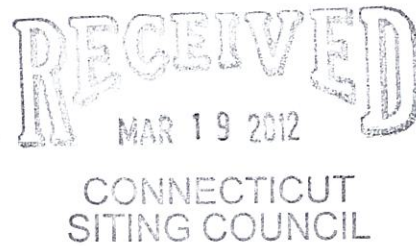


280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

March 16, 2012

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



Re: **Notice of Exempt Modification – Antenna Swap**
150 Lost Acres Road, North Granby, Connecticut

Dear Ms. Roberts:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) wireless telecommunications antennas at the 160-foot level on an existing 170-foot tower at the above-referenced address. The tower is owned by SBA. Cellco's use of the tower was approved by the Council in 2008. Cellco now intends to replace ten (10) of its existing antennas with four (4) model LPA-80063-4CF cellular antennas; three (3) model BXA-171085-12BF PCS antennas; two (2) model BXA-70063-4CF LTE antennas; and one (1) model BXA-70063-6CF LTE antenna, all at the same 160-foot level. Cellco also intends to install six (6) coax cable diplexers on its existing antenna mounting structure. 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 William F. Smith, Jr., Town Manager of the Town of Granby. A copy of this letter is also being sent to John and Lindsey Lombardi, the owners 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 160-foot level on the existing 170-foot tower.



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Linda Roberts
March 16, 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). Please note, under the recommendations section on page 3 of the Structural Analysis, Cellco does not propose any modification to the coax cable location or configuration. The cables that exist today are installed as shown in "Figure 1".

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:

William F. Smith, Jr., Granby Town Manger
John and Lindsey Lombardi
Sandy M. Carter



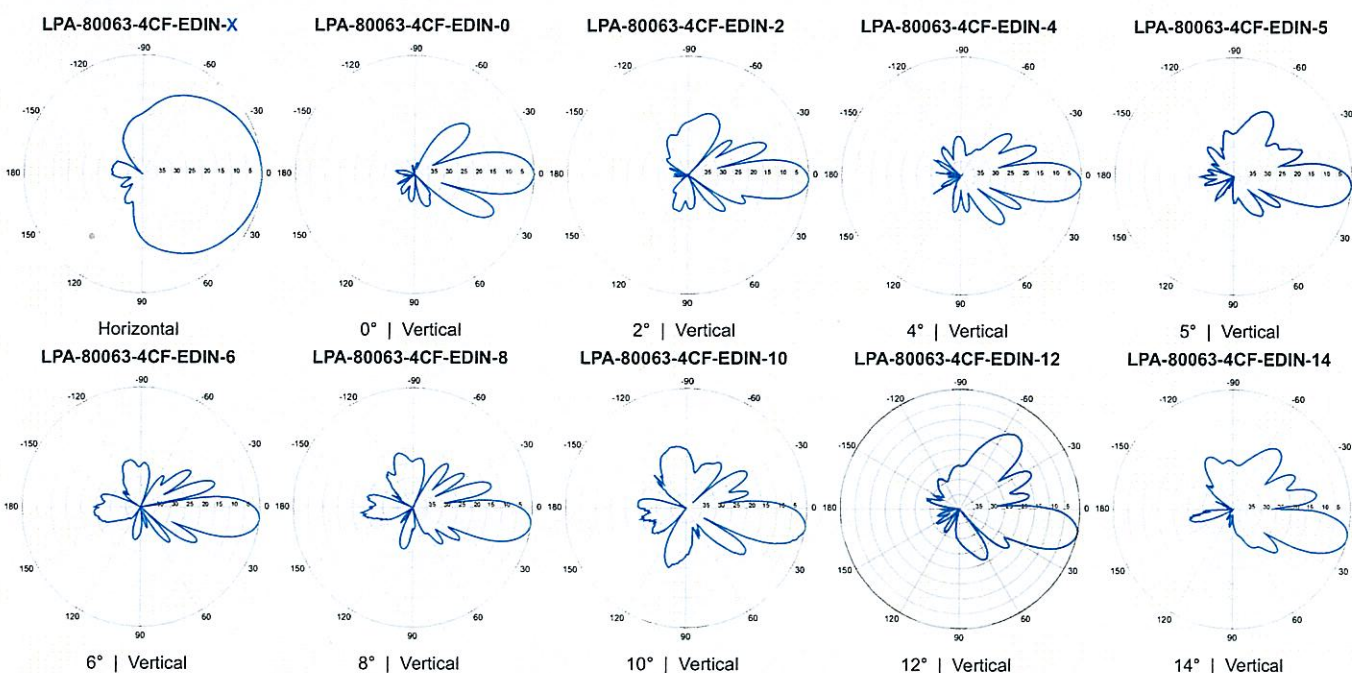
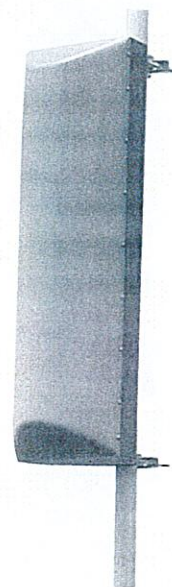
LPA-80063-4CF-EDIN-X

V-Pol | Log Periodic | 63° | 13.0 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	63°
Vertical beamwidth	15°
Gain	13.0 dBd (15.1 dBi)
Electrical downtilt (X)	0, 2, 4, 5, 6, 8, 10, 12, 14
Impedance	50Ω
VSWR	≤1.4:1
Upper sidelobe suppression (0°)	-15.7 dB
Front-to-back ratio (+/-30°)	-31.7 dB
Null fill	5% (-26.02 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	1205 x 385 x 332 mm47.4 x 15.2 x 13.1 in
Depth of antenna with z-bracket	372 mm14.6 in
Weight without mounting brackets	9.1 kg20 lbs
Survival wind speed	> 201 km/hr> 125 mph
Wind area	Front: 0.46 m ² Side: 0.39 m ² Front: 5.0 ft ² Side: 4.2 ft ²
Wind load @ 161 km/hr (100 mph)	Front: 660 N Side: 550 NFront: 149 lbf Side: 124 lbf
Mounting Options	
Part Number	Fits Pipe DiameterWeight
2-Point Mounting & Downtilt Bracket Kit (0-20°)	2169999950-102 mm 2.0-4.0 in5.4 kg 12 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.



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BXA-171085-12BF-EDIN-X

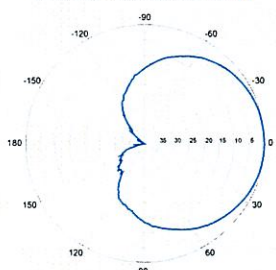
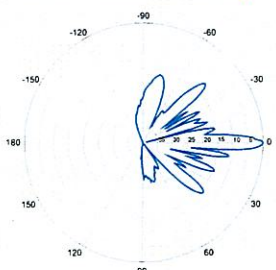
Replace "X" with desired electrical downtilt.

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		

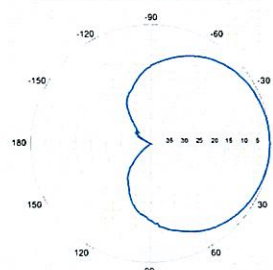
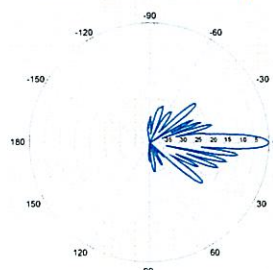


BXA-171085-12BF-EDIN-X

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

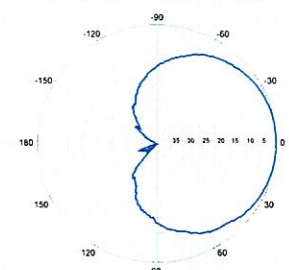
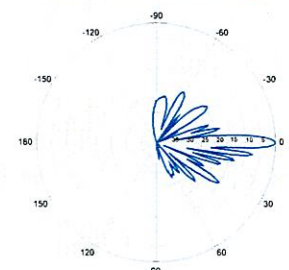
0° | Vertical | 1710-1880 MHz

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

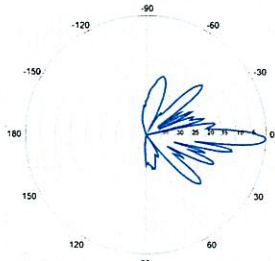
0° | Vertical | 1920-2170 MHz

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BXA-171085-12BF-EDIN-X

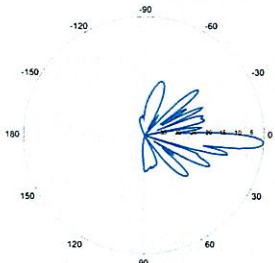
X-Pol | FET Panel | 85° | 18.0 dBi

BXA-171085-12BF-EDIN-2



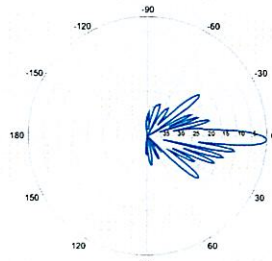
2° | Vertical | 1710-1880 MHz

BXA-171085-12BF-EDIN-4



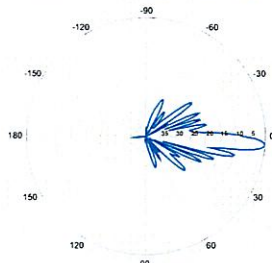
4° | Vertical | 1710-1880 MHz

BXA-171085-12BF-EDIN-2



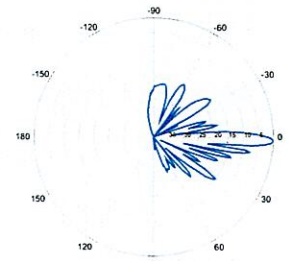
2° | Vertical | 1850-1990 MHz

BXA-171085-12BF-EDIN-4



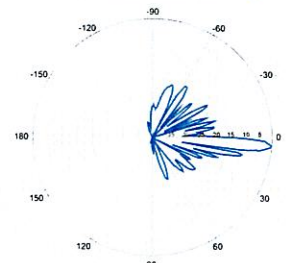
4° | Vertical | 1850-1990 MHz

BXA-171085-12BF-EDIN-2



2° | Vertical | 1920-2170 MHz

BXA-171085-12BF-EDIN-4



4° | Vertical | 1920-2170 MHz

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BXA-70063-4CF-EDIN-X

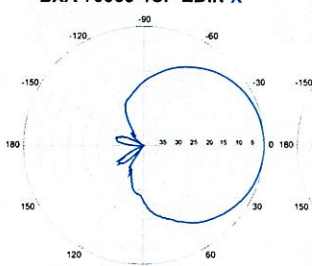
X-Pol | FET Panel | 63° | 13.0 dBd

Replace "X" with desired electrical downtilt.

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

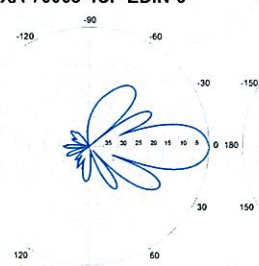
Electrical Characteristics	696-900 MHz				
Frequency bands	696-806 MHz		806-900 MHz		
Polarization	±45°				
Horizontal beamwidth	65°		63°		
Vertical beamwidth	17°		15°		
Gain	12.5 dBd (14.6 dBi)		13.0 dBd (15.1 dBi)		
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 9, 10, 12, 14				
Impedance	50Ω				
VSWR	≤1.35:1				
Upper sidelobe suppression (0°)	-16.3 dB		-22.1 dB		
Front-to-back ratio (+/-30°)	-36.1 dB		-34.9 dB		
Null fill	5% (-26.02 dB)				
Isolation between ports	< -30 dB				
Input power with EDIN connectors	500 W				
Input power with NE connectors	300 W				
Lightning protection	Direct Ground				
Connector(s)	2 Ports / EDIN or NE / Female / Center (Back)				
Mechanical Characteristics					
Dimensions Length x Width x Depth	1205 x 285 x 133 mm		47.4 x 11.2 x 5.2 in		
Depth with z-brackets	173 mm		6.8 in		
Weight without mounting brackets	4.5 kg		9.9 lbs		
Survival wind speed	> 201 km/hr		> 125 mph		
Wind area	Front: 0.34 m ²	Side: 0.16 m ²	Front: 3.7 ft ²	Side: 1.7 ft ²	
Wind load @ 161 km/hr (100 mph)	Front: 498 N	Side: 260 N	Front: 111 lbf	Side: 55 lbf	
Mounting Options	Part Number	Fits Pipe Diameter		Weight	
2-Point Mounting Bracket Kit	36210002	50-160 mm	2.0-6.3 in	4.5 kg	10 lbs
2-Point Downtilt Bracket Kit (0-20°)	36114003	50-160 mm	2.0-6.3 in	4.9 kg	11 lbs
Downtilt Mounting Applications	A mounting bracket and downtilt bracket kit must be ordered for downtilt applications				
Concealment Configurations	For concealment configurations, order BXA-70063-4CF-EDIN-X-FP				

BXA-70063-4CF-EDIN-X



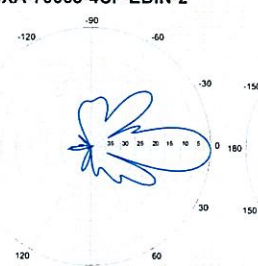
Horizontal | 750 MHz

BXA-70063-4CF-EDIN-0



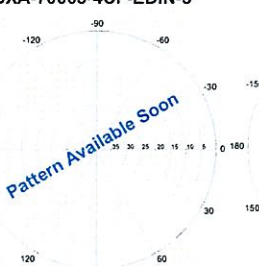
0° | Vertical | 750 MHz

BXA-70063-4CF-EDIN-2



2° | Vertical | 750 MHz

BXA-70063-4CF-EDIN-3

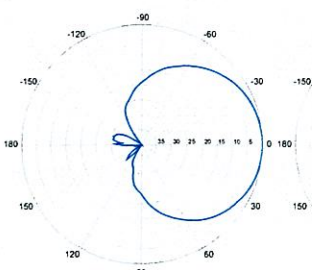


3° | Vertical | 750 MHz

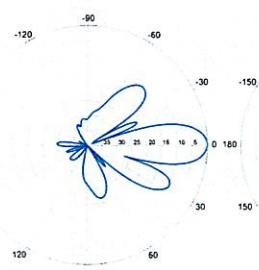
BXA-70063-4CF-EDIN-4



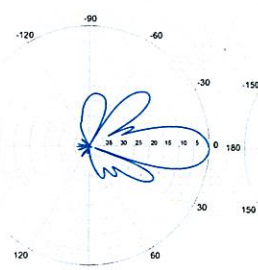
4° | Vertical | 750 MHz



Horizontal | 850 MHz



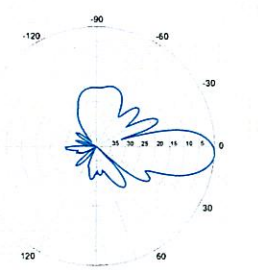
0° | Vertical | 850 MHz



2° | Vertical | 850 MHz



3° | Vertical | 850 MHz



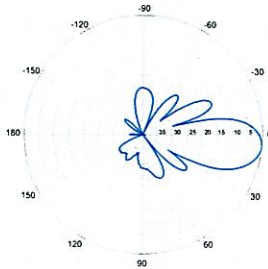
4° | Vertical | 850 MHz

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-70063-4CF-EDIN-X

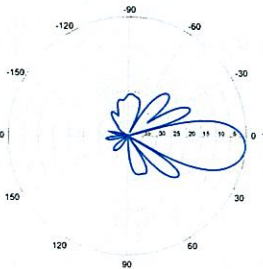
X-Pol | FET Panel | 63° | 13.0 dBd

BXA-70063-4CF-EDIN-5



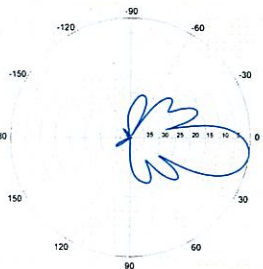
5° | Vertical | 750 MHz

BXA-70063-4CF-EDIN-6



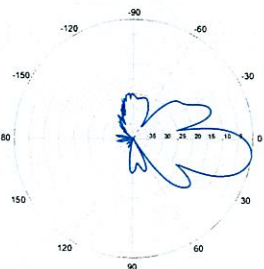
6° | Vertical | 750 MHz

BXA-70063-4CF-EDIN-8



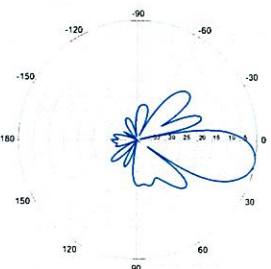
8° | Vertical | 750 MHz

BXA-70063-4CF-EDIN-9

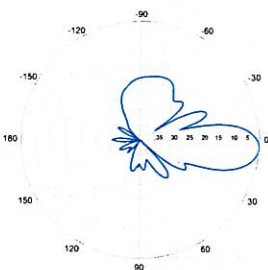


9° | Vertical | 750 MHz

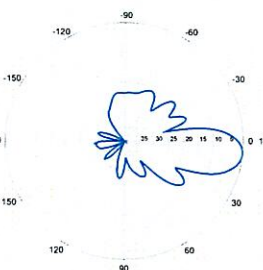
BXA-70063-4CF-EDIN-10



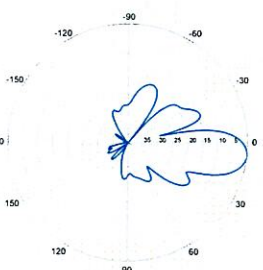
10° | Vertical | 750 MHz



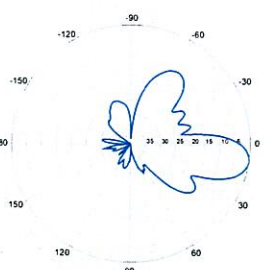
5° | Vertical | 850 MHz



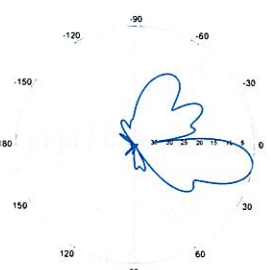
6° | Vertical | 850 MHz



8° | Vertical | 850 MHz

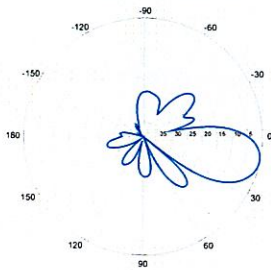


9° | Vertical | 850 MHz

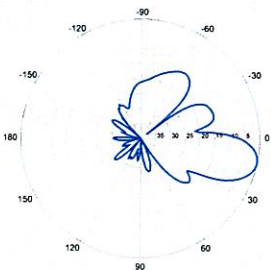


10° | Vertical | 850 MHz

BXA-70063-4CF-EDIN-12

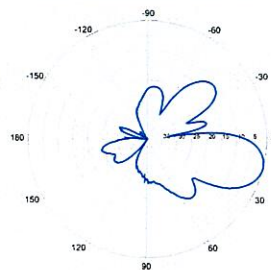


12° | Vertical | 750 MHz

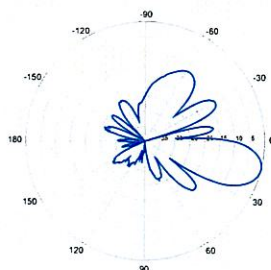


12° | Vertical | 850 MHz

BXA-70063-4CF-EDIN-14



14° | Vertical | 750 MHz



14° | Vertical | 850 MHz

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BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

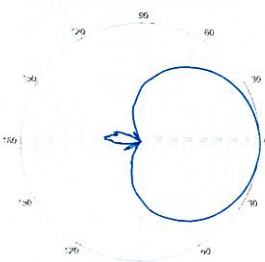
Replace "X" with desired electrical downtilt.

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			

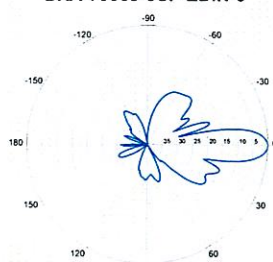


BXA-70063-6CF-EDIN-X



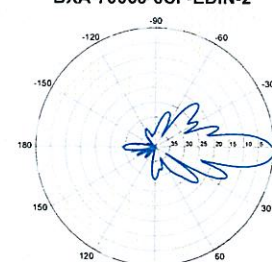
Horizontal | 750 MHz

BXA-70063-6CF-EDIN-0

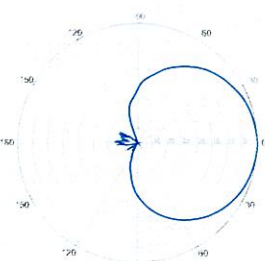


0° | Vertical | 750 MHz

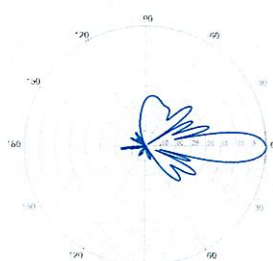
BXA-70063-6CF-EDIN-2



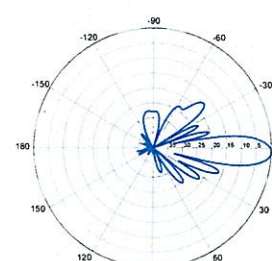
2° | Vertical | 750 MHz



Horizontal | 850 MHz



0° | Vertical | 850 MHz



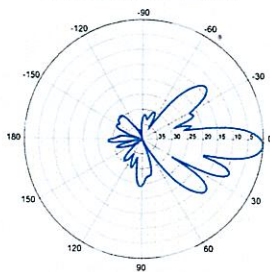
2° | Vertical | 850 MHz

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BXA-70063-6CF-EDIN-X

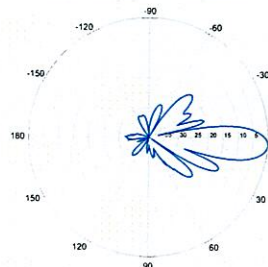
X-Pol | FET Panel | 63° | 14.5 dBd

BXA-70063-6CF-EDIN-3



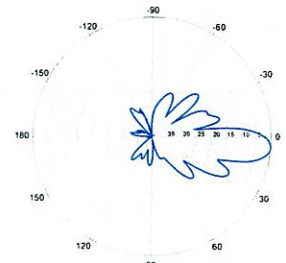
3° | Vertical | 750 MHz

BXA-70063-6CF-EDIN-4

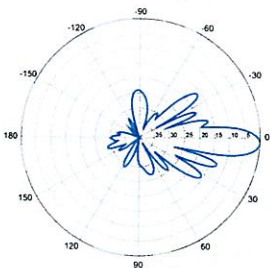


4° | Vertical | 750 MHz

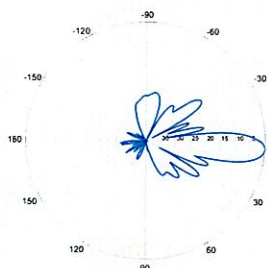
BXA-70063-6CF-EDIN-5



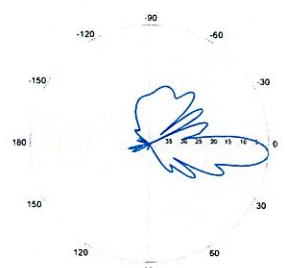
5° | Vertical | 750 MHz



3° | Vertical | 850 MHz

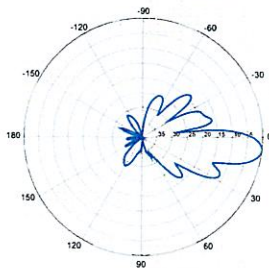


4° | Vertical | 850 MHz



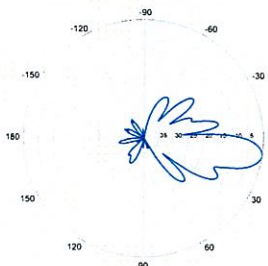
5° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-6



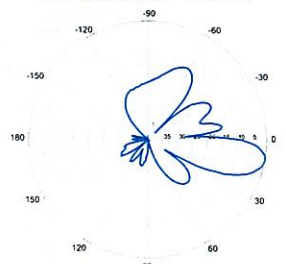
6° | Vertical | 750 MHz

BXA-70063-6CF-EDIN-8

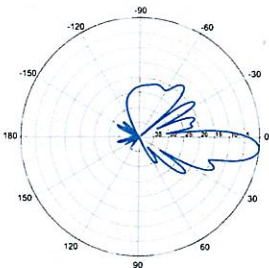


8° | Vertical | 750 MHz

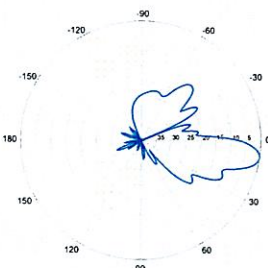
BXA-70063-6CF-EDIN-10



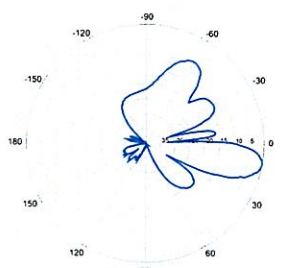
10° | Vertical | 750 MHz



6° | Vertical | 850 MHz



8° | Vertical | 850 MHz



10° | Vertical | 850 MHz

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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

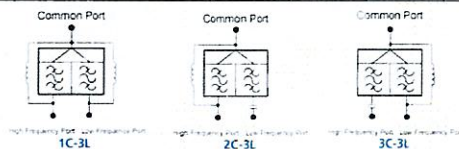
All information contained in the present datasheet is subject to confirmation at time of ordering

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 FD9R6004x3C-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)	

General		Power	Density						
Site Name: North Granby									
Tower Height: Verizon @ 160ft									
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total	
*AT&T UMTS	1	500	170	0.0062	1900	1.0000	0.62%		
*AT&T GSM	2	427	170	0.0106	1900	1.0000	1.06%		
*AT&T UMTS	1	500	170	0.0062	880	0.5867	1.06%		
*AT&T GSM	4	296	170	0.0147	880	0.5867	2.51%		
Verizon PCS	11	317	160	0.0490	1970	1.0000	4.90%		
Verizon Cellular	9	339	160	0.0429	869	0.5793	7.40%		
Verizon AWS	1	670	160	0.0094	2145	1.0000	0.94%		
Verizon 700	1	793	160	0.0111	698	0.4653	2.39%		
								20.89%	
* 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.**

170' Self-Support Tower

**SBA Site Name: North Granby
SBA Site ID: CT10017-A
Verizon Site Name: North Granby, CT**

FDH Project Number 11-12300E S1 (R1)

Analysis Results

Tower Components	82.5%	Sufficient
Foundation	76.0%	Sufficient

Prepared By:

Daniel Chang, EI
Project Engineer

Reviewed By:

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

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Raleigh, NC 27615
(919) 755-1012
info@fdh-inc.com



March 13, 2012

Prepared pursuant to TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and the 2005 Connecticut 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 existing self-supported tower located in North Granby, 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 State Building Code*. Information pertaining to the existing/proposed antenna loading, current tower geometry, the member sizes, and foundation dimensions was obtained from:

- ☐ UNR-Rohn, Inc. (Eng. File No. 37696MP) original design drawings dated August 3, 1998
- ☐ SBA Network Services, Inc.

The *basic design wind speed* per the *TIA/EIA-222-F* standards and the *2005 CSBC* is 80 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 160 ft, the tower meets the requirements of the *TIA/EIA-222-F* standards and the *2005 CSBC* provided the **Recommendations** listed below are satisfied. Furthermore, provided the foundations were designed and constructed to support the original design reactions (See UNR-Rohn, Inc. Eng. File No. 37696MP), 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 the *2005 CSBC* are met with the existing and proposed loading in place, we have the following recommendations:

1. Coax lines must be installed as shown in **Figure 1**.
2. The proposed diplexers should be mounted directly behind the proposed 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 ¹	Carrier	Mount Elevation (ft)	Mount Type
170	(6) Allgon 7770.00 w/ Mount Pipe (6) Powerwave LGP21401 TMAs (6) Diplexers	(12) 1 5/8	AT&T	170	(3) T-Frames
160.5	(6) ADC Cleargain TMAs	(12) 1 5/8	Verizon	159.1	(3) 14.5' Andrew T-Frames (QT-SF14-4-72)
160	(6) Antel LPA-80080/6CF w/ Mount Pipe (6) Antel LPA-185080/12CF w/ Mount Pipe				

¹ See Figure 1 for coax location.

Proposed Loading:

Antenna Elevation (ft)	Description	Coax and Lines	Carrier	Mount Elevation (ft)	Mount Type
160	(2) Antel LPA-80080/6CF w/ Mount Pipe (1) Antel BXA-70063/6CF w/ Mount Pipe (2) Antel BXA-70063/4CF w/ Mount Pipe (4) Antel LPA-80063/4CF w/ Mount Pipe (3) Antel BXA-171085-12BF w/ Mount Pipe (6) RFS FD9R6004/2C-3L Diplexers	(12) 1 5/8	Verizon	159.1	(3) 14.5' Andrew T-Frames (QT-SF14-4-72)

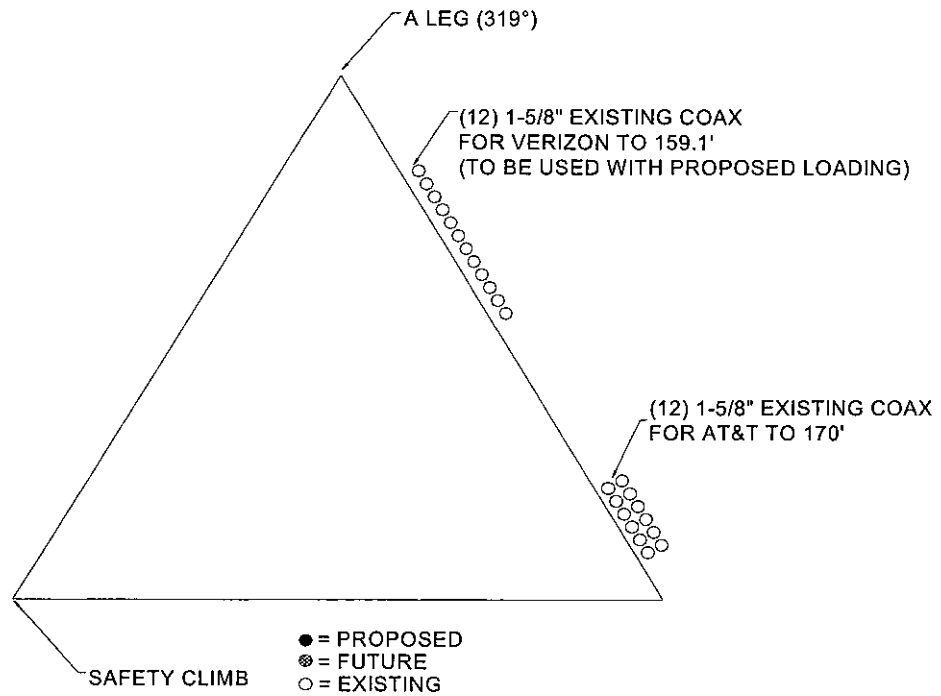


Figure 1 – Coax Layout

RESULTS

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

Table 2 - Material Strength

Member Type	Yield Strength
Legs	50 ksi
Bracing	50 ksi & 36 ksi

Table 3 displays the summary of the ratio (as a percentage) of force in the member to their capacities. Values greater than 100% indicate locations where the maximum force in the member exceeds its capacity. *Note: Capacities up to 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
T1	170 - 160	Leg	Pipe 2.5 STD	7.0	Pass
		Diagonal	L1 3/4x1 3/4x3/16	11.2 16.1 (b)	Pass
		Top Girt	L2x2x3/16	6.7	Pass
T2	160 - 140	Leg	Pipe 2.5 STD	52.4	Pass
		Diagonal	L1 3/4x1 3/4x3/16	47.7 60.9 (b)	Pass
		Top Girt	L2x2x3/16	7.0	Pass
T3	140 - 120	Leg	Pipe 3 STD	71.9	Pass
		Diagonal	L2x2x3/16	49.7	Pass
		Top Girt	L2x2x3/16	1.9	Pass
T4	120 - 100	Leg	Pipe 3.5 EH	64.8	Pass
		Diagonal	L2 1/2x2 1/2x3/16	50.0 50.3 (b)	Pass
T5	100 - 80	Leg	Pipe 4 EH	66.0	Pass
		Diagonal	L2 1/2x2 1/2x3/16	72.8	Pass
T6	80 - 60	Leg	Pipe 5 EH	54.7	Pass
		Diagonal	L3x3x1/4	45.8 61.4 (b)	Pass
T7	60 - 40	Leg	Pipe 6 EHS	62.2	Pass
		Diagonal	L3 1/2x3 1/2x1/4	50.5 51.9 (b)	Pass
T8	40 - 20	Leg	Pipe 6 EH	57.9	Pass
		Diagonal	L3 1/2x3 1/2x1/4	64.5	Pass
T9	20 - 0	Leg	Pipe 6 EH	65.8	Pass
		Diagonal	L3 1/2x3 1/2x1/4	82.5	Pass

* Capacities include 1/3 allowable stress increase per TIA/EIA-222-F.

Table 4 - Maximum Base Reactions

Load Type	Direction	Current Analysis (TIA/EIA-222-F)	Original Design (TIA/EIA-222-F)
Individual Foundation	Horizontal	20 k	29 k
	Uplift	158 k	214 k
	Compression	179 k	240 k
Overturning Moment	---	3,081 k-ft	4,053 k-ft

GENERAL COMMENTS

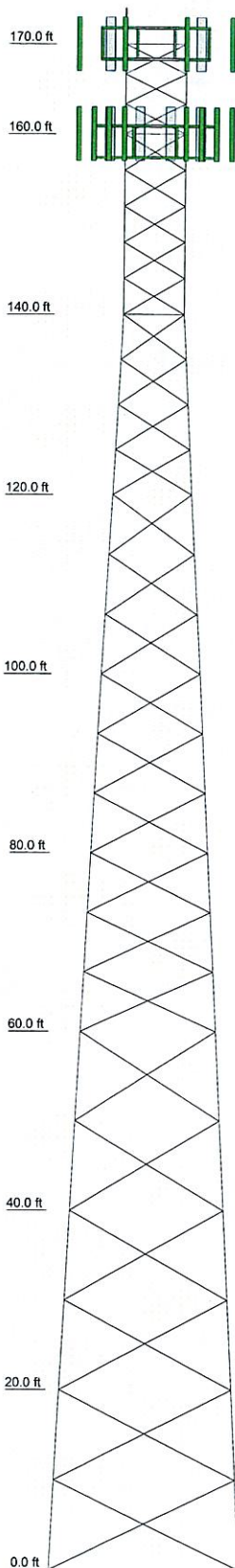
This engineering analysis is based upon the theoretical capacity of the structure. It is not a condition assessment of the tower and its foundation. It is the responsibility of SBA Network Services, Inc. to verify that the tower modeled and analyzed is the correct structure (with accurate antenna loading 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	T1	T2	T3	T4	T5	T6	T7	T8	T9
Legs	Pipe 2.5 STD	Pipe 3 STD	Pipe 3.5 EH	Pipe 4 EH	Pipe 5 EH	Pipe 6 EHS	Pipe 6 EH	Pipe 6 EH	Pipe 6 EH
Leg Grade	L1 3/4x1 3/4x3/16	L2x3/16	L2 1/2x2 1/2x3/16	L3x3x1/4	L3 1/2x3 1/2x1/4	L3 1/2x3 1/2x1/4	L3 1/2x3 1/2x1/4	L3 1/2x3 1/2x1/4	L3 1/2x3 1/2x1/4
Diagonals	A36	A36	A36	A36	A36	A36	A36	A36	A36
Diagonal Grade	L2x3/16	L2x3/16	L2x3/16	L2x3/16	L2x3/16	L2x3/16	L2x3/16	L2x3/16	L2x3/16
Top Girts	L2x3/16	L2x3/16	L2x3/16	L2x3/16	L2x3/16	L2x3/16	L2x3/16	L2x3/16	L2x3/16
Face Width (ft)	6.65	8.72	10.76	12.83	14.85	16.85	18.85	20.86	22.86
# Panels @ (ft)	3 @ 3.33333	4 @ 5	5 @ 4	9 @ 6.66667	6 @ 10	3.1	3.3	3.3	3.3
Weight (K)	0.5	0.9	1.0	1.4	1.7	2.0	2.7	3.1	3.3



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod	170	BXA-70063/6CF W/Mount Pipe	159.1
(2) 7770.00 w/ mount pipe	170	BXA-70063/4CF W/ Mount Pipe	159.1
(2) 7770.00 w/ mount pipe	170	BXA-70063/4CF W/ Mount Pipe	159.1
(2) 7770.00 w/ mount pipe	170	(2) LPA-80063/4CF w/ Mount Pipe	159.1
(2) LGP21401 TMA	170	LPA-80063/4CF w/ Mount Pipe	159.1
(2) LGP21401 TMA	170	LPA-80063/4CF w/ Mount Pipe	159.1
(2) LGP21401 TMA	170	Antel BXA-171085-12BF w/Mount Pipe	159.1
(2) Diplexer	170	Antel BXA-171085-12BF w/Mount Pipe	159.1
(2) Diplexer	170	Antel BXA-171085-12BF w/Mount Pipe	159.1
(2) Diplexer	170	(2) RFS FD9R6004/2C-3L Diplexer	159.1
(3) T-Frames	170	(2) RFS FD9R6004/2C-3L Diplexer	159.1
LPA-80080/6CF w/ mount pipe	159.1	(2) RFS FD9R6004/2C-3L Diplexer	159.1
LPA-80080/6CF w/ mount pipe	159.1	(3) 14.5' Andrew T-Frames	159.1

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

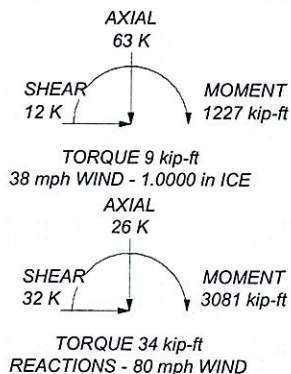
TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 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: 82.5%

MAX. CORNER REACTIONS AT BASE:

DOWN: 179 K
SHEAR: 20 K

UPLIFT: -158 K
SHEAR: 18 K



FDH Engineering, Inc.

2730 Rowland Road, Suite 100

Raleigh, NC 27615

Phone: (919) 755-1012

FAX: (919) 755-1031

Tower Analysis

Job: **North Granby, CT10017-A**

Project: **11-12300E S1 (R1)**

Client: **SBA Network Services, Inc.** Drawn by: **Daniel Chang** App'd:

Code: **TIA/EIA-222-F** Date: **03/13/12** Scale: **NTS**

Path: **D:\Projects\11-12300E S1 (R1)\11-12300E S1 (R1).dwg** Dwg No. **E-1**