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KENNETH C. BALDWIN

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Also admitted in Massachusetts

ORIGINAL

November 19, 2012

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

Re: **EM-VER-019-120514 – Cellco Partnership d/b/a Verizon Wireless**
130 Tatnic Hill Road, Brooklyn, Connecticut

Dear Mr. Martin:

On June 1, 2012, the Siting Council acknowledged receipt of Cellco's notice of intent to modify its existing telecommunications facility at 130 Tatnic Hill Road in Brooklyn, Connecticut. 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 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

11963799-v1

CENTEK engineering

Centered on Solutions℠

November 14, 2012

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

Re: Existing Telecommunications Facility Tower Modification Certification Letter

Project:	**Verizon ~ Brookyln** 130 Tatnic Hill Road Brooklyn, 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.CO30

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.

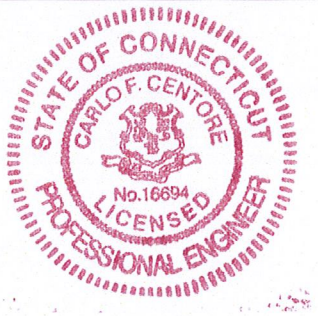
The following are the basis for substantiating compliance with the design documents prepared by FDH Engineering:

- Review of the FDH structural analysis dated 5/1/2012.
- Field observations by Centek personnel of coax and diplexer installations on 10/22/2012 which determined all coax lines and diplexers were installed in general compliance with the recommendations of the structural analysis report prepared by FDH on 5/1/2012.

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
www.ct.gov/csc

June 1, 2012

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

RE: **EM-VER-019-120514**- Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 130 Tatnic Hill Road, Brooklyn, 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 May 1, 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 14, 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

Linda Roberts
Executive Director

LR/CDM/jbw

c: The Honorable Austin T. Tanner, First Selectman, Town of Brooklyn
Chester Dobrowski, Zoning Enforcement Officer, Town of Brooklyn
Sean Gormley, SBA

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
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www.ct.gov/csc

May 15, 2012

The Honorable Austin T. Tanner
First Selectman
Town of Brooklyn
Town Hall
P. O. Box 356
Brooklyn, CT 06234-0356

RE: **EM-VER-019-120514**- Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 130 Tatnic Hill Road, Brooklyn, Connecticut.

Dear First Selectman Tanner:

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 30, 2012.

Thank you for your cooperation and consideration.

Very truly yours,

Linda Roberts

Linda Roberts
Executive Director

LR/jbw

Enclosure: Notice of Intent

c: Chester Dobrowski, Zoning Enforcement Officer, Town of Brooklyn

ROBINSON & COLE LLP

EM-VER-019-120514

KENNETH C. BALDWIN

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May 10, 2012

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

Re: **Notice of Exempt Modification – Antenna Swap**
130 Tatnic Hill Road, Brooklyn, Connecticut

Dear Ms. Roberts:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) wireless telecommunications antennas at the top of an existing 175-foot tower at the above-referenced address. The tower is owned by SBA. The Council approved Cellco's shared use of this tower in 2001. Cellco now intends to replace all of its 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 176-foot antenna centerline height. Cellco also intends to install six (6) coax cable diplexers directly behind its new panel 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 Austin Tanner, First Selectman of the Town of Brooklyn. A copy of this letter is also being sent to 1100 Norwich Rd LLC, 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 176-foot level on the tower.

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 facility modifications. (See Tab 3). Consistent with the recommendations of the Structural Analysis, all of Cellco's coax cables are currently located inside the monopole. No new cables are proposed to be added at this time.

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:
Austin Tanner, Brooklyn First Selectman
1100 Norwich Rd LLC
Sandy M. Carter

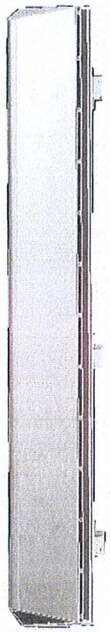
Amphenol ANTENNA SOLUTIONS

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.

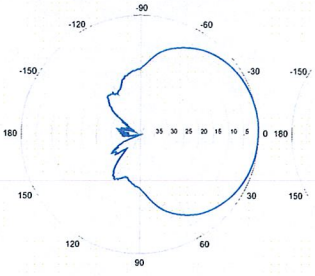


Electrical Characteristics	
Frequency bands	806-960 MHz
Polarization	Vertical
Horizontal beamwidth	80°
Vertical beamwidth	10°
Gain	14.0 dBd (16.1 dBi)
Electrical downtilt (X)	0, 2, 4, 5, 6, 8, 10
Impedance	50Ω
VSWR	≤1.4:1
Upper sidelobe suppression (0°)	-22.6 dB
Null fill	10% (-20.0 dB)
Input power	500 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 m² Side: 0.61 m²	Front: 2.7 ft² Side: 6.6 ft²
Wind load @ 161 km/hr (100 mph)	Front: 415 N Side: 878 N	Front: 93 lbf Side: 198 lbf

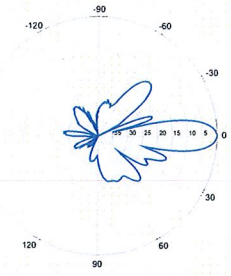
Mounting Options	Part Number	Fits Pipe Diameter	Weight
3-Point Mounting & Downtilt Bracket Kit (0-20°)	21700000	50-102 mm 2.0-4.0 in	11 kg 25 lbs
Lock-Down Brace	If the lock-down brace is used, the maximum diameter of the mounting pipe is 88.9 mm or 3.5 in.		

LPA-80080-6CF-EDIN-X



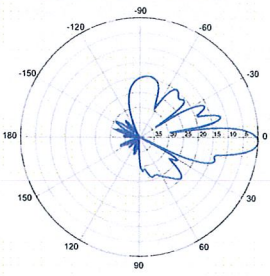
Horizontal | 750 MHz

LPA-80080-6CF-EDIN-0



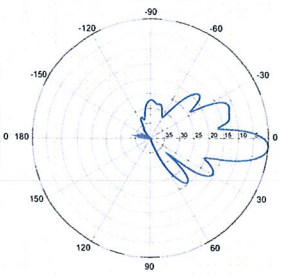
0° | Vertical

LPA-80080-6CF-EDIN-2



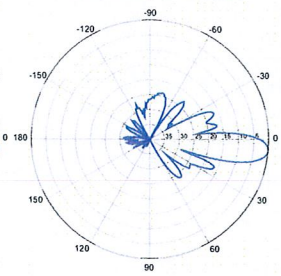
2° | Vertical

LPA-80080-6CF-EDIN-4



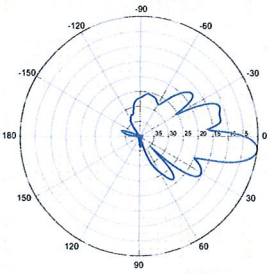
4° | Vertical

LPA-80080-6CF-EDIN-5



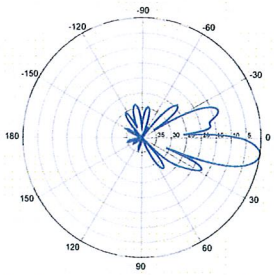
5° | Vertical

LPA-80080-6CF-EDIN-6



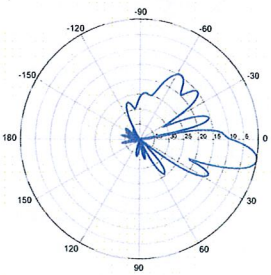
6° | Vertical

LPA-80080-6CF-EDIN-8



8° | Vertical

LPA-80080-6CF-EDIN-10



10° | Vertical

BXA-171085-12CF-EDIN-X

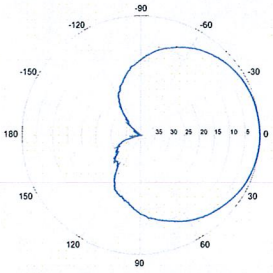
Replace "X" with desired electrical downtilt.

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 / 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 m² Side: 0.19 m²		Front: 3.1 ft² Side: 2.1 ft²
Wind load @ 161 km/hr (100 mph)	Front: 460 N Side: 304 N		Front: 103 lbf Side: 68 lbf

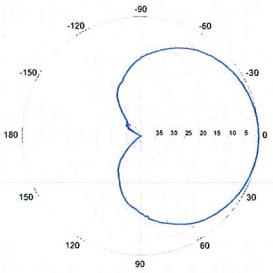
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting Bracket Kit	26799997	50-102 mm 2.0-4.0 in	2.3 kg 5 lbs
2-Point Mounting & Downtilt Bracket Kit	26799999	50-102 mm 2.0-4.0 in	3.6 kg 8 lbs
Concealment Configurations	For concealment configurations, order BXA-171085-12CF-EDIN-X-FP		

BXA-171085-12CF-EDIN-X



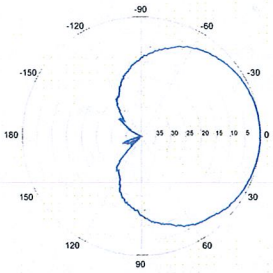
Horizontal | 1710-1880 MHz

BXA-171085-12CF-EDIN-X



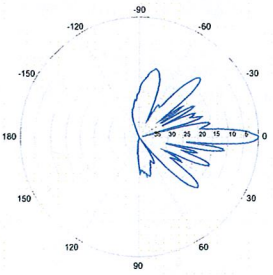
Horizontal | 1850-1990 MHz

BXA-171085-12CF-EDIN-X



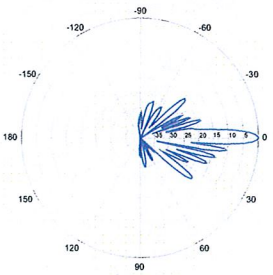
Horizontal | 1920-2170 MHz

BXA-171085-12CF-EDIN-0



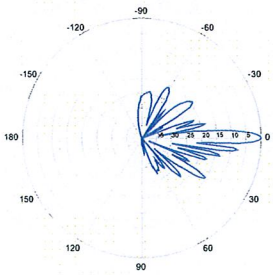
0° | Vertical | 1710-1880 MHz

BXA-171085-12CF-EDIN-0



0° | Vertical | 1850-1990 MHz

BXA-171085-12CF-EDIN-0

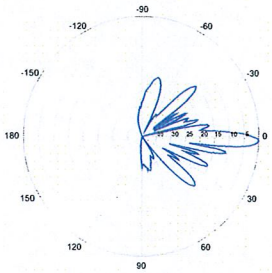


0° | Vertical | 1920-2170 MHz

BXA-171085-12CF-EDIN-X

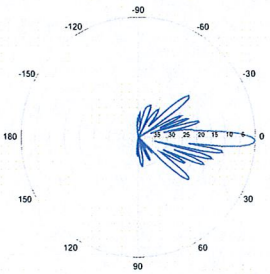
X-Pol | FET Panel | 85° | 18.0 dBi

BXA-171085-12CF-EDIN-2



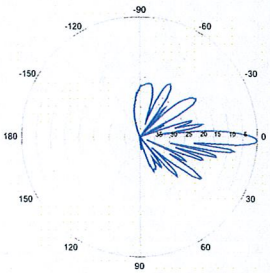
2° | Vertical | 1710-1880 MHz

BXA-171085-12CF-EDIN-2



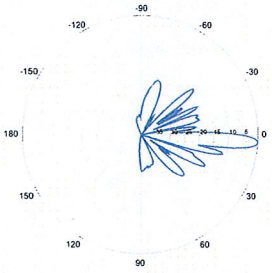
2° | Vertical | 1850-1990 MHz

BXA-171085-12CF-EDIN-2



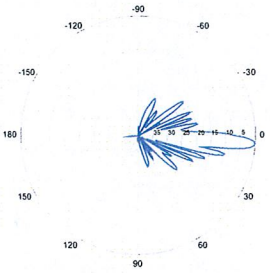
2° | Vertical | 1920-2170 MHz

BXA-171085-12CF-EDIN-4



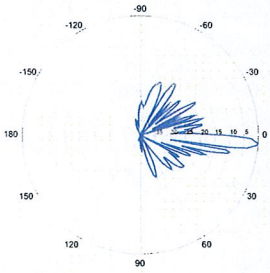
4° | Vertical | 1710-1880 MHz

BXA-171085-12CF-EDIN-4



4° | Vertical | 1850-1990 MHz

BXA-171085-12CF-EDIN-4



4° | Vertical | 1920-2170 MHz

Amphenol ANTENNA SOLUTIONS

BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

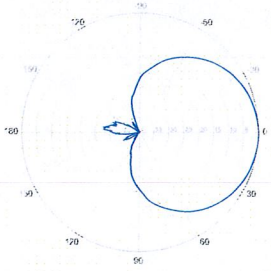
Replace "X" with desired electrical downtilt.

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 m² Side: 0.24 m²	Front: 5.5 ft² Side: 2.6 ft²
Wind load @ 161 km/hr (100 mph)	Front: 759 N Side: 391 N	Front: 169 lbf Side: 89 lbf

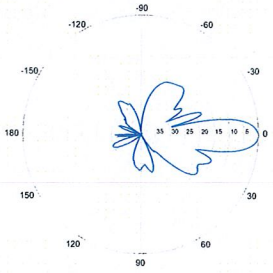
Mounting Options	Part Number	Fits Pipe Diameter	Weight
3-Point Mounting & Downtilt Bracket Kit	36210008	40-115 mm 1.57-4.5 in	6.9 kg 15.2 lbs
Concealment Configurations	For concealment configurations, order BXA-70063-6CF-EDIN-X-FP		

BXA-70063-6CF-EDIN-X



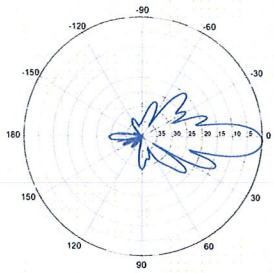
Horizontal | 750 MHz

BXA-70063-6CF-EDIN-0

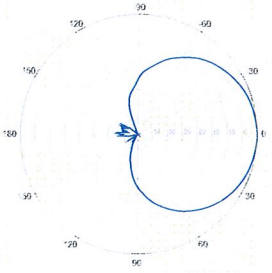


0° | Vertical | 750 MHz

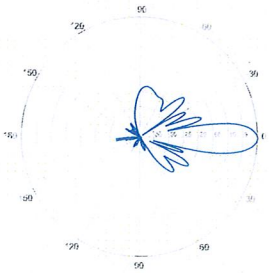
BXA-70063-6CF-EDIN-2



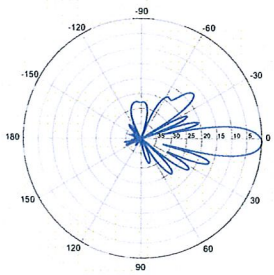
2° | Vertical | 750 MHz



Horizontal | 850 MHz



0° | Vertical | 850 MHz

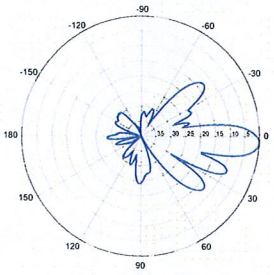


2° | Vertical | 850 MHz

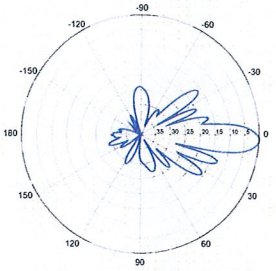
BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

BXA-70063-6CF-EDIN-3

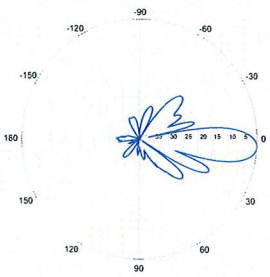


3° | Vertical | 750 MHz

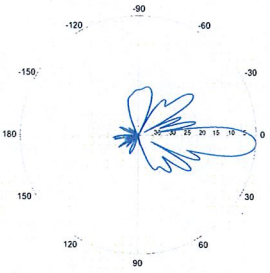


3° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-4

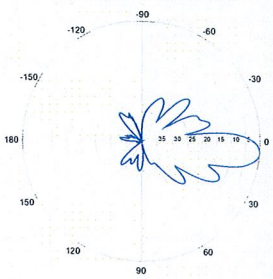


4° | Vertical | 750 MHz

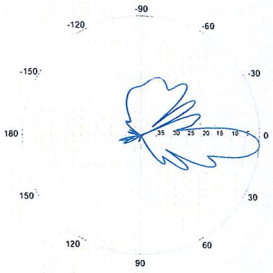


4° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-5

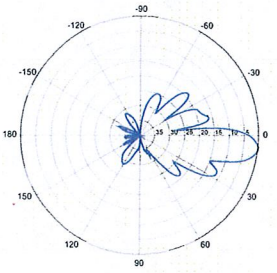


5° | Vertical | 750 MHz

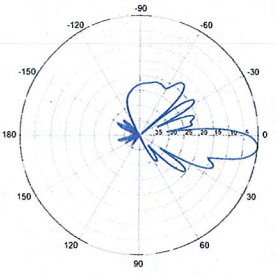


5° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-6

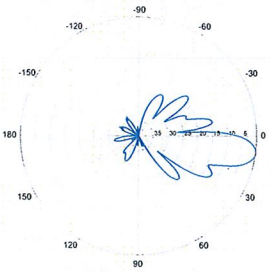


6° | Vertical | 750 MHz

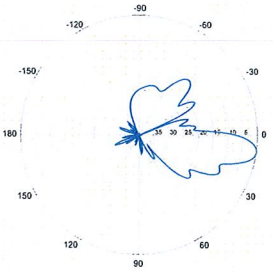


6° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-8

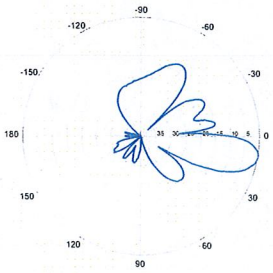


8° | Vertical | 750 MHz

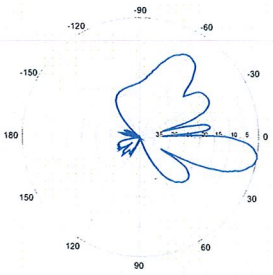


8° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-10



10° | Vertical | 750 MHz



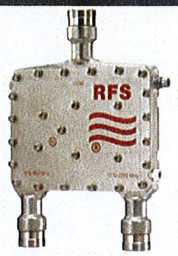
10° | Vertical | 850 MHz

Product Data Sheet | **FD9R6004/2C-3L**

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

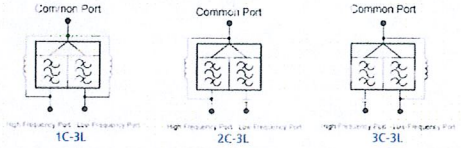
Notes

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

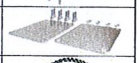
Other Documentation

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)	

Site Name: Brooklyn Tower Height: Verizon @ 176ft	General	Power	Density					
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total
*Sprint			164	0.0179	1962.5	1.0000	1.79%	
*Nextel	9	100	153	0.0138	851	0.5673	2.44%	
*T-Mobile	8	240	140	0.0352	1935	1.0000	3.52%	
Verizon PCS	**11**	**227**	**176**	**0.0290**	**1970**	**1.0000**	**2.90%**	
Verizon Cellular	**9**	**242**	**176**	**0.0253**	**869**	**0.5793**	**4.36%**	
Verizon AWS	**1**	**650**	**176**	**0.0075**	**2145**	**1.0000**	**0.75%**	
Verizon 700	**1**	**799**	**176**	**0.0093**	**698**	**0.4653**	**1.99%**	
								17.76%
* Source: Siting Council								

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

Structural Analysis for SBA Network Services, Inc.

175' Monopole Tower

SBA Site Name: South Brooklyn
SBA Site ID: CT01915-S
Verizon Site ID: 118589
Verizon Site Name: Brooklyn CT

FDH Project Number 12-01186E S1 (R1)

Analysis Results

Tower Components	93.2%	Sufficient
Foundation	73.9%	Sufficient

Prepared By:

Stephanie Neal, EI
Project Engineer

Reviewed By:

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

FDH Engineering, Inc.
2730 Rowland Rd.
Raleigh, NC 27615
(919) 755-1012
info@fdh-inc.com

May 1, 2012

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

TABLE OF CONTENTS

EXECUTIVE SUMMARY

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

- Paul J. Ford and Company (Job No. 29200-401) original tower and foundation design drawings dated April 5, 2000
- SBA Network Services, Inc.

The *basic design wind speed* per the *TIA/EIA-222-F* standards and *2005 CT 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 176 ft, the tower meets the requirements of the *TIA/EIA-222-F* standards and *2005 CT Building Code* provided the **Recommendations** listed below are satisfied. Furthermore, provided the foundation was constructed per the original design drawings (see PJF Job No. 29200-401), the foundation 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 Building Code* are met with the existing and proposed loading in place, we have the following recommendations:

1. All coax must be installed inside the monopole shaft.
2. The 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
176	(12) Decibel DB844H80 w/ Mount Pipe	(12) 1-5/8"	Verizon	175	(1) Low Profile Platform (Assumed EPA = 28.47 ft^2)
157	(6) 60" x 6.1" x 2.6" Panels w/ Mount Pipe	(6) 1-5/8"	Sprint	157	(1) Low Profile Platform (Assumed EPA = 28.47 ft^2)
147	(9) Allgon ALP 9212 w/ Mount Pipe	(9) 1-5/8"	Nextel	147	(1) Low Profile Platform (Assumed EPA = 28.47 ft^2)
140	(6) EMS RR90-17-02DP w/ Mount Pipe	(12) 1-5/8"	T-Mobile	140	(1) Low Profile Platform (Assumed EPA = 28.47 ft^2)

Proposed Loading:

Antenna Elevation (ft)	Description	Coax and Lines	Carrier	Mount Elevation (ft)	Mount Type
176	(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) RFS FD9R6004/2C-3L Diplexers	(12) 1-5/8"	Verizon	175	(1) Low Profile Platform (Assumed EPA = 28.47 ft^2)

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	60 & 65 ksi
Flange Plate	536 ksi
Flange Bolts	A325
Base Plate	50 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	175 - 161	Pole	TP22x18.78x0.1875	32.4	Pass
	161	Flange Bolts	(18) 0.75" dia. w/ BC = 19"	48.3	Pass
	161	Flange Plate	26" dia. PL x 0.75" thk	93.2	Pass
L2	161 - 119	Pole	TP31.66x22x0.25	88.5	Pass
L3	119 - 78.75	Pole	TP40.417x30.24x0.3125	91.4	Pass
L4	78.75 - 38.75	Pole	TP48.993x38.6421x0.4375	73.4	Pass
L5	38.75 - 0	Pole	TP57.03x46.6804x0.5	67.8	Pass
		Anchor Bolts	(32) 2.25" dia. w/ BC = 64"	42.9	Pass
		Base Plate	68" Sq PL x 2.5" thk	46.4	Pass

Table 4 - Maximum Base Reactions

Base Reactions	Current Analysis* *(TIA/EIA-222-F)*	Original Design *(TIA/EIA-222-F)*
Axial	42 k	38 k
Shear	29 k	30 k
Moment	3,621 k-ft	3,710 k-ft

*Foundations determined adequate per independent analysis.

GENERAL COMMENTS

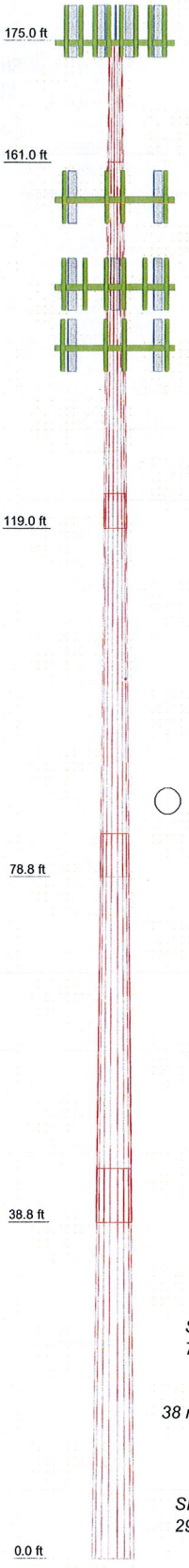
This engineering analysis is based upon the theoretical capacity of the structure. It is not a condition assessment of the tower and its foundation. It is the responsibility of SBA Network Services, Inc. to verify that the tower modeled and analyzed is the correct structure (with accurate antenna loading 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.

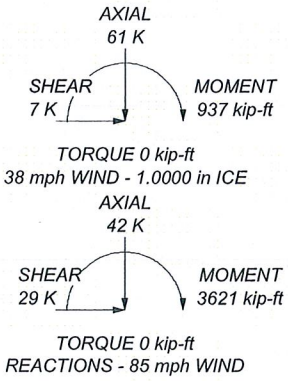
LIMITATIONS

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	1	2	3	4	5
Length (ft)	14.000	42.000	44.250	45.000	45.000
Number of Sides	18	18	18	18	18
Thickness (in)	0.1875	0.2500	0.3125	0.4375	0.5000
Socket Length (ft)		4.000	5.000	6.250	
Top Dia (in)	18.7800	22.0000	30.2400	38.6421	46.6804
Bot Dia (in)	22.0000	31.6600	40.4170	48.9930	57.0300
Grade	A607-60			A607-65	
Weight (K)	0.6	3.0	5.2	9.2	12.5





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod	175	(2) FD9R6004/2C-3L Diplexer (Verizon)	175
(1) Low Profile Platform MNT (Verizon)	175	(2) 60" x 6.1" x 2.6" Panel w/ Mount Pipe (Sprint)	157
BXA-70063-6CF w/ Mount Pipe (Verizon)	175	(1) Low Profile Platform MNT (Sprint)	157
BXA-70063-6CF w/ Mount Pipe (Verizon)	175	(2) 60" x 6.1" x 2.6" Panel w/ Mount Pipe (Sprint)	157
BXA-70063-6CF w/ Mount Pipe (Verizon)	175	(2) 60" x 6.1" x 2.6" Panel w/ Mount Pipe (Sprint)	157
(2) LPA-80080/6CF W/Mount Pipe (Verizon)	175	(3) ALP 9212 (Nextel)	147
(2) LPA-80080/6CF W/Mount Pipe (Verizon)	175	(3) Antenna Mount Pipe (Nextel)	147
(2) LPA-80080/6CF W/Mount Pipe (Verizon)	175	(3) Antenna Mount Pipe (Nextel)	147
BXA-171085-12CF w/ Mount Pipe (Verizon)	175	(3) Antenna Mount Pipe (Nextel)	147
BXA-171085-12CF w/ Mount Pipe (Verizon)	175	(1) Low Profile Platform MNT (Nextel)	147
BXA-171085-12CF w/ Mount Pipe (Verizon)	175	(3) ALP 9212 (Nextel)	147
(2) FD9R6004/2C-3L Diplexer (Verizon)	175	(3) ALP 9212 (Nextel)	147
(2) FD9R6004/2C-3L Diplexer (Verizon)	175	(2) RR90-17-02DP w/Mount Pipe (T-Mobile)	140
		(2) RR90-17-02DP w/Mount Pipe (T-Mobile)	140
		(2) RR90-17-02DP w/Mount Pipe (T-Mobile)	140
		(1) Low Profile Platform MNT (T-Mobile)	140

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-60	60 ksi	75 ksi	A607-65	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: 91.4%

FDH ENGINEERING
Tower Analysis

FDH Engineering, Inc.
2730 Rowland Road
Raleigh, NC 27615
Phone: (919) 755-1012
FAX: (919) 755-1013

Job: *South Brooklyn, CT01915-S*			
Project: *12-01186E S1*			
Client: SBA	Drawn by: SMN	App'd:	
Code: TIA/EIA-222-F	Date: 01/10/12	Scale: NTS	
Path:		Dwg No. E-1	