STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

IN RE:	:	
	:	
APPLICATION OF MESSAGE CENTER MANAGEMENT AND NEW CINGULAR WIRELESS, PCS LLC FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR THE CONSTRUCTION, MAINTENANCE AND OPERATION OF A WIRELESS TELECOMMUNICATIONS FACILITY IN REDDING, CONNECTICUT	:	DOCKET NO. 449
	:	JULY 3, 2014

RESPONSES OF CELLCO PARTNERSHIP d/b/a VERIZON WIRELESS
TO CONNECTICUT SITING COUNCIL PRE-HEARING QUESTIONS

On June 16, 2014, the Connecticut Siting Council ("Council") issued Pre-Hearing Questions to Cellco Partnership d/b/a Verizon Wireless ("Cellco"), relating to the above-captioned docket. Below are Cellco's responses. Cellco identifies this facility as its "Redding NE" cell site.

Question No. 1

Does Cellco Partnership d/b/a Verizon Wireless (Cellco) have a search ring in the vicinity of the proposed tower? If yes, when was the search ring first initiated for a site in this area? What was the approximate radius of Cellco's search ring for this area? Provide the longitude and latitude coordinates of the center of the search ling. Show the search ring on a map.

Response

Cellco has had a search ring in eastern Redding since early 2007, when it expressed an interest in and intervened Sprint's proposal to rebuild the same Fire Department tower at 186 Black Rock Turnpike (Docket No. 334). The search ring in this area has remained active since

that time. A copy of the 2007 Search Ring Map is included in Attachment 1. The search ring has a radius of approximately 1.0 miles and is centered on the Fire Department site. Coordinates for the Fire Department parcel are included in the Docket No. 449 application behind Tab 3.

In 2007, Cellco proposed to install its antennas at the highest available location, the 110-foot level on the proposed 120-foot Sprint tower. Cellco prefers the 140-foot level on the proposed MCM tower. For the reasons discussed below, Cellco's service objectives in the area are much better served with antennas at the 140-foot level.

Question No. 2

Does Cellco have a lease with Message Center Management Inc. in order to co-locate on the tower?

Response

Cellco has an agreement, in principle, with Message Center Management Inc. ("MCM") to share the proposed tower and expects to finalize the lease shortly.

Question No. 3

How many antennas would Cellco install on the tower?

Response

Cellco would initially install twelve (12) antennas at the 140-foot level on the proposed tower.

Question No. 4

What type of antenna mount will be used for the proposed antennas, e.g. low-profile platform?

Response

Cellco intends to attach its antennas to a low-profile antenna platform at the 140-foot level on the proposed 150-foot tower.

Question No. 5

Provide specifications sheet(s) for the proposed antennas.

Response

Specification for Cellco's antennas are included in Attachment 2.

Question No. 6

Would flush-mounted antennas or antennas attached to the tower at the proposed height via T-arms provide the required coverage? Would either configuration result in reduced coverage and/or necessitate greater antenna height with multiple levels of antennas? Explain.

Response

Cellco could install a full array of twelve (12) antennas on T-arms without adversely impacting service from this tower location. As discussed in prior Council proceedings, going to a flush-mounted antenna configuration would result in significant compromises to Cellco's ability to provide reliable wireless service from any tower location, including the proposed Redding NE facility. Cellco's use flush-mounted antennas would result in a reduction in the overall size of the coverage footprint from this site, the inability to deploy all of Cellco's advanced wireless services and technologies, and the need to occupy more than one antenna location, limiting future colocation opportunities.

Question No. 7

Besides the proposed panel antennas, would Cellco install any remote radio heads or diplexers or other equipment on its antenna platform? Explain.

Response

Yes. Cellco intends to install three (3) remote radio heads (RRHs) behind its 2100 MHz antennas at this site. *See* Specifications included in Attachment 3.

Question No. 8

Would Cellco's equipment shelter have a light fixture installed on the outside wall? What type of lighting would be utilized? When would the light be on?

Response

Yes. Above the shelter door is a small security light, activated by a motion sensor. This is a typical "porch light" typically with a 75 watt light bulb inside.

Question No. 9

What measures are proposed for Cellco's equipment to ensure security and deter vandalism? (This would include but not be limited to alarms, gates, locks, etc.)

Response

Cellco's shelter is equipped with door locks for the equipment and generator rooms and a silent intrusion alarm system. The shelter will be located within a fenced facility compound with a gate that will remain locked.

Question No. 10

Which frequencies are Cellco licensed to utilize in Fairfield County?

Response

Cellco is licensed by the Federal Communications Commission ("FCC") to operate in the 700 MHz, 850 MHz, 1900 MHz and 2100 MHz frequency ranges throughout Connecticut including Fairfield County.

Question No. 11

List the frequency bands that Cellco would utilize at this site, e.g. 700 MHz, 850 MHz, 1900 MHz, and 2100 MHz or as applicable, and include the corresponding technology acronyms as applicable, e.g. LTE, CDMA, etc.

Response

Initially, Cellco would deploy its 700 MHz (LTE) and 2100 MHz (AWS) wireless service at the Redding NE cell site.

Question No. 12

What is the total estimated cost for antennas and equipment for Cellco? This would be analogous to the data that New Cingular Wireless PCS, LLC (AT&T) provided on page 29 of the Application.

Response

Cellco estimates its equipment and antenna costs to be approximately $600,000 at this location.

Question No. 13

Provide a power density analysis for Cellco's proposed antenna array and include the following information: number of channels per sector for each antenna system that would

be installed on the proposed tower, ERP per channel for each antenna system, and frequency at which each antenna system would operate.

Response

Operator	Operating Frequency	Number of Trans.	ERP Per Trans.	Total ERP	Distance to Target	Calculated Power Density	Maximum Permissible Exposure*	Fraction of MPE
	(MHz)		(watts)	(watts)	(feet)	(mW/cm^2)	(mW/cm^2)	(%)
VZW PCS	1970	15	402	6030	140	0.1106	1.0	11.06%
VZW Cell	869	9	333	2997	140	0.0550	0.579333333	9.49%
VZW AWS	2145	1	1750	1750	140	0.0321	1.0	3.21%
VZW 700	698	1	667	667	140	0.0122	0.465333333	2.63%
Total Percentage of Maximum Permissible Exposure								26.40%

*Guidelines adopted by the FCC on August 1, 1996, 47 CFR Part 1 based on NCRP Report 86, 1986 and generally on ANSI/IEEE C95.1-1992

MHz = Megahertz
mW/cm^2 = milliwatts per square centimeter
ERP = Effective Radiated Power

Question No. 14

Does Cellco have any statistics on dropped calls and/or ineffective attempts in the vicinity of the proposed facility? If so, what do they indicate? Does Cellco have any other indicators of substandard service in this area?

Response

As depicted on the "existing" coverage plots included in Attachment 4, Cellco has little or no coverage in the area around the proposed cell site at 186 Black Rock Turnpike. For those sectors of adjacent cell sites directed toward the Redding NE search area, Cellco experiences dropped calls at an average rate of 2.2% and ineffective attempts at an average rate of 2.14%.

Cellco's network design objective for dropped calls and ineffective attempts is less than one percent (1%). Other indicators of substandard service include the results of Cellco's monthly drive tests, customer complaints, propagation modeling data and system performance data. *See* also Cellco's responses to Question Nos. 24 and 26.

Question No. 15

Page 1 of the Application indicates that the purpose of the proposed facility is to allow AT&T to "...provide services in the vicinity of Blackrock Turnpike and other local roads, schools, and homes in the Redding Ridge area." Does that quote also apply to Cellco? If necessary, modify that quote to indicate Cellco's purpose for co-locating at the facility.

Response

Yes. Generally speaking, the AT&T quote would also apply to Cellco's need for service in the area.

Question No. 16

Would Cellco's antennas comply with federal E911 requirements?

Response

Yes.

Question No. 17

Identify distances and directions to the adjacent sites with which the proposed facility would hand off signals. Include addresses of these sites, tower/structure type e.g. monopole, tower/structure heights, Cellco's existing antenna centerline heights, and distances and directions from the proposed tower.

Response

Cellco's existing Easton North cell site is located approximately 1.8 miles to the east at 197 North Street in Easton, Connecticut. Cellco antennas at mounted at the 165-foot level of this existing 190-foot "tree" tower.

Cellco's existing Redding cell site is located approximately 2.25 miles to the northwest at 80 Lonetown Road, Redding, Connecticut. Cellco antennas are mounted at the 90-foot level on this existing 120-foot lattice tower.

Cellco's existing Topstone cell site is located approximately 5 miles to the west at 100 Old Redding Road, Redding, Connecticut. Cellco antennas are mounted at the 172-foot level on this existing 180-foot lattice tower.

Cellco's existing Weston North cell site is located approximately 5 miles to the south at 237 Godfrey Road, Weston, Connecticut. Cellco antennas are mounted at the 165-foot level on this existing 185-foot lattice tower.

Cellco's existing Easton North 2 cell site is located approximately 3.75 miles to the southeast at 206 Everett Road in Easton, Connecticut. Cellco antennas at mounted at the 128-foot level of this existing 158-foot monopole tower.

Question No. 18

Would the proposed site be needed for coverage, capacity, or both? Explain.

Response

The proposed Redding NE cell site would primarily provide Cellco customers with significant coverage benefits along Route 58 and local roads in the area and to a lesser extent

capacity relief to several of its adjacent cell sites.

Question No. 19

Are all frequencies used to transmit voice and data?

Response

Currently, no. Cellco is utilizing its 850 MHz and 1900 MHz frequencies to transmit CDMA voice services and data services and utilizes its 700 MHz and 2100 MHz frequencies to transmit long-term evolution (LTE) data services only. Cellco plans to launch LTE voice services some time later in 2014. Initially, Cellco would deploy only 700 MHz and 2100 MHz frequencies at the Redding NE cell site.

Question No. 20

What is the lowest height at which Cellco's antennas could achieve its coverage objectives from the proposed site?

Response

Cellco could install its antennas at the 120-foot level on the proposed tower and still satisfy most of its coverage objectives in the central Redding area. Because Cellco's coverage in the area very limited today, the 140' antenna height is preferred.

Question No. 21

What is the signal strength for which Cellco designs its system? Also include in-vehicle and in-building thresholds if applicable.

Response

Cellco's minimum design threshold signal strength is -85 dBm for in-vehicle service and

-75 dBm for in-vehicle service. These thresholds are the same for voice and data services.

Question No. 22

What is the existing signal strength within the area Cellco is seeking to cover from this site?

Response

Signal strength in the area around the proposed Redding NE cell site ranges from -85 dBm to -113 dBm.

Question No. 23

Does Cellco have any statistics on dropped calls and/or ineffective attempts in the vicinity of the proposed facility? If so, what do they indicate? Does Cellco have any other indicators of substandard service in this area?

Response

See Cellco's Response to Question No. 14.

Question No. 24

Provide existing coverage plots for 700 MHz, 850 MHz, 1900 MHz, and 2100 MHz or other frequencies as applicable. Also provide the existing plus proposed coverage plots for same frequencies.

Response

Coverage plots showing Cellco's existing service in the area are included in Attachment 4. Plots showing existing and proposed coverage, with Cellco antennas at the 140' level on the proposed tower are included in Attachment 5.

Question No. 25

Provide propagation maps showing existing plus proposed coverage at an antenna height that is ten feet shorter than proposed for 700 MHz, 850 MHz, 1900 MHz, and 2100 MHz or as applicable.

Response

The plots requested are included in Attachment 6.

Question No. 26

Provide the lengths of the coverage gaps on the primary roads that Cellco is seeking to cover from the proposed site at the proposed frequencies, e.g. 700 MHz, 850 MHz, 1900 MHz, and 2100 MHz or as applicable.

Response

For the purposes of this response and Cellco's response to Question No. 28, Cellco considers the "primary roads" in the area to included State Route 58 (Black Rock Turnpike) and Cross Highway. The total length of Cellco's coverage gaps along Black Rock Turnpike in the area around the Redding NE facility is 3.65 miles. The total length of Cellco's coverage gaps along Cross Highway in the area around the Redding NE facility is 2.25 miles.

Question No. 27

Provide the lengths of the coverage gaps on the secondary roads that Cellco is seeking to cover from the proposed site at the proposed frequencies, e.g. 700 MHz, 850 MHz, 1900 MHz, and 2100 MHz or as applicable.

Response

There are numerous secondary roads in the area around the Redding NE facility that suffer from unreliable service today. The total length of gaps along these secondary road is 2.85 miles at 700 MHz, 3.14 miles at 850 MHz, 4.84 miles at 1900 MHz, and 5.02 miles at 2100 MHz frequencies. The secondary roads in the area that were evaluated for this response include, Silversmith Lane, Meeker Hill Road, Turney Road, South Lane, Iris Lane, Beech Lane, Sullivan Drive, Hopewell Woods Road and Sunset Hill Road.

Question No. 28

Provide the lengths of the coverage that Cellco would provide along primary roads from the proposed site at the proposed frequencies, e.g. 700 MHz, 850 MHz, 1900 MHz, and 2100 MHz or as applicable. Also provide such data assuming that the tower is ten feet shorter.

Response

At 700 MHz, the proposed facility will cover a 0.42 mile portion of Cross Highway and a 2.42 mile portion of Black Rock Turnpike. At 850 MHz, the proposed facility will cover a 0.35 mile portion Cross Highway and a 2.20 mile portion of Black Rock Turnpike. At 1900 MHz, the proposed facility will cover a 0.30 mile portion of Cross Highway and a 1.94 mile portion of Black Rock Turnpike. At 2100 MHz, the proposed facility will cover a 0.30 mile portion of Cross Highway and a 1.85 mile portion of Black Rock Turnpike.

Question No. 29

Provide the lengths of the coverage that Cellco would provide along secondary

roads from the proposed site at the proposed frequencies, e.g. 700 MHz, 850 MHz, 1900 MHz and 2100 MHz or as applicable. Also provide such data assuming that the tower is ten feet shorter.

Response

For the same secondary roads listed in in response to Question No. 27, Cellco will provide a total of 9.20 miles of coverage at 700 MHz, 6.95 miles of coverage at 850 MHz, 5.40 miles of coverage at 1900 MHz, and 5.05 miles of coverage at 2100 MHz.

Question No. 30

What is the predicted coverage footprint from the proposed site (in square miles), at each frequency used by Cellco? Also, provide such coverage footprints assuming that the tower is ten feet shorter.

Response

Coverage Footprint (Sq. Miles)				
Antenna Height	**700 MHz**	**850 MHz**	**1900 MHz**	**2100 MHz**
140 feet	33.56	15.19	12.22	7.8
130 feet	32.24	14.46	11.76	7.5

Question No. 31

Would Cellco share the fire department's backup generator or share a generator with AT&T or utilize its own backup generator? Explain. Where would the backup generator that

would serve Cellco be located?

Response

Cellco anticipates that it will install a back-up generator for its own use inside its equipment shelter and be responsible for its own back-up power supply at this cell site. It is Cellco's understanding, however, that MCM is in discussions with the Fire Department about the installation of one shared generator at this site. Cellco does not have any detailed information about the status of those discussions.

Question No. 32

What is the fuel source, amount of fuel storage, and run time for the backup generator before it is refueled?

Response

Cellco proposes to install a diesel-fueled back-up generator inside its shelter. The generator would include a 210 gallon "belly" tank included as a part of the generator unit. At full load, Cellco's generator could run continuously for approximately 49 hours before refueling would be required. As Cellco has discussed in prior proceedings, at less than full load, under more "normal" operating conditions, the same generator could run for up to four (4) days before refueling would be required.

Question No. 33

Would Cellco also provide battery backup to provide seamless uninterrupted power (in order to prevent a reboot condition) while the backup generator starts? If the generator fails to start, approximately how many hours could the battery backup power Cellco's equipment?

Response

Yes. Battery power, associated with Cellco's typical cell site, can provide up to eight hours of reliable back-up power.

Question No. 34

Has Cellco considered using a fuel cell as a backup power source for the proposed site? Explain.

Response

Cellco continues with its research and development programs which focus on ways to improve all aspects of its network operations, including back-up power supplies but has not committed to use fuel cells for primary or back-up power at individual cell sites. As we've discussed in prior Council proceedings, Cellco is still engaged in certain "trials" where the use of fuel cells at active cell sites continues to be evaluated. One interesting issue that surfaced in the aftermath of Superstorm Sandy was that, unlike Cellco's diesel and propane refueling vendors, the hydrogen refueling vendor identified for the fuel cell trial sites was not well equipped to respond during the disaster recovery period.

Question No. 35

Identify the safety standards and/or codes by which equipment, machinery, or technology would be used or operated at the proposed facility.

Response

Cellco is not aware of any specific manufacturer's safety standards for the equipment machinery and technology to be installed and used at the Redding NE cell site. The facility

described in this Application will be designed and constructed in accordance with the appropriate State building code requirements and the standards of the Electronic Industries Association.

Question No. 36

Will the proposed facility support text-to-911 service? Is additional equipment required for this purpose?

Response

Yes. The Redding NE facility will support text-to-911 service as soon as the supporting Public Safety Answering Point (PSAP) is ready to accept text-to-911 messages. No additional equipment is required at the Redding NE cell site to support this service.

Question No. 37

Is Cellco aware of any Public Safety Answering Points in the area of the proposed site that are able to accept text-to-911?

Response

No, not at this time.

CERTIFICATE OF SERVICE

I hereby certify that on the 3rd day of July, 2014, a copy of the foregoing was sent, via electronic mail, to:

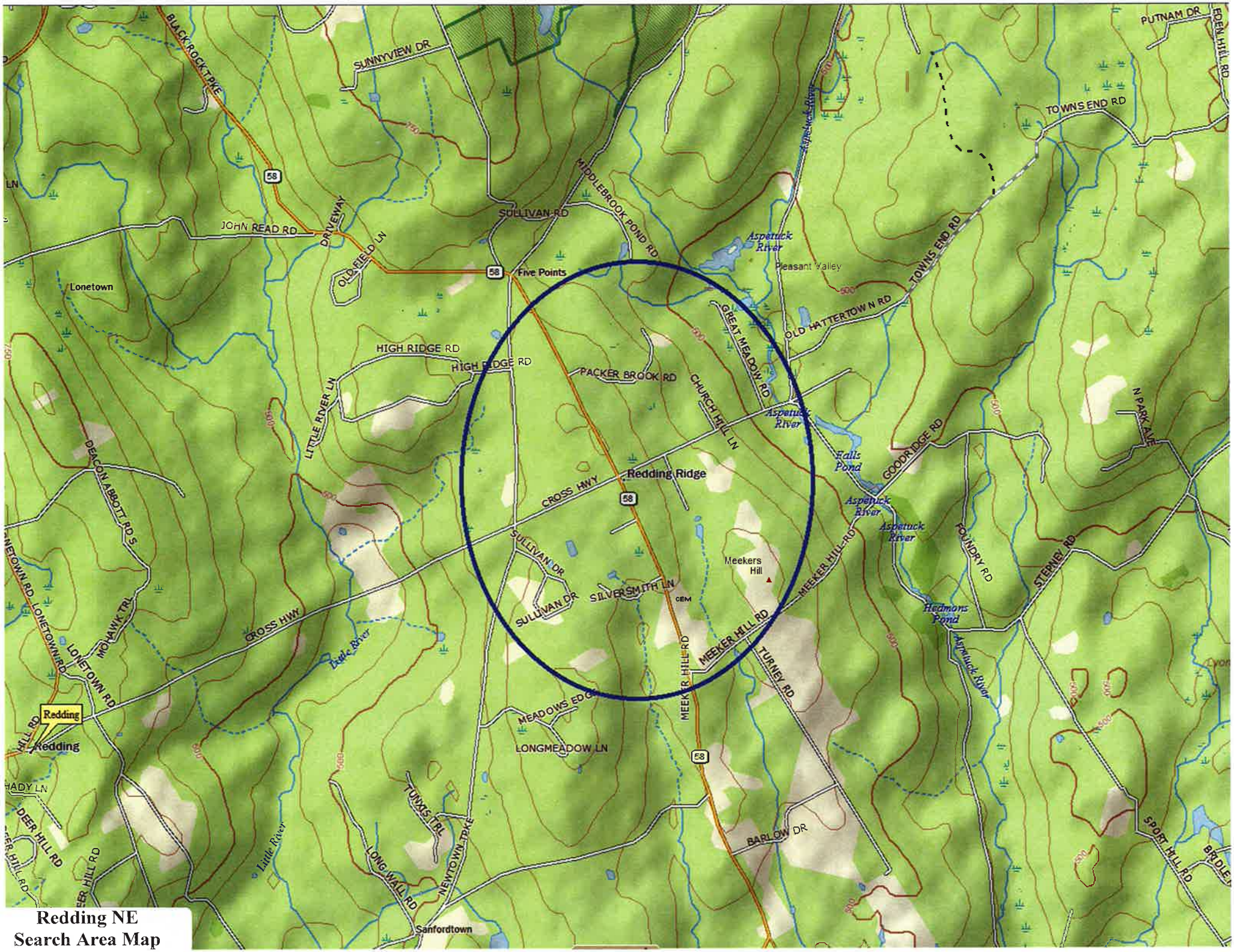
Daniel M. Laub, Esq.
Christopher B. Fisher, Esq.
Cuddy & Feder LLP
445 Hamilton Avenue, 14th Floor
White Plains, NY 10601
CFisher@cuddyfeder.com
DLaub@cuddyfeder.com

Michele Briggs
AT&T
500 Enterprise Drive
Rocky Hill, CT 06067-3900
Michele.g.briggs@cingular.com

Virginia King
Message Center Management
40 Woodland Street
Hartford, CT 06105
vking@mcmgmt.com

Kenneth C. Baldwin

ATTACHMENT 1


Redding NE
Search Area Map
Redding Ridge
Five Points
Lonetown
Pleasant Valley
Meekers Hill
Redding
Sanfordtown
SULLIVAN RD
HIGH RIDGE RD
PACKER BROOK RD
CHURCH HILL LN
GREAT MEADOW RD
OLD HATTERTOWN RD
TOWNS END RD
GOODRIDGE RD
CROSS HWY
SULLIVAN DR
SILVERSMITH LN
MEEKER HILL RD
TURNEY RD
LONGMEADOW LN
MEADOWS EDGE
BARLOW DR
LITTLE RIVER LN
JOHN READ RD
DRIVEWAY
OLD FIELD LN
MIDDLEBROOK POND RD
SUNNYVIEW DR
BLACK ROCK TPKE
PUTNAM DR
EDEN HILL RD
N PARK AVE
FOUNDRY RD
STEPNEY RD
SPORT HILL RD
DEACON ABBOTT RD S
MOHAWK TRL
LONETOWN RD
DEER HILL RD
LONG WALL RD
NEWTOWN TPKE
TUNXIS TRL
Aspetuck River
Falls Pond
Hedmons Pond
Little River
Pond River
CEM
58

ATTACHMENT 2

Product Specifications

COMMSCOPE®

POWERED BY ANDREW.

LNX-6514DS-VTM

Andrew® Antenna, 698–896 MHz, 65° horizontal beamwidth, RET compatible

- Great solution to maximize network coverage and capacity
- Excellent gain, VSWR, front-to-back ratio, and PIM specifications for robust network performance
- Ideal choice for site collocations and tough zoning restrictions
- Excellent solution for site sharing and maximizing capacity
- Fully compatible with Andrew remote electrical tilt system for greater OpEx savings
- The RF connectors are designed for IP67 rating and the radome for IP56 rating

Electrical Specifications

Frequency Band, MHz	**698–806**	**806–896**
Gain, dBi	15.7	16.3
Beamwidth, Horizontal, degrees	65	65
Beamwidth, Horizontal Tolerance, degrees	±3	±3
Beamwidth, Vertical, degrees	12.5	11.2
Beam Tilt, degrees	0–10	0–10
USLS, typical, dB	17	18
Front-to-Back Ratio at 180°, dB	32	30
CPR at Boresight, dB	20	20
CPR at Sector, dB	10	10
Isolation, dB	30	30
VSWR | Return Loss, dB	1.4 | 15.6	1.4 | 15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153
Input Power per Port, maximum, watts	400	400
Polarization	±45°	±45°
Impedance	50 ohm	50 ohm

General Specifications

Antenna Brand	Andrew®
Antenna Type	DualPol®
Band	Single band
Brand	DualPol® | Teletilt®
Operating Frequency Band	698 – 896 MHz

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Aluminum
Radome Material	Fiberglass, UV resistant
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	2
Wind Loading, maximum	617.7 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph

Product Specifications

LNX-6514DS-VTM

Dimensions

Depth	181.0 mm | 7.1 in
Length	1847.0 mm | 72.7 in
Width	301.0 mm | 11.9 in
Net Weight	17.6 kg | 38.8 lb

Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 1.1 Actuator	LNX-6514DS-R2M
Model with Factory Installed AISG 2.0 Actuator	LNX-6514DS-A1M
RET System	Teletilt®

Regulatory Compliance/Certifications

Agency	Classification
RoHS 2011/65/EU	Compliant by Exemption
China RoHS SJ/T 11364-2006	Above Maximum Concentration Value (MCV)
ISO 9001:2008	Designed, manufactured and/or distributed under this quality management system

Included Products

DB380 — Pipe Mounting Kit for 2.4"-4.5" (60-115mm) OD round members on wide panel antennas. Includes 2 clamp sets and double nuts.

DB5083 — Downtilt Mounting Kit for 2.4"-4.5" (60 - 115 mm) OD round members. Includes a heavy-duty, galvanized steel downtilt mounting bracket assembly and associated hardware. This kit is compatible with the DB380 pipe mount kit for panel antennas that are equipped with two mounting brackets.

Product Specifications

COMMSCOPE®

HBXX-6517DS-VTM

Andrew® Quad Port Teletilt® Antenna, 1710–2180 MHz, 65° horizontal beamwidth, RET compatible

POWERED BY ANDREW.

Electrical Specifications

Frequency Band, MHz	1710–1880	1850–1990	1920–2180
Gain by all Beam Tilts, average, dBi	18.5	18.6	18.8
Gain by all Beam Tilts Tolerance, dB	±0.4	±0.3	±0.4
Gain by Beam Tilt, average, dBi	0 ° | 18.4 3 ° | 18.7 6 ° | 18.4	0 ° | 18.4 3 ° | 18.7 6 ° | 18.5	0 ° | 18.7 3 ° | 18.9 6 ° | 18.6
Beamwidth, Horizontal, degrees	67	66	65
Beamwidth, Horizontal Tolerance, degrees	±2.4	±1.7	±2.9
Beamwidth, Vertical, degrees	5.0	4.7	4.4
Beamwidth, Vertical Tolerance, degrees	±0.3	±0.3	±0.3
Beam Tilt, degrees	0–6	0–6	0–6
USLS, dB	18	19	19
Front-to-Back Total Power at 180° ± 30°, dB	25	26	26
CPR at Boresight, dB	22	23	22
CPR at Sector, dB	10	10	9
Isolation, dB	30	30	30
VSWR | Return Loss, dB	1.4 | 15.6	1.4 | 15.6	1.4 | 15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350
Polarization	±45°	±45°	±45°

**Values calculated using NGMN Alliance N-P-BASTA v9.6*

Mechanical Specifications

Color | Radome Material	Light gray | PVC, UV resistant
Connector Interface | Location | Quantity	7-16 DIN Female | Bottom | 4
Wind Loading, maximum	668.0 N @ 150 km/h 150.2 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph
Antenna Dimensions, L x W x D	1903.0 mm x 305.0 mm x 166.0 mm | 74.9 in x 12.0 in x 6.5 in
Net Weight	19.5 kg | 43.0 lb
Model with factory installed AISG 2.0 RET	HBXX-6517DS-A2M

ATTACHMENT 3

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 weights 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

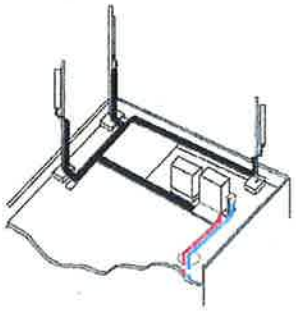
Because of its small size and weight, the Alcatel-Lucent RRH2x40-07-U can be installed close to the antenna. Operators can therefore locate the Alcatel-Lucent RRH2x40-07-U where RF engineering is deemed ideal, minimizing trade-offs between available sites and RF optimum sites. The RF feeder cost and 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.

Features

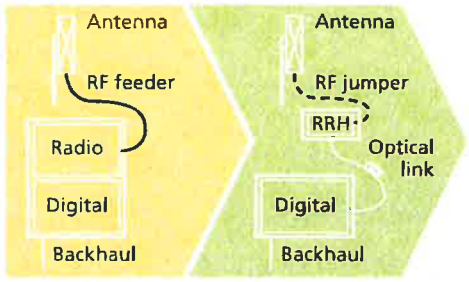
- Zero-footprint deployment
- Easy installation, with a lightweight unit can be carried and set up by one person
- Optimized RF power, with flexible site selection and elimination of a TMA
- Convection-cooled (fanless), noise-free, and heaterless unit
- Best-in-class power efficiency, with significantly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

Benefits

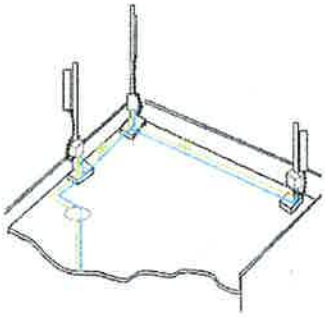
- Leverages existing real estate with lower site costs
- Reduces installation costs, with fewer installation materials and simplified logistics
- Decreases power costs and minimizes environmental impacts, with the potential for eco-sustainable power options
- Improves RF performance and adds flexibility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



Macro



RRH for space-constrained cell sites



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

www.alcatel-lucent.com

CPG2809100913 (09)

Alcatel·Lucent

ATTACHMENT 4

Existing Verizon Wireless 700 MHz Coverage
Redding, Connecticut and Surrounding Area
(*Map Scale is 1:35,000)

Coverage plot assumes 55% site loading on the Cellco system
Coverage is depicted at a signal threshold of -85 dBm

NEWTOWN WEST CT
BETHEL CT
REDDING CT
REDDING NE CT
EASTON NORTH CT
MONROE CT
TOPSTONE CT
EASTON NORTH 2 CT
WESTON NORTH CT
TRUMBULL CENTER CT
FAIRFIELD NORTH CT

DANBURY
BETHEL
NEWTOWN
OXFORD
MONROE
REDDING
SHELTON
RIDGEFIELD
EASTON
TRUMBULL
WESTON
LEWISBORO
WILTON
BRIDGEPORT
FAIRFIELD

Legend

- Proposed Verizon Wireless Facility
- Existing Verizon Wireless Facilities
- Existing Surrounding Wireless 700 MHz Coverage
- Major Route
- Municipal and Private Open Space
- School
- State Forest/Park
- Open Water
- Town Line

ALL-POINTS TECHNOLOGY CORPORATION

verizon wireless

N
W E
S

0 0.75 1.5 Miles

Map Notes:
This map was prepared at a map scale of 1:35,000 at 24" by 36" layout. Report copies have been reduced to 11" x 17". Refer to graphic scale. Open Space, Schools, and State Forests/Parks are depicted using available State GIS data, which may be outdated in some areas. Base map: CTECO Hillshade (2000)

C:\GIS\Projects\verizon\Redding\gis_MXD\RF_Plots\700MHz_Existing.mxd

Existing Verizon Wireless 850 MHz Coverage
Redding, Connecticut and Surrounding Area
(*Map Scale is 1:35,000)

Coverage plot assumes 55% site loading on the Cellco system
Coverage is depicted at a signal threshold of -85 dBm

NEWTOWN WEST CT
BETHEL CT
REDDING CT
REDDING NE CT
MONROE CT
EASTON NORTH CT
EASTON NORTH 2 CT
TOPSTONE CT
WESTON NORTH CT
TRUMBULL CENTER CT
FAIRFIELD NORTH CT

DANBURY
BETHEL
NEWTOWN
OXFORD
MONROE
REDDING
RIDGEFIELD
EASTON
SHELTON
WESTON
TRUMBULL
LEWISBORO
WILTON
BRIDGEPORT
FAIRFIELD

Legend

- Proposed Verizon Wireless Facility
- Existing Verizon Wireless Facilities
- Existing Surrounding Wireless 850 MHz Coverage
- Major Route
- Municipal and Private Open Space
- School
- State Forest/Park
- Open Water
- Town Line

ALL-POINTS TECHNOLOGY CORPORATION

verizon

0 0.75 1.5 Miles

Map Notes:
This map was prepared at a map scale of 1:35,000 at 24" by 36" layout. Report copies have been reduced to 11" x 17". Refer to graphic scale
Open Space, Schools, and State Forests/Parks are depicted using available State GIS data, which may be outdated in some areas.
Base map: CTECO Hillshade (2009)

Existing Verizon Wireless 1900 MHz Coverage
Redding, Connecticut and Surrounding Area
(*Map Scale is 1:35,000)

Coverage plot assumes 55% site loading on the Cellco system
Coverage is depicted at a signal threshold of -85 dBm

NEWTOWN WEST CT
BETHEL CT
REDDING CT
REDDING NE CT
MONROE CT
EASTON NORTH CT
EASTON NORTH 2 CT
TOPSTONE CT
WESTON NORTH CT
TRUMBULL CENTER CT
FAIRFIELD NORTH CT

DANBURY
BETHEL
NEWTOWN
OXFORD
MONROE
REDDING
SHELTON
RIDGEFIELD
EASTON
TRUMBULL
WESTON
LEWISBORO
WILTON
FAIRFIELD
BRIDGEPORT

Legend

- Proposed Verizon Wireless Facility
- Existing Verizon Wireless Facilities
- Existing Surrounding Wireless 1900 MHz Coverage
- Major Route
- Municipal and Private Open Space
- School
- State Forest/Park
- Open Water
- Town Line

ALL-POINTS TECHNOLOGY CORPORATION

verizon wireless

0 0.75 1.5 Miles

Map Notes:
This map was prepared at a map scale of 1:35,000 at 24" by 36" layout. Report copies have been reduced to 11" x 17". Refer to graphic scale.
Open Space, Schools, and State Forests/Parks are depicted using available State GIS data, which may be outdated in some areas.
Base map: CTECO Hillshade (2000)

Existing Verizon Wireless 1700 MHz / 2100 MHz Coverage
Redding, Connecticut and Surrounding Area
(*Map Scale is 1:35,000)

Coverage plot assumes 55% site loading on the Cellco system
Coverage is depicted at a signal threshold of -85 dBm

NEWTOWN WEST CT
BETHEL CT
REDDING CT
REDDING NE CT
EASTON NORTH CT
MONROE CT
TOPSTONE CT
EASTON NORTH 2 CT
TRUMBULL CENTER CT
WESTON NORTH CT
FAIRFIELD NORTH CT

DANBURY
BETHEL
NEWTOWN
OXFORD
REDDING
RIDGEFIELD
EASTON
MONROE
TRUMBULL
SHELTON
WESTON
LEWISBORO
WILTON
BRIDGEPORT
FAIRFIELD

Council of New York

Legend

- Proposed Verizon Wireless Facility
- Existing Verizon Wireless Facilities
- Existing Surrounding Wireless 1700 MHz / 2100 MHz Coverage
- Major Route
- Municipal and Private Open Space
- School
- State Forest/Park
- Open Water
- Town Line

ALL-POINTS TECHNOLOGY CORPORATION

verizon

0 0.75 1.5 Miles

Map Notes:
This map was prepared at a map scale of 1:35,000 at 24" by 36" layout. Report copies have been reduced to 11" x 17". Refer to graphic scale.
Open Space, Schools, and State Forests/Parks are depicted using available State GIS data, which may be outdated in some areas.
Base map: CTECO Hillshade (2000)

ATTACHMENT 5

Proposed Verizon Wireless 700 MHz Coverage
with Antenna Centerline Height at 140' AGL
Redding, Connecticut and Surrounding Area
(*Map Scale is 1:35,000)

Coverage plot assumes 55% site loading on the Cellco system
Coverage is depicted at a signal threshold of -85 dBm

NEWTOWN WEST CT
BETHEL CT
REDDING CT
REDDING NE CT
EASTON NORTH CT
MONROE CT
TOPSTONE CT
EASTON NORTH 2 CT
TRUMBULL CENTER CT
WESTON NORTH CT
FAIRFIELD NORTH CT

DANBURY
BETHEL
NEWTOWN
OXFORD
MONROE
REDDING
RIDGEFIELD
EASTON
TRUMBULL
SHELTON
WESTON
WILTON
LEWISBORO
BRIDGEPORT
FAIRFIELD

Legend

- Proposed Verizon Wireless Facility
- Existing Verizon Wireless Facilities
- Existing Surrounding Wireless 700 MHz Coverage
- Proposed Facility Wireless 700 MHz Coverage with Antenna Centerline at 140'
- Major Route
- Municipal and Private Open Space
- School
- State Forest/Park
- Open Water
- Town Line

ALL-POINTS TECHNOLOGY CORPORATION

verizon

Map Notes:
This map was prepared at a map scale of 1:35,000 at 24" by 36" layout. Report copies have been reduced to 11" x 17". Refer to graphic scale.
Open Space, Schools, and State Forests/Parks are depicted using available State GIS data, which may be outdated in some areas.
Base map: CTECO Hillshade (2000)

0 0.75 1.5 Miles

Proposed Verizon Wireless 850 MHz Coverage with Antenna Centerline Height at 140' AGL Redding, Connecticut and Surrounding Area (*Map Scale is 1:35,000)

Coverage plot assumes 55% site loading on the Cellco system
Coverage is depicted at a signal threshold of -85 dBm

NEWTOWN WEST CT
BETHEL CT
REDDING CT
REDDING NE CT
EASTON NORTH CT
MONROE CT
TOPSTONE CT
EASTON NORTH 2 CT
TRUMBULL CENTER CT
WESTON NORTH CT
FAIRFIELD NORTH CT

DANBURY
BETHEL
NEWTOWN
OXFORD
MONROE
REDDING
SHELTON
RIDGEFIELD
EASTON
TRUMBULL
WESTON
LEWISBORO
WILTON
BRIDGEPORT
FAIRFIELD

Legend

- Proposed Verizon Wireless Facility
- Existing Verizon Wireless Facilities
- Existing Surrounding Wireless 850 MHz Coverage
- Proposed Facility Wireless 850 MHz Coverage with Antenna Centerline at 140'
- Major Route
- Municipal and Private Open Space
- School
- State Forest/Park
- Open Water
- Town Line

ALL-POINTS TECHNOLOGY CORPORATION

verizon wireless

0 0.75 1.5 Miles

Map Notes:
This map was prepared at a map scale of 1:35,000 at 24" by 36" layout. Report copies have been reduced to 11" x 17". Refer to graphic scale.
Open Space, Schools, and State Forests/Parks are depicted using available State GIS data, which may be outdated in some areas.
Base map: CTECO Hillshade (2009)

Proposed Verizon Wireless 1900 MHz Coverage
with Antenna Centerline Height at 140' AGL
Redding, Connecticut and Surrounding Area
(*Map Scale is 1:35,000)

Coverage plot assumes 55% site loading on the Cellco system
Coverage is depicted at a signal threshold of -85 dBm

NEWTOWN WEST CT
BETHEL CT
REDDING CT
REDDING NE CT
MONROE CT
EASTON NORTH CT
TOPSTONE CT
EASTON NORTH 2 CT
WESTON NORTH CT
TRUMBULL CENTER CT
FAIRFIELD NORTH CT
DANBURY
BETHEL
NEWTOWN
OXFORD
REDDING
MONROE
SHELTON
RIDGEFIELD
EASTON
TRUMBULL
WESTON
LEWISBORO
WILTON
FAIRFIELD
BRIDGEPORT

Legend

- Proposed Verizon Wireless Facility
- Existing Verizon Wireless Facilities
- Existing Surrounding Wireless 1900 MHz Coverage
- Proposed Facility Wireless 1900 MHz Coverage with Antenna Centerline at 140'
- Major Route
- Municipal and Private Open Space
- School
- State Forest/Park
- Open Water
- Town Line

ALL-POINTS TECHNOLOGY CORPORATION

verizon wireless

0 0.75 1.5 Miles

Map Notes:
This map was prepared at a map scale of 1:35,000 at 24" by 36" layout. Report copies have been reduced to 11" x 17". Refer to graphic scale.
Open Space, Schools, and State Forests/Parks are depicted using available State GIS data, which may be outdated in some areas.
Base map: CTECO Hillshade (2009)

Proposed Verizon Wireless 1700 MHz / 2100 MHz Coverage with Antenna Centerline Height at 140' AGL
Redding, Connecticut and Surrounding Area
(*Map Scale is 1:35,000)

Coverage plot assumes 55% site loading on the Cellco system
Coverage is depicted at a signal threshold of -85 dBm

NEWTOWN WEST CT
BETHEL CT
MONROE CT
REDDING CT
EASTON NORTH CT
REDDING NE CT
TOPSTONE CT
EASTON NORTH 2 CT
WESTON NORTH CT
TRUMBULL CENTER CT
FAIRFIELD NORTH CT

DANBURY
BETHEL
NEWTOWN
OXFORD
MONROE
REDDING
SHELTON
RIDGEFIELD
EASTON
TRUMBULL
WESTON
LEWISBORO
WILTON
BRIDGEPORT
FAIRFIELD

Legend

- Proposed Verizon Wireless Facility
- Existing Verizon Wireless Facilities
- Existing Surrounding Wireless 1700 MHz / 2100 MHz Coverage
- Proposed Facility Wireless 1700 MHz / 2100 MHz Coverage with Antenna Centerline at 140'
- Major Route
- Municipal and Private Open Space
- School
- State Forest/Park
- Open Water
- Town Line

0 0.75 1.5 Miles

Map Notes:
This map was prepared at a map scale of 1:35,000 at 24" by 36" layout. Report copies have been reduced to 11" x 17". Refer to graphic scale.
Open Space, Schools, and State Forests/Parks are depicted using available State GIS data, which may be outdated in some areas.
Base map: CTECO Hillshade (2000)

ATTACHMENT 6

Proposed Verizon Wireless 1700 MHz / 2100 MHz Coverage with Antenna Centerline Height at 130' AGL
Redding, Connecticut and Surrounding Area
(*Map Scale is 1:35,000)

Coverage plot assumes 55% site loading on the Cellco system
Coverage is depicted at a signal threshold of -85 dBm

NEWTOWN WEST CT
BETHEL CT
MONROE CT
REDDING CT
EASTON NORTH CT
REDDING NE CT
TOPSTONE CT
EASTON NORTH 2 CT
WESTON NORTH CT
TRUMBULL CENTER CT
FAIRFIELD NORTH CT

DANBURY
BETHEL
NEWTOWN
OXFORD
MONROE
REDDING
SHELTON
RIDGEFIELD
EASTON
TRUMBULL
WESTON
LEWISBORO
WILTON
BRIDGEPORT
FAIRFIELD

Legend

- Proposed Verizon Wireless Facility
- Existing Verizon Wireless Facilities
- Existing Surrounding Wireless 1700 MHz / 2100 MHz Coverage
- Proposed Facility Wireless 1700 MHz / 2100 MHz Coverage with Antenna Centerline at 130'
- Major Route
- Municipal and Private Open Space
- School
- State Forest/Park
- Open Water
- Town Line

ALL-POINTS TECHNOLOGY CORPORATION

verizon

0 0.75 1.5 Miles

Map Notes:
This map was prepared at a map scale of 1:35,000 at 24" by 36" layout. Report copies have been reduced to 11" x 17". Refer to graphic scale
Open Space, Schools, and State Forests/Parks are depicted using available State GIS data, which may be outdated in some areas.
Base map: CTECO Hillshade (2009)

Proposed Verizon Wireless 1900 MHz Coverage
with Antenna Centerline Height at 130' AGL
Redding, Connecticut and Surrounding Area
(*Map Scale is 1:35,000)

Coverage plot assumes 55% site loading on the Cellco system
Coverage is depicted at a signal threshold of -85 dBm

NEWTOWN WEST CT
BETHEL CT
REDDING CT
REDDING NE CT
EASTON NORTH CT
MONROE CT
TOPSTONE CT
EASTON NORTH 2 CT
TRUMBULL CENTER CT
WESTON NORTH CT
FAIRFIELD NORTH CT

DANBURY
BETHEL
NEWTOWN
OXFORD
REDDING
MONROE
SHELTON
RIDGEFIELD
EASTON
TRUMBULL
WESTON
BRIDGEPORT
FAIRFIELD
LEWISBORO
WILTON

Legend

- Proposed Verizon Wireless Facility
- Existing Verizon Wireless Facilities
- Existing Surrounding Wireless 1900 MHz Coverage
- Proposed Facility Wireless 1900 MHz Coverage with Antenna Centerline at 130'
- Major Route
- Municipal and Private Open Space
- School
- State Forest/Park
- Open Water
- Town Line

ALL-POINTS TECHNOLOGY CORPORATION

verizon wireless

0 0.75 1.5 Miles

Map Notes:
This map was prepared at a map scale of 1:35,000 at 24" by 36" layout. Report copies have been reduced to 11" x 17". Refer to graphic scale.
Open Space, Schools, and State Forests/Parks are depicted using available State GIS data, which may be outdated in some areas.
Base map: CTECO Hillshade (2000)

Proposed Verizon Wireless 700 MHz Coverage
with Antenna Centerline Height at 130' AGL
Redding, Connecticut and Surrounding Area
(*Map Scale is 1:35,000)

Coverage plot assumes 55% site loading on the Cellco system
Coverage is depicted at a signal threshold of -85 dBm

NEWTOWN WEST CT
BETHEL CT
REDDING CT
REDDING NE CT
MONROE CT
EASTON NORTH CT
EASTON NORTH 2 CT
TOPSTONE CT
WESTON NORTH CT
TRUMBULL CENTER CT
FAIRFIELD NORTH CT

DANBURY
BETHEL
NEWTOWN
OXFORD
REDDING
MONROE
SHELTON
RIDGEFIELD
EASTON
WESTON
TRUMBULL
BRIDGEPORT
FAIRFIELD
LEWISBORO
WILTON

Legend

- Proposed Verizon Wireless Facility
- Existing Verizon Wireless Facilities
- Existing Surrounding Wireless 700 MHz Coverage
- Proposed Facility Wireless 700 MHz Coverage with Antenna Centerline at 130'
- Major Route
- Municipal and Private Open Space
- School
- State Forest/Park
- Open Water
- Town Line

ALL-POINTS TECHNOLOGY CORPORATION

verizon

Map Notes:
This map was prepared at a map scale of 1:35,000 at 24" by 36" layout. Report copies have been reduced to 11" x 17". Refer to graphic scale.
Open Space, Schools, and State Forests/Parks are depicted using available State GIS data, which may be outdated in some areas.
Base map: CTECO Hillshade (2000)

0 0.75 1.5 Miles

Proposed Verizon Wireless 850 MHz Coverage
with Antenna Centerline Height at 130' AGL
Redding, Connecticut and Surrounding Area
(*Map Scale is 1:35,000)

Coverage plot assumes 55% site loading on the Cellco system
Coverage is depicted at a signal threshold of -85 dBm

NEWTOWN WEST CT
BETHEL CT
REDDING CT
MONROE CT
EASTON NORTH CT
REDDING NE CT
TOPSTONE CT
EASTON NORTH 2 CT
TRUMBULL CENTER CT
WESTON NORTH CT
FAIRFIELD NORTH CT

DANBURY
BETHEL
NEWTOWN
OXFORD
MONROE
REDDING
SHELTON
RIDGEFIELD
EASTON
TRUMBULL
WESTON
WILTON
LEWISBORO
BRIDGEPORT
FAIRFIELD

Legend

- Proposed Verizon Wireless Facility
- Existing Verizon Wireless Facilities
- Existing Surrounding Wireless 850 MHz Coverage
- Proposed Facility Wireless 850 MHz Coverage with Antenna Centerline at 130'
- Major Route
- Municipal and Private Open Space
- School
- State Forest/Park
- Open Water
- Town Line

ALL-POINTS TECHNOLOGY CORPORATION

verizon wireless

0 0.75 1.5 Miles

Map Notes:
This map was prepared at a map scale of 1:35,000 at 24" by 36" layout. Report copies have been reduced to 11" x 17". Refer to graphic scale.
Open Space, Schools, and State Forests/Parks are depicted using available State GIS data, which may be outdated in some areas
Base map: GTECO Hillshade (2009)