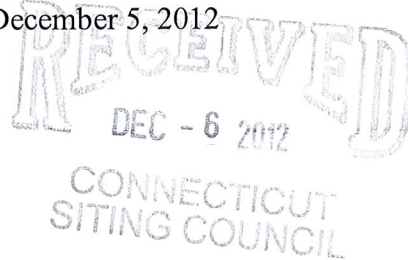


280 Trumbull Street  
Hartford, CT 06103-3597  
Main (860) 275-8200  
Fax (860) 275-8299  
kbaldwin@rc.com  
Direct (860) 275-8345

**ORIGINAL**

Also admitted in Massachusetts

December 5, 2012



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

Re: **EM-VER-003-120423 – Cellco Partnership d/b/a Verizon Wireless  
90 Knowlton Hill Road, Ashford, Connecticut**

Dear Mr. Martin:

On May 11, 2012, the Siting Council acknowledged receipt of Cellco's notice of intent to modify its existing telecommunications facility at 90 Knowlton Hill Road in Ashford, Connecticut. The modification involved the replacement of certain antennas and the installation cable diplexers.

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



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Centered on Solutions<sup>SM</sup>

November 28, 2012

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

**Re: Existing Telecommunications Facility Tower Modification Certification Letter**

**Project:** Verizon ~ Ashford West  
90 Knowlton Hill Road  
Ashford, 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.:** 12005.CO31

Dear Mr. Gauger,

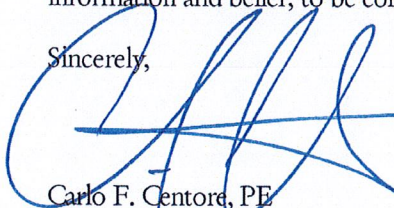
We are providing this "Existing Telecommunications Facility Tower Modification Certification Letter" with regard to the antenna upgrade by Verizon Wireless at the above referenced project.

The following are the basis for substantiating compliance with the design documents prepared by FDH Engineering:

- Review of the FDH structural analysis dated 4/10/2012.
- Field observations by Centek personnel of coax and diplexer installation on 11/27/2012 which determined all coax lines and diplexers were installed in general compliance with the recommendations of the structural analysis report prepared by FDH on 4/10/2012.

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, Jim Smith, 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](mailto:siting.council@ct.gov)

[www.ct.gov/csc](http://www.ct.gov/csc)

May 11, 2012

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

RE: **EM-VER-003-120423**- Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 90 Knowlton Hill Road, Ashford, 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:

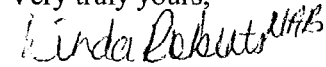
- The existing coax lines be utilized and the proposed diplexers be installed in accordance with the recommendations made in the Structural Analysis Report prepared by FDH Engineering dated April 10, 2012 and stamped by Christopher Murphy; and
- Following the installation of the proposed equipment, Verizon shall provide documentation certifying that the 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 less 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 April 20, 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

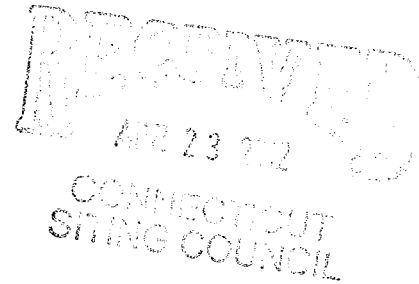
Executive Director

LR/CDM/laf

c: The Honorable Ralph H. Fletcher, First Selectman, Town of Ashford  
Richard Dziadus, Zoning Enforcement Officer, Town of Ashford  
Sean Gormley, SBA Communications Corporation

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

April 20, 2012



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

Re: **Notice of Exempt Modification – Antenna Swap  
90 Knowlton Hill Road, Ashford, Connecticut**

Dear Ms. Roberts:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains twelve (12) wireless telecommunications antennas at the 129-foot level on an existing 150-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 2006. Cellco now intends to replace all of its existing antennas with six (6) model LPA-80080-6CF cellular antennas; three (3) model BXA-171085-12CF PCS antennas; and three (3) model BXA-70063-6CF LTE antennas, all at the same 129-foot level. Cellco also intends to install six (6) coax cable diplexers directly behind its antennas. Attached behind Tab 1 are the specifications for the replacement antennas and cable diplexers.

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 Ralph H. Fletcher, First Selectman of the Town of Ashford. A copy of this letter is also being sent to Estate of Royal Knowlton, Et Al, 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 and diplexers will be located at the 129-foot level on the existing 150-foot tower.



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Linda Roberts  
April 20, 2012  
Page 2

2. The proposed modifications will 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) power density levels at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard. A cumulative power density table for Cellco's modified facility is included behind Tab 2.

Also attached is a Structural Analysis confirming that the tower and foundation can support Cellco's proposed 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:

Ralph H. Fletcher, Ashford First Selectman  
Estate of Royal Knowlton. Et Al  
Sandy M. Carter



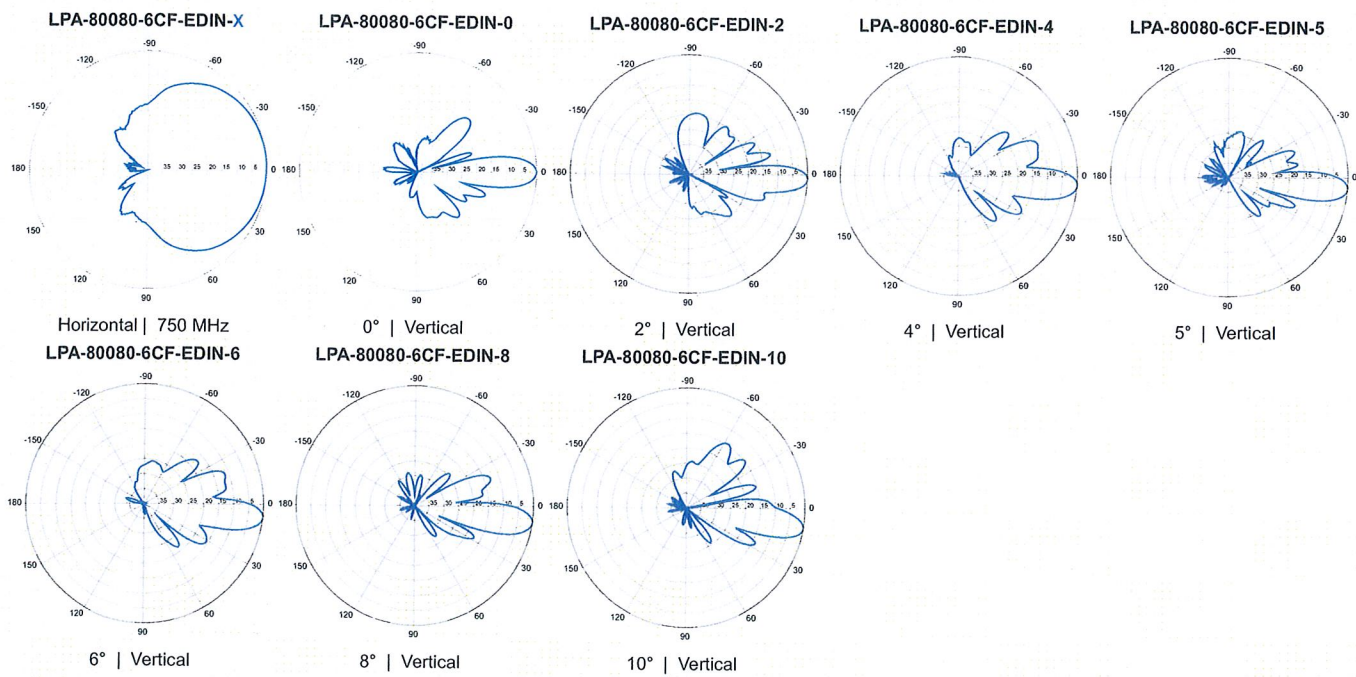
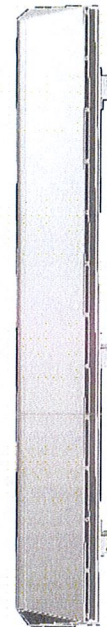
## LPA-80080-6CF-EDIN-X

V-Pol | Log Periodic | 80° | 14.0 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		
Frequency bands	806-960 MHz	
Polarization	Vertical	
Horizontal beamwidth	80°	
Vertical beamwidth	10°	
Gain	14.0 dBd (16.1 dBi)	
Electrical downtilt (X)	0, 2, 4, 5, 6, 8, 10	
Impedance	50Ω	
VSWR	≤1.4:1	
Upper sidelobe suppression (0°)	-22.6 dB	
Null fill	10% (-20.0 dB)	
Input power	500 W	
Lightning protection	Direct Ground	
Connector(s)	1 Port / EDIN or NE / Female / Center (Back)	
Mechanical Characteristics		
Dimensions Length x Width x Depth	1800 x 140 x 335 mm      70.9 x 5.5 x 13.2 in	
Depth of antenna with z-bracket	375 mm      14.8 in	
Weight without mounting brackets	9.5 kg      21.0 lbs	
Survival wind speed	> 201 km/hr      > 125 mph	
Wind area	Front: 0.25 m <sup>2</sup> Side: 0.61 m <sup>2</sup> Front: 2.7 ft <sup>2</sup> Side: 6.6 ft <sup>2</sup>	
Wind load @ 161 km/hr (100 mph)	Front: 415 N    Side: 878 N      Front: 93 lbf    Side: 198 lbf	
Mounting Options		
Part Number	Fits Pipe Diameter	Weight
3-Point Mounting & Downtilt Bracket Kit (0-20°)	21700000      50-102 mm    2.0-4.0 in	11 kg    25 lbs
Lock-Down Brace	If the lock-down brace is used, the maximum diameter of the mounting pipe is 88.9 mm or 3.5 in.	



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-171085-12CF-EDIN-X

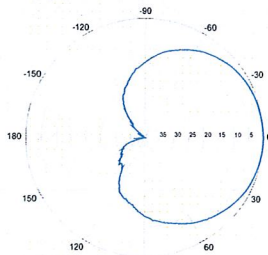
Replace 'X' with desired electrical downtilt.

X-Pol | FET Panel | 85° | 18.0 dBi

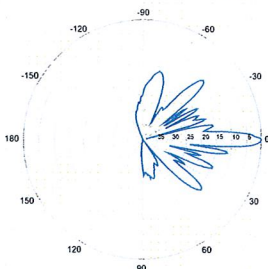
Electrical Characteristics	1710-2170 MHz		
	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Polarization	±45°	±45°	±45°
Horizontal beamwidth	88°	85°	80°
Vertical beamwidth	4.5°	4.5°	4.5°
Gain	15.1 dBd / 17.2 dBi	15.5 dBd / 17.6 dBi	15.9 dBd / 18.0 dBi
Electrical downtilt (X)		0, 2, 4	
Impedance	50Ω		
VSWR	≤1.5:1		
First upper sidelobe	< -17 dB		
Front-to-back ratio	> 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 / Center (Back)		
Operating temperature	-40° to +60° C / -40° to +140° F		
Mechanical Characteristics			
Dimensions Length x Width x Depth	1840 x 154 x 105 mm	72.4 x 6.1 x 4.1 in	
Depth with z-brackets	133 mm	5.2 in	
Weight without mounting brackets	6.8 kg	15 lbs	
Survival wind speed	> 201 km/hr	> 125 mph	
Wind area	Front: 0.28 m <sup>2</sup> Side: 0.19 m <sup>2</sup>	Front: 3.1 ft <sup>2</sup>	Side: 2.1 ft <sup>2</sup>
Wind load @ 161 km/hr (100 mph)	Front: 460 N Side: 304 N	Front: 103 lbf	Side: 68 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-171085-12CF-EDIN-X-FP		



**BXA-171085-12CF-EDIN-X**

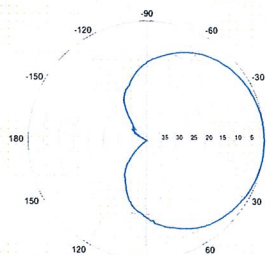


Horizontal | 1710-1880 MHz  
**BXA-171085-12CF-EDIN-0**

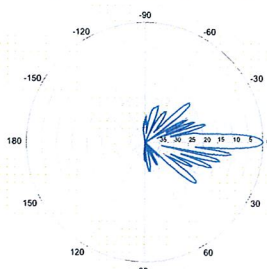


0° | Vertical | 1710-1880 MHz

**BXA-171085-12CF-EDIN-X**

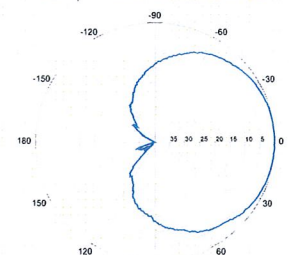


Horizontal | 1850-1990 MHz  
**BXA-171085-12CF-EDIN-0**

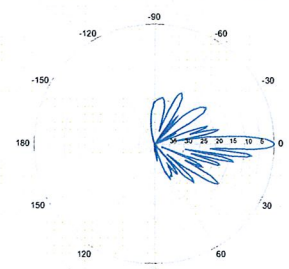


0° | Vertical | 1850-1990 MHz

**BXA-171085-12CF-EDIN-X**



Horizontal | 1920-2170 MHz  
**BXA-171085-12CF-EDIN-0**



0° | Vertical | 1920-2170 MHz

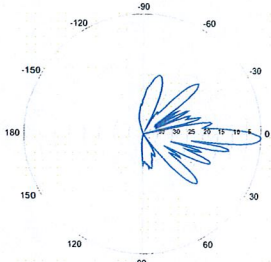
Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product.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



**BXA-171085-12CF-EDIN-X**

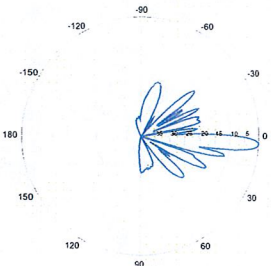
X-Pol | FET Panel | 85° | 18.0 dBi

**BXA-171085-12CF-EDIN-2**



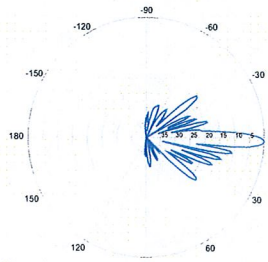
2° | Vertical | 1710-1880 MHz

**BXA-171085-12CF-EDIN-4**



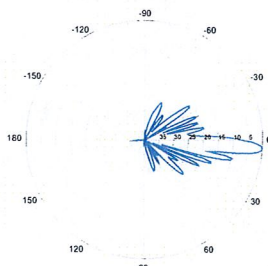
4° | Vertical | 1710-1880 MHz

**BXA-171085-12CF-EDIN-2**



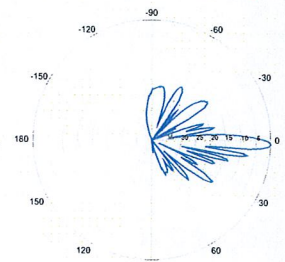
2° | Vertical | 1850-1990 MHz

**BXA-171085-12CF-EDIN-4**



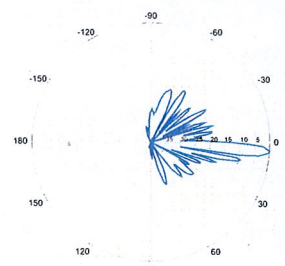
4° | Vertical | 1850-1990 MHz

**BXA-171085-12CF-EDIN-2**



2° | Vertical | 1920-2170 MHz

**BXA-171085-12CF-EDIN-4**



4° | Vertical | 1920-2170 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-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

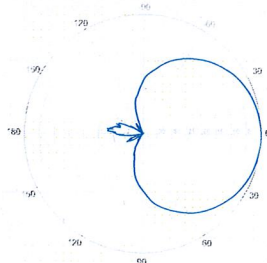
Replace "X" with desired electrical downtilt.

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



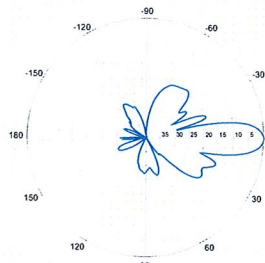
Electrical Characteristics	696-900 MHz			
Frequency bands	696-806 MHz		806-900 MHz	
Polarization	±45°			
Horizontal beamwidth	65°		63°	
Vertical beamwidth	13°		11°	
Gain	14.0 dBd (16.1 dBi)		14.5 dBd (16.6 dBi)	
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 10			
Impedance	50Ω			
VSWR	≤1.35:1			
Upper sidelobe suppression (0°)	-18.3 dB		-18.2 dB	
Front-to-back ratio (+/-30°)	-33.4 dB		-36.3 dB	
Null fill	5% (-26.02 dB)			
Isolation between ports	< -25 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	1804 x 285 x 132 mm		71.0 x 11.2 x 5.2 in	
Dimensions Length x Width x Depth	172 mm		6.8 in	
Depth with z-brackets	7.9 kg		17 lbs	
Weight without mounting brackets	> 201 km/hr		> 125 mph	
Survival wind speed	Front: 0.51 m <sup>2</sup>	Side: 0.24 m <sup>2</sup>	Front: 5.5 ft <sup>2</sup>	Side: 2.6 ft <sup>2</sup>
Wind area	Front: 759 N	Side: 391 N	Front: 169 lbf	Side: 89 lbf
Wind load @ 161 km/hr (100 mph)	Part Number	Fits Pipe Diameter		Weight
Mounting Options	36210008	40-115 mm	1.57-4.5 in	6.9 kg 15.2 lbs
3-Point Mounting & Downtilt Bracket Kit	For concealment configurations, order BXA-70063-6CF-EDIN-X-FP			
Concealment Configurations				

BXA-70063-6CF-EDIN-X



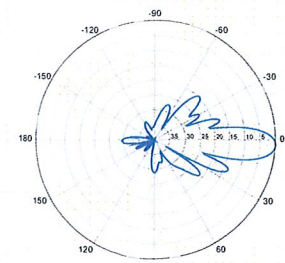
Horizontal | 750 MHz

BXA-70063-6CF-EDIN-0

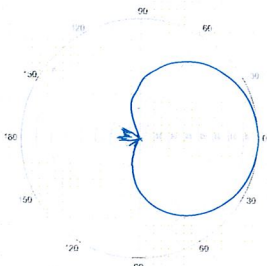


0° | Vertical | 750 MHz

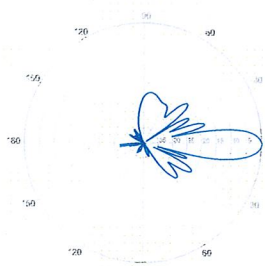
BXA-70063-6CF-EDIN-2



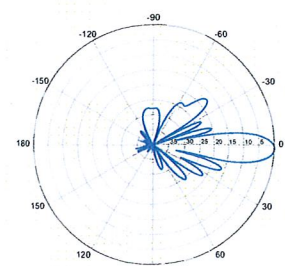
2° | Vertical | 750 MHz



Horizontal | 850 MHz



0° | Vertical | 850 MHz



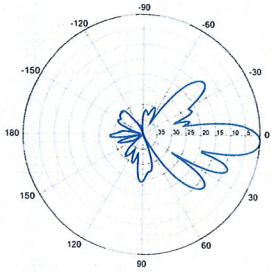
2° | Vertical | 850 MHz

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-70063-6CF-EDIN-X**

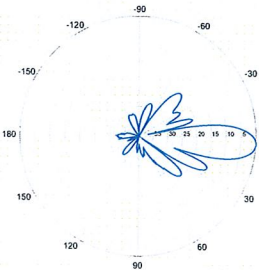
X-Pol | FET Panel | 63° | 14.5 dBd

**BXA-70063-6CF-EDIN-3**



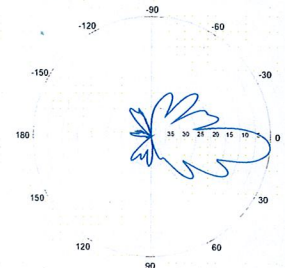
3° | Vertical | 750 MHz

**BXA-70063-6CF-EDIN-4**

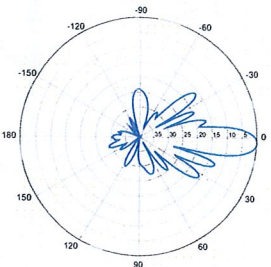


4° | Vertical | 750 MHz

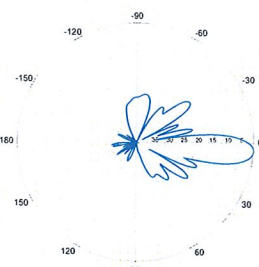
**BXA-70063-6CF-EDIN-5**



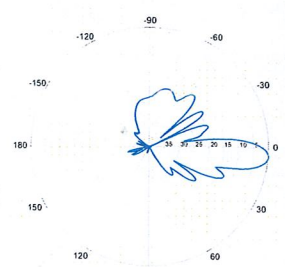
5° | Vertical | 750 MHz



3° | Vertical | 850 MHz

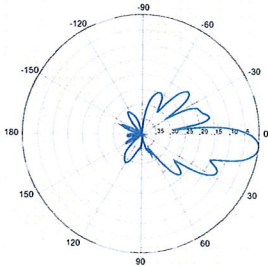


4° | Vertical | 850 MHz



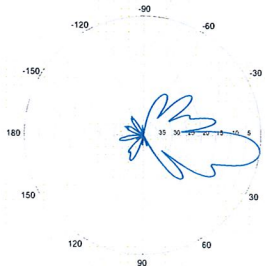
5° | Vertical | 850 MHz

**BXA-70063-6CF-EDIN-6**



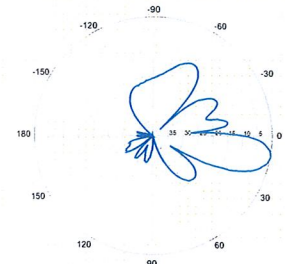
6° | Vertical | 750 MHz

**BXA-70063-6CF-EDIN-8**

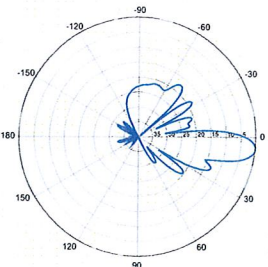


8° | Vertical | 750 MHz

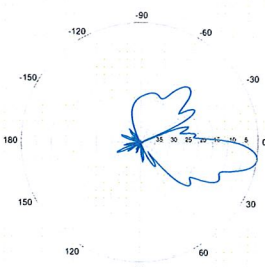
**BXA-70063-6CF-EDIN-10**



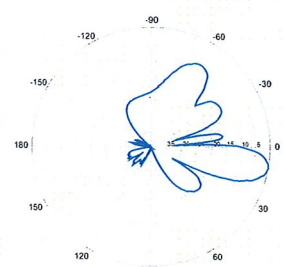
10° | Vertical | 750 MHz



6° | Vertical | 850 MHz



8° | Vertical | 850 MHz



10° | Vertical | 850 MHz

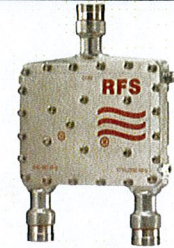
Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product.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



## ShareLite Wideband Diplexer – In-line 698-960 MHz/1710-2200 MHz, DC pass in high frequency path

## Product Description

The ShareLite FD9R6004 Series of diplexers are designed to enable feeder sharing between systems in the 698-960 MHz range and in the 1710-2200 MHz range. The diplexer is equipped with in-line connector placement so it can be installed in the BTS cabinet or at the tower top. This is especially valuable in crowded sites or when the feeders are not easily accessible. Due to its wideband design, the FD9R6004 Series can accommodate many combining solutions between 698-960 MHz and 1710-2200 MHz systems such as LTE 700 MHz, Cellular 800 MHz with PCS, GSM900 with GSM1800, or GSM900 with UMTS. This diplexer features a highly selective filter. It provides a high level of isolation between ports, while keeping the insertion loss on both paths at an extremely low level. The FD9R6004 diplexers are available with various DC pass options, helpful in configurations with or without the Tower Mount Amplifiers installed.



## Features/Benefits

- LTE ready design
- Extremely Low Insertion Loss
- High level of Rejection between bands – Protection against interferences
- Extremely High Power Handling Capability
- Integrated DC block/bypass versions available
- Very compact & small size design – Easy installation and reduced tower load
- In-line long-neck connectors for easy connection & waterproofing
- Exceptional reliability & environmental protection (IP 67)
- Equipped with 1 \* Breathable Vent – Prevent any humidity inside the product
- Mounting hardware for Wall and Pole mount provided (P/N SEM2-1A)
- Grounding already provided through the mounting bracket
- Kit available for easy dual mount

## Technical Specifications

Product Type	Diplexer/Cross Band Coupler
Frequency Range 1, MHz	698-960
Frequency Range 2, MHz	1710-2200
Application	LTE700, GSM900, UMTS, GSM1800, Cellular 800, PCS
Configuration	Sharelite Single diplexer, outdoor, DC pass in the 1710-2170MHz path, with mounting hardware SEM2-1A
Mounting	Wall Mounting: With 4 screws (maximum 6mm diameter); Pole Mounting: With included clamp set 40-110mm (1.57-4.33)
Return Loss All Ports Min/Typ, dB	19/23
Power Handling Continuous, Max, W	1250 at common port; 750 in low frequency path & 500 in high frequency path
Power Handling Peak, Max, W	15000 in low frequency path & 8000 in high frequency path
Impedance, Ohms	50
Insertion Loss, Path 1, dB	0.07 typ.
Insertion Loss, Path 2, dB	0.13 typ.
Rejection Between Bands Min/Typ, dB	58/64@698-960MHz; 60/70@1710-2200MHz
IMP Level at the COM Port, Typ, dBm	-112 @ 2x43
DC Pass in Low Frequency Path	No
DC Pass in High Frequency Path	Yes
Temperature Range, °C (°F)	-40 to +60 (-40 to +140)
Environmental	ETSI 300-019-2-4 Class 4.1E
Ingress Protection	IP 67
Lightning Protection	EN/IEC61000-4-5 Level 4
Connectors	In-line long-neck 7-16-Female
Weight, kg (lb)	1.2 (2.6)
Shipping Weight, kg (lb)	3.2 (7) for 2 * single units in 1 * box, 9.8 (21.6) for 6 * units = 3 * Boxes in 1 * overwrap
Dimensions, H x W x D, mm (in)	147 x 164 x 37 (5.8 x 6.5 x 1.5)
Shipping Dimensions, H x W x D, mm (in)	254 x 406 x 82 (10 x 16 x 3.2) for 2 * Single Units in 1 * box, 280 x 406 x 241 (11 x 16 x 9.5) for 6 * units = 3 * Boxes in 1 * overwrap
Volume, L	0.43
Housing	Aluminum

## Notes

All information contained in the present datasheet is subject to confirmation at time of ordering

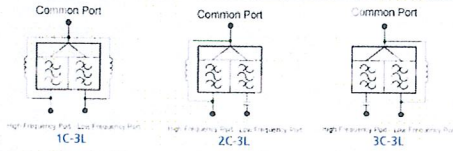


ShareLite Wideband Diplexer – In-line 698-960 MHz/1710-2200 MHz, DC pass in high frequency path

Other Documentation

FD9R6004/2C-3L Installation Instructions: [Wideband\\_Diplexer\\_Installation\\_Rev5.pdf](#)

Selection Guide Diplexer 698-960 / 1710-2200MHz					
	Model Number	Full DC Pass	DC Pass High Band	DC Pass Low Band	Mounting Hardware Included
Single	FD9R6004/1C-3L				X
	FD9R6004/2C-3L				X
	FD9R6004/3C-3L				X
Dual	KIT-FD9R6004/1C-DL				X
	KIT-FD9R6004/2C-DL				X
	KIT-FD9R6004/3C-DL				X



The FD9R6004 Series is upgradeable to a Dual Diplexer kit by means of 2 diplexers and mounting hardware kits SEM2-1A and SEM2-3

Mounting Hardware and Ground Cable Ordering Information	
Model Number	Description
SEM2-1A	Mounting Hardware, Pole mount ø40-110mm (Included with the Single and Dual Diplexer) Wall Screws M6 (Not included with the product)
SEM2-3	Assembly kit for 2 pcs of FD9R6004/xC-3L (Can be ordered separately but included with the Dual Diplexer Kit)
CA020-2	Ground Cable, 2m, includes lugs (Optional)
CA030-2	Ground Cable, 2m, includes lugs (Optional)
SEM6	Mounting Hardware for 6 Diplexers, Tower Base (Optional)

All information contained in the present datasheet is subject to confirmation at time of ordering





FDH Engineering, Inc., 2730 Rowland Rd. Raleigh, NC 27615, Ph. 919.755.1012, Fax 919.755.1031

**Structural Analysis for  
SBA Network Services, Inc.**

**150' Monopole Tower**

**SBA Site Name: Knowlton  
SBA Site ID: CT13614-A  
Verizon Site Name: Ashford West CT 2**

**FDH Project Number 12-01182E S1 R1**

**Analysis Results**

Tower Components	75.8%	Sufficient
Foundation	98.2%	Sufficient

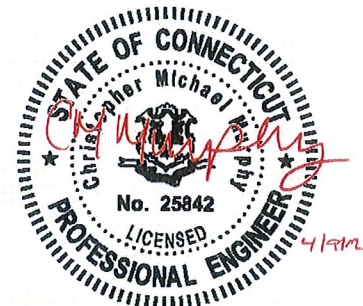
Prepared By:

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FDH Engineering, Inc.  
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April 10, 2012

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

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## EXECUTIVE SUMMARY

At the request of SBA Network Services, Inc., FDH Engineering, Inc. performed a structural analysis of the monopole located in Ashford, 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 the 2005 Connecticut Building Code*. Information pertaining to the existing/proposed antenna loading, soil parameters, current tower geometry, geotechnical data, and member sizes was obtained from:

- JGI Eastern, Inc. (Project No. 05360G) Geotechnical Evaluation dated June 28, 2005
- Sabre Communications Corp. (Job No. 06-06307) Stamped Permit Drawings dated June 29, 2005
- FDH, Inc. (Project No. 08-07650T) TIA Inspection Report dated October 7, 2008
- SBA Network Services, Inc.

The *basic design wind speed* per the *TIA/EIA-222-F standards and the 2005 Connecticut Building Code* is 85 mph without ice and 38 mph with 1" radial ice. Ice is considered to increase in thickness with height.

## Conclusions

With the existing and proposed antennas from Verizon in place at 129 ft, the tower meets the requirements of the *TIA/EIA-222-F standards and the 2005 Connecticut Building Code* provided the **Recommendations** listed below are satisfied. Furthermore, provided the foundations were designed and constructed to support the original design reactions (see Sabre Job No. 06-06307), 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 the 2005 Connecticut Building Code* are met with the existing and proposed loading in place, we have the following recommendation:

1. Proposed panels will utilize the existing coax installed inside the monopoles shaft.
2. The proposed diplexers should be installed directly behind the proposed panel.

**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
149.26	(6) RFS APXV18-204018 w/Mount Pipe (6) Remec S20057A-1 TMAs	(12) 1-5/8"	ATT	149.26	(1) 13' LP Platform
140.11	(6) Powerwave AXCM 800-1900-90-13 w/Mount Pipe (6) Powerwave LGP21401 TMAs (6) Powerwave LGP13519 TMAs	(1) 1/4" (12) 1-5/8"	T-Mobile	140.11	(1) 12.5' LP Platform
129	(6) Antel LPA80080-4CF w/Mount Pipe (6) Antel LPA185080-8CF w/Mount Pipe	(12) 1-5/8"	Verizon	129	(1) 12.5' LP Platform

**Proposed Loading:**

Antenna Elevation (ft)	Description	Coax and Lines	Carrier	Mount Elevation (ft)	Mount Type
129	(3) Antel BXA-70063/6CF w/Mount Pipe (6) Antel LPA-80080/6CF w/Mount Pipe (3) Antel BXA-171085/12CF w/Mount Pipe (6) FD9R6004/2C Diplexers	(12) 1-5/8"	Verizon	129	(1) 12.5' LP Platform

## RESULTS

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

**Table 2 - Material Strength**

Member Type	Yield Strength
Tower Shaft Sections	65 ksi
Base Plate	60 ksi
Anchor Bolts	75 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 100% 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
L1	150 - 96.75	Pole	TP38.7x25.7x0.375	56.3	Pass
L2	96.75 - 48	Pole	TP49.86x36.7904x0.4375	68.3	Pass
L3	48 - 0	Pole	TP60.46x47.7025x0.4375	75.8	Pass
		Anchor Bolts	(20) 2.25"Ø x 68" BC	70.8	Pass
		Base Plate	68" Sq. x 3" tk. PL	59.3	Pass

**Table 4 - Maximum Base Reactions**

Base Reactions	Current Analysis (TIA/EIA-222-F)	Original Design (TIA/EIA-222-F)
Axial	55 k	56 k
Shear	34 k	40 k
Moment	3,987 k-ft	5,289 k-ft

## 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	1	2	3
Length (ft)	53.25	53.50	53.25
Number of Sides	18	18	18
Thickness (in)	0.3750	0.4375	0.4375
Socket Length (ft)	4.75	6.25	47.4582
Top Dia (in)	25.7000	36.7904	60.4600
Bot Dia (in)	38.7000	49.8600	13.5
Grade		A572-65	
Weight (K)	6.9	10.8	31.2



**DESIGNED APPURTENANCE LOADING**

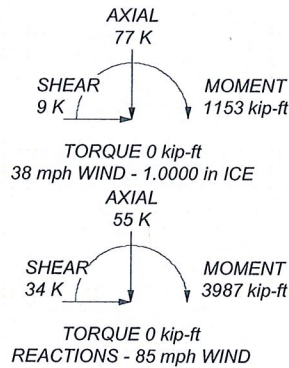
TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod (Tower Owner)	149	(2) Pipe Mount (ATT)	140.11
(2) APXV18-204018 w/Mount Pipe (ATT)	149	(2) Pipe Mount (ATT)	140.11
(2) APXV18-204018 w/Mount Pipe (ATT)	149	(2) Pipe Mount (ATT)	140.11
(2) APXV18-204018 w/Mount Pipe (ATT)	149	12.5' Low Profile Platform (ATT)	140.11
(2) APXV18-204018 w/Mount Pipe (ATT)	149	13' Low Profile Platform (Verizon)	129
(2) S20057A-1 (ATT)	149	BXA-70063/6CF W/Mount Pipe (Verizon)	129
(2) S20057A-1 (ATT)	149	BXA-70063/6CF W/Mount Pipe (Verizon)	129
(2) S20057A-1 (ATT)	149	BXA-70063/6CF W/Mount Pipe (Verizon)	129
(2) Pipe Mount (ATT)	149	(2) LPA-80080/6CF W/Mount Pipe (Verizon)	129
(2) Pipe Mount (ATT)	149	(2) LPA-80080/6CF W/Mount Pipe (Verizon)	129
(2) Pipe Mount (ATT)	149	(2) LPA-80080/6CF W/Mount Pipe (Verizon)	129
13' Low Profile Platform (ATT)	149	(2) LPA-80080/6CF W/Mount Pipe (Verizon)	129
(2) AXCM-800/1900-90-13 w/ Mount Pipe (T-Mobile)	140.11	(2) LPA-80080/6CF W/Mount Pipe (Verizon)	129
(2) AXCM-800/1900-90-13 w/ Mount Pipe (T-Mobile)	140.11	BXA-171085-12CF w/Mount Pipe (Verizon)	129
(2) AXCM-800/1900-90-13 w/ Mount Pipe (T-Mobile)	140.11	BXA-171085-12CF w/Mount Pipe (Verizon)	129
(2) LGP21401 TMA (T-Mobile)	140.11	BXA-171085-12CF w/Mount Pipe (Verizon)	129
(2) LGP21401 TMA (T-Mobile)	140.11	BXA-171085-12CF w/Mount Pipe (Verizon)	129
(2) LGP21401 TMA (T-Mobile)	140.11	(2) FD9R6004 (Verizon)	129
(2) LGP13519 TMA (T-Mobile)	140.11	(2) FD9R6004 (Verizon)	129
(2) LGP13519 TMA (T-Mobile)	140.11	(2) FD9R6004 (Verizon)	129
(2) LGP13519 TMA (T-Mobile)	140.11	(2) FD9R6004 (Verizon)	129

**MATERIAL STRENGTH**

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

**TOWER DESIGN NOTES**

1. Tower is located in Windham County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 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: 75.8%



	<b>FDH Engineering, Inc.</b> 2730 Rowland Rd. Raleigh NC 27615 Raleigh NC 27615 Phone: (919) 755-1012 FAX: (919) 755-1031	Job: <b>Knowlton CT13614-A</b> Project: <b>12-01182ES1</b>
	Client: SBA Code: TIA/EIA-222-F Path: C:\Users\FDH User\Desktop\Knowlton_CT13614-SA_VerizonAnalysis\Knowlton.ctb	Drawn by: Chad Barham Date: 01/11/12