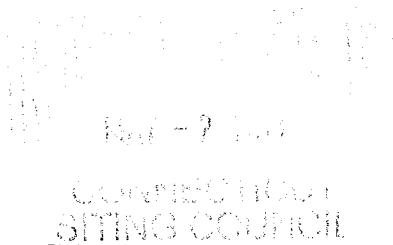


280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

Also admitted in Massachusetts

April 30, 2013

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



Re: **EM-VER-125-120509 – Cellco Partnership d/b/a Verizon Wireless
477 Route 7, Sharon, Connecticut**

Dear Mr. Martin:

On May 25, 2012, the Siting Council acknowledged receipt of Cellco's notice of intent to modify its telecommunications facility at 477 Route 7 in Sharon. The modification involved the replacement of certain antennas and the installation of coax 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 these conditions have 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 SolutionsSM

April 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 ~ Sharon North
477 Route 7
Sharon, 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.CO48

Dear Mr. Gauger,

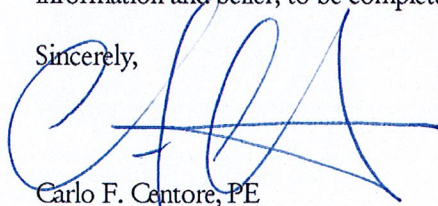
We are providing this "Existing Telecommunications Facility Tower Modification Certification Letter" with regard to the antenna upgrade by Verizon Wireless at the above referenced project.

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

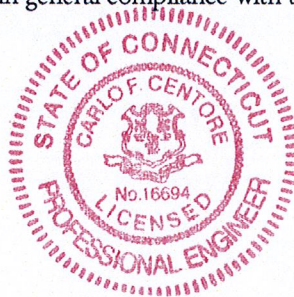
- Review of the FDH structural analysis dated 03/27/2012.
- Field observations by Centek personnel of coax and diplexer installations on 04/25/2013 which determined all coax lines and diplexers were installed in general compliance with the recommendations of the structural analysis report prepared by FDH on 03/27/2012.

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, Tom Nolan, Jeff York



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

May 25, 2012

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

RE: **EM-VER-125-120509**- Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 477 Route 7, Sharon, Connecticut.

Dear Attorney Baldwin:

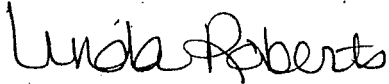
The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the following conditions:

- The coax and the proposed diplexers be installed in accordance with the recommendations made in the Structural Analysis Report prepared by FDH Engineering dated March 27, 2012 and stamped by Christopher Murphy;
- 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 May 8, 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.

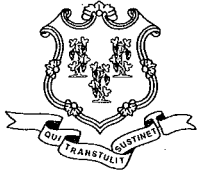
Very truly yours,



Linda Roberts
Executive Director

LR/CDM/jbw

c: The Honorable Robert John Loucks, First Selectman, Town of Sharon
Elizabeth H. Casey, Zoning Enforcement Officer, Town of Sharon
Sean Gormley, SBA



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

May 10, 2012

The Honorable Robert John Loucks
First Selectman
Town of Sharon
Town Hall
63 Main Street
P. O. Box 224
Sharon, CT 06069-0224

RE: **EM-VER-125-120509**- Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 477 Route 7, Sharon, Connecticut.

Dear First Selectman Loucks:

The Connecticut Siting Council (Council) received this request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72.

If you have any questions or comments regarding this proposal, please call me or inform the Council by May 24, 2012.

Thank you for your cooperation and consideration.

Very truly yours,

Linda Roberts
Executive Director

LR/jbw

Enclosure: Notice of Intent

c: Elizabeth H. Casey, Zoning Enforcement Officer, Town of Sharon

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



CONNECTICUT
 SITING COUNCIL

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

Re: **Notice of Exempt Modification – Antenna Swap
 477 Route 7, Sharon, Connecticut**

Dear Ms. Roberts:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains twelve (12) wireless telecommunications antennas at the top of the existing 130-foot monopine tower at the above-referenced address. The tower is owned by SBA. The Council approved Cellco’s use of the tower in 2007 (Petition No. 798). Cellco now intends to modify its installation by replacing six (6) of its existing antennas with three (3) model BXA-171085-12BF PCS antennas and three (3) model BXA-70063-6CF LTE antennas, at the same 130-foot level on the tower. Cellco also intends to install six (6) coax cable diplexers 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 Robert J. Loucks, First Selectman of the Town of Sharon. A copy of this letter is also being sent to Theresa Meisel, 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 overall height of the existing tower. Cellco’s new antennas and diplexers will be located at the 130-foot level on the existing tower.



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11626026-v1

Linda Roberts
May 8, 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) emissions 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). Consistent with the recommendations on page 3 of the Structural Analysis, all of Cellco's coax cables will remain inside the monopole and no new cables are proposed.

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:

Robert J. Loucks, Sharon First Selectman
Theresa Meisel
Sandy M. Carter



BXA-171085-12BF-EDIN-X

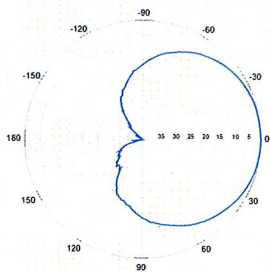
Replace "X" with desired electrical downtilt.

X-Pol | FET Panel | 85° | 18.0 dBi

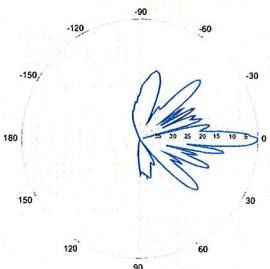
Electrical Characteristics		1710-2170 MHz				
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz			
Polarization	±45°	±45°	±45°			
Horizontal beamwidth	88°	85°	80°			
Vertical beamwidth	4.5°	4.5°	4.5°			
Gain	15.1 dBd / 17.2 dBi	15.5 dBd / 17.6 dBi	15.9 dBd / 18.0 dBi			
Electrical downtilt (X)	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 / Bottom					
Operating temperature	-40° to +60° C / -40° to +140° F					
Mechanical Characteristics						
Dimensions Length x Width x Depth	1820 x 154 x 105 mm	71.7 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 ² Side: 0.19 m ²	Front: 3.1 ft ² Side: 2.1 ft ²				
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-171085-12BF-EDIN-X-FP				



BXA-171085-12BF-EDIN-X

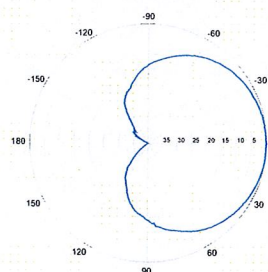


Horizontal | 1710-1880 MHz
BXA-171085-12BF-EDIN-0

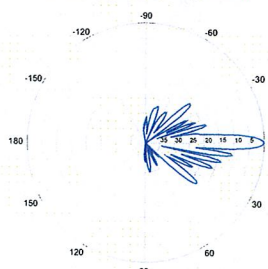


0° | Vertical | 1710-1880 MHz

BXA-171085-12BF-EDIN-X

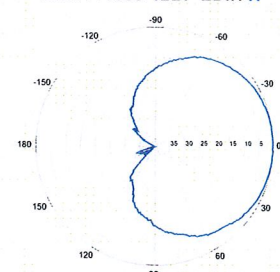


Horizontal | 1850-1990 MHz
BXA-171085-12BF-EDIN-0

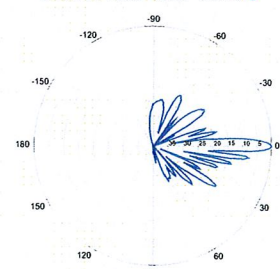


0° | Vertical | 1850-1990 MHz

BXA-171085-12BF-EDIN-X



Horizontal | 1920-2170 MHz
BXA-171085-12BF-EDIN-0



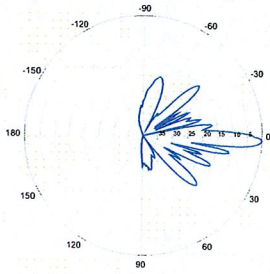
0° | Vertical | 1920-2170 MHz

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-171085-12BF-EDIN-X

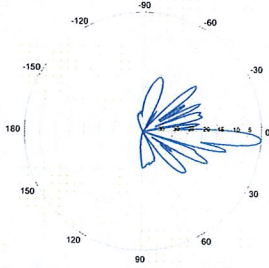
X-Pol | FET Panel | 85° | 18.0 dBi

BXA-171085-12BF-EDIN-2



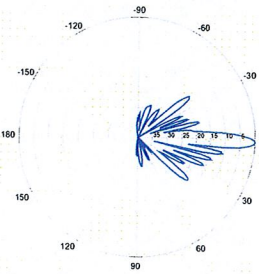
2° | Vertical | 1710-1880 MHz

BXA-171085-12BF-EDIN-4



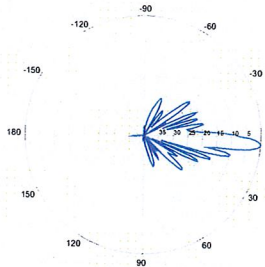
4° | Vertical | 1710-1880 MHz

BXA-171085-12BF-EDIN-2



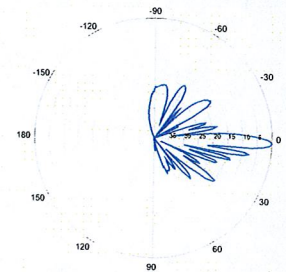
2° | Vertical | 1850-1990 MHz

BXA-171085-12BF-EDIN-4



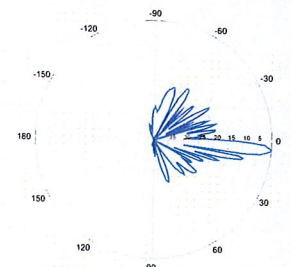
4° | Vertical | 1850-1990 MHz

BXA-171085-12BF-EDIN-2



2° | Vertical | 1920-2170 MHz

BXA-171085-12BF-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

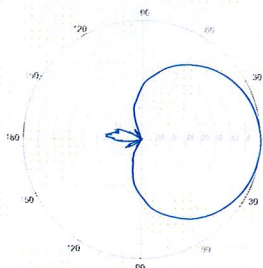
Replace "X" with desired electrical downtilt.

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			
Dimensions Length x Width x Depth	1804 x 285 x 132 mm	71.0 x 11.2 x 5.2 in	
Depth with z-brackets	172 mm	6.8 in	
Weight without mounting brackets	7.9 kg	17 lbs	
Survival wind speed	> 201 km/hr	> 125 mph	
Wind area	Front: 0.51 m ² Side: 0.24 m ²	Front: 5.5 ft ² Side: 2.6 ft ²	
Wind load @ 161 km/hr (100 mph)	Front: 759 N Side: 391 N	Front: 169 lbf Side: 89 lbf	
Mounting Options	Part Number	Fits Pipe Diameter	Weight
3-Point Mounting & Downtilt Bracket Kit	36210008	40-115 mm 1.57-4.5 in	6.9 kg 15.2 lbs
Concealment Configurations	For concealment configurations, order BXA-70063-6CF-EDIN-X-FP		

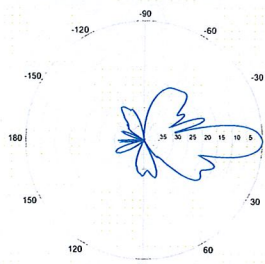


BXA-70063-6CF-EDIN-X



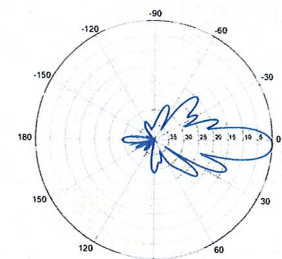
Horizontal | 750 MHz

BXA-70063-6CF-EDIN-0

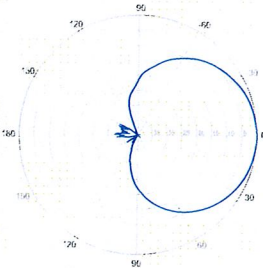


0° | Vertical | 750 MHz

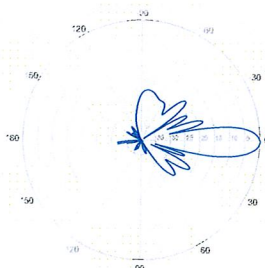
BXA-70063-6CF-EDIN-2



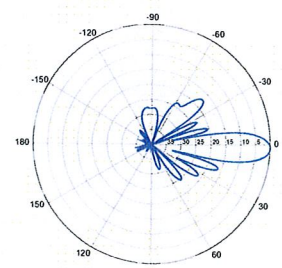
2° | Vertical | 750 MHz



Horizontal | 850 MHz



0° | Vertical | 850 MHz



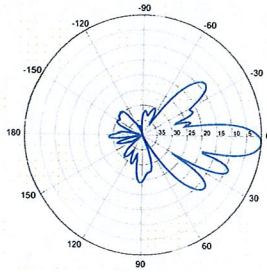
2° | Vertical | 850 MHz

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

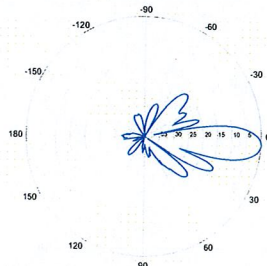
X-Pol | FET Panel | 63° | 14.5 dBd

BXA-70063-6CF-EDIN-3



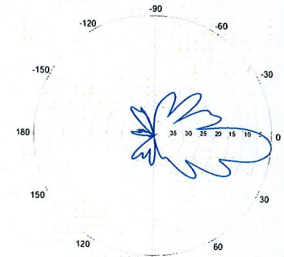
3° | Vertical | 750 MHz

BXA-70063-6CF-EDIN-4

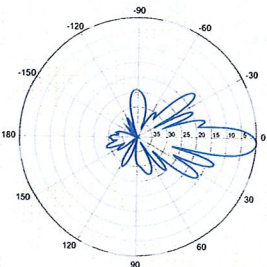


4° | Vertical | 750 MHz

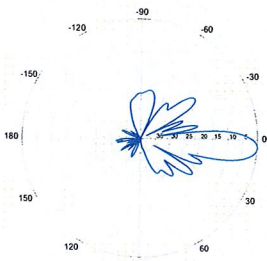
BXA-70063-6CF-EDIN-5



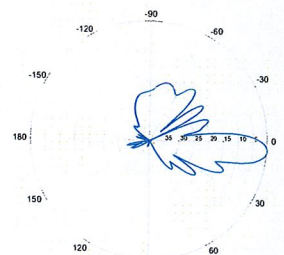
5° | Vertical | 750 MHz



3° | Vertical | 850 MHz

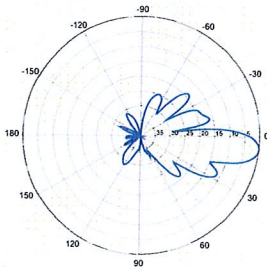


4° | Vertical | 850 MHz



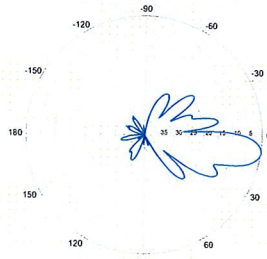
5° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-6



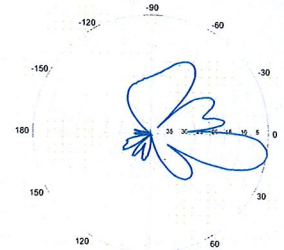
6° | Vertical | 750 MHz

BXA-70063-6CF-EDIN-8

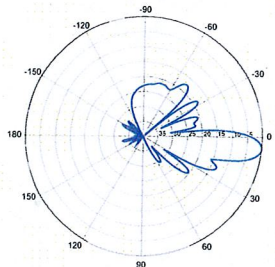


8° | Vertical | 750 MHz

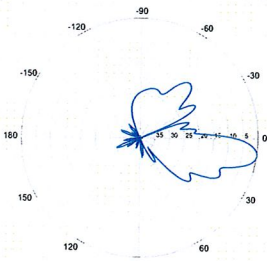
BXA-70063-6CF-EDIN-10



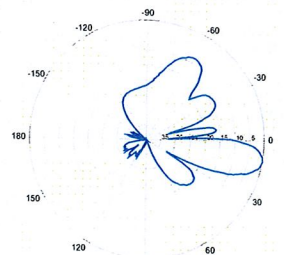
10° | Vertical | 750 MHz



6° | Vertical | 850 MHz



8° | Vertical | 850 MHz



10° | Vertical | 850 MHz

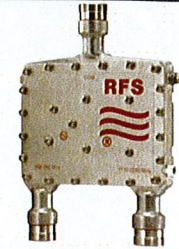
Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product. 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

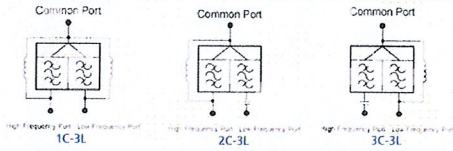


ShareLite Wideband Diplexer – In-line 698-960 MHz/1710-2200 MHz, DC pass in high frequency path

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

General		Power	Density					
Site Name: Sharon N								
Tower Height: Verizon @ 130ft								
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total
*Nextel	9	100	108	0.0277	851	0.5673	4.89%	
*Sprint	11	111	118	0.0315	1962	1.0000	3.15%	
*Cingular	6	296	98	0.0665	880	0.5867	11.33%	
*Cingular	3	427	98	0.0480	1930	1.0000	4.80%	
Verizon PCS	7	256	130	0.0381	1970	1.0000	3.81%	
Verizon Cellular	9	261	130	0.0500	869	0.5793	8.63%	
Verizon AWS	1	675	130	0.0144	2145	1.0000	1.44%	
Verizon 700	1	852	130	0.0181	698	0.4653	3.90%	41.95%
* Source: Siting Council								



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

130' Monopine Tower

**SBA Site Name: Sharon 3
SBA Site ID: CT02408-S
Verizon Site Name: Sharon North**

FDH Project Number 12-01174E S1 (R1)

Analysis Results

Tower Components	79.7%	Sufficient
Foundation	57.1%	Sufficient

Prepared By:

Bradley Smith, EI
Project Engineer

Reviewed By:

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

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March 27, 2012

Prepared pursuant to TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and 2005 CT State 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 Sharon, 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 CT State Building Code*. Information pertaining to the existing/proposed antenna loading, foundation dimensions, current tower geometry, geotechnical data, and member sizes was obtained from:

- Fred A. Nudd Corporation (Project No. 8318) original design drawings dated April 3, 2001
- Jaworski Geotech, Inc. (Project No. 00133G) Geotechnical Evaluation dated April 5, 2001
- Vertical Structures, Inc. (Job No. 2008-007-003) Structural Analysis Report dated January 8, 2008
- SBA Network Services, Inc.

The *basic design wind speed* per the *TIA/EIA-222-F* standards and *2005 CT State Building Code* 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 Verizon in place at 130 ft, the tower meets the requirements of the *TIA/EIA-222-F* standards and *2005 CT State Building Code* provided the **Recommendations** listed below are satisfied. Furthermore, provided the foundations were designed and constructed to support the original design reactions (see Nudd Project No. 01-8318-1), the foundations should have the necessary capacity to support the existing and proposed loading. For a more detailed description of the analysis of the tower, see the **Results** section of this report.

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

Recommendations

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

1. Coax should be installed inside the monopole's shaft.
2. Proposed diplexers should be installed directly behind the proposed panel antennas.

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
130	(6) Antel LPA-185080/12CF (6) Antel LPA-80080/6CF	(12) 1-5/8"	Verizon	130	(3) T-Arms
118-128	Tree Branches	---	---	---	---
120	(12) Decibel DB978H90-M	(12) 1-5/8"	Sprint	120	(3) T-Arms
108-118	Tree Branches	---	---	---	---
110	(12) Decibel DB844H90E-XY	(12) 1-1/4"	Nextel	110	(3) T-Arms
98-108	Tree Branches	---	---	---	---
100	(6) Powerwave 7770.00 (12) Powerwave LGP21401 TMAs (6) Powerwave LGP Diplexers	(12) 1-5/8"	Cingular	100	(3) T-Arms
88	Tree Branches	---	---	---	---
78	Tree Branches	---	---	---	---

Proposed Loading:

Antenna Elevation (ft)	Description	Coax and Lines	Carrier	Mount Elevation (ft)	Mount Type
130	(3) Antel BXA-70063/6C-2 (3) Antel BXA-171085-12BF-2 (6) Antel LPA-80080/6CF (6) RFS FD9R6004/2C-3 Diplexers	(12) 1-5/8"	Verizon	130	(3) T-Arms

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
Flange Plate	50 ksi
Flange Bolts	Fu=120 ksi (assumed)
Base Plate	50 ksi
Anchor Bolts	Fu=125 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	130 - 120	Pole	TP24x24x0.2813	20.2	Pass
---	120	Flange Bolts	(12) 1" Ø on a 27" Ø BC	15.3	Pass
---	120	Flange Plate	30" Ø x 1.25" thk PL	9.5	Pass
L2	120 - 95	Pole	TP34.375x24x0.3125	32.9	Pass
L3	95 - 70	Pole	TP44.75x34.375x0.375	37.1	Pass
L4	70 - 25.5	Pole	TP62.375x41.7175x0.4375	39.1	Pass
L5	25.5 - 0	Pole	TP72x58.1948x0.4375	41.5	Pass
		Anchor Bolts	(25) 2" Ø on a 65" Ø BC	47.6	Pass
		Base Plate	74" Ø x 2" thk PL	79.7	Pass

Table 4 - Maximum Base Reactions

Base Reactions	Current Analysis (TIA/EIA-222-F)	Original Design (TIA/EIA-222-F)
Axial	49 k	---
Shear	32 k	56 k
Moment	2,965 k-ft	5,810 k-ft

GENERAL COMMENTS

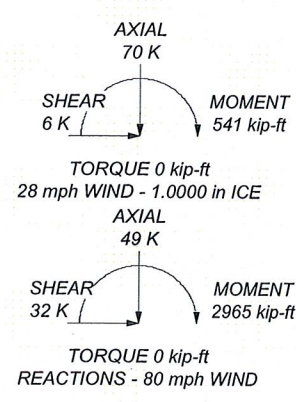
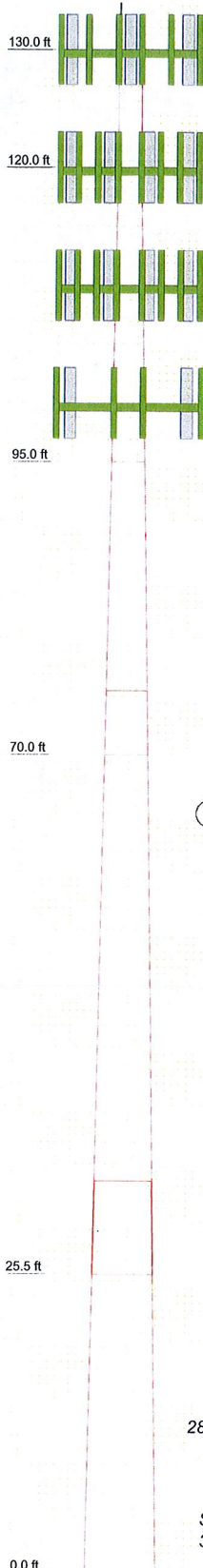
This engineering analysis is based upon the theoretical capacity of the structure. It is not a condition assessment of the tower and its foundation. It is the responsibility of SBA Network Services, Inc. to verify that the tower modeled and analyzed is the correct structure (with accurate antenna loading 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	4	5
Length (ft)	10.00	25.00	25.00	50.00	33.50
Number of Sides	1	18	18	18	18
Thickness (in)	0.2500	0.3125	0.3750	0.4375	0.4375
Socket Length (ft)			5.50	8.00	
Top Dia (in)		24.0000	34.3750	41.7175	58.1948
Bot Dia (in)		24.0000	44.7500	62.3750	72.0000
Grade					
Weight (K)				12.2	10.2
				A572-65	
					A53-B-35



DESIGNED APPURTENANCE LOADING


TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod	130	(4) DB978H90-M (Sprint)	120
BXA-70063/6CF W/Mount Pipe (Verizon)	130	(4) DB978H90-M (Sprint)	120
BXA-70063/6CF W/Mount Pipe (Verizon)	130	(3) 12' T-Arms mnt (Sprint)	120
BXA-70063/6CF W/Mount Pipe (Verizon)	130	8' Pine Tree Branches	118 - 108
BXA-70063/6CF W/Mount Pipe (Verizon)	130	(4) DB844H90E-XY w/ Mount Pipe (Nextel)	110
BXA-171085-12BF w/Mount Pipe (Verizon)	130	(4) DB844H90E-XY w/ Mount Pipe (Nextel)	110
BXA-171085-12BF w/Mount Pipe (Verizon)	130	(4) DB844H90E-XY w/ Mount Pipe (Nextel)	110
BXA-171085-12BF w/Mount Pipe (Verizon)	130	(3) 12' T-Arms mnt (Nextel)	110
BXA-171085-12BF w/Mount Pipe (Verizon)	130	8' Pine Tree Branches	108 - 98
(2) LPA-80080/6CF W/Mount Pipe (Verizon)	130	(2) 7770.00 w/Mount Pipe (Cingular)	100
(2) LPA-80080/6CF W/Mount Pipe (Verizon)	130	(2) 7770.00 w/Mount Pipe (Cingular)	100
(2) LPA-80080/6CF W/Mount Pipe (Verizon)	130	(4) LGP21401 TMA (Cingular)	100
(2) LPA-80080/6CF W/Mount Pipe (Verizon)	130	(4) LGP21401 TMA (Cingular)	100
(2) FD9R6004/2C-3 Diplexer (Verizon)	130	(2) LGP Diplexer (Cingular)	100
(2) FD9R6004/2C-3 Diplexer (Verizon)	130	(2) LGP Diplexer (Cingular)	100
(2) FD9R6004/2C-3 Diplexer (Verizon)	130	(2) LGP Diplexer (Cingular)	100
(3) 12' T-Arms mnt (Verizon)	130	(3) 12' T-Arms mnt (Cingular)	100
8' Pine Tree Branches	128 - 118	8' Pine Tree Branches	88
(4) DB978H90-M (Sprint)	120	8' Pine Tree Branches	78

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-35	35 ksi	63 ksi	A572-65	65 ksi	80 ksi

TOWER DESIGN NOTES

1. Tower is located in Litchfield County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 28 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 41.5%



FDH Engineering, Inc.
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Phone: (919) 755-1012
FAX: (919) 755-1031

Job: **Sharon 3, CT02408-S**

Project: **12-01174E S1 (R1)**

Client: SBA	Drawn by: Bradley Smith	App'd:
Code: TIA/EIA-222-F	Date: 03/27/12	Scale: NTS
Path:		Dwg No. E-1