ROBINSON & COLE LLP

KENNETH C. BALDWIN

280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

Also admitted in Massachusetts

September 5, 2013

David Martin
Siting Analyst
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **EM-VER-011-121018 – Cellco Partnership d/b/a Verizon Wireless**
1021 Blue Hills Avenue, Bloomfield, Connecticut

Dear Mr. Martin:

On November 27 2012, the Siting Council acknowledged receipt of Cellco's notice of intent to modify its existing Cottage Grove telecommunications facility at 1021 Blue Hills Avenue in Bloomfield, Connecticut. The modification involved the replacement of certain antennas and the installation additional antenna cables.

As a condition of the acknowledgement, Cellco was required to provide the Council with a letter stating that the recommendations specified in the structural report were implemented. Attached is a Tower Modification Certification Letter verifying that this condition has been satisfied. All construction associated with these modifications has now been completed.

If you have any questions please do not hesitate to contact me or Rachel Mayo.

Sincerely,

Kenneth C. Baldwin

Attachment
Copy to:
Sandy M. Carter
Brian Ragozzine
Mark Gauger

CENTEK engineering

Centered on Solutions℠

August 26, 2013

Mr. Mark Gauger
Verizon Wireless
99 East River Drive
East Hartford, Connecticut 06108

Re: Existing Telecommunications Facility Tower Modification Certification Letter

Project:	**Verizon ~Cottage Grove** 1021 Blue Hills Road Bloomfield, CT
Tower Owner:	**SBA Communications Corporation** 5900 Broken Sound Parkway NW Boca Raton, Florida 33487
Engineer:	**FDH Engineering** 2730 Rowland Ave Raleigh, NC 27615

Centek Project No.: 13008.009

Dear Mr. Gauger,

We are providing this "Existing Telecommunications Facility Tower Modification Certification Letter" with regard to the antenna upgrade by Verizon Wireless at the above referenced project.

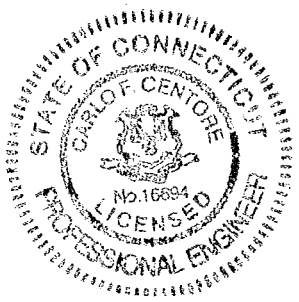
The following are the basis for substantiating compliance with the FDH Engineering Structural Analysis Report (FDH Project No. 12-06690E S2 dated 09/20/2012 :

- Review of the FDH Structural Analysis Report dated 09/20/2012.
- Field observations by Centek personnel of the coax installation on 08/12/2013 which determined all coax lines were installed in general compliance with the recommendations of the structural analysis report prepared by FDH on 09/20/2012.

The work under this Contract has been reviewed and found, to the Engineer's best knowledge, information and belief, to be completed in general compliance with the documents referenced above.

Sincerely,

Carlo F. Centore, PE
Principal ~Structural Engineer



CC: Rachel Mayo, Tim Parks, Aleksey Tyurin, Brian Ragozzine

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

November 27, 2012

Kenneth C. Baldwin, Esq.
Robinson & Cole LLP
280 Trumbull Street
Hartford, CT 06103

RE: **EM-VER-011-121018** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 1021 Blue Hills Avenue, Bloomfield, Connecticut.

Dear Attorney Baldwin:

The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the following conditions:

- The coax lines shall be installed in accordance with the recommendations made in the Structural Analysis Report prepared by FDH Engineering dated September 20, 2012 and stamped by Christopher Murphy;
- Not more than 45 days following completion of the antenna installation, Verizon shall provide documentation certifying that its installation complied with the engineer's recommendation;
- Any deviation from the proposed modification as specified in this notice and supporting materials with Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Not more than 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration;

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated October 17, 2012. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Thank you for your attention and cooperation.

Very truly yours,

Linda Roberts UAB

Linda Roberts
Executive Director

LR/CDM/jbw

c: The Honorable Sydney Schulman, Mayor, Town of Bloomfield
Louie Chapman, Jr., Town Manager, Town of Bloomfield
Thomas B. Hooper, Director of Planning, Town of Bloomfield
Sean Gormley, SBA

STATE OF CONNECTICUT
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www.ct.gov/csc

October 26, 2012

The Honorable Sydney Schulman
Mayor
Town of Bloomfield
Town Hall
800 Bloomfield Avenue
P. O. Box 337
Bloomfield, CT 06002-0337

RE: **EM-VER-011-121018** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 10212 Blue Hills Avenue, Bloomfield, Connecticut

Dear Mayor Schulman:

The Connecticut Siting Council (Council) received a request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72. A copy of which has already been provided to you.

If you have any questions or comments regarding the proposal, please call me or inform the Council by November 9, 2012.

Thank you for your cooperation and consideration.

Very truly yours,

LRoberts

Linda Roberts
Executive Director

LR/jbw

c: Louie Chapman, Jr., Town Manager, Town of Bloomfield
Thomas B. Hooper, Director of Planning, Town of Bloomfield

ROBINSON & COL

EM-VER-011-121018

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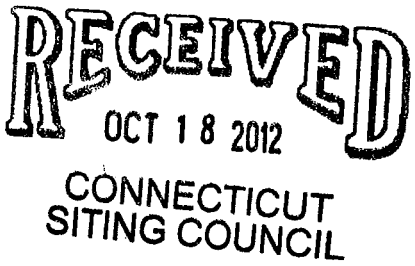
Also admitted in Massachusetts

October 17, 2012



Linda Roberts
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Notice of Exempt Modification – Antenna Swap**
10212 Blue Hills Avenue, Bloomfield, Connecticut

Dear Ms. Roberts:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) wireless telecommunications antennas at the 110-foot level on an existing 125-foot tower at the above-referenced address. The tower is owned by SBA. Cellco's use of the tower was approved by the Council in 2008. Cellco now intends to replace six (6) of its existing antennas with three (3) model BXA-171063-8BF PCS antennas; one (1) model BXA-70080-4CF LTE antenna; and adding two (2) model SLCP 2X6014 LTE antennas, all at the same 110-foot level. Cellco also intends to install six (6) additional coax cables, attached to the leg of the lattice tower. Attached behind Tab 1 are the specifications for the replacement antennas.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Louie Chapman, Jr., Town Manager of the Town of Bloomfield. A copy of this letter is also being sent to Blue Hills Fire District, the owner of the property on which the tower is located.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's replacement antennas will be located at the 110-foot level on the existing 125-foot tower.

2. The proposed modifications do not involve any change to ground-mounted equipment and, therefore, will not require the extension of the site boundaries.

3. The proposed modifications will not increase noise levels at the facility by six decibels or more.

4. The operation of the replacement antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard. As shown on the attached Far Field Analysis, the maximum RF emissions from Cellco's modified facility are estimated to be 1.89% of the FCC standard. (See Tab 2). According to the Council's RF database, maximum RF emissions levels for existing carriers are 72.55% of the FCC standard.

Also attached is a Structural Analysis Report confirming that the tower and foundation can support Cellco's proposed antenna modifications. (See Tab 3).

For the foregoing reasons, Cellco respectfully submits that the proposed modifications to the above-referenced telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
Louie Chapman, Jr., Bloomfield Town Manager
Blue Hills Fire District
Sandy M. Carter

Amphenol ANTENNA SOLUTIONS

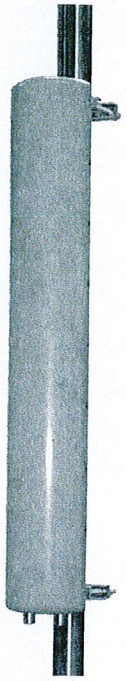
BXA-171063-8BF-EDIN-X

Replace "X" with desired electrical downtilt.

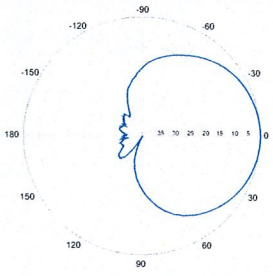
X-Pol | FET Panel | 63° | 17.4 dBi

Electrical Characteristics	1710-2170 MHz		
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Polarization	±45°	±45°	±45°
Horizontal beamwidth	68°	65°	60°
Vertical beamwidth	7°	7°	7°
Gain	14.5 dBd / 16.6 dBi	14.9 dBd / 17.0 dBi	15.3 dBd / 17.4 dBi
Electrical downtilt (X)	0, 2, 4, 8		
Impedance	50Ω		
VSWR	≤1.5:1		
First upper sidelobe	< -17 dB		
Front-to-back isolation	> 30 dB		
In-band isolation	> 28 dB		
IM3 (20W carrier)	< -150 dBc		
Input power	300 W		
Lightning protection	Direct Ground		
Connector(s)	2 Ports / EDIN / Female / Bottom		
Operating temperature	-40° to +60° C / -40° to +140° F		
Mechanical Characteristics			
Dimensions Length x Width x Depth	1232 x 154 x 105 mm		48.5 x 6.1 x 4.1 in
Depth with t-brackets	133 mm		5.2 in
Weight without mounting brackets	4.8 kg		10.5 lbs
Survival wind speed	296 km/hr		184 mph
Wind area	Front: 0.19 m² Side: 0.14 m²		Front: 2.0 ft² Side: 1.5 ft²
Wind load @ 161 km/hr (100 mph)	Front: 281 N Side: 223 N		Front: 63 lbf Side: 50 lbf

Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting Bracket Kit	26799997	50-102 mm 2.0-4.0 in	2.3 kg 5 lbs
2-Point Mounting & Downtilt Bracket Kit	26799999	50-102 mm 2.0-4.0 in	3.6 kg 8 lbs
Concealment Configurations	For concealment configurations, order BXA-171063-8BF-EDIN-X-FP		

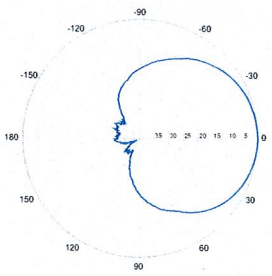


BXA-171063-8BF-EDIN-X



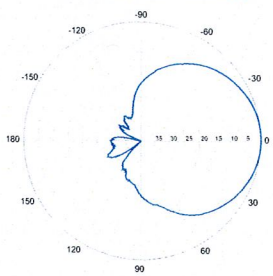
Horizontal | 1710-1880 MHz

BXA-171063-8BF-EDIN-X



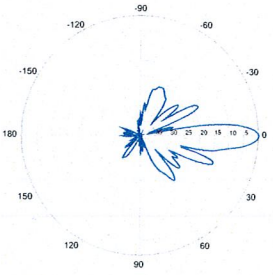
Horizontal | 1850-1990 MHz

BXA-171063-8BF-EDIN-X



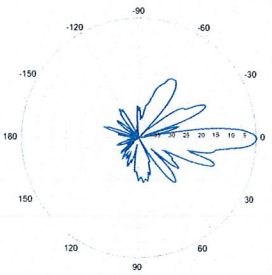
Horizontal | 1920-2170 MHz

BXA-171063-8BF-EDIN-0



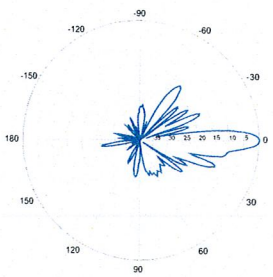
0° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-0



0° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-0

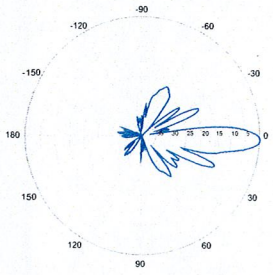


0° | Vertical | 1920-2170 MHz

BXA-171063-8BF-EDIN-X

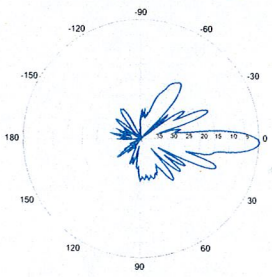
X-Pol | FET Panel | 63° | 17.4 dBi

BXA-171063-8BF-EDIN-2



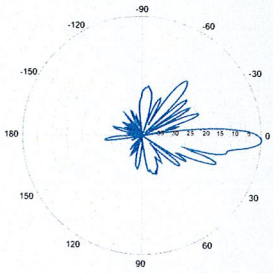
2° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-2



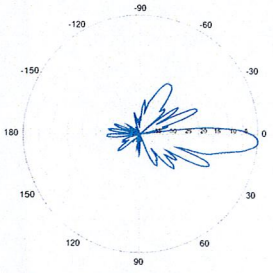
2° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-2



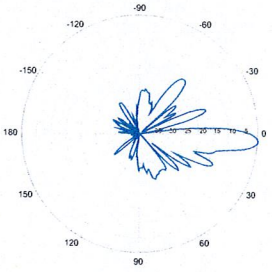
2° | Vertical | 1920-2170 MHz

BXA-171063-8BF-EDIN-4



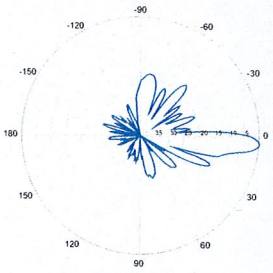
4° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-4



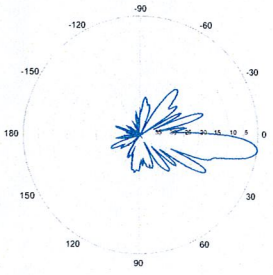
4° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-4



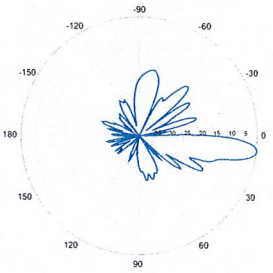
4° | Vertical | 1920-2170 MHz

BXA-171063-8BF-EDIN-8



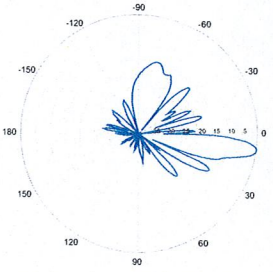
8° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-8



8° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-8

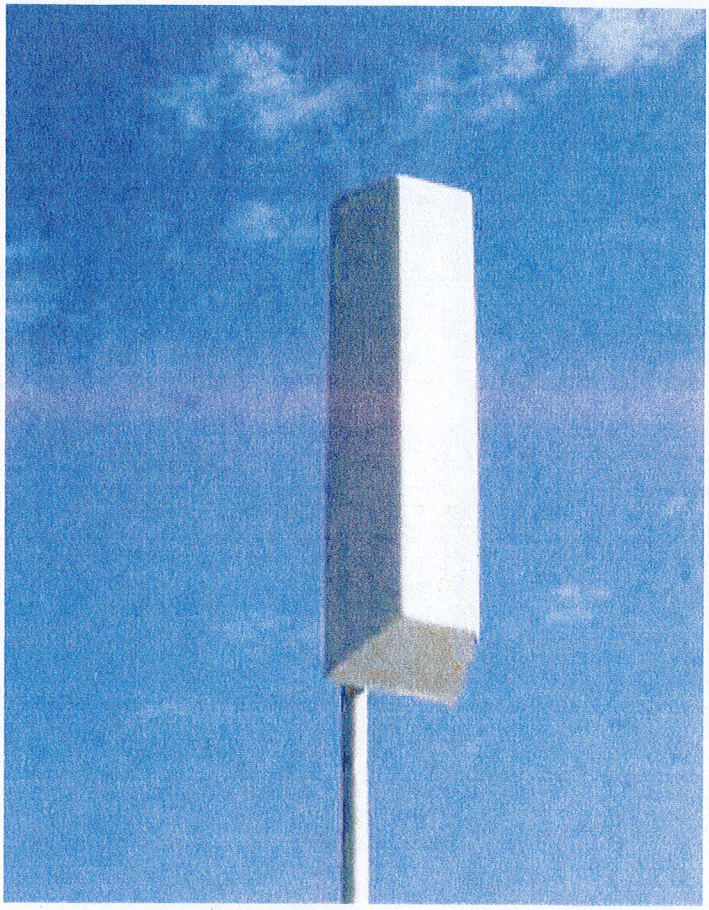


8° | Vertical | 1920-2170 MHz

Swedcom

SLCP 2x6014

Dual (2x) Circularly Polarized log-periodic antenna



Features

- Transmit Diversity Gain
- Can be configured to combine space & polarization diversity
- Outstanding performance over the entire band (700 - 800 MHz)
- Excellent Axial Ratio
- Optimized for 4G & 3G systems
- Low intermodulation
- Improved Side-to-side rejection
- Fading reduction
- Excellent isolation between ports

Electrical specifications

Frequency range:	**700-800 MHz**	
Impedance:	**50 ohm**	
Connector type:	**7/16 Din**	
Return loss:	**18 dB**	
Polarization:	**Circular**	
Gain ea. port [Circular]:	**2x14 dBdC**	
Gain ea. port [Linear]:	**2x11 dBdL**	
Axial Ratio:	**2 dB**	
Isolation between ports (TX band):	**30 dB**	
Front-to-back ratio:	**30 dB**	
Intermodulation (2x20W):	**IM3**	**150 dB**
	IM5	**160 dB**
	IM7/9	**170 dB**
Power rating:	**2x 500 W**	
H-plane (-3 dB point):	**2x 55°**	
V-plane (-3 dB point):	**2x 16°**	
Lightning protection:	**DC grounded**	

Mechanical specifications

Overall height:	**53 in**	**[1346 mm]**
Width:	**14 in**	**[356 mm]**
Depth:	**11 in**	**[279 mm]**
Weight (excluding brackets):	**20 lbs**	**[9 Kg]**
Wind load measured up to:	**150 mph**	**[240 Km/h]**
Wind area (side of antenna):	**5.15 sq. ft.**	**[0.48 sq.m]**
Lateral thrust at 113 mph/ 180 Km/h (worst case):	**263 lbs**	**[1171 N]**

Materials

Radiating Elements:	**Aluminum**
Transformer (Power distribution)	**Ceramic PCB**
Chassis:	**Aluminum**
Radome:	**Grey Fiberglass/PVC**
Mounting bolts:	**Stainless steel**

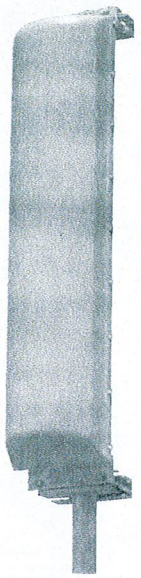
The SLCP 2x6014 is made in the U.S.A.

BXA-70080-4CF-EDIN-X

X-Pol | FET Panel | 80° | 12.0 dBd

Replace "X" with desired electrical downtilt.

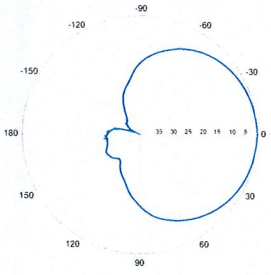
Antenna is also available with NE connector(s). Replace "EDIN" with "NE" in the model number when ordering.



Electrical Characteristics	696-900 MHz	
Frequency bands	696-806 MHz	806-900 MHz
Polarization	±45°	
Horizontal beamwidth	82°	80°
Vertical beamwidth	17°	15°
Gain	11.5 dBd (13.6 dBi)	12.0 dBd (14.1 dBi)
Electrical downtilt (X)	0, 2, 4, 6, 8, 10, 12, 14	
Impedance	50Ω	
VSWR	≤1.35:1	
Upper sidelobe suppression (0°)	-11.8 dB	-13.1 dB
Front-to-back ratio (+/-30°)	-30.3 dB	-36.7 dB
Null fill	5% (-26.02 dB)	
Isolation between ports	< -30 dB	
Input power with EDIN connectors	500 W	
Input power with NE connectors	300 W	
Lightning protection	Direct Ground	
Connector(s)	2 Ports / EDIN or NE / Female / Center (Back)	
Mechanical Characteristics		
Dimensions Length x Width x Depth	1206 x 204 x 151 mm	47.5 x 8.0 x 5.9 in
Depth with z-brackets	196 mm	7.7 in
Weight without mounting brackets	5.4 kg	12 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.25 m^2 Side: 0.18 m^2	Front: 2.6 ft^2 Side: 1.9 ft^2
Wind load @ 161 km/hr (100 mph)	Front: 351 N Side: 280 N	Front: 79 lbf Side: 61 lbf

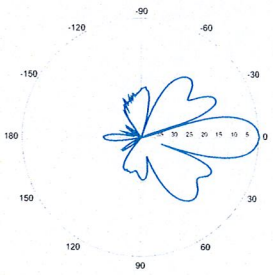
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting & Downtilt Bracket Kit	36210006	40-115 mm 1.57-4.5 in	4.1 kg 9 lbs
Concealment Configurations	For concealment configurations, order BXA-70080-4CF-EDIN-X-FP		

BXA-70080-4CF-EDIN-X



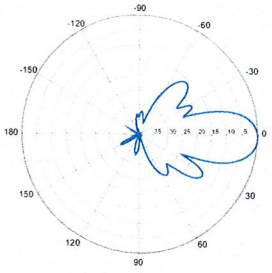
Horizontal | 750 MHz

BXA-70080-4CF-EDIN-0

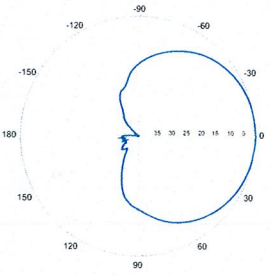


0° | Vertical | 750 MHz

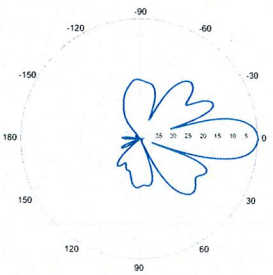
BXA-70080-4CF-EDIN-2



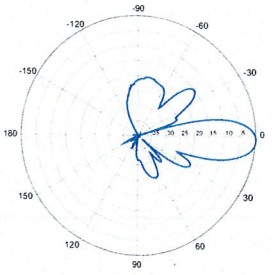
2° | Vertical | 750 MHz



Horizontal | 850 MHz



0° | Vertical | 850 MHz



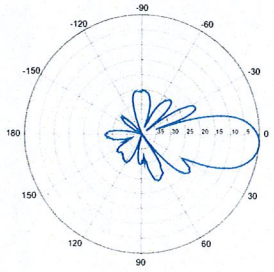
2° | Vertical | 850 MHz

Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product. Improvements to product may be made without notice.

BXA-70080-4CF-EDIN-X

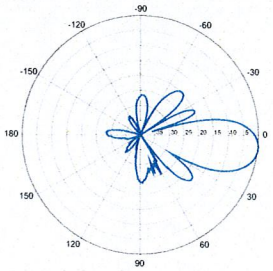
X-Pol | FET Panel | 80° | 12.0 dBd

BXA-70080-4CF-EDIN-4



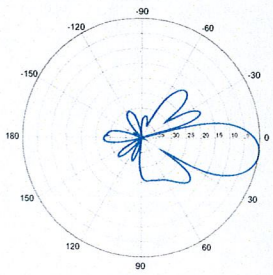
4° | Vertical | 750 MHz

BXA-70080-4CF-EDIN-6

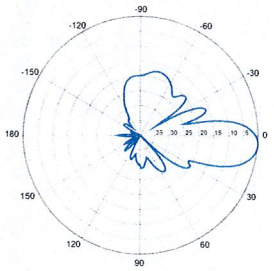


6° | Vertical | 750 MHz

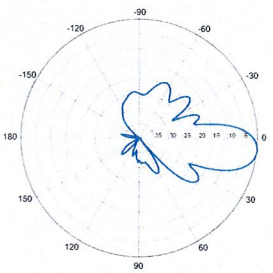
BXA-70080-4CF-EDIN-8



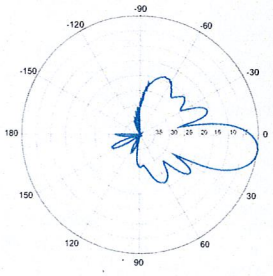
8° | Vertical | 750 MHz



4° | Vertical | 850 MHz

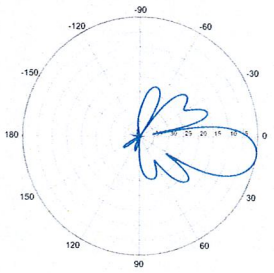


6° | Vertical | 850 MHz



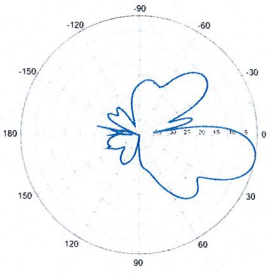
8° | Vertical | 850 MHz

BXA-70080-4CF-EDIN-10



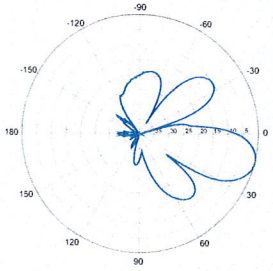
10° | Vertical | 750 MHz

BXA-70080-4CF-EDIN-12

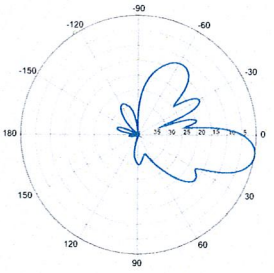


12° | Vertical | 750 MHz

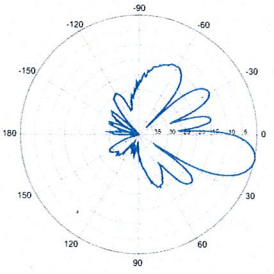
BXA-70080-4CF-EDIN-14



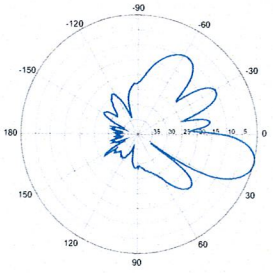
14° | Vertical | 750 MHz



10° | Vertical | 850 MHz



12° | Vertical | 850 MHz



14° | Vertical | 850 MHz

Far Field Approximation
with downtilt variation

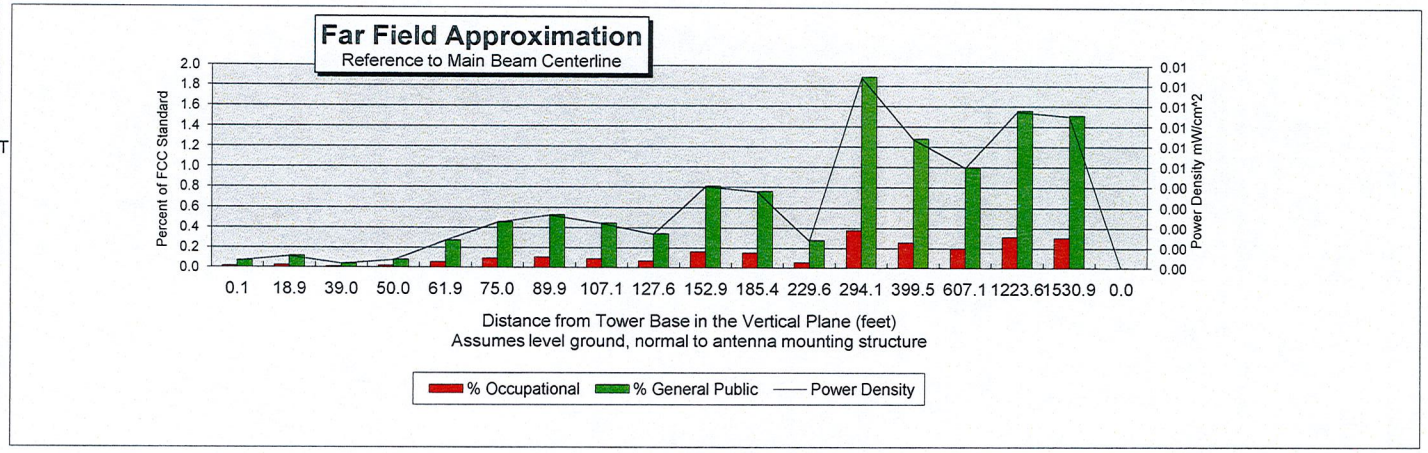
Estimated RF Emission

Composite Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	COTTAGE GROVE, CT
Site #:	
Date:	10/09/12
Name:	Mark Brauer
File Name:	WEST HARTFORD WEST, CT

Operating Freq. (MHz)	**746.0**
Antenna Height (ft):	**110.0**
Antenna Gain (dBi):	**16.2**
Antenna Size (in.):	**72.0**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
Power @ J4 (w):	**2025.0**



This approximation is only valid in the far field, which begins at: 64.4 Feet

Enter Main Beam Distance in feet below:

Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	0.0	
Solve for r, dx to antenna	107.0	108.7	113.9	118.1	123.6	130.7	139.7	151.4	166.5	186.6	214.1	253.3	313.0	413.6	616.5	1228.3	1534.7	#####	
Distance from Antenna Structure Base in Horizontal plane	0.1	18.9	39.0	50.0	61.9	75.0	89.9	107.1	127.6	152.9	185.4	229.6	294.1	399.5	607.1	1223.6	1530.9	#####	#NUM!
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	0	0
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0	0
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.01	#####	#NUM!
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.4	0.3	0.2	0.3	0.3	#####	#NUM!
Percent of General Population Standard	0.1	0.1	0.0	0.1	0.3	0.5	0.5	0.4	0.3	0.8	0.8	0.3	1.9	1.3	1.0	1.6	1.5	#####	#NUM!

Antenna Type BXA-70063-6CF
Max % 1.89

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 P<
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

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

Structural Analysis for SBA Network Services, Inc.

125' Self-Support Tower

SBA Site Name: Bloomfield
SBA Site ID: CT01725-A
Verizon Site Name: Cottage Grove

FDH Project Number 12-06690E S2

Analysis Results

Tower Components	98.5%	Sufficient
Foundations	82.0%	Sufficient

Prepared By:

Brad Smith, 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

September 20, 2012

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

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 Bloomfield, 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 State Building Code (2005 CSBC).* Information pertaining to the existing/proposed antenna loading, current tower geometry, the member sizes, geotechnical data, and foundation dimensions was obtained from:

- Fred A. Nudd Corporation (Project No. 5566A) original design drawings dated March 11, 1998
- FDH Engineering, Inc. (Project No. 12-06690E G1) Geotechnical Evaluation of Subsurface Conditions dated August 10, 2012
- SBA Network Services, Inc.

The *basic design wind speed* per the *TIA/EIA-222-F* standards and *2005 CSBC* 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 AT&T in place at 110 ft, the tower meets the requirements of the *TIA/EIA-222-F* standards and *2005 CSBC* provided the **Recommendation** listed below is satisfied. Furthermore, provided the foundations were constructed per the original design drawings (see Fred A. Nudd Project No. 5566A) and utilizing the existing soil parameters (see FDH Engineering, Inc. Project No. 12-06690E G1), 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.

Recommendation

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

1. Coax must be installed as shown in **Figure 1**.

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	Coax and Lines	Carrier	Mount Elevation (ft)	Mount Type
135	(3) Celwave PD455 Dipoles (2) 20' Omnis	(1) 1-1/4" (2) 7/8" (2) 1/2"	Blue Hills Fire & PD	125	(1) Platform w/ Handrails
125	(6) EMS RV90-17-00 (3) RFS APX16PV-16PVL-C (9) Andrew OneBase Twin TMAs	(18) 1-5/8"	T-Mobile		
120	(9) Decibel DB844H90E-XY (3) Kathrein 840 10054	(12) 1-1/4"	Nextel/ Clearwire	120	(3) T-Frames
	(2) Dragonwave Horizon DUO Radios (3) Samsung U-RAS Flexible Radios (2) Andrew VHLP2.5 Dishes	(7) 5/16" (2) 1/2"			
110	(6) Antel LPA-80063/4CF (6)Antel LPA-185063/8CF (2) GPS	(12) 1-5/8" (2) 1/2"	Verizon	107	(3) T-Frames
98	(6) Powerwave 7770 (1) KMW AM-X-CD-16-65-00T-RET (2) Andrew SBNH-1D6565C (6) Powerwave LGP21401 TMAs (6) Ericsson RRUS-11 RRUs (6) Powerwave LGP21903 Diplexers	(12) 7/8" (1) 3" Flex Conduit (1) 3/8" Fiber (2) 3/4" DC Power	AT&T	98	(3) T-Frames
96	(1) Raycap DC6-48-60-18-8F Surge Arrestor			96	Direct Mount
75	(3) RFS APXV18-206517S-C	(6) 1-5/8"	Pocket	75	(3) Pipe Mounts
51	(1) 2' Omni (assumed)	---	---	50	(1) Standoff

Proposed Loading:

Antenna Elevation (ft)	Description	Coax and Lines	Carrier	Mount Elevation (ft)	Mount Type
110	(6) Antel LPA-80063/4CF (3) Antel LAP-171063-8BF (2) Swedcom SLCP 2X6014F (1) Antel BXA-70080/4CF (2) GPS	(18) 1-5/8" (2) 1/2"	Verizon	107	(3) T-Frames

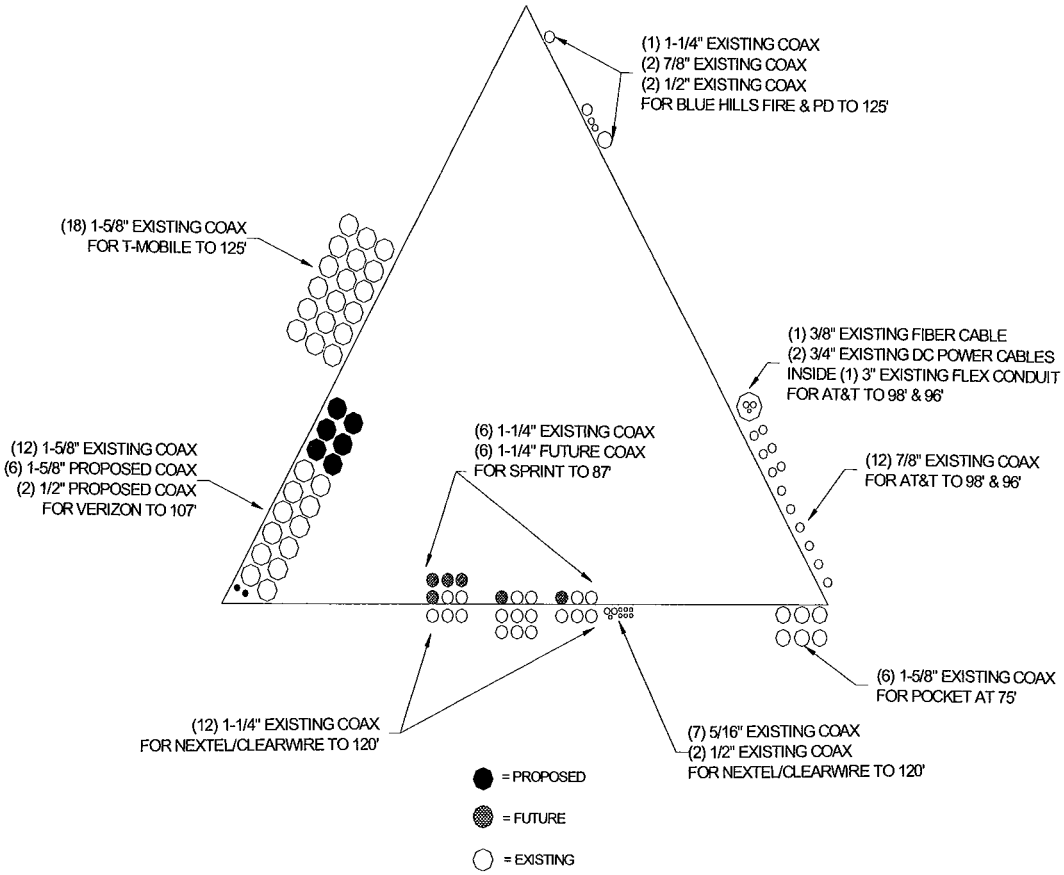


Figure 1 – Coax Layout

RESULTS

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

Table 2 - Material Strength

Member Type	Yield Strength
Legs	55 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	125 - 120	Leg	P2.5x.203 (2.88 OD)	9.5	Pass
		Diagonal	5/8	44.2	Pass
		Horizontal	L1 1/2x1 1/2x3/16	2.2 5.1 (b)	Pass
		Top Girt	L1 1/2x1 1/2x3/16	5.9 9.6 (b)	Pass
T2	120 - 100	Leg	P2.5x.203 (2.88 OD)	69.0	Pass
		Diagonal	L1 1/2x1 1/2x3/16	63.5 76.7 (b)	Pass
		Top Girt	L1 1/2x1 1/2x3/16	4.4 7.1 (b)	Pass
T3	100 - 80	Leg	P3.5x.226 (4.00 OD)	83.0	Pass
		Diagonal	L2x2x3/16	51.8 82.8 (b)	Pass
T4	80 - 60	Leg	P5x.258 (5.563 OD)	76.4	Pass
		Diagonal	L2 1/2x2 1/2x3/16	44.8 91.0 (b)	Pass
T5	60 - 40	Leg	P6x.28 (6.625 OD)	74.4	Pass
		Diagonal	L2 1/2x2 1/2x3/16	52.4 67.9 (b)	Pass
T6	40 - 30	Leg	P6x.28 (6.625 OD)	90.3	Pass
		Diagonal	L3x3x3/16	55.5 79.2 (b)	Pass
T7	30 - 20	Leg	P6x.28 (6.625 OD)	98.5	Pass
		Diagonal	L3x3x3/16	60.5 78.6 (b)	Pass

Section No.	Elevation ft	Component Type	Size	% Capacity	Pass Fail
T8	20 - 0	Leg	P8x.322 (8.625 OD)	69.2	Pass
		Diagonal	L3 1/2x3 1/2x1/4	35.8 60.8 (b)	Pass

Table 4 - Maximum Base Reactions

Load Type	Direction	Current Analysis* *(TIA/EIA-222-F)*	Original Design *(EIA/TIA-222-E)*
Individual Foundation	Horizontal	18 k	---
	Uplift	200 k	168 k
	Compression	225 k	178 k
Overturning Moment	---	2,321 k-ft	---

*Foundations determined adequate per independent analysis.

GENERAL COMMENTS

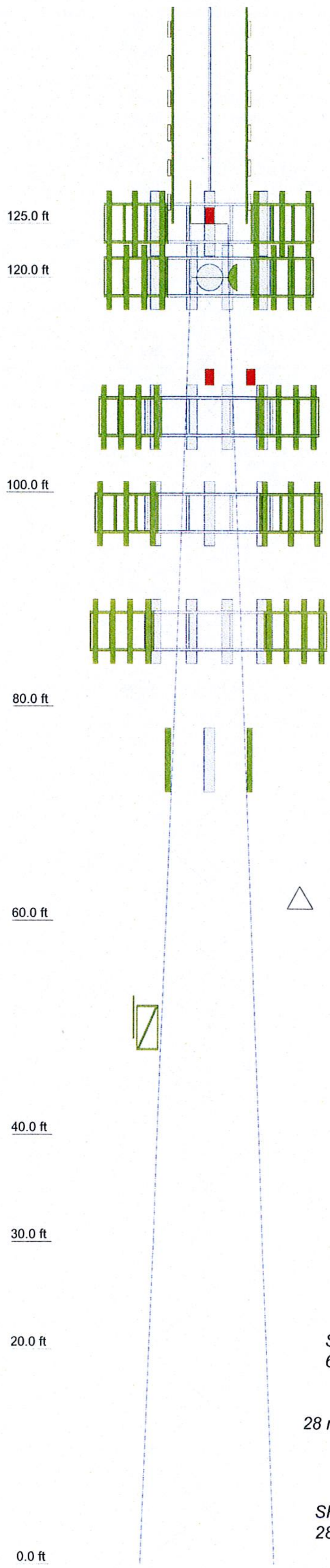
This engineering analysis is based upon the theoretical capacity of the structure. It is not a condition assessment of the tower and its foundation. It is the responsibility of SBA Network Services, Inc. to verify that the tower modeled and analyzed is the correct structure (with accurate antenna loading 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	T1	T2	T3	T4	T5	T6	T7	T8	Base
Legs	P2.5x.203 (2.88 OD)		P3.5x.226 (4.00 OD)	P5x.258 (5.563 OD)	P6x.28 (6.625 OD)		P8x.322 (8.625 OD)		
Leg Grade	A572-55								
Diagonals	SR 5/8	L1 1/2x1 1/2x3/16	L2x2x3/16	L2 1/2x2 1/2x3/16		L3x3x3/16		L3 1/2x3 1/2x1/4	
Diagonal Grade	A36								
Top Girts	L1 1/2x1 1/2x3/16		N.A.						
Horizontals	A	N.A.							
Face Width (ft)	3.5		5	6.5	8	9.5	10.25	11	12.5
# Panels @ (ft)	2 @ 2.5	8 @ 5		6 @ 6.66667			4 @ 10		
Weight (K)	0.2	0.7	1.0	1.4	1.7	0.9	0.9	2.8	9.6



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod	125	SLCP 2x6014F w/ Mount Pipe	107
Flash Beacon Lighting	125	GPS	107
PD455 Dipole	125	GPS	107
PD455 Dipole	125	(3) T-Frames MNT	107
PD455 Dipole	125	(2) LPA-80063/4CF w/ Mount Pipe	107
20' Omni	125	(2) LPA-80063/4CF w/ Mount Pipe	107
20' Omni	125	(2) 7770 w/Mount Pipe	98
(2) RV90-17-00 w/Mount Pipe	125	AM-X-CD-16-65-00T-RET w/ Mount Pipe	98
(2) RV90-17-00 w/Mount Pipe	125		
(2) RV90-17-00 w/Mount Pipe	125	SBNH-1D6565C w/Mount Pipe	98
APX16PV-16PVL-C W/Mount Pipe	125	SBNH-1D6565C w/Mount Pipe	98
APX16PV-16PVL-C W/Mount Pipe	125	(2) LGP21401 TMA	98
APX16PV-16PVL-C W/Mount Pipe	125	(2) LGP21401 TMA	98
(3) OneBase Twin TMA	125	(2) LGP21401 TMA	98
(3) OneBase Twin TMA	125	(2) RRUS-11	98
(3) OneBase Twin TMA	125	(2) RRUS-11	98
(1) Platform w/ Handrails MNT	125	(2) RRUS-11	98
(3) DB844H90E-XY	120	(2) LGP21903 Diplexer	98
(3) DB844H90E-XY	120	(2) LGP21903 Diplexer	98
(3) DB844H90E-XY	120	(2) LGP21903 Diplexer	98
840 10054	120	Empty Mount Pipe	98
840 10054	120	Empty Mount Pipe	98
840 10054	120	Empty Mount Pipe	98
Horizon DUO Radio	120	(3) T-Frames MNT	98
Horizon DUO Radio	120	(2) 7770 w/Mount Pipe	98
U-RAS Flexible Radio	120	(2) 7770 w/Mount Pipe	98
U-RAS Flexible Radio	120	DC6-48-60-18-8F Surge Arrestor	96
U-RAS Flexible Radio	120	(4) DB980F65T2E-M w/Mount Pipe	87
(3) T-Frames MNT	120	(3) T-Frames MNT	87
VHLP2.5 Dish	120	(4) DB980F65T2E-M w/Mount Pipe	87
VHLP2.5 Dish	120	(4) DB980F65T2E-M w/Mount Pipe	87
(2) LPA-80063/4CF w/ Mount Pipe	107	APXV18-206517S-C w/Mount Pipe	75
LPA-171063-8BF w/Mount Pipe	107	APXV18-206517S-C w/Mount Pipe	75
LPA-171063-8BF w/Mount Pipe	107	APXV18-206517S-C w/Mount Pipe	75
LPA-171063-8BF w/Mount Pipe	107	2' Omni	50
BXA-70080/4CF w/ Mount Pipe	107	(1) Standoff MNT	50
SLCP 2x6014F w/ Mount Pipe	107		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	L1 1/2x1 1/2x3/16		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-55	55 ksi	70 ksi	A36	36 ksi	58 ksi

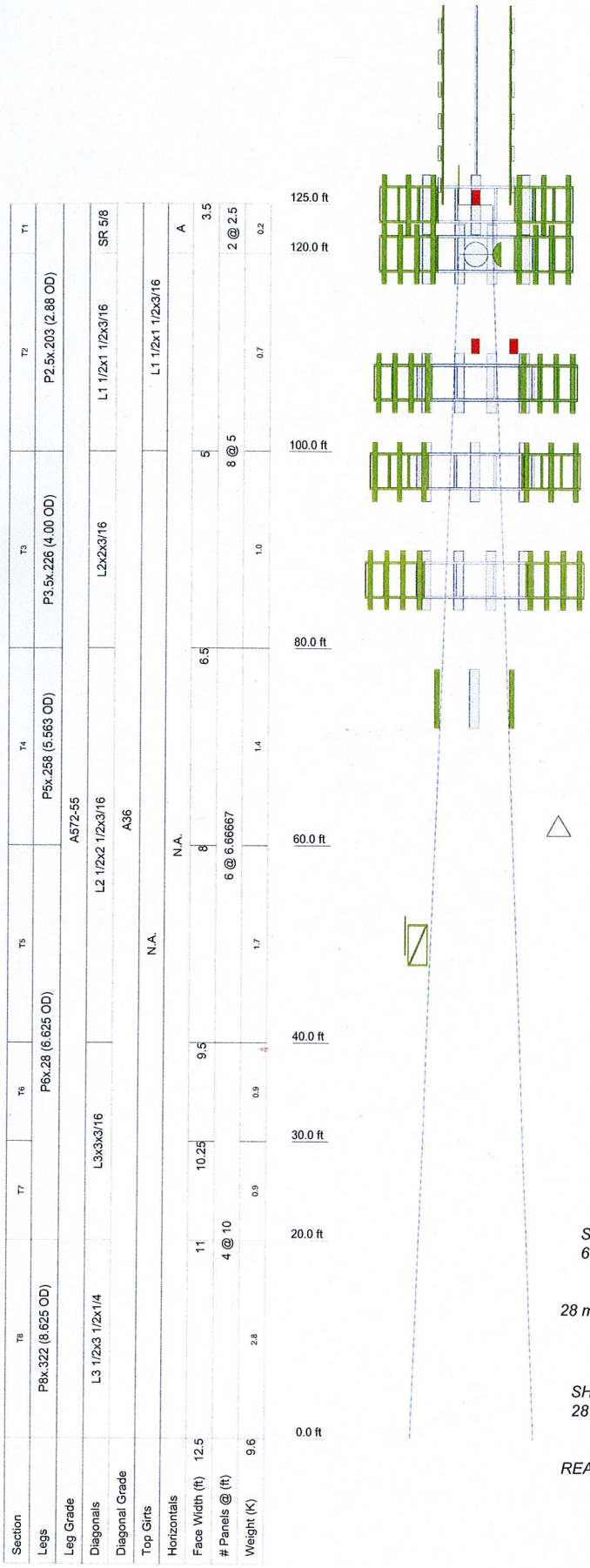
TOWER DESIGN NOTES

1. Tower is located in Hartford 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: 98.5%

AXIAL 77 K
SHEAR 6 K — *MOMENT 493 kip-ft*
TORQUE 1 kip-ft
28 mph WIND - 1.0000 in ICE

AXIAL 32 K
SHEAR 28 K — *MOMENT 2321 kip-ft*
TORQUE 6 kip-ft
REACTIONS - 80 mph WIND

FDH Engineering, Inc. 6521 Meridien Drive, Raleigh, NC 27616, Phone: (919) 755-1012, FAX: (919) 755-1031 — Tower Analysis	Job: **Bloomfield, CT01725-A**
	Project: **12-06690E S2**
	Client: SBA Network Services, Inc. — Drawn by: Bradley Smith — App'd:
	Code: TIA/EIA-222-F — Date: 09/20/12 — Scale: NTS
	Path: — Dwg No. E-1



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lighning Rod	125	SLCP 2x6014F w/ Mount Pipe	107
Flash Beacon Lighting	125	GPS	107
PD455 Dipole	125	GPS	107
PD455 Dipole	125	(3) T-Frames MNT	107
PD455 Dipole	125	(2) LPA-80063/4CF w/ Mount Pipe	107
20' Omni	125	(2) LPA-80063/4CF w/ Mount Pipe	107
20' Omni	125	(2) 7770 w/Mount Pipe	98
(2) RV90-17-00 w/Mount Pipe	125	AM-X-CD-16-65-00T-RET w/ Mount Pipe	98
(2) RV90-17-00 w/Mount Pipe	125		
(2) RV90-17-00 w/Mount Pipe	125	SBNH-1D6565C w/Mount Pipe	98
APX16PV-16PVL-C W/Mount Pipe	125	SBNH-1D6565C w/Mount Pipe	98
APX16PV-16PVL-C W/Mount Pipe	125	(2) LGP21401 TMA	98
APX16PV-16PVL-C W/Mount Pipe	125	(2) LGP21401 TMA	98
(3) OneBase Twin TMA	125	(2) LGP21401 TMA	98
(3) OneBase Twin TMA	125	(2) RRUS-11	98
(3) OneBase Twin TMA	125	(2) RRUS-11	98
(1) Platform w/ Handrails MNT	125	(2) RRUS-11	98
(3) DB844H90E-XY	120	(2) LGP21903 Diplexer	98
(3) DB844H90E-XY	120	(2) LGP21903 Diplexer	98
(3) DB844H90E-XY	120	(2) LGP21903 Diplexer	98
840 10054	120	Empty Mount Pipe	98
840 10054	120	Empty Mount Pipe	98
840 10054	120	Empty Mount Pipe	98
Horizon DUO Radio	120	(3) T-Frames MNT	98
Horizon DUO Radio	120	(2) 7770 w/Mount Pipe	98
U-RAS Flexible Radio	120	(2) 7770 w/Mount Pipe	98
U-RAS Flexible Radio	120	DC6-48-60-18-8F Surge Arrestor	96
U-RAS Flexible Radio	120	(4) DB980F65T2E-M w/Mount Pipe	87
(3) T-Frames MNT	120	(3) T-Frames MNT	87
VHLP2.5 Dish	120	(4) DB980F65T2E-M w/Mount Pipe	87
VHLP2.5 Dish	120	(4) DB980F65T2E-M w/Mount Pipe	87
(2) LPA-80063/4CF w/ Mount Pipe	107	APXV18-206517S-C w/Mount Pipe	75
LPA-171063-8BF w/Mount Pipe	107	APXV18-206517S-C w/Mount Pipe	75
LPA-171063-8BF w/Mount Pipe	107	APXV18-206517S-C w/Mount Pipe	75
LPA-171063-8BF w/Mount Pipe	107	2' Omni	50
BXA-70080/4CF w/ Mount Pipe	107	(1) Standoff MNT	50
SLCP 2x6014F w/ Mount Pipe	107		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	L1 1/2x1 1/2x3/16		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-55	55 ksi	70 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower is located in Hartford 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: 98.5%

MAX.
DC
SHE
UP
SHEAR

AXIAL
77 K

SHEAR
6 K

MOMENT
493 kip-ft

TORQUE 1 kip-ft
28 mph WIND - 1.0000 in ICE

AXIAL
32 K

SHEAR
28 K

MOMENT
2321 kip-ft

TORQUE 6 kip-ft
REACTIONS - 80 mph WIND

FDH Engineering, Inc.
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Raleigh, NC 27616
Phone: (919) 755-1012
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Tower Analysis

Job: Bloomfield, CT01725-A			
Project: 12-06690E S2			
Client: SBA Network Services, Inc.	Drawn by: Bradley Smith	App'd:	
Code: TIA/EIA-222-F	Date: 09/20/12	Scale: NTS	
Path: C:\Users\Bradley Smith\Desktop\Bloomfield_CT01725_SA_Version\Archive\Bloomfield_CT01725-A.eri		Dwg No. E-1	

Far Field Approximation
with downtilt variation

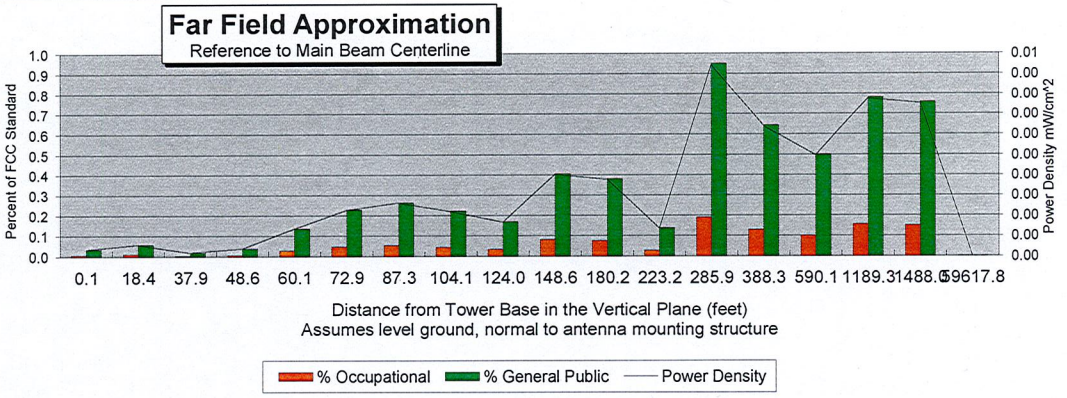
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	BLOOMFIELD BLUE HILLS, C
Site #:	
Date:	11/13/12
Name:	Mark Brauer
File Name:	Bloomfield Blue Hills, CT - FF P

Operating Freq. (MHz)	**746.0**
Antenna Height (ft):	**107.0**
Antenna Gain (dBi):	**16.7**
Antenna Size (in.):	**72.0**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
Power @ J4 (w):	**867.0**



This approximation is only valid in the far field, which begins at: 64.4 Feet

Enter Main Beam Distance in feet below:

Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	0.1	
Solve for r, dx to antenna	104.0	105.6	110.7	114.8	120.1	127.0	135.8	147.1	161.9	181.4	208.1	246.2	304.2	402.0	599.2	1193.9	1491.7	#####	
Distance from Antenna Structure Base in Horizontal plane	0.1	18.4	37.9	48.6	60.1	72.9	87.3	104.1	124.0	148.6	180.2	223.2	285.9	388.3	590.1	1189.3	1488.0	#####	#NUM!
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	0	0
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0	0
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#NUM!
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.2	0.1	0.1	0.2	0.2	0.0	#NUM!
Percent of General Population Standard	0.03	0.06	0.02	0.04	0.14	0.23	0.26	0.22	0.17	0.41	0.38	0.14	0.95	0.64	0.50	0.78	0.76	0.00	#NUM!

Antenna Type LTE
Max % 0.95%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 P
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

Far Field Approximation
with downtilt variation

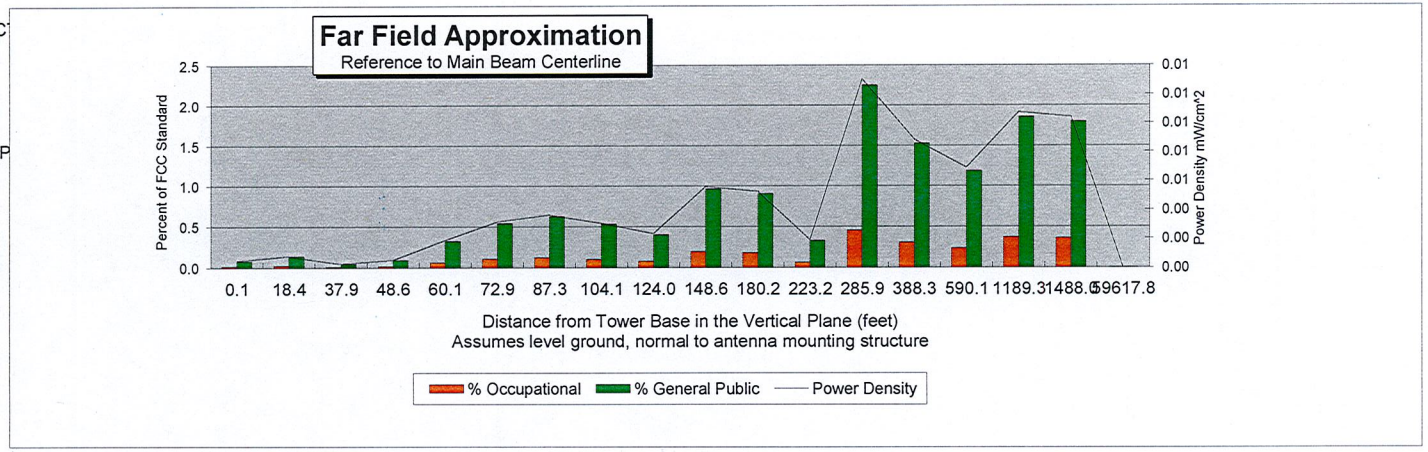
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	BLOOMFIELD BLUE HILLS, C
Site #:	
Date:	11/13/12
Name:	Mark Brauer
File Name:	Bloomfield Blue Hills, CT - FF P

Operating Freq. (MHz)	**869.0**
Antenna Height (ft):	**107.0**
Antenna Gain (dBi):	**16.7**
Antenna Size (in.):	**72.0**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
Power @ J4 (w):	**2394.0**



This approximation is only valid in the far field, which begins at: 64.4 Feet

Enter Main Beam Distance in feet below:

Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	0.1	
Solve for r, dx to antenna	104.0	105.6	110.7	114.8	120.1	127.0	135.8	147.1	161.9	181.4	208.1	246.2	304.2	402.0	599.2	1193.9	1491.7	#####	
Distance from Antenna Structure Base in Horizontal plane	0.1	18.4	37.9	48.6	60.1	72.9	87.3	104.1	124.0	148.6	180.2	223.2	285.9	388.3	590.1	1189.3	1488.0	#####	#NUM!
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	0	0
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0	0
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.00	#NUM!
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.5	0.3	0.2	0.4	0.4	0.0	#NUM!
Percent of General Population Standard	0.08	0.14	0.05	0.09	0.32	0.54	0.63	0.53	0.40	0.96	0.91	0.33	2.25	1.53	1.19	1.86	1.80	0.00	#NUM!

Antenna Type cellular
Max % 2.25%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
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4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

Far Field Approximation
with downtilt variation

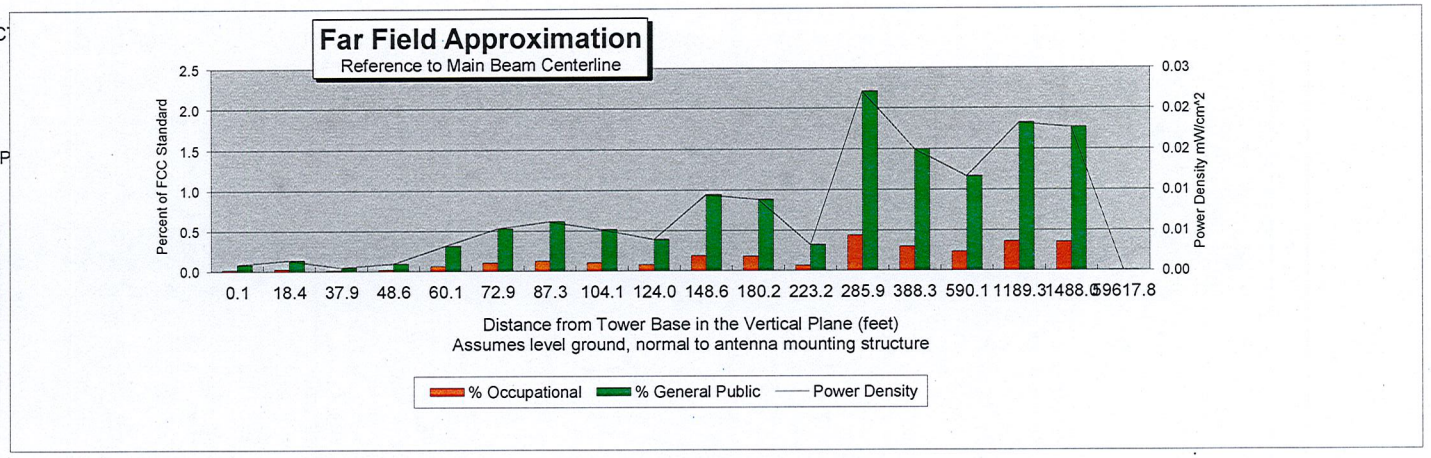
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	BLOOMFIELD BLUE HILLS, C
Site #:	
Date:	11/13/12
Name:	Mark Brauer
File Name:	Bloomfield Blue Hills, CT - FF P

Operating Freq. (MHz)	**1970.0**
Antenna Height (ft):	**107.0**
Antenna Gain (dBi):	**18.1**
Antenna Size (in.):	**72.0**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
Power @ J4 (w):	**2904.0**



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Enter Main Beam Distance in feet below:

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Solve for r, dx to antenna	104.0	105.6	110.7	114.8	120.1	127.0	135.8	147.1	161.9	181.4	208.1	246.2	304.2	402.0	599.2	1193.9	1491.7	#####	
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Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	0	0
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0	0
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.02	0.01	0.01	0.02	0.02	0.00	#NUM!
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.4	0.3	0.2	0.4	0.4	0.0	#NUM!
Percent of General Population Standard	0.08	0.14	0.05	0.09	0.32	0.53	0.62	0.52	0.40	0.95	0.89	0.32	2.21	1.50	1.17	1.82	1.77	0.00	#NUM!

Antenna Type PCS
Max % 2.21%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
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3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 P
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
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Far Field Approximation
with downtilt variation

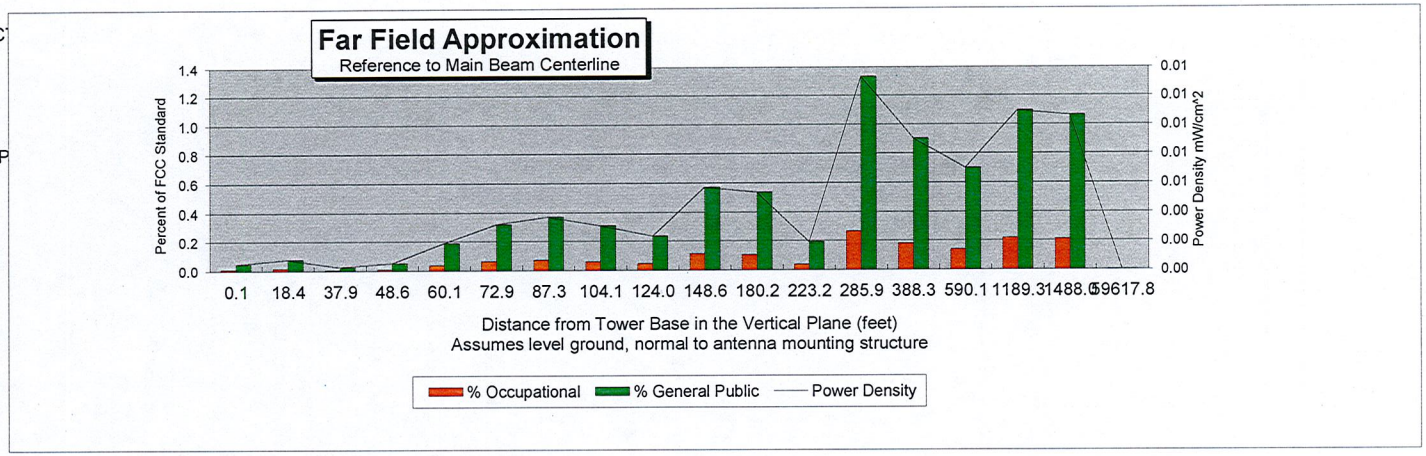
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	BLOOMFIELD BLUE HILLS, C
Site #:	
Date:	11/13/12
Name:	Mark Brauer
File Name:	Bloomfield Blue Hills, CT - FF P

Operating Freq. (MHz)	**2110.0**
Antenna Height (ft):	**107.0**
Antenna Gain (dBi):	**18.1**
Antenna Size (in.):	**72.0**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
Power @ J4 (w):	**1750.0**



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Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.00	#NUM!
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.3	0.2	0.1	0.2	0.2	0.0	#NUM!
Percent of General Population Standard	0.05	0.08	0.03	0.06	0.19	0.32	0.37	0.31	0.24	0.57	0.54	0.19	1.33	0.90	0.70	1.10	1.06	0.00	#NUM!

Antenna Type AWS
Max % 1.33%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 P
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
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