EM-SPRINT-120-130828

HPC Wireless Services
22 Shelter Rock Lane.
Building C
Danbury, CT, 06810
P.: 203.797.1112

August 27, 2013

VIA OVERNIGHT COURIER

Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051
Attn: Ms. Melanie Bachman, Acting Executive Director

Re: Sprint Spectrum, L.P. – Exempt Modification
Lower County Road, a/k/a/ 35 Lower County Road, Roxbury, Connecticut

Dear Ms. Bachman:

This letter and attachments are submitted on behalf of Sprint Spectrum, L.P. ("Sprint"). Sprint is undertaking modifications to certain existing sites in its Connecticut system in order to implement updated technology. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction that constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and attachments is being sent to the First Selectman of the Town of Roxbury.

Sprint plans to modify the existing wireless communications facility owned by SBA 2012 TC Assets, LLC and located at Lower County Road, a/k/a/ 35 Lower County Road, Roxbury (coordinates 41°-33'-34.52" N, 73°-17'-32.1" W). Attached are plan and elevation drawings depicting the planned changes, and documentation of the structural sufficiency of the structure to accommodate the revised antenna configuration. Also included is a power density report reflecting the modification to Sprint's operations at the site.

The changes to the facility do not constitute a modification as defined in Connecticut General Statutes ("C.G.S.") Section 16-50i(d) because the general physical characteristics of the facility will not be significantly changed. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in R.C.S.A. Section 16-50j-72(b)(2).

1. Sprint will remove the existing three (3) CMDA antennas and add three (3) dual-band panel antennas on new pipe masts mounted to the existing T-arms, at a centerline height of approximately 177.5'. Sprint will also install six (6) RRHs (remote radio heads) on existing pipe mounts behind the LTE antennas. During an interim period of up to one year, the three (3) existing CDMA antennas will remain. Sprint will also install three (3) hybriflex cables along the existing coaxial cable run, and will remove the

coaxial cable at the end of the interim period. The proposed modifications will not extend the height of the approximately 180' structure.

2. Sprint will make related equipment changes within the existing Equipment Shelter, including a new fiber distribution box mounted to an inside Shelter wall. The existing GPS antenna will be replaced by another GPS antenna mounted to the outside of the Equipment Shelter. These changes will have no effect on the site boundaries.

3. The proposed changes will not increase the noise level at the existing facility by six decibels or more. The incremental effect of the proposed changes will be negligible.

4. The changes to the facility will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site. As indicated on the attached report prepared by EBI Consulting, Sprint's operations at the site will result in a power density of approximately 7.608%; the combined site operations will result in a total power density of approximately 41.838%.

Please contact me by phone at (203) 610-1071 or by e-mail at mjhowlett@optonline.net with questions concerning this matter. Thank you for your consideration.

Respectfully yours,

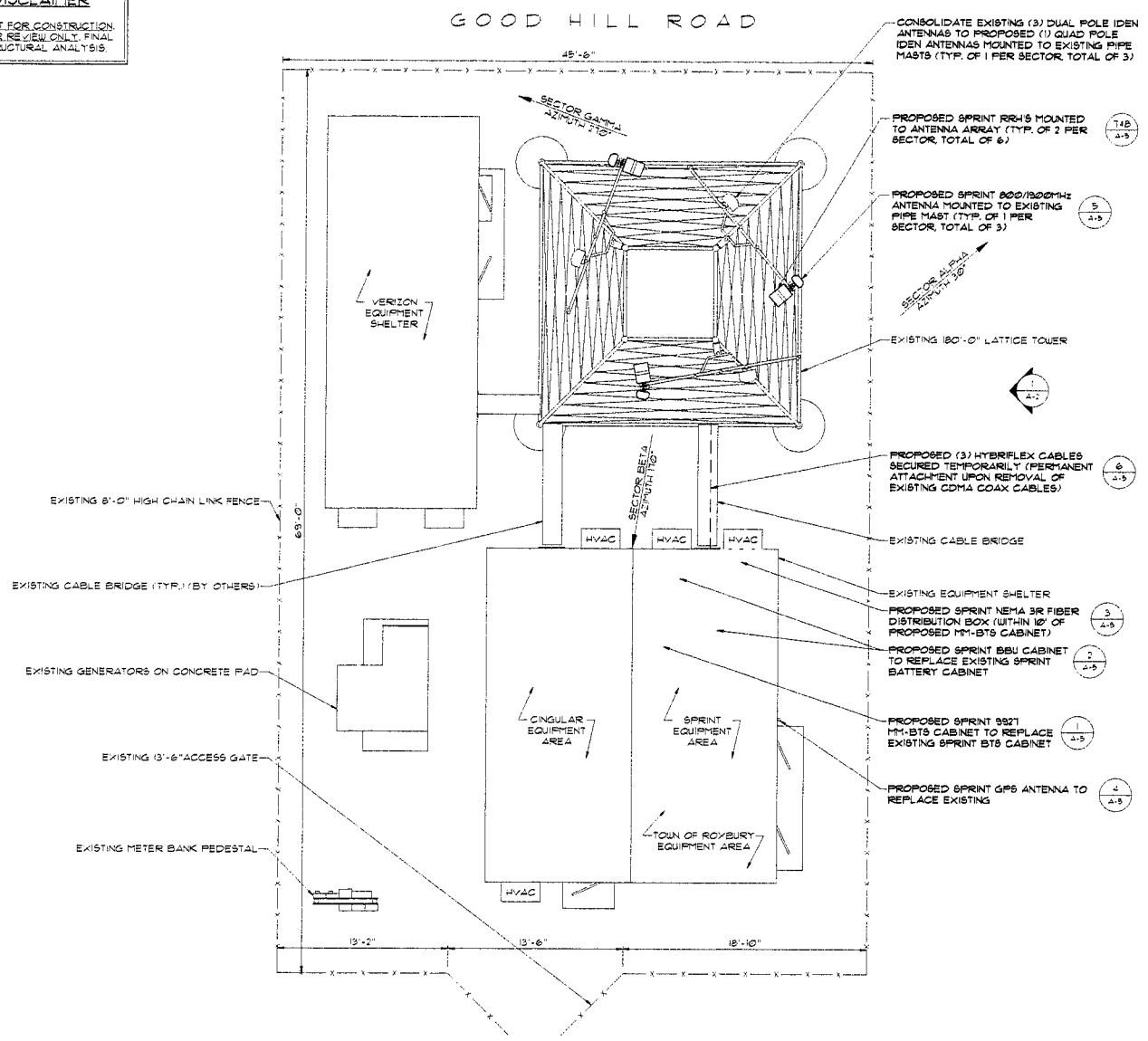
Melanie J. Howlett

Attachments

cc: Honorable Barbara Henry, First Selectman, Town of Roxbury
Town Assessor, Town of Roxbury (underlying property owner)

STRUCTURAL DISCLAIMER

THESE DRAWINGS ARE NOT FOR CONSTRUCTION. THEY ARE SUBMITTED FOR REVIEW ONLY. FINAL DESIGN IS PENDING A STRUCTURAL ANALYSIS.



1 SITE PLAN

SCALE: 1/4"=1'-0"

Sprint

1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495
P: 800-357-7641

Alcatel·Lucent
1 ROBBINS ROAD
WESTFORD, MA 01886
P: (978) 952-1600

Salient ARCHITECTS, LLC

New Jersey Office:
8 East Palisade Avenue
Englewood, NJ 07631
P: 201-587-0032 - F: 201-587-9556

New England Office:
15 New England Executive Park
Burlington, MA 01803
P: 781-791-5019 - F: 781-701-5018

NOT FOR CONSTRUCTION

SUBMITTALS

NO	DATE	DESCRIPTION	BY
1	05/16/12	PRELIMINARY	KB
2	06/19/12	REVISED PER COMMENTS	NAS
3	07/10/12	REVISED PER COMMENTS	AD

SITE NUMBER:
CT12XC0031

SITE NAME:
ROXBURY

SITE ADDRESS:
LOWER COUNTY ROAD
ROXBURY, CT 06783

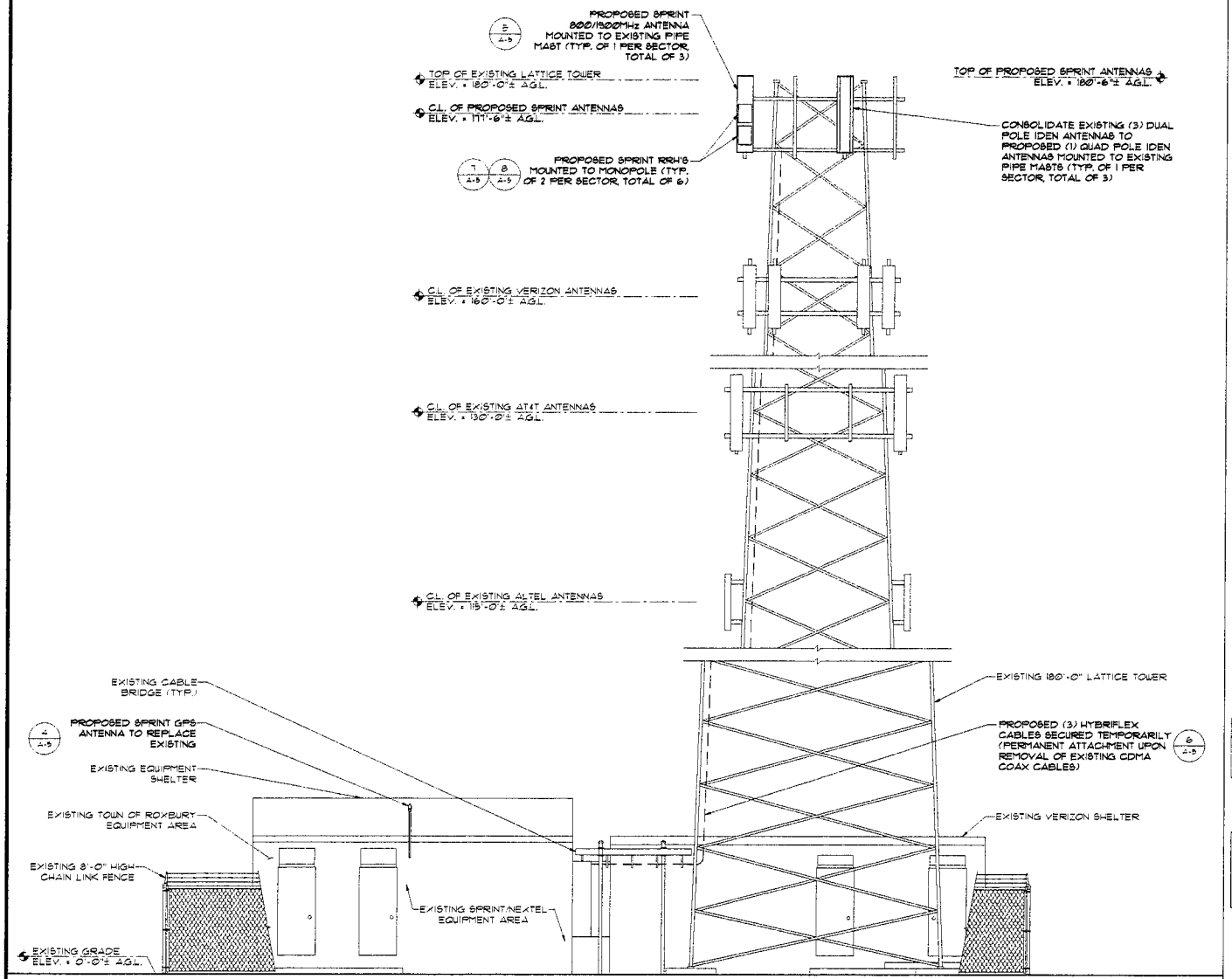
SHEET TITLE:
SITE PLAN

SALIENT PROJ. NO: CT12XC0031

DATE

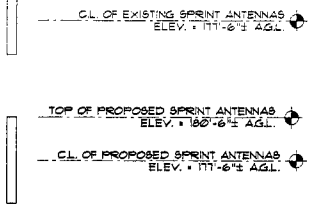
CHECKED BY: JHP

SHEET NO: A-1



1 NORTHEAST ELEVATION

SCALE = 1/4" = 1'-0"



2 HEIGHT COMPARISON

SCALE = 1/4" = 1'-0"

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ANTENNA CONFIGURATION NOTE

ALL EXISTING CDMA ANTENNAS TO BE REMOVED / REPLACED WITH NETWORK VISION ANTENNAS FOR FINAL CONFIGURATION.

ANTENNA SEPARATION TO BE FIELD VERIFIED BY THE GENERAL CONTRACTOR.

Sprint

1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495
P: 800-357-7641

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P: 201-567-0032 - F: 201-567-9556

New England Office:
16 New England Executive Park
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NOT FOR CONSTRUCTION

SUBMITTALS

NO	DATE	DESCRIPTION	BY
1	05/16/12	PRELIMINARY	KB
2	06/15/12	REVISED PER COMMENTS	NAB
3	07/10/12	REVISED PER COMMENTS	AD

SITE NUMBER:
CT72XC031

SITE NAME:
ROXBURY

SITE ADDRESS:
LOWER COUNTY ROAD
ROXBURY, CT 06783

SHEET TITLE:
ELEVATION

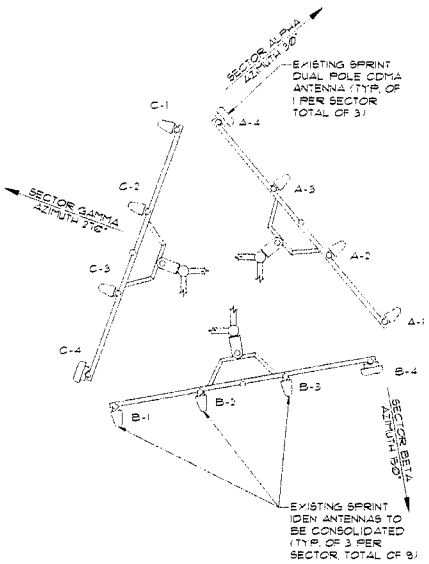
SALIENT PROJ. NO.: CT72XC031

DATE:

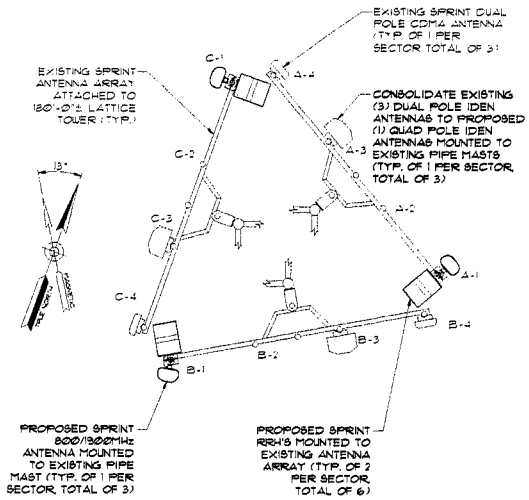
CHECKED BY: JHP

SHEET NO.: A-2

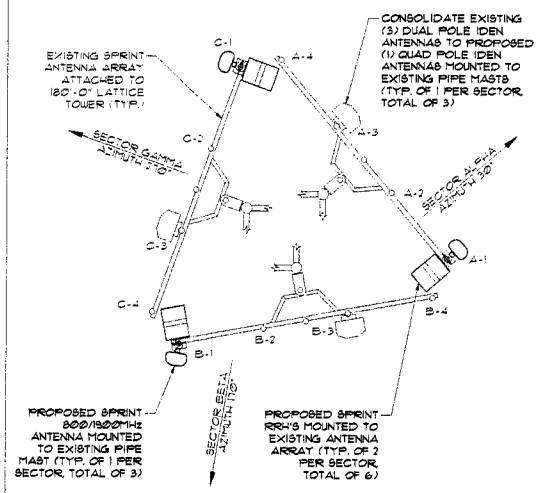
EXISTING ANTENNA PLAN



INTERIM ANTENNA PLAN



FINAL ANTENNA PLAN



1 ANTENNA SCENARIO

SCALE = 3/8"=1'-0"

	POSITION	ANTENNA STATUS	FREQUENCY (MHZ)	ANTENNA MAKE	ANTENNA MODEL	AZIMUTHS EXISTING (FOR REFERENCE)	AZIMUTHS PROPOSED	MECHANICAL DOWN TILT	ELECTRICAL DOWN TILT	RAD CENTER (A.G.L.)	*HYBRIFLEX CABLE LENGTH (FT.)	RRH MODEL	TOP COAX JUMPER SIZE (IN.)	*TOP COAX JUMPER LENGTH (FT.)	TOP COAX JUMPER MAKE	TOP COAX JUMPER MODEL	COMBINER	*COMBINER JUMPER LENGTH (FT.)	ANTENNA COLOR CODING
ALPHA	A-1	PROPOSED	800/1900	RFS	APXV9PP18-C-A20	30°	30°	0°	-1°	177'-6"	210'-0"	(1) 800MHz	1/2	10	RFS	(2) LCF12-50J	--	--	TBD
								0°	0°			(1) 1900MHz	1/2	10	RFS	(4) LCF12-50J	--	--	
BETA	B-1	PROPOSED	800/1900	RFS	APXV9PP18-C-A20	150°	170°	0°	-2°	177'-6"	210'-0"	(1) 800MHz	1/2	10	RFS	(2) LCF12-50J	--	--	TBD
								0°	-2°			(1) 1900MHz	1/2	10	RFS	(4) LCF12-50J	--	--	
GAMMA	C-1	PROPOSED	800/1900	RFS	APXV9PP18-C-A20	270°	270°	0°	-2°	177'-6"	210'-0"	(1) 800MHz	1/2	10	RFS	(2) LCF12-50J	--	--	TBD
								0°	-2°			(1) 1900MHz	1/2	10	RFS	(4) LCF12-50J	--	--	

* CONTRACTOR TO FIELD VERIFY ALL CABLE/JUMPER LENGTHS AGAINST CURRENT B.O.M.

2 RF SYSTEM SCHEDULE

SCALE = N.T.S.

Sprint

1 INTERNATIONAL BLVD, SUITE 800
MAHWAH, NJ 07495
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1	05/10/12	PRELIMINARY	KS
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SITE NUMBER:
CT12XC031

SITE NAME:
ROXBURY

SITE ADDRESS:
LOWER COUNTY ROAD
ROXBURY, CT 06783

SHEET TITLE:
ANTENNA SCENARIO AND RF SYSTEM SCHEDULE

SALIENT PROJ. NO: CT12XC031
DATE
CHECKED BY: JHP

SHEET NO: A-5

FDH Engineering, Inc., 6521 Meridien Drive Raleigh, NC 27616, Ph. 919.755.1012

Structural Analysis for SBA Network Services, Inc.

180' Self-Support Tower

SBA Site Name: Roxbury County Rd
SBA Site ID: CT46125-A-03
Sprint Site ID: CT72XC031

FDH Project Number 13SATF1400

Analysis Results

Tower Components	57.7 %	Sufficient
Foundation	63.6 %	Sufficient

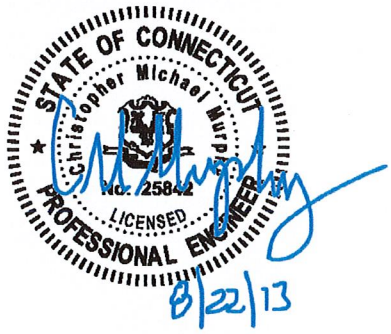
Prepared By:

Kristi Gardner, EI
Project Engineer

Reviewed By:

Christopher M Murphy, PE
President
CT PE License No. 25842

FDH Engineering, Inc.
6521 Meridien Drive
Raleigh, NC 27616
(919) 755-1012
info@fdh-inc.com



August 22, 2013

Prepared pursuant to TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and 2005 Connecticut Building Code (CBC)

TABLE OF CONTENTS

EXECUTIVE SUMMARY

At the request of SBA Network Services, Inc., FDH Engineering, Inc. performed a structural analysis of the existing self-supported tower located in Roxbury, CT to determine whether the tower is structurally adequate to support both the existing and proposed loads pursuant to the *Structural Standards for Steel Antenna Towers and Antenna Supporting Structures, TIA/EIA-222-F* and *2005 Connecticut Building Code (CBC)*. Information pertaining to the existing/proposed antenna loading, current tower geometry, the member sizes, and foundation dimensions was obtained from:

- Fred A. Nudd Corp. (Drawing No. 99-7018-1R) original design drawings dated October 12, 1999
- Tectonic Engineering Consultants P.C. (Work Order 1170.C056) Geotechnical Evaluation dated August 4, 1999
- Vertical Solutions (Project No. 111673 Rev. 1) Rigorous Structural Analysis dated February 16, 2012
- SBA Network Services, Inc.

The *basic design wind speed* per the *TIA/EIA-222-F* standards and *2005 CBC* is 80 mph without ice and 28 mph with 1" radial ice. Ice is considered to increase in thickness with height.

Conclusions

With the existing and proposed antennas from Sprint in place at 177.5 ft, the tower meets the requirements of the *TIA/EIA-222-F* standards and *2005 CBC* provided the **Recommendations** listed below are satisfied. Furthermore, provided the foundations were designed and constructed to support the original design reactions (see Fred A. Nudd Corp. Drawing No. 99-7018-1R), the foundations should have the necessary capacity to support the existing and proposed loading. For a more detailed description of the analysis of the tower, see the **Results** section of this report.

Our structural analysis has been performed assuming all information provided to FDH Engineering, Inc. is accurate (i.e., the steel data, tower layout, existing antenna loading, and proposed antenna loading) and that the tower has been properly erected and maintained per the original design drawings.

Recommendations

To ensure the requirements of the *TIA/EIA-222-F* standards and *2005 CBC* are met with the existing and proposed loading in place, we have the following recommendations:

1. The feedlines should be installed as shown in **Figure 1**.
2. RRU/RRH Stipulation: The proposed equipment may be installed in any arrangement as determined by the client.

APPURTENANCE LISTING

The proposed and existing antennas with their corresponding cables/coax lines are shown in **Table 1**. *If the actual layout determined in the field deviates from the layout, FDH Engineering, Inc. should be contacted to perform a revised analysis.*

Table 1 - Appurtenance Loading

Existing Loading:

Antenna Elevation (ft)	Description	Feedlines	Carrier	Mount Elevation (ft)	Mount Type
184.25	(1) 10' Dipole	(1) 1/2"	Town of Roxbury	179.25	(1) Pipe Mount
181	(1) 5' Omni	(1) 7/8"		178.5	(1) Pipe Mount
177	(9) Andrew DB844H90E-XY (3) EMS RR90-17-02DPL2	(15) 1-5/8"	Sprint	177	(3) T-Frames
163	(3) Antel BXA-70063-6CF-2 (6) Antel LPA-80080/6CF (3) Antel BXA-171085-8CF-2 (6) RFS FD9R6004/2C-3L Diplexers	(12) 1-5/8"	Verizon	163	(3) T-Frames
150.5	(1) 18' Dipole	(2) 1/2"	Town of Roxbury	141.5	(2) Standoffs
146.5	(1) 10' Dipole				
130	(6) Powerwave 7770 (2) KMW AM-X-CD-16-65-00T-RET (1) Powerwave P65-17-XLH-RR (6) Powerwave LGP21401 TMAs (6) Powerwave LGP21903 Diplexers (6) Ericsson RRUS-11 RRUs	(12) 1-5/8" (1) 1/2" Fiber [1] (2) 3/4" DC [1]	AT&T	130	(3) T-Frames (Assumed C_AA_A = 33.1 ft^2)
118	(3) Antel BXA-80090/4CF	(6) 1-1/4"	Verizon	118	(3) Standoffs
70.5	(2) GPS	(2) 1/2"	Sprint	70.5	(2) Standoffs
18	(1) Yagi	(1) 1/2"	Town of Roxbury	18	Direct

1. AT&T's proposed coax will be installed inside (1) 3" Flex Conduit.

Proposed Loading:

Antenna Elevation (ft)	Description	Feedlines	Carrier	Mount Elevation (ft)	Mount Type
177.5	(3) RFS APXVSPP18-C-A20 (3) ALU 1900 4x45 65MHz RRUs (3) ALU 900 2x50W RRUs	(3) 1-1/4"	Sprint	177	(3) T-Frames

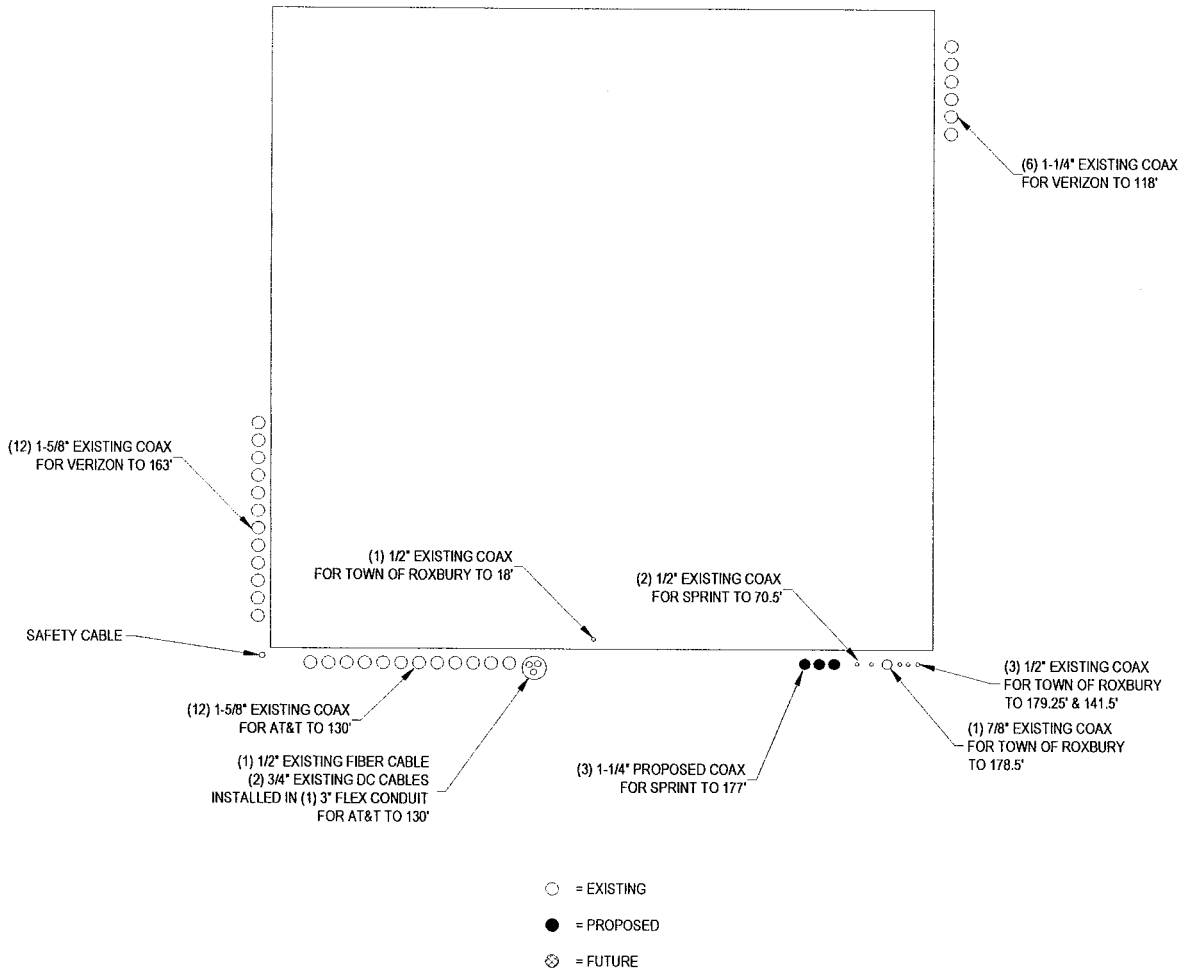


Figure 1 – Coax Layout

RESULTS

The following yield strength of steel for individual members was used for analysis:

Table 2 - Material Strength

Member Type	Yield Strength
Legs	54 ksi
Bracing	36 ksi

Table 3 displays the summary of the ratio (as a percentage) of force in the member to their capacities. Values greater than 100% indicate locations where the maximum force in the member exceeds its capacity. *Note: Capacities up to 105% are considered acceptable.* **Table 4** displays the maximum foundation reactions.

If the assumptions outlined in this report differ from actual field conditions, FDH Engineering, Inc. should be contacted to perform a revised analysis. Furthermore, as no information pertaining to the allowable twist and sway requirements for the existing or proposed appurtenances was provided, deflection and rotation were not taken into consideration when performing this analysis.

See the **Appendix** for detailed modeling information

Table 3 - Summary of Working Percentage of Structural Components

Section No.	Elevation ft	Component Type	Size	% Capacity	Pass Fail
T1	180 - 160	Leg	P2.5x.203 (2.875 OD)	13.6	Pass
		Diagonal	L1 3/4x1 3/4x3/16	29.4 34.6 (b)	Pass
		Top Girt	L1 3/4x1 3/4x3/16	0.3 0.4 (b)	Pass
T2	160 - 140	Leg	P3x.216 (3.5 OD)	32.2	Pass
		Diagonal	L2 1/2x2 1/2x3/16	24.5 35.1 (b)	Pass
T3	140 - 120	Leg	P3.5x.226 (4.00 OD)	45.5	Pass
		Diagonal	L3x3x3/16	26.2 49.4 (b)	Pass
T4	120 - 100	Leg	P5x.258 (5.563 OD)	43.7	Pass
		Diagonal	L3 1/2x3 1/2x1/4	23.9 30.2 (b)	Pass
T5	100 - 80	Leg	P6x.28 (6.625 OD)	42.1	Pass
		Diagonal	L3 1/2x3 1/2x1/4	29.0 32.4 (b)	Pass
T6	80 - 60	Leg	P6x.28 (6.625 OD)	53.3	Pass
		Diagonal	L4x4x1/4	25.3 35.3 (b)	Pass
T7	60 - 40	Leg	P8x.322 (8.625 OD)	39.5	Pass
		Diagonal	L4x4x1/4	30.4 38.2 (b)	Pass
T8	40 - 20	Leg	P8x.322 (8.625 OD)	46.5	Pass
		Diagonal	L4x4x3/8	25.5 41.2 (b)	Pass
T9	20 - 0	Leg	P8x.322 (8.625 OD)	53.3 57.7 (b)	Pass
		Diagonal	L5x5x5/16	20.6 45.4 (b)	Pass

Table 4 - Maximum Base Reactions

Load Type	Direction	Current Analysis *(TIA/EIA-222-F)*	Original Design *(TIA/EIA-222-F)*
Individual Foundation	Horizontal	18 k	74 k
	Uplift	154 k	242 k
	Compression	170 k	---
Overturning Moment	---	4,587 k-ft	7,431 k

GENERAL COMMENTS

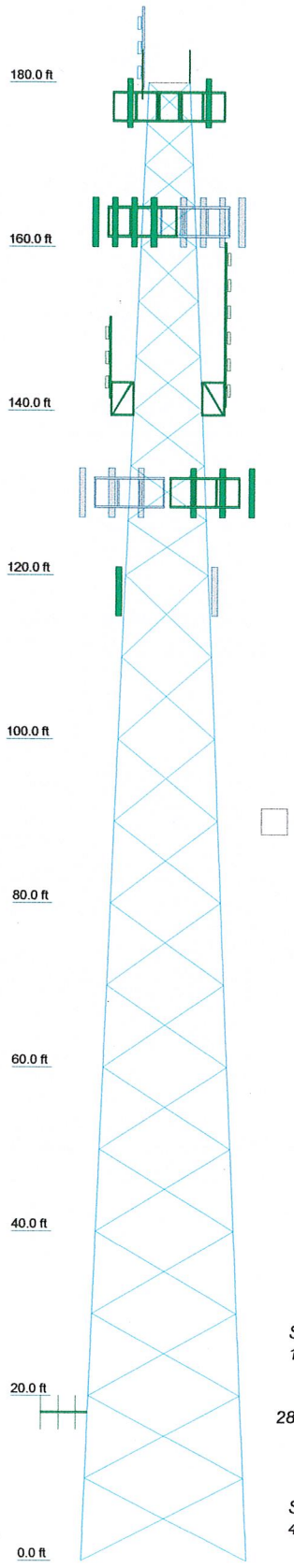
This engineering analysis is based upon the theoretical capacity of the structure. It is not a condition assessment of the tower and its foundation. It is the responsibility of SBA Network Services, Inc. to verify that the tower modeled and analyzed is the correct structure (with accurate antenna loading information) modeled. If there are substantial modifications to be made or the assumptions made in this analysis are not accurate, FDH Engineering, Inc. should be notified immediately to perform a revised analysis.

LIMITATIONS

All opinions and conclusions are considered accurate to a reasonable degree of engineering certainty based upon the evidence available at the time of this report. All opinions and conclusions are subject to revision based upon receipt of new or additional/updated information. All services are provided exercising a level of care and diligence equivalent to the standard and care of our profession. No other warranty or guarantee, expressed or implied, is offered. Our services are confidential in nature and we will not release this report to any other party without the client's consent. The use of this engineering work is limited to the express purpose for which it was commissioned and it may not be reused, copied, or distributed for any other purpose without the written consent of FDH Engineering, Inc.

APPENDIX

Section	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs		P8x.322 (8.625 OD)		P6x.28 (6.625 OD)		P5x.258 (5.563 OD)	P3.5x.226 (4.00 OD)	P3x.216 (3.5 OD)	P2.5x.203 (2.875 OD)
Leg Grade		A500-C (Fy=54 ksi)							
Diagonals	L5x5x5/16	L4x4x3/8	L4x4x1/4		L3 1/2x3 1/2x1/4		L3x3x3/16	L2 1/2x2 1/2x3/16	L1 3/4x1 3/4x3/16 "
Diagonal Grade					A36				
Top Girts					N.A.				L1 3/4x1 3/4x3/16
Face Width (ft)	20	18.3333	16.6667	15	13.3333	11.6667	10	8.33333	6.66667	5
# Panels @ (ft)		12 @ 10					6 @ 6.66667		4 @ 5
Weight (K)	28.6	5.9	5.4	4.3	3.4	3.0	2.5	1.7	1.3	1.0



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod	180	10' Dipole	141.5
10' Dipole	179.25	SO 306-1	141.5
Pipe Mount MNT	179.25	(2) 7770.00 w/Mount Pipe	130
5' Omni	178.5	(2) 7770.00 w/Mount Pipe	130
Pipe Mount MNT	178.5	(2) 7770.00 w/Mount Pipe	130
APXVSPP18-C-A20 w/Mount Pipe	177	AM-X-CD-16-65-00T-RET w/ Mount Pipe	130
APXVSPP18-C-A20 w/Mount Pipe	177		
APXVSPP18-C-A20 w/Mount Pipe	177	AM-X-CD-16-65-00T-RET w/ Mount Pipe	130
1900 4x45 65 MHz RRH	177	P65-17-XLH-RR w/Mount Pipe	130
1900 4x45 65 MHz RRH	177	(2) LGP21401 TMA	130
1900 4x45 65 MHz RRH	177	(2) LGP21401 TMA	130
900 MHz 2x50W RRH	177	(2) LGP21401 TMA	130
900 MHz 2x50W RRH	177	(2) LGP21903 Diplexer	130
900 MHz 2x50W RRH	177	(2) LGP21903 Diplexer	130
T-Frame MNT	177	(2) LGP21903 Diplexer	130
T-Frame MNT	177	(2) RRUS-11	130
T-Frame MNT	177	(2) RRUS-11	130
BXA-70063-6CF-2 w/ Mount Pipe	163	(2) RRUS-11	130
BXA-70063-6CF-2 w/ Mount Pipe	163	T-Frame (Assumed) MNT	130
BXA-70063-6CF-2 w/ Mount Pipe	163	T-Frame (Assumed) MNT	130
(2) LPA-80080/6CF w/ Mount Pipe	163	T-Frame (Assumed) MNT	130
(2) LPA-80080/6CF w/ Mount Pipe	163	BXA-80090/4CF w/ Mount Pipe	118
(2) LPA-80080/6CF w/ Mount Pipe	163	BXA-80090/4CF w/ Mount Pipe	118
BXA-171085-8CF-2 w/ Mount Pipe	163	BXA-80090/4CF w/ Mount Pipe	118
BXA-171085-8CF-2 w/ Mount Pipe	163	Standoff MNT	118
BXA-171085-8CF-2 w/ Mount Pipe	163	Standoff MNT	118
(2) FD9R6004/2C-3L Diplexer	163	Standoff MNT	118
(2) FD9R6004/2C-3L Diplexer	163	GPS	70.5
(2) FD9R6004/2C-3L Diplexer	163	GPS	70.5
T-Frame MNT	163	SO 701-1	70.5
T-Frame MNT	163	SO 701-1	70.5
T-Frame MNT	163	Yagi	18
18' Dipole	141.5		
SO 306-1	141.5		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A500-C (Fy=54 ksi)	54 ksi	65 ksi	A36	36 ksi	58 ksi

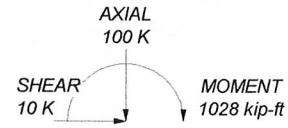
TOWER DESIGN NOTES

1. Tower is located in Litchfield County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 28 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 57.7%

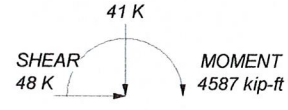
MAX. CORNER REACTIONS AT BASE:

DOWN: 170 K
SHEAR: 18 K

UPLIFT: -154 K
SHEAR: 17 K



TORQUE 12 kip-ft
28 mph WIND - 1.0000 in ICE



TORQUE 67 kip-ft
REACTIONS - 80 mph WIND

FDH Engineering, Inc
6521 Meridien Drive
Raleigh, NC 27616
Phone: (919) 755-1012
FAX: (919) 755-1013

Job: Roxbury County Rd, CT46125-A-03			
Project: 13SATF1400			
Client: SBA	Drawn by: Kristi Gardner		App'd:
Code: TIA/EIA-222-F	Date: 08/22/13		Scale: NTS
Path:			Dwg No. E-1

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

Sprint Existing Facility

Site ID: CT72XC031

CT056 - Ring to Existing - (R2E) PH1A
35 Lower County Road
Roxbury, CT 06783

September 13, 2012

21 B Street · Burlington, MA 01803 · Tel: (781) 273.2500 · Fax: (781) 273.3311

EBI Consulting
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September 13, 2012

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

Re: Emissions Values for Site **CT72XC031 - CT056 - Ring to Existing - (R2E) PH1A**

EBI Consulting was directed to analyze the proposed upgrades to the existing Sprint facility located at 35 Lower County Road, Roxbury, CT, for the purpose of determining whether the emissions from the proposed Sprint equipment upgrades 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 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of μW/cm2 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 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.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limit for the cellular band is approximately 567 $\mu W/cm^2$, and the general population exposure limit for the PCS band is 1000 $\mu W/cm^2$. 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 upgrades to the existing Sprint Wireless antenna facility located at 35 Lower County Road, Roxbury, CT, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. All calculations were performed assuming the main lobe of the antenna was focused at the base of the tower to present a worst case scenario. Actual values seen from this site will be dramatically less than those shown in this report. 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 emissions were calculated using the following assumptions:

1) 2 CDMA Carriers (1900 MHz) were considered for each sector of the proposed installation.
2) 1 CDMA Carrier (850 MHz) was considered for each sector of the proposed installation
3) 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.
4) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The actual gain in this direction was used per the manufactures supplied specifications.
5) The antenna used in this modeling is the RFS APXVSPP18-C-A20. This is based on feedback from the carrier with regards to anticipated antenna selection. This antenna has a 15.9 dBd gain value at its main lobe at 1900 MHz and 13.4 dBd at its main lobe for 850 MHz. All calculations were performed assuming the main lobe of the antenna was focused at the base of the tower to present a worst case scenario.

6) The antenna mounting height centerline of the proposed antennas is **177.5 feet** above ground level (AGL)
7) 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 calculation were done with respect to uncontrolled / general public threshold limits

Site ID	CT72XC031 - CT056 - Ring to Existing - (R2E) PH1A
Site Addresss	35 Lower County Road, Roxbury, CT 06783
Site Type	Self Support Tower

Sector 1

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	15.9	177.5	171.5	1/2 "	0.5	0	1386.9474	16.95265	1.69527%
1a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	177.5	171.5	1/2 "	0.5	0	389.96892	4.766589	0.84067%
														Sector total Power Density Value:		2.536%	

Sector 2

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
2a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	15.9	177.5	171.5	1/2 "	0.5	0	1386.9474	16.95265	1.69527%
2a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	177.5	171.5	1/2 "	0.5	0	389.96892	4.766589	0.84067%
														Sector total Power Density Value:		2.536%	

Sector 3

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
3a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	15.9	177.5	171.5	1/2 "	0.5	0	1386.9474	16.95265	1.69527%
3a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	177.5	171.5	1/2 "	0.5	0	389.96892	4.766589	0.84067%
														Sector total Power Density Value:		2.536%	

Site Composite MPE %	
Carrier	MPE %
Sprint	7.608%
Town	1.190%
Alltel	3.730%
Nextel	7.620%
AT&T	7.920%
Verizon Wireless	13.770%
Total Site MPE %	**41.838%**

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Summary

All calculations performed for this analysis yielded results that were well within the allowable limits for general public exposure to RF Emissions.

The anticipated Maximum Composite contributions from the Sprint facility are **7.608% (2.536% from each sector)** of the allowable FCC established general public limit considering all three sectors simultaneously sampled at the ground level.

The anticipated composite MPE value for this site assuming all carriers present is **41.838%** of the allowable FCC established general public 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 were well within the allowable 100% threshold standard per the federal government

Scott Heffernan
RF Engineering Director

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Burlington, MA 01803