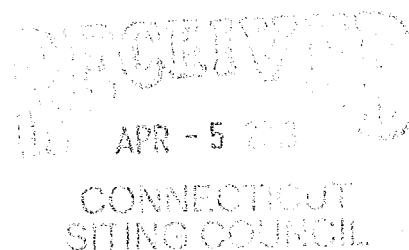


280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

Also admitted in Massachusetts

April 4, 2013

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



Re: **Notice of Exempt Modification – Revised Antenna Configuration
497 Ekonk Hill Road, Voluntown, Connecticut**

Dear Ms. Roberts:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) received Connecticut Siting Council (“Council”) approval to establish a wireless telecommunications facility at 497 Ekonk Hill Road in Voluntown on December 14, 2009 (EM-VER-147-091028). In that filing, the Council approved the installation of twelve (12) antennas at the 153-foot level of the existing 180-foot tower and a 12’ x 30’ shelter located inside the fenced compound. Cellco’s facility has not yet been constructed. The 2009 approval is valid until December 14, 2013.

Cellco has decided to update its antenna configuration and now intends to install three (3) model BXA-70063-6CF cellular antennas; three (3) model BXA-171063-12CF PCS antennas; three (3) model BXA-70063-6CF LTE antennas; and three (3) model BXA-171063-12CF AWS antennas, all at the same 153-foot level on the tower. Cellco also intends to install six (6) remote radio heads (“RRHs”) behind its antennas. Attached behind Tab 1 are the specifications for the new antennas and RRHs.

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 Ronald Millovitsch, First Selectman for the Town of Voluntown. A copy of this letter is being sent to Thomas and Patricia Sweet, the owners of the property on which the tower is located.



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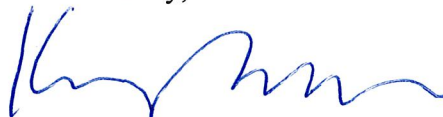
Linda Roberts
April 4, 2013
Page 2

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 RRHs will be located at the 153-foot level of the 180-foot tower.
2. The proposed modifications will not involve any change to ground-mounted equipment and, therefore, will not require the extension of the site boundary.
3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A cumulative General Power Density table for Cellco's modified facility is included behind Tab 2.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The tower and its foundation can support Cellco's proposed modifications. (*See Structural Analysis attached behind Tab 3*).

For the foregoing reasons, Cellco respectfully submits that the revised antenna configuration at 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:

Ronald Millovitsch, Voluntown First Selectman
Thomas and Patricia Sweet
Sandy M. Carter



BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

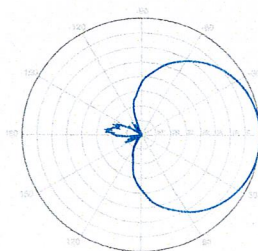
Replace "X" with desired electrical downtilt.

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			

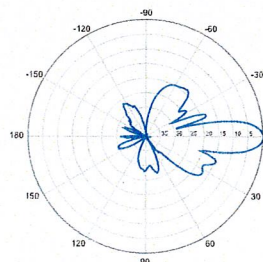


BXA-70063-6CF-EDIN-X



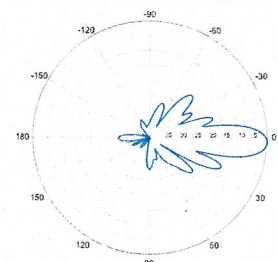
Horizontal | 750 MHz

BXA-70063-6CF-EDIN-0

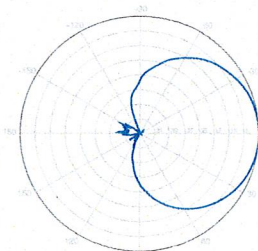


0° | Vertical | 750 MHz

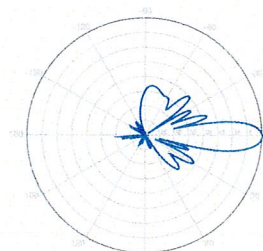
BXA-70063-6CF-EDIN-2



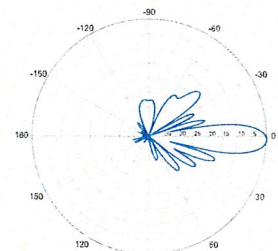
2° | Vertical | 750 MHz



Horizontal | 850 MHz



0° | Vertical | 850 MHz



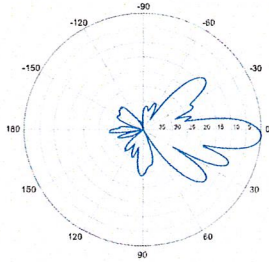
2° | Vertical | 850 MHz

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

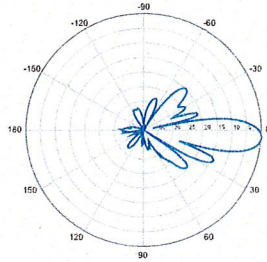
X-Pol | FET Panel | 63° | 14.5 dBd

BXA-70063-6CF-EDIN-3



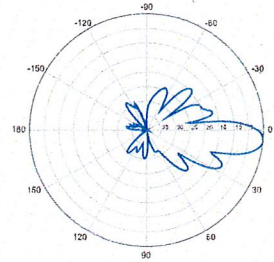
3° | Vertical | 750 MHz

BXA-70063-6CF-EDIN-4

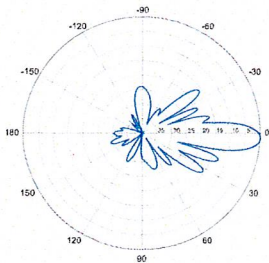


4° | Vertical | 750 MHz

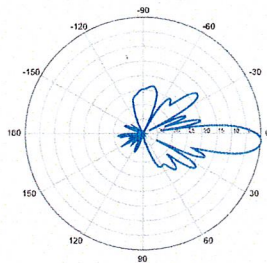
BXA-70063-6CF-EDIN-5



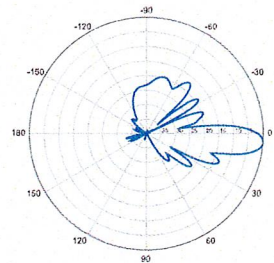
5° | Vertical | 750 MHz



3° | Vertical | 850 MHz

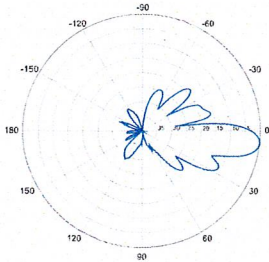


4° | Vertical | 850 MHz



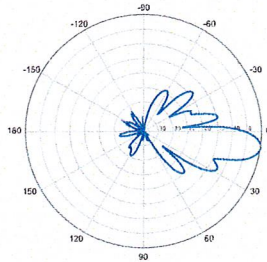
5° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-6



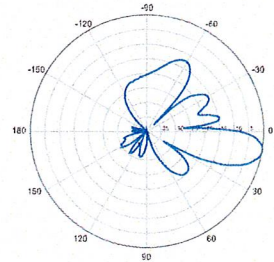
6° | Vertical | 750 MHz

BXA-70063-6CF-EDIN-8

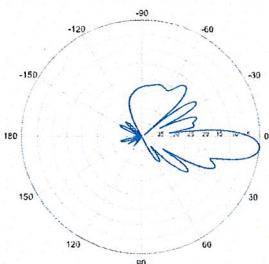


8° | Vertical | 750 MHz

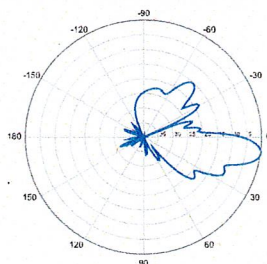
BXA-70063-6CF-EDIN-10



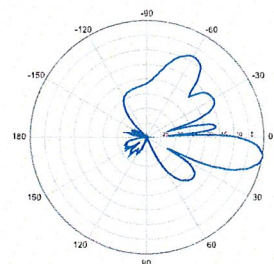
10° | Vertical | 750 MHz



6° | Vertical | 850 MHz



8° | Vertical | 850 MHz



10° | Vertical | 850 MHz

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BXA-171063-12CF-EDIN-X

X-Pol | FET Panel | 63° | 19.0 dBi

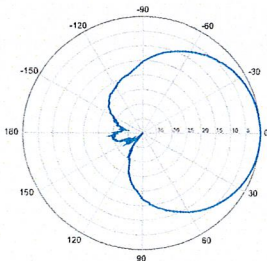
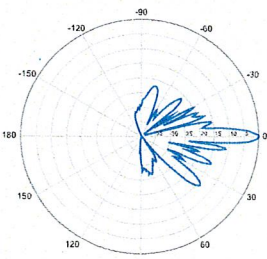
Replace "X" with desired electrical downtilt.

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

Electrical Characteristics	1710-2170 MHz				
Frequency bands	1710-1880 MHz		1850-1990 MHz		1920-2170 MHz
Polarization	±45°		±45°		±45°
Horizontal beamwidth	68°		65°		60°
Vertical beamwidth	4.5°		4.5°		4.5°
Gain	16.1 dBd / 18.2 dBi		16.5 dBd / 18.6 dBi		16.9 dBd / 19.0 dBi
Electrical downtilt (X)	0, 2, 5				
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 or NE / Female / Center (Back)				
Operating temperature	-40° to +60° C / -40° to +140° F				
Mechanical Characteristics					
Dimensions Length x Width x Depth	1842 x 154 x 105 mm		72.5 x 6.1 x 4.1 in		
Depth with z-brackets	133 mm		5.2 in		
Weight without mounting brackets	5.8 kg		12.8 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-171063-12CF-EDIN-X-FP				

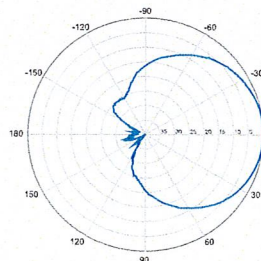
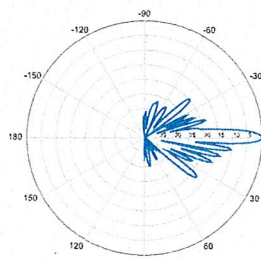


BXA-171063-12CF-EDIN-X

Horizontal | 1710-1880 MHz
BXA-171063-12CF-EDIN-0

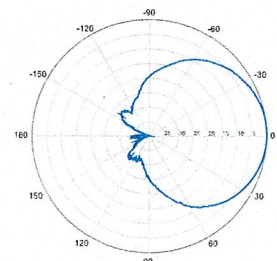
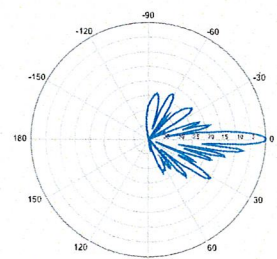
0° | Vertical | 1710-1880 MHz

BXA-171063-12CF-EDIN-X

Horizontal | 1850-1990 MHz
BXA-171063-12CF-EDIN-0

0° | Vertical | 1850-1990 MHz

BXA-171063-12CF-EDIN-X

Horizontal | 1920-2170 MHz
BXA-171063-12CF-EDIN-0

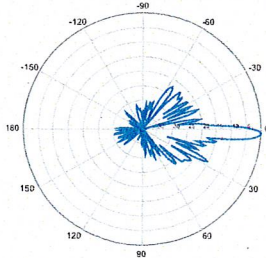
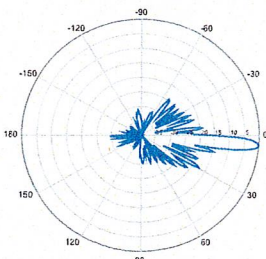
0° | Vertical | 1920-2170 MHz

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BXA-171063-12CF-EDIN-X

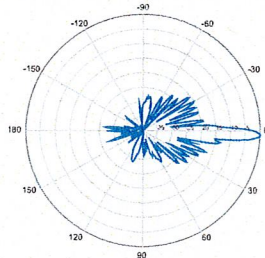
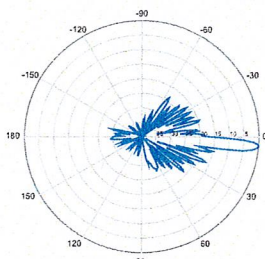
X-Pol | FET Panel | 63° | 19.0 dBi

BXA-171063-12CF-EDIN-2

2° | Vertical | 1710-1880 MHz
BXA-171063-12CF-EDIN-5

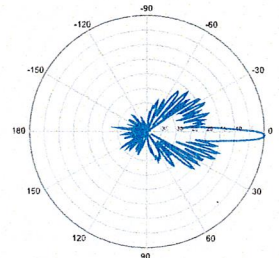
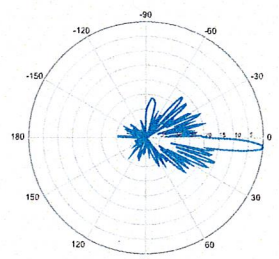
5° | Vertical | 1710-1880 MHz

BXA-171063-12CF-EDIN-2

2° | Vertical | 1850-1990 MHz
BXA-171063-12CF-EDIN-5

5° | Vertical | 1850-1990 MHz

BXA-171063-12CF-EDIN-2

2° | Vertical | 1920-2170 MHz
BXA-171063-12CF-EDIN-5

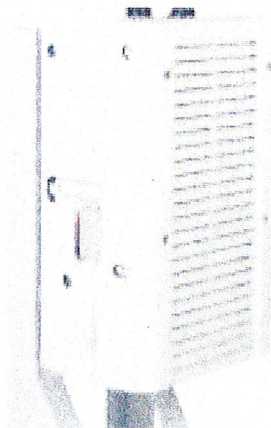
5° | Vertical | 1920-2170 MHz

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Alcatel-Lucent RRH2x40-07-U

REMOTE RADIO HEAD

The Alcatel-Lucent RRH2x40-07-U is a high-power, small form-factor Remote Radio Head (RRH) operating in the North American Digital Dividend / 700MHz frequency band (3GPP Band 13). The Alcatel-Lucent RRH2x40-07-U is designed with an eco-efficient approach, providing operators with the means to achieve high quality and capacity coverage with minimum site requirements.



A distributed eNodeB expands deployment options by using two components, a Base Band Unit (BBU) containing the digital assets and a separate RRH containing the radio-frequency (RF) elements. This modular design optimizes available space and allows the main components of an eNodeB to be installed separately, within the same site or several kilometres apart.

The Alcatel-Lucent RRH2x40-07-U is linked to the BBU by an optical-fiber connection carrying downlink and uplink digital radio signals along with operations, administration and maintenance (OA&M) information. The Alcatel-Lucent RRH2x40-07-U has two transmit RF paths, 40 W RF output power per transmit path, and is designed to manage up to two-way receive diversity. The device is ideally suited to support macro coverage, with multiple-input multiple-output (MIMO) 2x2 operation in up to 10 MHz of bandwidth.

The Alcatel-Lucent RRH2x40-07-U is designed to make available all the benefits of a distributed eNodeB, with excellent RF characteristics, with low

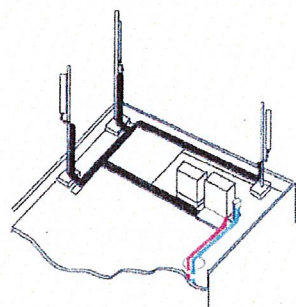
capital expenditures (CAPEX) and low operating expenditures (OPEX). The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment or require costly cranes to be employed, leaving coverage holes. However, many of these sites can host an Alcatel-Lucent RRH2x40-07-U installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

Fast, low-cost installation and deployment

The Alcatel-Lucent RRH2x40-07-U is a zero-footprint solution and operates noise-free, simplifying negotiations with site property owners and minimizing environmental impacts. Installation can easily be done by a single person because the Alcatel-Lucent RRH2x40-07-U is compact and weighs less than 23 kg (50 lb), eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day — a fraction of the time required for a traditional BTS.

Excellent RF performance

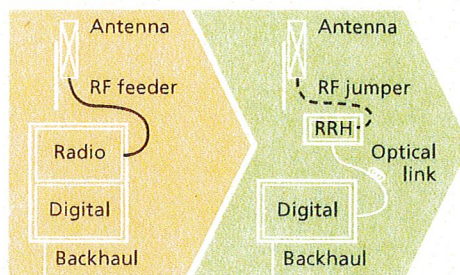
Because of its small size and weight, the Alcatel-Lucent RRH2x40-07-U can be installed close to the antenna. Operators can therefore locate the Alcatel-Lucent RRH2x40-07-U where RF engineering is deemed ideal, minimizing trade-offs between available sites and RF optimum sites. The RF feeder cost and installation costs are reduced or eliminated, and there is no need for a Tower Mounted Amplifier (TMA) because losses introduced by the RF feeder are greatly reduced. The Alcatel-Lucent RRH2x40-07-U provides more RF power while at the same time consuming less electricity.



Macro

Features

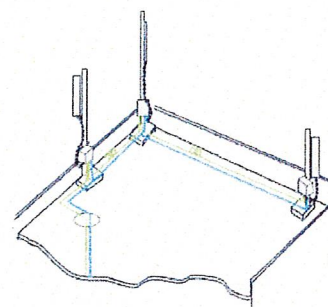
- Zero-footprint deployment
- Easy installation, with a lightweight unit can be carried and set up by one person
- Optimized RF power, with flexible site selection and elimination of a TMA
- Convection-cooled (fanless), noise-free, and heaterless unit
- Best-in-class power efficiency, with significantly reduced energy consumption



RRH for space-constrained cell sites

Benefits

- Leverages existing real estate with lower site costs
- Reduces installation costs, with fewer installation materials and simplified logistics
- Decreases power costs and minimizes environmental impacts, with the potential for eco-sustainable power options
- Improves RF performance and adds flexibility to network planning



Distributed

Technical specifications

Physical dimensions

- Height: 390 mm (15.4 in.)
- Width: 380 mm (15 in.)
- Depth: 210 mm (8.2 in.)
- Weight (without mounting kit): less than 23 kg (50 lb)

Power

- Power supply: -48V

Operating environment

- Outdoor temperature range:
 - With solar load: -40°C to +50°C (-40°F to +122°F)
 - Without solar load: -40°C to +55°C (-40°F to +131°F)
- Passive convection cooling (no fans)

- Enclosure protection

→ IP65 (International Protection rating)

RF characteristics

- Frequency band: 700 MHz; 3GPP Band 13
- Bandwidth: up to 10 MHz
- RF output power at antenna port:
 - 40 W nominal RF power for each Tx port
- Rx diversity: 2-way or 4-way
- Noise figure: below 2.5 dB typical
- ALD features
 - TMA
 - Remote electrical tilt (RET) support (AISG v2.0)

Optical characteristics

Type/number of fibers

- Up to 3.12 Gb/s line bit rate
- Single-mode variant
 - One SM fiber (9/125 μm) per RRH2x, carrying UL and DL using CWDM (at 1550/1310 nm)
- Multi-mode variant
 - Two MM fibers (50/125 μm) per RRH2x: one carrying UL, the other carrying DL (at 850 nm)

Optical fiber length

- Up to 500 m (0.31 mi), using MM fiber
- Up to 20 km (12.43 mi), using SM fiber

Alarms and ports

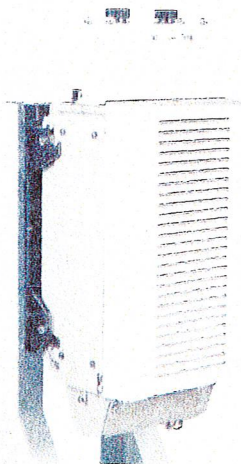
- Six external alarms
- Two optical ports to support daisy-chaining

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Alcatel-Lucent RRH2x40-AWS

REMOTE RADIO HEAD

The Alcatel-Lucent RRH2x40-AWS is a high-power, small form-factor Remote Radio Head (RRH) operating in the AWS frequency band (1700/2100MHz - 3GPP Band 4). The Alcatel-Lucent RRH2x40-AWS is designed with an eco-efficient approach, providing operators with the means to achieve high quality and capacity coverage with minimum site requirements.



A distributed eNodeB expands deployment options by using two components, a Base Band Unit (BBU) containing the digital assets and a separate RRH containing the radio-frequency (RF) elements. This modular design optimizes available space and allows the main components of an eNodeB to be installed separately, within the same site or several kilometres apart.

The Alcatel-Lucent RRH2x40-AWS is linked to the BBU by an optical-fiber connection carrying downlink and uplink digital radio signals along with operations, administration and maintenance (OA&M) information. The Alcatel-Lucent RRH2x40-AWS has two transmit RF paths, 40 W RF output power per transmit path, and is designed to manage up to four-way receive diversity. The device is ideally suited to support macro coverage, with multiple-input multiple-output (MIMO) 2x2 operation in up to 20 MHz of bandwidth.

The Alcatel-Lucent RRH2x40-AWS is designed to make available all the benefits of a distributed eNodeB, with excellent RF characteristics, with low

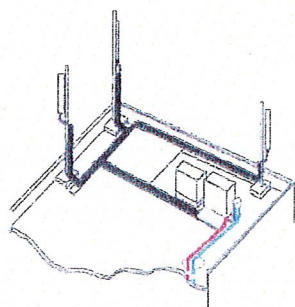
capital expenditures (CAPEX) and low operating expenditures (OPEX). The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment or require costly cranes to be employed, leaving coverage holes. However, many of these sites can host an Alcatel-Lucent RRH2x40-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

Fast, low-cost installation and deployment

The Alcatel-Lucent RRH2x40-AWS is a zero-footprint solution and operates noise-free, simplifying negotiations with site property owners and minimizing environmental impacts. Installation can easily be done by a single person because the Alcatel-Lucent RRH2x40-AWS is compact and weighs less than 20 kg (44 lb), eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day — a fraction of the time required for a traditional BTS.

Excellent RF performance

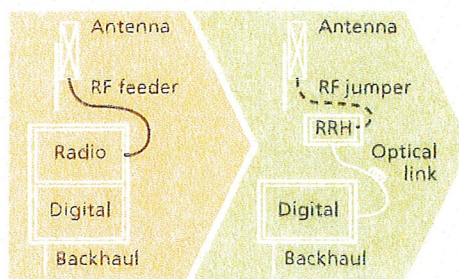
Because of its small size and weight, the Alcatel-Lucent RRH2x40-AWS can be installed close to the antenna. Operators can therefore locate the Alcatel-Lucent RRH2x40-AWS where RF engineering is deemed ideal, minimizing trade-offs between available sites and RF optimum sites. The RF feeder cost and installation costs are reduced or eliminated, and there is no need for a Tower Mounted Amplifier (TMA) because losses introduced by the RF feeder are greatly reduced. The Alcatel-Lucent RRH2x40-AWS provides more RF power while at the same time consuming less electricity.



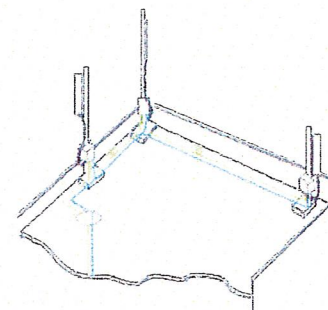
Macro

Features

- Zero-footprint deployment
- Easy installation, with a lightweight unit can be carried and set up by one person
- Optimized RF power, with flexible site selection and elimination of a TMA
- Convection-cooled (fanless)
- Noise-free
- Best-in-class power efficiency, with significantly reduced energy consumption



RRH for space-constrained cell sites



Distributed

Benefits

- Leverages existing real estate with lower site costs
- Reduces installation costs, with fewer installation materials and simplified logistics
- Decreases power costs and minimizes environmental impacts, with the potential for eco-sustainable power options
- Improves RF performance and adds flexibility to network planning

Technical specifications

Physical dimensions

- Height: 620 mm (24.4 in.)
- Width: 270 mm (10.63 in.)
- Depth: 170mm (6.7 in.)
- Weight (without mounting kit): less than 20 kg (44 lb)

Power

- Power supply: -48VDC

Operating environment

- Outdoor temperature range:
 - With solar load: -40°C to +50°C (-40°F to +122°F)
 - Without solar load: -40°C to +55°C (-40°F to +131°F)

- Passive convection cooling (no fans)
- Enclosure protection
 - IP65 (International Protection rating)

RF characteristics

- Frequency band: 1700/2100 MHz (AWS); 3GPP Band 4
- Bandwidth: up to 20 MHz
- RF output power at antenna port: 40 W nominal RF power for each Tx port
- Rx diversity: 2-way or 4-way with optional Rx Diversity module
- Noise figure: below 2.0 dB typical
- Antenna Line Device features
 - TMA and Remote electrical tilt (RET) support via AISG v2.0

Optical characteristics

Type/number of fibers

- Single-mode variant
 - One Single Mode Single Fiber per RRH2x, carrying UL and DL using CWDM
 - Single mode dual fiber (SM/DF)
- Multi-mode variant
 - Two Multi-mode fibers per RRH2x: one carrying UL, the other carrying DL

Optical fiber length

- Up to 500 m (0.31 mi), using MM fiber
- Up to 20 km (12.43 mi), using SM fiber

Digital Ports and Alarms

- Two optical ports to support daisy-chaining
- Six external alarms

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Site Name: Bailey Pond (Voluntown)		General	Power	Density				
Tower Height: Verizon @ 153ft								
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total
*Sprint CDMA/LTE	2	625.2	175.5	0.0146	1900	1.0000	1.46%	
*AT&T UMTS	2	565	165	0.0149	880	0.5867	2.54%	
*AT&T UMTS	2	875	165	0.0231	1900	1.0000	2.31%	
*AT&T GSM	1	283	165	0.0037	880	0.5867	0.64%	
*AT&T GSM	4	525	165	0.0277	1900	1.0000	2.77%	
*AT&T LTE	1	1615	165	0.0213	734	0.4893	4.36%	
Verizon PCS	11	237	153	0.0400	1970	1.0000	4.00%	
Verizon Cellular	9	248	153	0.0343	869	0.5793	5.92%	
Verizon AWS	1	1750	153	0.0269	2145	1.0000	2.69%	
Verizon 700	1	1050	153	0.0161	698	0.4653	3.47%	
								30.16%
* Source: Siting Council								



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

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

180' Self-Support Tower

**SBA Site Name: Voluntown
SBA Site ID: CT10024-A-03
Verizon Site ID: 220525
Verizon Site Name: Baily Pond CT**

FDH Project Number 1311441400 (R1)

Analysis Results

Tower Components	80.9%	Sufficient
Foundation	77.7%	Sufficient

Prepared By:

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Project Engineer

Reviewed By:

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

FDH Engineering, Inc.
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March 21, 2013

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

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EXECUTIVE SUMMARY

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

- ☐ Rohn Industries, Inc. (File No. 42895AE002) original design drawings dated April 24, 2001
- ☐ Dr. Clarence Welti, PE, P.C. (Project No. Stone Hill Road, Voluntown, CT) Geotechnical Study dated March 5, 2001
- ☐ FDH, Inc. (Job No. 07-03022T) TIA Inspection Report dated April 11, 2007
- ☐ SBA Network Services, Inc.

The *basic design wind speed* per the *TIA/EIA-222-F* standards and the *2005 CBC* is 85 mph without ice and 38 mph with 3/4" radial ice. Ice is considered to increase in thickness with height.

Conclusions

With the existing and proposed antennas from Verizon in place at 153 ft, the tower meets the requirements of the *TIA/EIA-222-F* standards and the *2005 CBC* provided the **Recommendations** listed below are satisfied. Furthermore, provided the foundation was designed and constructed to support the original design reactions (see Rohn File No. 42895AE002), 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 the *2005 CBC* are met with the existing and proposed loading in place, we have the following recommendations:

1. Coax must be installed as shown in **Figure 1**.
2. RRU/RRH Stipulation: The proposed equipment may be installed in any arrangement as determined by the client.

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
178	(12) Decibel DB980H90E-M	(6) 1-5/8"	Sprint	178	(3) 12' T-Frames
165	(9) Powerwave 7770.00 (3) Powerwave P65-17-XLH-RR (6) Powerwave LGP21401 TMAs (6) Powerwave LGP21903 Diplexers (6) Ericsson RRUS-11 RRUs (1) Raycap DC6-48-60-18-8F Surge Arrestor	(12) 1-5/8" (2) DC Cables (1) Fiber Cable	AT&T	165	(3) 12.5' T-Frames
153	(4) Antel LPA-80080/8CF (2) Antel LPA-4019 (3) Antel BXA-70063/6CF (3) Antel BXA-185063/12CF	(12) 1-5/8"	Verizon	153	(3) T-Frames
66	(1) 7.5"x3" Dia. GPS	(1) 1/2"	Sprint	66	Direct Mount

Proposed Loading:

Antenna Elevation (ft)	Description	Coax and Lines	Carrier	Mount Elevation (ft)	Mount Type
153	(6) Antel BXA-70063-6CF (6) Antel BXA-171063-12CF (3) Alcatel Lucent RRH2x40-AWS RRUs (3) Alcatel Lucent RRH2x40-07 RRUs (1) RFS DB-T1-6Z-8AB-0Z Distribution Box	(12) 1-5/8"	Verizon	153	(3) T-Frames

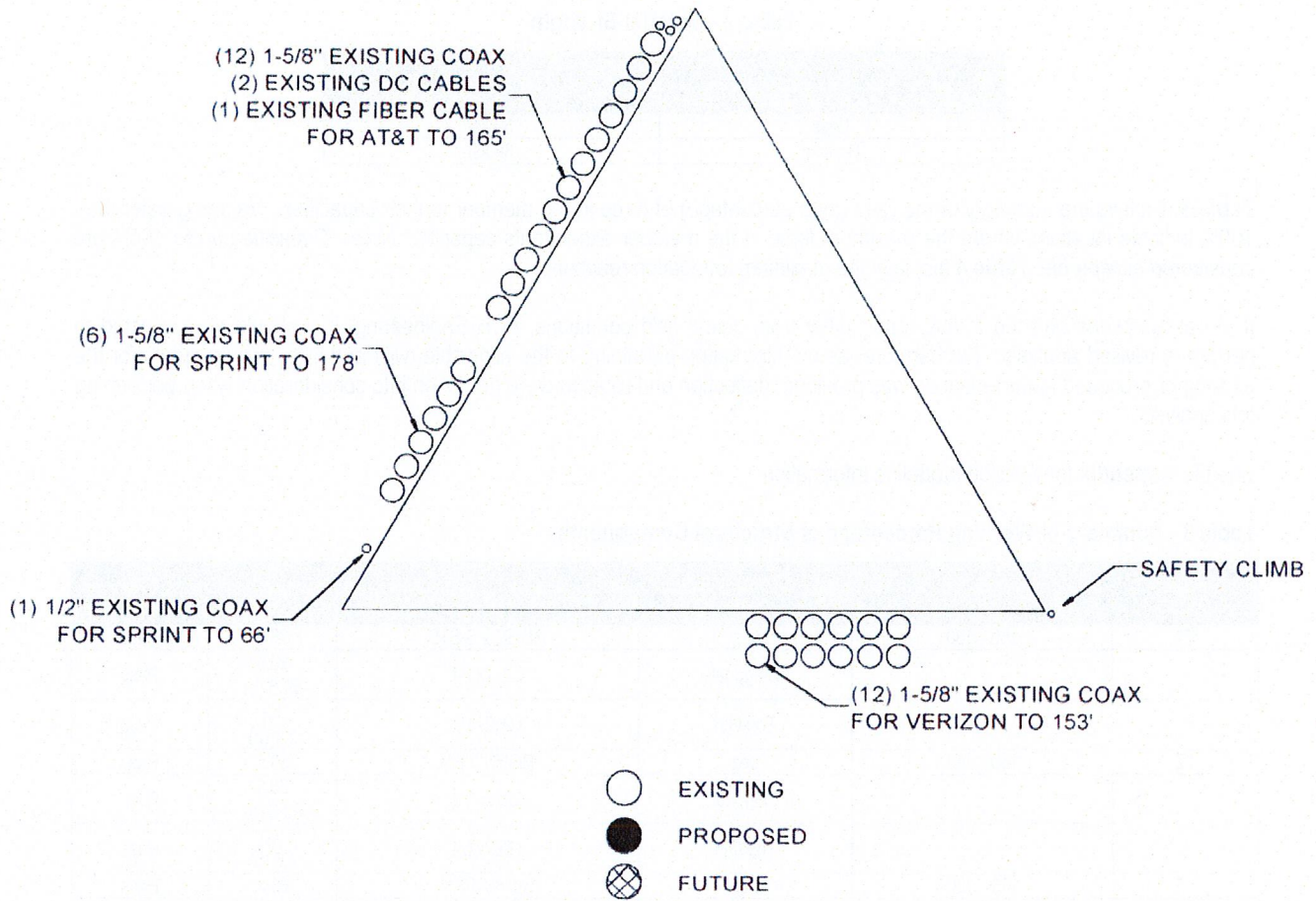


Figure 1 - Coax Layout

RESULTS

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

Table 2 - Material Strength

Member Type	Yield Strength
Legs	50 ksi
Bracing	36 ksi

Table 3 displays the summary of the ratio (as a percentage) of force in the member to their capacities. Values greater than 100% indicate locations where the maximum force in the member exceeds its capacity. *Note: Capacities up to 105% are considered acceptable.* **Table 4** displays the maximum foundation reactions.

If the assumptions outlined in this report differ from actual field conditions, FDH Engineering, Inc. should be contacted to perform a revised analysis. Furthermore, as no information pertaining to the allowable twist and sway requirements for the existing or proposed appurtenances was provided, deflection and rotation were not taken into consideration when performing this analysis.

See the **Appendix** for detailed modeling information

Table 3 - Summary of Working Percentage of Structural Components

Section No.	Elevation ft	Component Type	Size	% Capacity*	Pass Fail
T1	180 - 160	Leg	ROHN 2.5 STD	36.9	Pass
		Diagonal	L2x2x1/4	26.5 54.6 (b)	Pass
		Top Girt	L2x2x1/4	1.2 2.1 (b)	Pass
T2	160 - 140	Leg	ROHN 3 EH	63.5	Pass
		Diagonal	L2x2x1/4	35.5 63.6 (b)	Pass
		Top Girt	L2x2x1/4	5.0 7.6 (b)	Pass
T3	140 - 120	Leg	ROHN 4 EH	68.2	Pass
		Diagonal	L2x2x1/4	58.3 64.7 (b)	Pass
T4	120 - 100	Leg	ROHN 5 EH	65.2	Pass
		Diagonal	L2 1/2x2 1/2x1/4	52.5 67.3 (b)	Pass
T5	100 - 80	Leg	ROHN 6 EHS	69.6	Pass
		Diagonal	L2 1/2x2 1/2x1/4	72.6	Pass
T6	80 - 60	Leg	ROHN 6 EH	65.8	Pass
		Diagonal	L3x3x1/4	58.8 61.6 (b)	Pass
T7	60 - 40	Leg	ROHN 8 EHS	65.9	Pass
		Diagonal	L3 1/2x3 1/2x1/4	59.8 68.1 (b)	Pass
T8	40 - 20	Leg	ROHN 8 EH	56.9 59.3 (b)	Pass
		Diagonal	L4x4x1/4	55.0 79.1 (b)	Pass
T9	20 - 0	Leg	ROHN 8 EH	63.2	Pass

Section No.	Elevation ft	Component Type	Size	% Capacity*	Pass Fail
		Diagonal	L4x4x1/4	67.2 80.9 (b)	Pass

*Capacities include a 1/3 allowable stress increase for wind.

Table 4 - Maximum Base Reactions

Load Type	Direction	Current Analysis (TIA/EIA-222-F)	Original Design (TIA/EIA-222-F)
Individual Foundation	Horizontal	29 k	51 k
	Uplift	246 k	333 k
	Compression	282 k	369 k
Overturning Moment	---	4,916 k-ft	6,330 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

