Attachment 7
Safety Code 6 Assessment

Red Oak Technologies

Supporting Your Wireless Journey

SAFETY CODE 6 SITE VALIDATION

TELUS Site: BC106996

1477 Hodges Rd,
Nanaimo G, BC

Supervisor: Alireza Torabian
P.Eng. License Number 54148

Rev. 1.0

Date: 25 October 2022

1.0 Background

As outlined in Client Procedures Circular CPC-2-0-03 "Radio Communication and Broadcasting Antenna Systems" by Innovation, Science, and Economic Development (ISED) Canada, it is the responsibility of proponents and operators of radio communication and broadcasting installations to ensure that their facilities comply with Health Canada's Safety Code 6 at all times, taking into consideration the local radio environment. Compliance with Safety Code 6 is an ongoing obligation. Therefore, at any time, antenna system operators may be required to provide a copy of their radio frequency (RF) exposure compliance reports to ISED as proof of ongoing compliance. Proponents and operators of existing antenna systems must retain copies of all information related to Safety Code 6 compliance, such as analyses and measurements.

2.0 Description of the Site

2.1 General Description (Table 1)

Site name:	Nanaimo G - Mulholland Dr/Yellowbrick Rd		
Address:	1477 Hodges Rd, Nanaimo G, BC		
Location code:	BC106996	**Site coordinates: (LAT / LONG) NAD83 / degrees.decimal)**	49.333319 / -124.367159

2.2 Description of the Site Location (Table 2)

Site Description	
Structure type (e.g. rooftop (with locked access), water tower, monopole, mast, lattice tower (with anti-climb))	Tower
Is tower using guy wires?	NA
Owner of the building and/or antenna structure	Unknown
Overall height of the antenna-supporting structure from the ground level (m) (and above rooftops if applicable (m))	60
Is the structure shared?	YES
Have all on-site antenna systems been included in the report?	YES
Objects (reflectors or scatterers) in the vicinity of the proposed site that may affect the RF field strength	Refer to Google Earth image of site in Section 3.2
Rooftop/tower access is restricted and locked at all times	NA

2.3 Identification of Radio Operators located in the vicinity of the site

LAND MOBILE SERVICE-type cellular sites located less than 100 m from the site:	☒ **Rogers**	☐ **Bell**	☐ **Freedom**	☐ **Other**	☐ **None**
BROADCAST stations located less than 1 km from the TELUS site:					☒ **None**

Note: ISED's Assignment and Licensing System (ALS) database is used to locate transmitting radio base stations.

3.0 Site Installation and Antennas

3.1 Summary of Site Installation

TELUS has 6 antennas on the tower, divided into 3 sectors in different azimuths. For each sector, TELUS has LTE transmitters in 4 bands (600MHz, 700MHz, 850MHz, 2100MHz).

3.2 Site and Antenna Locations

The location of the antennas at the site are shown below.

4.0 SAFETY CODE 6 ANALYSIS

4.1 Safety Code Simulation

Using the Safety Code 6 simulation tool, EMF Visual, the antenna supporting structures (e.g. buildings, towers) and the antennas were created. EMF Visual was then used to determine the RF emissions at the areas that are accessible by the general public to assess if the site is compliant with the Safety Code 6 limits for uncontrolled environments.

The analysis of the site shows the emission levels on this site do not exceed the 2015 SC6 limits for uncontrolled environments. No further action is required.

The Safety Code 6 disposition for this site is shown below.

☑	Cumulative RF field levels relating to the site's antenna facilities **<u>are compliant with</u>** the limits of maximum RF exposure established in Health Canada's Safety Code 6, with reference to Uncontrolled Environment exposure criteria. **(Compliant-Uncontrolled)**
☐	Cumulative RF field levels relating to the site's antenna facilities **<u>are compliant with</u>** the limits of maximum RF exposure established in Health Canada's Safety Code 6, when mitigating controls have been implemented. **(Compliant-Controlled)**

Notes:

The Safety Code 6 study carried out on the cell site facilities in question takes the following aspects into account:

a) References in the study to Safety Code 6 are based on the Health Canada document titled "Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz" (last version published in *2015).*

- The calculations included in the study reflect the maximum exposure limits set forth in Safety Code 6.

b) **EMF Visual** electromagnetic field calculation software is used to assess RF field levels.

- The software assesses electromagnetic field levels using an approach based on decomposing the antenna being studied into smaller radiant elements and superimposing the effects.
- This approach, which has been published and standardized (CENELEC EN50383 European standard), evaluates the electromagnetic field in both the far field and near field of the antenna.
- The approach used by EMF Visual software was published in an article titled, "Optimal modeling of real radio base station antennas for human exposure assessment using spherical-mode decomposition" which appeared in the magazine IEEE Antennas and Wireless Propagation Letters, Vol. 1, pp. 215-218, 2002. (Y. Adane, A. Gati.).

c) Sound engineering practices:

- The parameters relating to TELUS transmitter output power and number of radio carriers considered for the study exceed actual parameters at the initial site in-service date to allow for future capacity growth at the site.
- Margins are included in TELUS antenna tilts in the study in order to take into account future changes in antenna tilt.
- Analyses of RF field levels are conducted at a height of 2.0 m (the estimated height of a person) with respect to the main horizontal surfaces (roof, ground level).
- The analysis also takes into account the electromagnetic fields of existing radio operators located in proximity to the site being studied (i.e. land mobile service type radio operators located less than 100 m from the site and broadcast station operators located less than 1 km away

Definitions:

a) **Controlled Environment:** An area where the RF field intensities have been adequately characterized by means of measurements or calculations and exposure is incurred by persons who are: aware of the potential for RF field exposure, cognizant of the intensity of the RF fields in their environment, aware of the potential health risks associated with RF filed exposure and able to control their risk using mitigation strategies.

b) **Uncontrolled Environment:** An area where any of the criteria defining the controlled environment are not met. All Safety Code 6 evaluations are conducted against the uncontrolled environment, since ISED is concerned with protecting the general public. In cases where these limits are not exceeded, the site is dispositioned as COMPLIANT-UNCONTROLLED. In cases where these limits are exceeded, controls to restrict access and provide notification of high emissions are required for site compliance. When such controls have been implemented, the site is dispositioned as COMPLIANT-CONTROLLED.

Radio Frequency System Shutdown Process

- **Scheduled Work Shutdown Process**
  - In case there is scheduled work to be completed on the rooftop, Telus requires a minimum of 48h advanced notice.
  - Call Network Operations Center: 1-800-391-1391 Option #3

    Request shutdown for Safety Code 6

- **Emergency Shutdown Process**
  - Call Network Operations Center: 1-800-391-1391 Option #3
    Request shutdown for Safety Code 6

    - SITE #: ONxxxx
      SECTOR # : 1, 2, 3, 4…

5.0 RF Exposure Compliance (SC-6)

ATTESTATION: I attest that the information provided in this document is correct and a technical report was prepared based on the information available. The site evaluation for Safety Code 6 compliancy was performed under my supervision, and the applicable evaluation methodology has been followed.

The maximum exposure levels on the nearby roofs and ground level was calculated to be less than 2015 SC6 limits for uncontrolled environments. This site is compliant with the 2015 SC6 limits for uncontrolled environments. No further action is required.

Signature: A.R. Torabian Date: 25 October 2022

Name: Alireza Torabian

Title: RF Engineer

Company: Red Oak Technologies

Disclaimer: This qualification accounts for the site as at the date written above. This qualification is not indefinite and the RF environment is subject to change due to factors which are beyond TELUS' knowledge or control, including but not limited to, building modifications and the addition of new wireless service providers onto the site. Such changes may invalidate the content of this report. TELUS has relied on technical information provided by third parties in the preparation of this report. TELUS cannot be held liable for the inaccuracy of any of the information it has received and relied on in good faith. Measured dimensions of the final physical site configuration may differ from the values used in this report.

References

The following publications/guidelines have been considered during the course of preparation of this SC-6 report

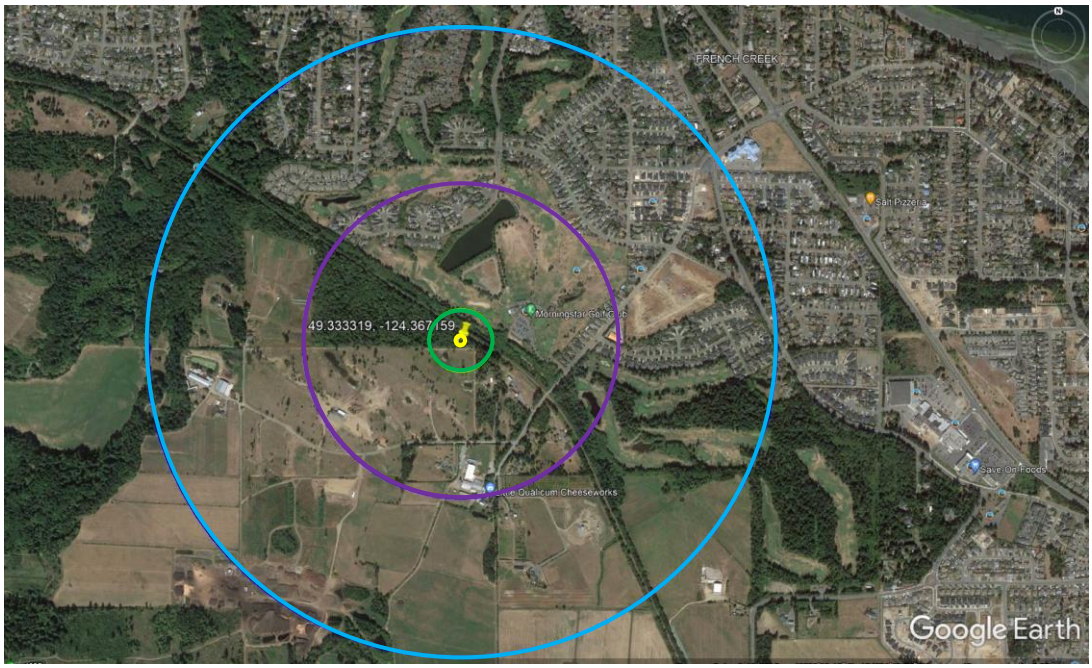
1) Broadcasting Procedures and Rules (BPR-1) – *General Rules Issue 7, February 2016*

2) Client Procedures Circular (CPC-2-0-03) – *Radio communication and Broadcasting Antenna Systems Issue 5, June 26, 2014*

3) Guidelines for the Preparation of Radio Frequency (RF) Exposure Compliance Reports for Radio Communications and Broadcasting Antenna Systems (GL-08, November, 2010)

4) Client Procedures Circular (CPC-2-0-20) – *Radio Frequency (RF) Fields – Signs and Access Control Issue 1, March 2013*

5) Health Canada – *Limits of Human Exposure to Radiofrequency Electromagnetic Energy in the Frequency Range from 3 KHz to 300 GHz – Safety Code 6 (2015)*.



Maximum predicted exposure in relation to SC6 within each circle

Blue: Within 1000m from the tower, 625 times below SC6 maximum
Purple: Within 500m from the tower, 144.93 times below SC6 maximum
Green: Within 100m from the tower, 31.64 times below SC6 maximum
Yellow: Within 10m from the tower, 151.51 times below SC6 maximum