



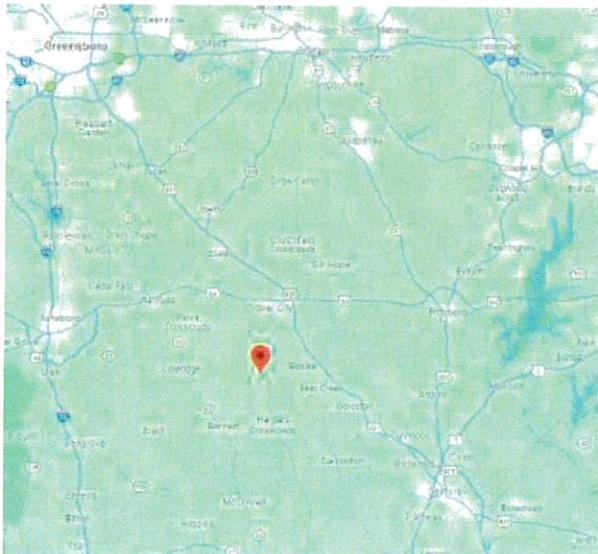
Sublight Engineering PLLC

BEAR MAPLE PROPOSED TOWER

verizon  SouthernTowers BTS

SOUTHERN TOWERS BTS, LP SITE #: NC-039
SOUTHERN TOWERS BTS, LP SITE NAME: BEAR MAPLE
VERIZON SITE NUMBER: 617355320
VERIZON SITE NAME: BEAR MAPLE
±4162 BONLEE BENNETT ROAD
BEAR CREEK, NC 27207

VICINITY MAP



LOCATION MAP



July 13, 2024

Matt Butcher
matt@sublight.net



Bear Maple RF Exposure Assessment

RF Exposure Assessment

Sublight Engineering PLLC (Sublight) has been asked to review compliance with the Federal Communications Commission (FCC) Radio Frequency (RF) exposure limits near the proposed installation Bear Maple. Southern Towers BTS engaged Sublight and provided information for this assessment.

Verizon Wireless propose to provide wireless communications services from this site. Other wireless operators may also collocate on this proposed 285-foot-tall tower.

This review considered RF exposure with respect to FCC limits in accessible areas near the tower. As detailed information on Verizon's installation or that of any other potential collector was not available, a typical installation was considered. Because of the proposed height of this tower, there is no reason to think actual operator details would change this review's findings.

Based on this review, RF exposure levels in accessible areas near this tower will be below FCC limits for the General Public.

Review

A computer modeling of the typical installation is provided in Figure 1 of typical operator equipment at the proposed tower location. This shows that the only areas that may exceed FCC exposure limits for the General Public are **more than 200 feet above ground** and extend out approximately 60 feet from the tower at that height. The levels on the ground withing 500 feet from the tower are predicted to be **less than 0.05% of the FCC General Public limits**. This is more than 2,000 times below limits which themselves have a 500-fold safety factor. Note that the predictions are very conservative and actual exposure is likely to be much less.

If you have any questions on this review please contact Sublight Engineering PLLC.

Matthew J Butcher, PE
matt@sublight.net
703.493.0549



Bear Maple RF Exposure Assessment



Figure 1 Exemplar RF Exposure Modeling



Bear Maple RF Exposure Assessment

FCC Regulations on RF Exposure

The US Congress instructed federal agencies to evaluate the effects of their actions on the quality of the human environment via the National Environmental Policy Act (NEPA) of 1969. As per that mandate the Federal Communications Commission (FCC) regulates exposure to RF energy. The FCC met this responsibility by issuing regulations to ensure that electromagnetic energy from FCC regulated facilities do not have an adverse effect on the human environment. These regulations were most recently updated in 2019¹.

Research in human interaction with electromagnetic energy dates to the 19th century. In 1890 d'Arsonval noted that 10 kHz electricity could warm the skin. In 1928 it was discovered that RF heating could affect internal organs and diathermy, a medical treatment, was introduced. Exposure to electromagnetic energy, specifically radio frequency (RF) energy, has been an area of concern and study since the 1950's. In 1953 the US Navy established limits to protect personnel from dangers introduced with high-power radars.

Since 1960 the International Committee on Electromagnetic Safety (ICES) has been responsible for the C95 series of standards, published now by the Institute of Electrical Engineers (IEEE). The latest in the series is IEEE C95.1-2019². Another group, the International Commission on Non-Ionizing Radiation Protection (ICNIRP), also publishes a similar standard, RF EMF Guidelines 2020³, which is adopted in much of the world. Health Canada developed Safety Code 6⁴ which is adapted from C95.1. The congressionally chartered National Council on Radiation Protection and Measurements (NCRP) published a report⁵ in 1986. That NCRP report, along with C95.1-1992, was used by the FCC to set the current exposure limits in effect for the United States.

The FCC, IEEE C95.1-2019, Health Canada Safety Code 6, and ICNIRP RF EMF Guidelines 2020 all have very similar exposure limits which are accepted by the World Health Organization (WHO) and most public health agencies around the world.

FCC regulations are developed via an open process which allows for participation from all interested parties. Additionally, the FCC consults with the Food and Drug Administration (FDA), Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA) and the National Institutes of Health (NIH) for guidance on electromagnetic exposure regulations.

¹ [FCC 19-126 RESOLUTION OF NOTICE OF INQUIRY, SECOND REPORT AND ORDER, NOTICE OF PROPOSED RULEMAKING, AND MEMORANDUM OPINION AND ORDER](#); 2019.

² [IEEE C95.1-2019 IEEE Standard for Safety Levels with Respect to Human Exposure to Electric, Magnetic, and Electromagnetic Fields, 0 Hz to 300 GHz](#); 2019.

³ [ICNIRP RF EMF Guidelines 2020](#). Guidelines for limiting exposure to electromagnetic fields (100 kHz to 300 GHz). Health Phys 118(00):000–000; 2020.

⁴ [Health Canada Safety Code 6](#) Limits of Human Exposure to Radiofrequency Electromagnetic Energy in the Frequency Range from 3 kHz to 300 GHz; 2015.

⁵ [NCRP Report No. 86](#), Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields; 1986.



Bear Maple RF Exposure Assessment

FCC regulations can be found in the Code of Federal Regulations⁶. Details on compliance are published in Bulletin OET-65⁷ by the FCC's Office of Engineering and Technology (OET).

The 2019 update to the FCC regulations was in response to the FCC seeking comments through the Notice of Proposed Rulemaking and Notice of Inquiry process. Rule changes from this process include clarifications on exposure limits and how wireless communications sites are managed with respect to signs and controls for access to areas where RF exposure levels may or do exceed FCC limits.

The federal government, through law and regulations implemented by the FCC, has assumed authority over regulation of radiofrequency (RF) radiation exposure limits by wireless facilities. Under the United States Code, 47 USC § 332(c)(7)(B)(iv), no local government may regulate the placement, construction, or modification of wireless facilities on the basis of the environmental effects of RF emissions, except to the extent that such facilities comply with FCC regulations concerning such emissions.



- Congress Mandated - NEPA
- Input From Everyone - especially

- Similar To
- Recommended By



Federal Communications Commission



World Health Organization



IEEE

⁶ [47 CFR 1.1307](#) Actions that may have a significant environmental effect, for which Environmental Assessments (EAs) must be prepared and [47 CFR 1.1310](#) Radiofrequency radiation exposure limits.

⁷ [Bulletin OET-65](#) Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; 1997.



Bear Maple RF Exposure Assessment

Regulations – FCC & OSHA

- **FCC - 47CFR §1.1310**
 - Exposure limits based on 1990s' NCRP / ANSI / IEEE recommendations
 - Similar to current IEEE / ICNIRP
 - Rules Updated Effective May 2021
- **OSHA – General Duty Clause**
 - Employer – shall furnish a safe workplace
 - Employee – has a right to know about hazards and shall comply with safety standards





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Public Health Agencies

- [Radiation: 5G mobile networks and health](#) - **World Health Organization** (2020)
To date, and after much research performed, no adverse health effect has been causally linked with exposure to wireless technologies.
- [Easy to Read Summaries of Scientific Opinions](#) - **European Commission SCENIHR** (2015)
The results of current scientific research show that there are no evident adverse health effects if exposure remains below the levels set by current standards.
- Recent Research on EMF and Health Risk, 14th and 15th Report - **Swedish Radiation Safety Authority (SSM)** (2020, 2021)
Measurements and exposure calculations have shown that a person's radiofrequency field exposure is dominated by personal mobile phone use. The exposure from environmental sources such as mobile phone base stations plays a minor role.
The results of the research review give no reason to change any reference levels or recommendations in the field.
- [Mobile phone base stations: radio waves and health](#) - **UK Public Health England** (2020)
...although a substantial amount of research has been conducted in this area, there is no convincing evidence that RF field exposures below guideline levels cause health effects in adults or children.
- [Scientific Evidence for Cell Phone Safety](#) - **US Food and Drug Administration (FDA)** (2020)
The current limit on radio frequency (RF) energy set by the Federal Communications Commission remains acceptable for protecting the public health.

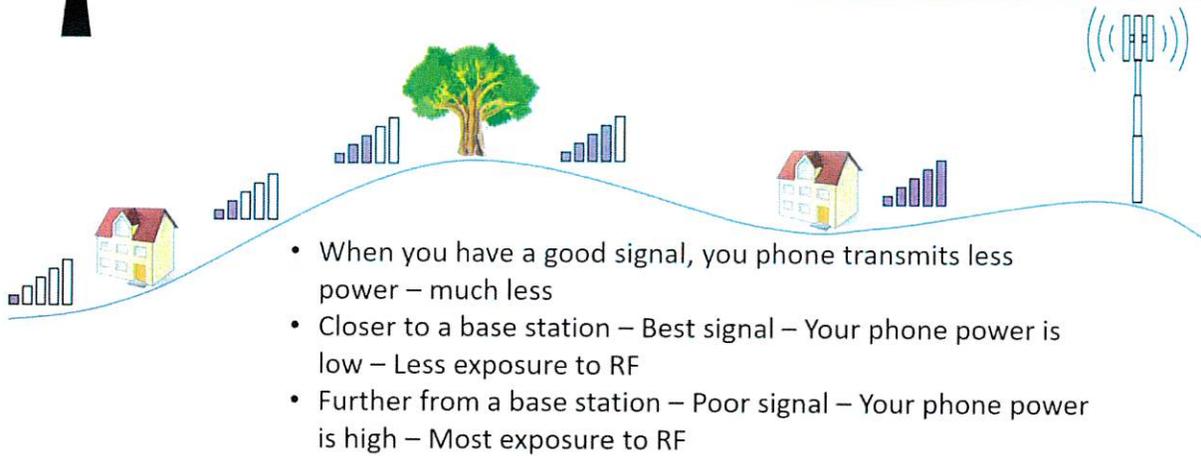
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Bear Maple RF Exposure Assessment



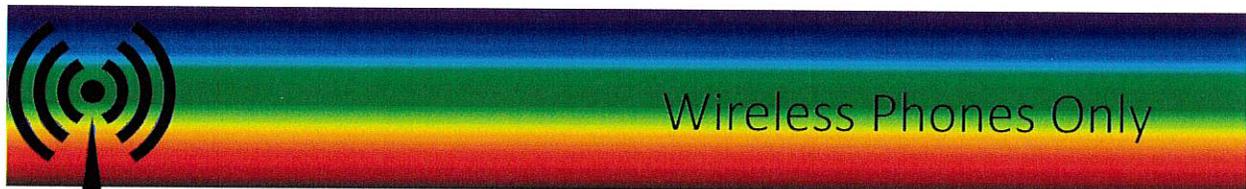
Signal and Exposure



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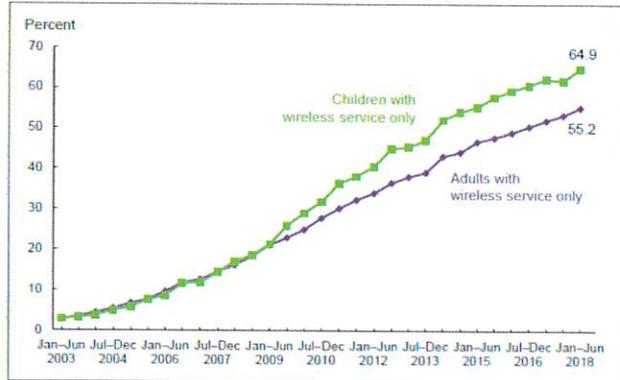


Wireless Phones Only

Over half of adults only have wireless phones

It is even more so for children - 65%

Figure. Percentages of adults and children living in households with only wireless telephone service: United States, 2003–2018



U.S. Department of Health & Human Services - National Center for Health Statistics, 2018

NOTE: Adults are aged 18 and over; children are under age 18.
DATA SOURCE: NCHS, National Health Interview Survey

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