq, Range	30-300 MHz	1.00 mW/cm^2	0.20 mW/cm^2

MPE limits are designed to provide a substantial margin of safety. 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.

Personal Communication System (PCS) facilities used by California Transmission Network in this area operate within a frequency range of 800-1900 MHz. Facilities typically consist of: 1) electronic transceivers (the radios or cabinets) connected to wired telephone lines; and 2) antennas that send the wireless signals created by the transceivers to be received by individual subscriber units (PCS telephones). Transceivers are typically connected to antennas by coaxial cables.

Because of the short wavelength of PCS services, the antennas require line-of-site paths for good propagation, and are typically installed above ground level. Antennas are constructed to concentrate energy towards the horizon, with as little energy as possible scattered towards the ground or the sky. This design, combined with the low power of PCS facilities, generally results in no possibility for exposure to approach Maximum Permissible Exposure (MPE) levels, with the exception of areas directly in front of the antennas.

FCC Compliance Requirement

A site is considered out of compliance with FCC regulations if there are areas that exceed the FCC exposure limits and there are no RF hazard mitigation measures in place. Any carrier which has an installation that contributes more than 5% of the applicable MPE must participate in mitigating these RF hazards.

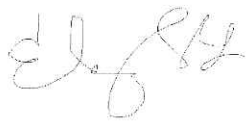
Appendix B

Certifications

Preparer Certification

I, Libby Galvin state that:

- I am an employee of EnviroBusiness Inc. (d/b/a EBI Consulting), which provides RF-EME safety and compliance services to the wireless communications industry.
- I have successfully completed RF-EME safety training, and I am aware of the potential hazards from RF-EME and would be classified "occupational" under the FCC regulations.
- I am familiar with the FCC rules and regulations as well as OSHA regulations both in general and as they apply to RF-EME exposure.
- I have reviewed the data provided by the client and incorporated it into this Site Compliance Report such that the information contained in this report is true and accurate to the best of my knowledge.



Libby Galvin
RF EME Technician II
April 19, 2016
EBI Consulting

Reviewed and Approved by:

Herbert J. Stockinger, PE
Senior Engineer

Note that EBI's scope of work is limited to an evaluation of the Radio Frequency – Electromagnetic Energy (RF-EME) field generated by the antennas and broadcast equipment noted in this report. The engineering and design of the building and related structures, as well as the impact of the antennas and broadcast equipment on the structural integrity of the building, are specifically excluded from EBI's scope of work.

Appendix C

Roofview® Export File / Antenna Inventory

StartMapDefinition

Roof Max X	Roof Max Y	Map Max X	Map Max Y	Y Offset	X Offset	Number of envelope		List Of Area
170	160	180	170	10	10	1	$U$41:$FX	$U$41:$FX$210

StartSettingsData

Standard	Method	Uptime	Scale Factc	Low Thr	Low Color	Mid Thr	Mid Color	Hi Thr	Hi Color	Over Color	Ap Ht Mult	Ap Ht Method
4	2	3	1	100	1	500	4	5000	2	3	1.5	1

StartAntennaData It is advisable to provide an ID (ant 1) for all antennas

ID	Name	(MHz) Freq	Trans Power	Trans Count	Coax Len	Coax Type	Other Loss	Input Power	Calc Power	Mfg	Model	(ft) X	(ft) Y	(ft) Z	Type	(ft) Aper	dBd Gain	BWdth Pt Dir	Uptime Profile	ON flag
CTN1	mobilite	2496	5	2				10	10	Alpha	AW3477	10	10	25.3	omni	2.4	6.35	360		#REF!

StartSymbolData

Sym	Map Mark	Roof X	Roof Y	Map Label	Description (notes for this table only)
Sym		5	35	AC Unit	Sample symbols
Sym		14	5	Roof Access	
Sym		45	5	AC Unit	
Sym		45	20	Ladder	