



# STATE OF CONNECTICUT

## CONNECTICUT SITING COUNCIL

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### VIA ELECTRONIC MAIL

January 14, 2019

Ryan Bailey  
Cherundolo Consulting  
1280 Route 46 West, Suite 9  
Parsippany, NJ 07054

RE: **EM-SPRINT-057-181121** – Sprint notice of intent to modify an existing telecommunications facility located at 1111 East Putnam Avenue, Greenwich, Connecticut.

Dear Mr. Bailey:

The Connecticut Siting Council (Council) is in receipt of your correspondence of January 9, 2019 submitted in response to the Council's November 28, 2018 notification of an incomplete request for exempt modification with regard to the above-referenced matter.

The submission renders the request for exempt modification complete and the Council will process the request in accordance with the Federal Communications Commission 60-day timeframe.

Thank you for your attention and cooperation.

Sincerely,

A handwritten signature in blue ink, appearing to read "Melanie A. Bachman".

Melanie A. Bachman  
Executive Director

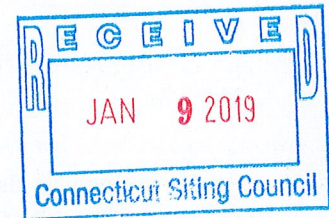
MAB/FOC/in



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## RADIO FREQUENCY EMISSIONS ANALYSIS REPORT EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS



**SPRINT Existing Facility**

**Site ID: CT52XC014**

**Greenwich/CT-BDR0132  
1111 E Putnam Avenue  
Greenwich, CT 06830**

**January 8, 2019**

**EBI Project Number: 6218004489**

Site Compliance Summary	
Compliance Status:	Compliant with Signage
Site total MPE% of FCC general population allowable limit:	<b>103.18 %</b>



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January 8, 2019

SPRINT

Attn: RF Engineering Manager  
1 International Boulevard, Suite 800  
Mahwah, NJ 07495

## Emissions Analysis for Site: **CT52XC014 – Greenwich/CT-BDR0132**

EBI Consulting was directed to analyze the proposed SPRINT facility located at **1111 E Putnam Avenue, Greenwich, CT**, for the purpose of determining whether the emissions from the Proposed SPRINT Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The number of  $\mu\text{W}/\text{cm}^2$  calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general population 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 population 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.

General population exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The general population exposure limits for the 850 MHz Band is approximately  $567 \mu\text{W}/\text{cm}^2$ . The general population exposure limit for the 1900 MHz (PCS), 2500 MHz (BRS) and 11 GHz microwave bands is  $1000 \mu\text{W}/\text{cm}^2$ . Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.



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 population/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.

Additional details can be found in FCC OET 65.

## CALCULATIONS

Calculations were done for the proposed SPRINT Wireless antenna facility located at **1111 E Putnam Avenue, Greenwich, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since SPRINT is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

For all calculations, all equipment was calculated using the following assumptions:

- 1) 1 CDMA channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.
- 2) 2 LTE channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 50 Watts per Channel.
- 3) 5 CDMA channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 16 Watts per Channel.
- 4) 2 LTE channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.
- 5) 8 LTE channels (2500 MHz (BRS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.
- 6) 1 microwave (11 GHz) backhaul channel was considered for the Sprint facility in Sector C. This channel has a transmit power of 1 Watt.



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- 7) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
- 8) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the building. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 9) The antennas used in this modeling are the **Commscope NNVV-65B-R4 and the RFS APXVTM14-ALU-I20** for transmission in the 850 MHz, 1900 MHz (PCS) and 2500 MHz (BRS) frequency bands and a **2-foot parabolic microwave dish** for the 11 GHz microwave backhaul. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 10) The antenna mounting height centerlines of the proposed panel antennas and parabolic microwave dishes are **51 feet** above ground level (AGL) for **Sector A**, **51 feet** above ground level (AGL) for **Sector B** and **51 feet** above ground level (AGL) for Sector C.
- 11) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

All calculations were done with respect to uncontrolled / general population threshold limits.



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## SPRINT Site Inventory and Power Data by Antenna

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Commscope NNVV-65B-R4	Make / Model:	Commscope NNVV-65B-R4	Make / Model:	Commscope NNVV-65B-R4
Gain:	12.75 / 15.05 dBd	Gain:	12.75 / 15.05 dBd	Gain:	12.75 / 15.05 dBd
Height (AGL):	51 feet	Height (AGL):	51 feet	Height (AGL):	51 feet
Frequency Bands:	850 MHz / 1900 MHz (PCS)	Frequency Bands:	850 MHz / 1900 MHz (PCS)	Frequency Bands:	850 MHz / 1900 MHz (PCS)
Channel Count:	10	Channel Count:	10	Channel Count:	10
Total TX Power(W):	280 Watts	Total TX Power(W):	280 Watts	Total TX Power(W):	280 Watts
ERP (W):	7,378.61	ERP (W):	7,378.61	ERP (W):	7,378.61
Antenna A1 MPE%	16.17 %	Antenna B1 MPE%	16.17 %	Antenna C1 MPE%	16.17 %
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	RFS APXVTM14-ALU- I20	Make / Model:	RFS APXVTM14-ALU- I20	Make / Model:	RFS APXVTM14-ALU- I20
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	51 feet	Height (AGL):	51 feet	Height (AGL):	51 feet
Frequency Bands:	2500 MHz (BRS)	Frequency Bands:	2500 MHz (BRS)	Frequency Bands:	2500 MHz (BRS)
Channel Count:	8	Channel Count:	8	Channel Count:	8
Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts
ERP (W):	6,224.72	ERP (W):	6,224.72	ERP (W):	6,224.72
Antenna A2 MPE%	11.05 %	Antenna B2 MPE%	11.05 %	Antenna C2 MPE%	11.05 %

## Microwave Backhaul Data

Antenna Type:	Gain (dBd)	Height (feet AGL):	Frequency Bands	Channel Count	Total TX Power(W)	ERP (W)	MPE %	Sector
2-foot parabolic dish	32.35 dBd	51	11 GHz	1	1	1,717.90	0.30	C

### Site Composite MPE%

Carrier	MPE%
SPRINT - Sector C	27.52 %
Verizon Wireless	47.66 %
Nextel	5.56 %
T-Mobile	19.31 %
Greenwich PD	2.09 %
Clearwire	1.04 %
<b>Site Total MPE %:</b>	<b>103.18 %</b>

SPRINT Sector A Total:	27.22 %
SPRINT Sector B Total:	27.22 %
SPRINT Sector C Total:	27.52 %
<b>Site Total:</b>	<b>103.18 %</b>

SPRINT Frequency Band / Technology Max Power Values (Sector C)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ( $\mu\text{W}/\text{cm}^2$ )	Frequency (MHz)	Allowable MPE ( $\mu\text{W}/\text{cm}^2$ )	Calculated % MPE
Sprint 850 MHz CDMA	1	376.73	51	6.69	850 MHz	567	1.19%
Sprint 850 MHz LTE	2	941.82	51	33.44	850 MHz	567	5.90%
Sprint 1900 MHz (PCS) CDMA	5	511.82	51	45.43	1900 MHz (PCS)	1000	4.54%
Sprint 1900 MHz (PCS) LTE	2	1,279.56	51	45.43	1900 MHz (PCS)	1000	4.54%
Sprint 2500 MHz (BRS) LTE	8	778.09	51	110.51	2500 MHz (BRS)	1000	11.05%
Sprint 11 GHz Microwave	1	1,717.900	51	3.05	11 GHz	1000	0.30%
<b>Total:</b>							<b>27.52%</b>



## Summary

As calculated, the theoretical modeling performed for this facility yielded results that were **not within** the allowable limits for general population exposure to RF Emissions. The following Signage and Safety Plan should be followed to bring the Sprint antennas into compliance.

The anticipated maximum composite contributions from the SPRINT facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:

SPRINT Sector	Power Density Value (%)
Sector A:	27.22 %
Sector B:	27.22 %
Sector C:	27.52 %
<b>SPRINT Maximum Total (Sector C):</b>	<b>27.52 %</b>
<b>Site Total:</b>	<b>103.18 %</b>
<b>Site Compliance Status:</b>	<b>NOT COMPLIANT</b>

The anticipated composite MPE value for this site assuming all carriers present is **103.18 %** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated exceeded the allowable 100% threshold standard per the federal government; therefore, signage and other mitigation measures have been proposed as per the Signage and Safety Plan below.



## Signage and Safety Plan

Blue RF Notice signs, shown below in **Exhibit A**, should be posted on the back side of all Sprint antenna locations on the rooftop warning all persons that they are entering an area where the RF emissions may exceed the FCC's general population limit for radio frequency energy exposure as they approach the front sides of the Sprint antennas. The Sprint antennas are mounted at the rooftop edge and are pointed off the rooftop resulting in the majority of RF energy being directed off of the rooftop. Radio frequency energy measurements should also be made at rooftop level following the installation to ensure that all areas accessible by the general public are within the FCC's general population limit for radio frequency energy exposure. If areas near the Sprint antennas are found to exist that exceed the FCC's general population limit for radio frequency energy exposure, physical barriers should be installed around the antennas to limit access to the areas that may exceed the general public are within the FCC's general population limit for radio frequency energy exposure.



*Exhibit A: RF Notice Sign*

Theoretical calculation results showed the potential for areas at ground level to exceed the FCC's general population limit for radio frequency energy exposure. Due to the fact that all antennas are not pointing in the same direction, there is a greater likelihood that the radio frequency energy levels are less than this worst-case scenario. Radio frequency energy measurements should be made at ground level to ensure that all areas accessible by the general public are within the FCC's general population limit for radio frequency energy exposure. If areas are found to exist that exceed the FCC's general population limit for radio frequency energy exposure, a Blue RF warning sign, shown below in **Exhibit A**, should be posted at these areas warning all persons that they are entering an area where the RF emissions may exceed the FCC's general population limit for radio frequency energy exposure.



## Nwankwo, Ifeanyi

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**From:** Ryan Bailey <[ryan@mackenzierealtyconsulting.com](mailto:ryan@mackenzierealtyconsulting.com)>  
**Sent:** Wednesday, January 09, 2019 8:58 AM  
**To:** Robidoux, Evan  
**Cc:** CSC-DL Siting Council; Ryan Bailey  
**Subject:** RE: Council Extension Letter for EM-SPRINT-057-181121-EastPutnamAve-Greenwich  
**Attachments:** (6218004489) Sprint DO Macro Upgrade CT52XC014 MPE Filing Report \_010819....pdf

Attached please find the updated report that the Council requested. Please let me know if you need hard copies or anything else in order to deem this submission complete

Thank you

Ryan Bailey  
Mackenzie Realty Consulting  
3B Prospect Pl  
Madison NJ 07940  
856-625-1596  
973-215-2940 Fax  
[ryan@mackenzierealtyconsulting.com](mailto:ryan@mackenzierealtyconsulting.com)

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**From:** Robidoux, Evan <[Evan.Robidoux@ct.gov](mailto:Evan.Robidoux@ct.gov)>  
**Sent:** Thursday, January 3, 2019 4:12 PM  
**To:** Ryan Bailey <[ryan@mackenzierealtyconsulting.com](mailto:ryan@mackenzierealtyconsulting.com)>  
**Cc:** CSC-DL Siting Council <[Siting.Council@ct.gov](mailto:Siting.Council@ct.gov)>  
**Subject:** Council Extension Letter for EM-SPRINT-057-181121-EastPutnamAve-Greenwich

Please see the attached correspondence.

Evan Robidoux  
Clerk Typist  
Connecticut Siting Council  
10 Franklin Square  
New Britain, CT 06051