

ORIGINAL

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January 27, 2010

Via Hand Delivery

S. Derek Phelps
 Executive Director
 Connecticut Siting Council
 10 Franklin Square
 New Britain, CT 06051

RECEIVED
 JAN 27 2010
 CONNECTICUT
 SITING COUNCIL

Re: **Notice of Exempt Modification – Antenna Swap**
890 Evergreen Avenue, Hamden, Connecticut

Dear Mr. Phelps:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains wireless telecommunications antennas at the 95-foot level on the existing 100-foot stealth agricultural silo at the above-referenced address. The stealth tower is owned by Crown Castle. The Council approved Cellco’s use of the tower in Docket No. 195. Cellco now intends to modify its installation by replacing six (6) of its PCS antennas with three (3) model MG D3-800T0 PCS antennas; two (2) model P65-16-XL-2; and one (1) LNX-6514DS-T4M LTE (700 MHz) antenna, all at the same 95-foot level on the tower. All antennas will remain inside the silo structure. Attached behind Tab 1 are the specifications for the proposed replacement antennas.

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 Scott D. Jackson, Mayor for the Town of Hamden. A copy of this letter is also being sent to Connecticut Agricultural Experiment Station, the owner of the property on which the stealth silo 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 any increase in the overall height of the existing silo tower. Cellco’s antennas will be located at the same 95-foot level on the existing 100-foot structure.



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S. Derek Phelps
January 27, 2010
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2. The proposed modifications will not involve any modifications 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 Opinion Letter confirming that the tower structure and foundation can support Cellco's proposed antennas modification. (See Tab 3).

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:

Scott D. Jackson, Hamden Mayor
Connecticut Agricultural Experiment Station
Sandy M. Carter





1710-2170 MHz
Model # MG D3-800TX

XPol GSM1800+PCS & UMTS Panel Antenna

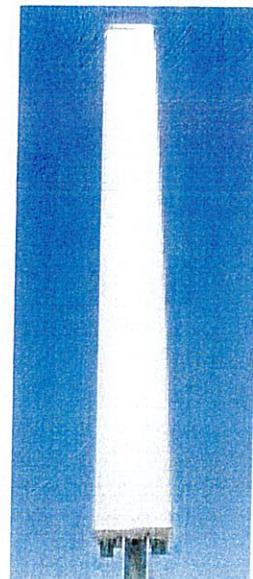
Beamwidth: H 65°/V 6.5°

Gain: 16.15 dBd/18.25 dBi

Length: 52.7 in

Electrical Specifications

Antenna model	MG D3-800TX		
Frequency range (MHz)	1710-1880	1850-1990	1920-2170
Impedance	50 ohms		
VSWR	1.4		
Polarization	$\pm 45^\circ$		
Isolation between ports (dB)	30		
Average gain (dBd/dBi)	15.7/17.8	15.9/18	16.15/18.25
Horizontal beamwidth (deg)	$65^\circ \pm 5^\circ$		
Vertical beamwidth (deg)	$6.5^\circ \pm 0.5^\circ$	$6.3^\circ \pm 0.5^\circ$	$6.3^\circ \pm 0.5^\circ$
Electrical tilt (deg)	Fixed 0° - 14°		
Upper sidelobe suppression (dB)	18		
Front-to-back ratio (db) @ $180^\circ \pm 30^\circ$	30		
Polarization isolation (dB) @3 dB beamwidth	20		
Maximum power per input (w)	250		
Intermodulation products (dBc)	-150		
Connectors	2 X 7/16 female		
Connector position	Antenna bottom		



Mechanical & Environmental Specifications

Dimensions in (mm)	52.7 x 6.3 x 3.5 (1380 x 160 x 90)
Survival wind speed mph (kph)	124 (200)
Front windload lbs (N) @100 mph/160 kph	74 (335)
Lateral windload lbs (N) @100 mph/160 kph	42 (188)
Antenna weight lbs (kg)	15 (7)
Clamps weight lbs (kg)	7.7 (3.5)
Mast mounting in (cm)	2.0 to 5.3 (50 to 135)
Radome color	Gray
Grounding	All metallic parts DC grounded
Temperature range F (°C)	-67° to 140° (-55 to +60°)
Humidity	100%

Shipping Specifications

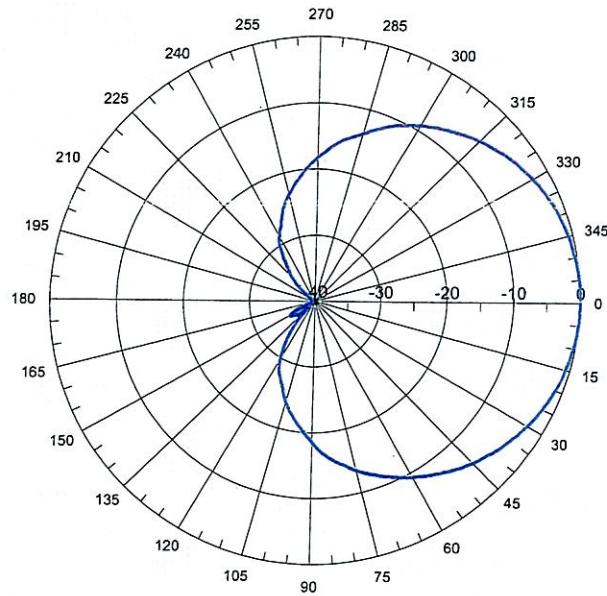
Dimensions in (mm)	64 x 8.8 x 6.9 (1630 x 225 x 175)
Weight lbs (kg)	27 (12.5)
Material	Cardboard and foam

1710-2170 MHz

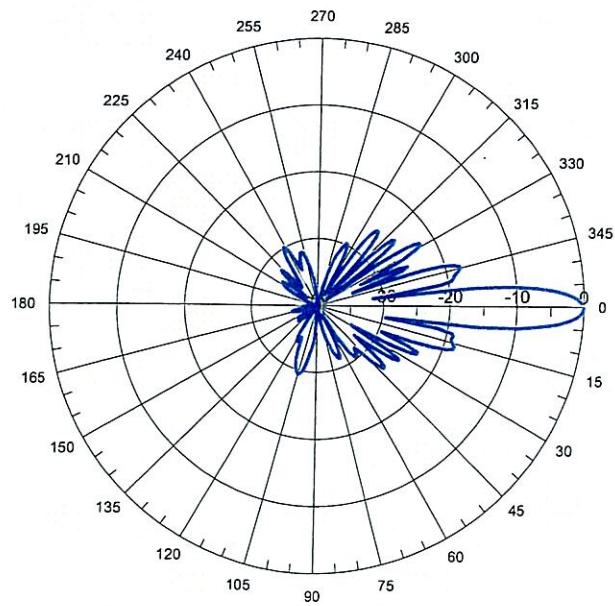
Model # MG D3-800TX

XPol GSM1800+PCS & UMTS Panel Antenna

H plane



E plane



P65-16-XL
-2

Very Low Broadband Antennas

POLARIZATION: Dual linear ±45°
 FREQUENCY (MHz): 698-894
 HORIZONTAL BEAM WIDTH (°): 65
 GAIN (dBi/dBd): 16.0/13.9
 TILT: 2
 LENGTH: 72"

ELECTRICAL SPECIFICATIONS*

	698-894	806-894
Frequency range (MHz)	698-896	806-894
Frequency band (MHz)	15.5/13.4	16.0/13.9
Gain (dBi/dBd)		
Polarization		
Nominal Impedance (Ω)		
VSWR		
Horizontal beam width, -3 dB (°)	68	65
Vertical beam width, -3 dB (°)	10.5	9.5
Electrical down tilt (°)		
Side lobe suppression, vertical 1st upper (dB)	> 15	> 15
Isolation between inputs (dB)	> 30	> 30
Tracking, horizontal plane ±60° (dB)	< 2	< 2
First null fill (dB)	-	-
Vertical beam squint (°)	< 0.5	< 0.5
Front to back ratio (dB)	> 30	> 30
Front to back ratio, total power (dB)	> 25	> 25
Cross polar discrimination (XPD) 0° (dB)	> 15	> 15
Cross polar discrimination (XPD) ±60° (dB)	> 10	> 10
Far field coupling		
IM3, 2xTx@43dBm (dBc)		
IM7, 2xTx@43dBm (dBc)		
Power handling, average per input (W)		
Power handling, average total (W)	-153	

MECHANICAL SPECIFICATIONS*

Connector	2 X 7/16 DIN Female
Connector position	Bottom
Dimensions, HxWxD, mm (ft)	72" x 12" x 5" (1829 x 305 x 125)
Mounting	Pre-mounted Tilt Brackets
Weight, with brackets, kg (lbs)	44 (20)
Weight, without brackets, kg (lbs)	33 (15)
Wind load, frontal/lateral/rear side 42 m/s Cd=1.6 (N)	1380
Maximum operational wind speed, m/s (mph)	100 (45)
Survival wind speed, m/s (mph)	125 (55)
Lightning protection	DC Ground
Radome material	PVC
Radome colour	Light Grey
Package size, HxWxD, mm (ft)	82" x 16" x 10" (2082 x 400 x 255)
Shipping weight, kg (lbs)	55 (25)
RET	N/A
Brackets	7256.00, 7454.00, 2210.00

*All specifications subject to change without notice. Please contact your Powerwave representative for complete performance data.

ANTENNA PATTERNS*

For detailed patterns visit <http://www.powerwave.com/rpa/>.

Product Specifications

LNX-6514DS-T4M

DualPol® Antenna, 698–896 MHz, 65° horizontal beamwidth, fixed electrical tilt



- Broadband, providing future-ready single antenna for application in 700 MHz and existing 850 MHz cellular operation
- Air dielectric design provides superior PIM performance with repeatable antenna-to-antenna gain and pattern consistency
- Single piece radome provides long term mechanical stability
- Proven core design technology, with over 1,000,000 similar antennas deployed
- Exceptional USLS pattern shaping for optimizing coverage and interference mitigation for LTE applications
- Specifically designed to have physical dimensions similar to most existing cellular antennas

CHARACTERISTICS

General Specifications

Antenna Type	DualPol®
Brand	DualPol®
Operating Frequency Band	698 – 896 MHz

Electrical Specifications

Frequency Band, MHz	698–806	806–896
Beamwidth, Horizontal, degrees	66	64
Gain, dBd	13.8	14.5
Gain, dBi	15.9	16.6
Beamwidth, Vertical, degrees	12.0	11.0
Beam Tilt, degrees	4	4
Upper Sidelobe Suppression (USLS), typical, dB	18	18
Front-to-Back Ratio at 180°, dB	33	33
Isolation, dB	30	30
VSWR Return Loss, db	1.35:1 16.5	1.35:1 16.5
Intermodulation Products, 3rd Order, 2 x 20 W, dBc	-150	-150
Input Power, maximum, watts	500	500
Polarization	±45°	±45°
Impedance, ohms	50	50
Lightning Protection	dc Ground	dc Ground

Product Specifications

INX6514DST4M



Mechanical Specifications

Color	Light gray
Connector Interface	7-16 DIN Female
Connector Location	Bottom
Connector Quantity	2
Wind Loading, maximum	617.7 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Speed, maximum	241.4 km/h 150.0 mph

Dimensions

Depth	181.0 mm 7.1 in
Length	1847.0 mm 72.7 in
Width	301.0 mm 11.9 in
Net Weight	17.0 kg 37.5 lb

Regulatory Compliance/Certifications

Agency	Classification
RoHS 2002/95/EC	Compliant by Exemption
China RoHS SJ/T 11364-2006	Above Maximum Concentration Value (MCV)



INCLUDED PRODUCTS

MTG-L-STD

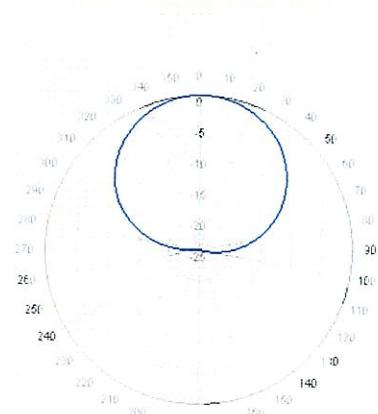
Downtilt Mounting Kit for panel Antennas

Product Specifications

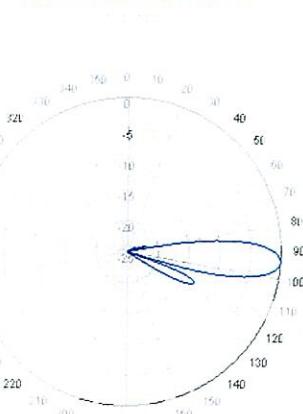
LNX-6514DS-T4M



Horizontal Pattern

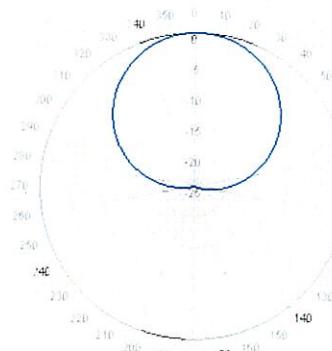


Vertical Pattern

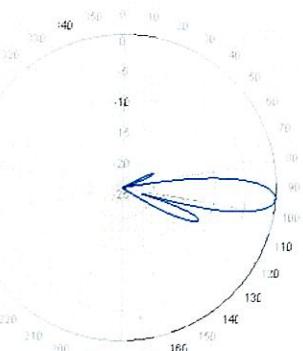


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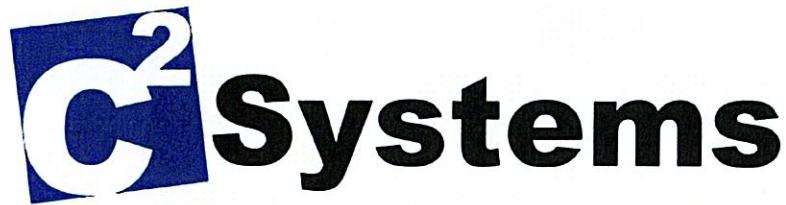
Freq: 750, Tilt: 0



Freq: 850, Tilt 0



Freq: 850, Tilt 0



C Squared Systems, LLC
920 Candia Road
Manchester, NH 03109
Phone: (603) 657 9702
E-mail:
support@csquaredsystems.com

Calculated Radio Frequency Emissions



Hamden N

890 Evergreen Ave, Hamden, CT

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1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed Verizon Wireless antenna upgrade on the existing silo at 890 Evergreen Ave, Hamden, CT. Verizon Wireless is proposing to modify their existing three-sector array to accommodate the addition of their 700 MHz LTE system to the existing silo and to modify their existing antenna array for their 1900 MHz PCS system. The existing Verizon Wireless antenna array for their 850 MHz Cellular system will not be modified.

2. FCC Guidelines for Evaluating RF Radiation Exposure Limits

In 1985, the FCC established rules to regulate radio frequency (RF) exposure from FCC licensed antenna facilities. In 1996, the FCC updated these rules, which were further amended in August 1997 by OET Bulletin 65 Edition 97-01. These new rules include Maximum Permissible Exposure (MPE) limits for transmitters operating between 300 kHz and 100 GHz. The FCC MPE limits are based upon those recommended by the National Council on Radiation Protection and Measurements (NCRP), developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI).

The FCC general population/uncontrolled limits set the maximum exposure to which most people may be subjected. General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

Public exposure to radio frequencies is regulated and enforced in units of milliwatts per square centimeter (mW/cm^2). The general population exposure limits for the various frequency ranges are defined in the attached "FCC Limits for Maximum Permissible Exposure (MPE)" in Attachment B of this report. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Higher exposure limits are permitted under the occupational/controlled exposure category, but only for persons who are exposed as a consequence of their employment provided they are fully aware of the potential for exposure, and are able to exercise control over their exposure. General population/uncontrolled limits are five times more stringent than the levels considered acceptable for occupational, or radio frequency trained individuals. Attachment B contains excerpts from OET Bulletin 65 and defines the Maximum Exposure Limit.

Finally, it should be noted that the MPE limits adopted by the FCC for both general population/uncontrolled exposure and for occupational/controlled exposure incorporate a substantial margin of safety and have been established to be well below levels generally accepted as having the potential to cause adverse health effects.

3. RF Exposure Prediction Methods

The emission field calculation results displayed in the following figures were generated using the following formula as outlined in FCC bulletin OET 65:

$$\text{Power Density} = \left(\frac{1.6^2 \times EIRP}{4\pi \times R^2} \right) \times \text{Off Beam Loss}$$

Where:

EIRP = Effective Isotropic Radiated Power

R = Radial Distance = $\sqrt{(H^2 + V^2)}$

H = Horizontal Distance from antenna

V = Vertical Distance from radiation center of antenna

1.6 = Ground Reflection Factor

Off Beam Loss is determined by the selected antenna patterns

Note that where the antenna models for the Verizon Wireless proposed facility are known, (Reference Table 1: Verizon Wireless Antenna Inventory) off-beam loss has been included in the above calculations for Verizon Wireless only, to account for the selected antenna patterns.

4. Verizon Wireless Antenna Inventory

Table 1 below outlines the proposed Verizon Wireless antenna configuration on the existing silo.

Antenna ID	Height AGL (feet)	Antenna Model	TX Freq (MHz)	Ant Gain (dBi)	Ant Length (feet)	Beam Width	Down Tilt
A-1	95	DB844H90-XY	869	14.1	4	90	0
A-2	95	P65-16-XL-2	757	14.2	6	63	0
A-3	95	MGD3-800T0	1970	18.25	4.5	85	2
A-4	95	DB844H90-XY	869	14.1	4	90	0
B-1	95	DB844H90-XY	869	14.1	4	90	0
B-2	95	LNX-6514DS-T4M	757	13.8	6	66	0
B-3	95	MGD3-800T0	1970	18.25	4.5	85	2
B-4	95	DB844H90-XY	869	14.1	4	90	0
G-1	95	DB844H90-XY	869	14.1	4	90	0
G-2	95	P65-16-XL-2	757	14.2	6	63	0
G-3	95	MGD3-800T0	1970	18.25	4.5	85	2
G-4	95	DB844H90-XY	869	14.1	4	90	0

Table 1: Verizon Wireless Antenna Inventory

5. Calculation Results

Table 2 below outlines the power density information for the site. All information for carriers other than Verizon Wireless was obtained from the current CSC database, except where otherwise noted.

Carrier	Number of Trans.	Effective Radiated Power (ERP) Per Transmitter (Watts)	Antenna Height (Feet)	Operating Frequency (MHz)	Total ERP (Watts)	Power Density (mw/cm ²)	Limit	%MPE
Nextel	9	100	75	851	900	0.0575	0.5673	10.14%
AT&T UMTS	1	500	85	880	500	0.0249	0.5867	4.24%
AT&T GSM	2	296	85	880	592	0.0295	0.5867	5.02%
AT&T GSM	1	513	85	1930	513	0.0255	1.0000	2.55%
Sprint WiMAX	3	562	75	2657	1686	0.1078	1.0000	10.78%
Sprint	11	411	75	1963	4521	0.2890	1.0000	28.90%
T-Mobile GSM	8	168	100	1945	1344	0.0483	1.0000	4.83%
T-Mobile UMTS	2	671	100	2100	1342	0.0483	1.0000	4.83%
Pocket	3	631	65	2130	1893	0.1611	1.0000	16.11%
Verizon	3	285	95	1970	855	0.0039	1.0000	0.39%
Verizon	9	200	95	869	1800	0.0082	0.5793	1.41%
Verizon	1	960	95	757	960	0.0044	0.5047	0.86%
							Total	90.06%

Table 2: Existing & Proposed Carrier Information

These calculations assume that the antennas are operating at 100 percent capacity, that all antenna channels are transmitting simultaneously, and that the radio transmitters are operating at full power. Obstructions (trees, buildings etc.) that would normally attenuate the signal are not taken into account. As a result, the predicted signal levels are much more conservative (higher) than the actual signal levels will be from the finished installation.

6. Conclusion

The above analysis verifies that emissions from the proposed site will be below the maximum power density levels as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. When using conservative methods, the

cumulative power density from the proposed transmit antennas at the existing facility is below the limit for the general public. The highest expected percent of Maximum Permissible Exposure at the base of the silo is 90.06% of the FCC limit.

As noted in the introduction, obstructions (trees, buildings etc.) that would normally attenuate the signal are not taken into account. As a result, the predicted signal levels are more conservative (higher) than the actual signal levels will be from the finished installation.

7. Statement of Certification

I certify to the best of my knowledge that the statements in this report are true and accurate. The calculations follow guidelines set forth in ANSI/IEEE Std. C95.3, ANSI/IEEE Std. C95.1 and FCC OET Bulletin 65 Edition 97-01.



January 25, 2010

Date

Daniel I. Goulet
C Squared Systems, LLC

Attachment A: References

OET Bulletin 65 - Edition 97-01 - August 1997 Federal Communications Commission Office of Engineering & Technology

ANSI C95.1-1982, American National Standard Safety Levels With Respect to Human Exposure to

C Squared Systems, LLC

Radio Frequency Electromagnetic Fields, 300 kHz to 100 GHz. IEEE-SA Standards Board

IEEE Std C95.3-1991 (Reaff 1997), IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave. IEEE-SA Standards Board

Attachment B: FCC Limits for Maximum Permissible Exposure (MPE)

(A) Limits for Occupational/Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6

3.0-30	1842/f	4.89/f	(900/f ²)*	6
30-300	61.4	0.163	1.0	6
300-1500	-	-	f/300	6
1500-100,000	-	-	5	6

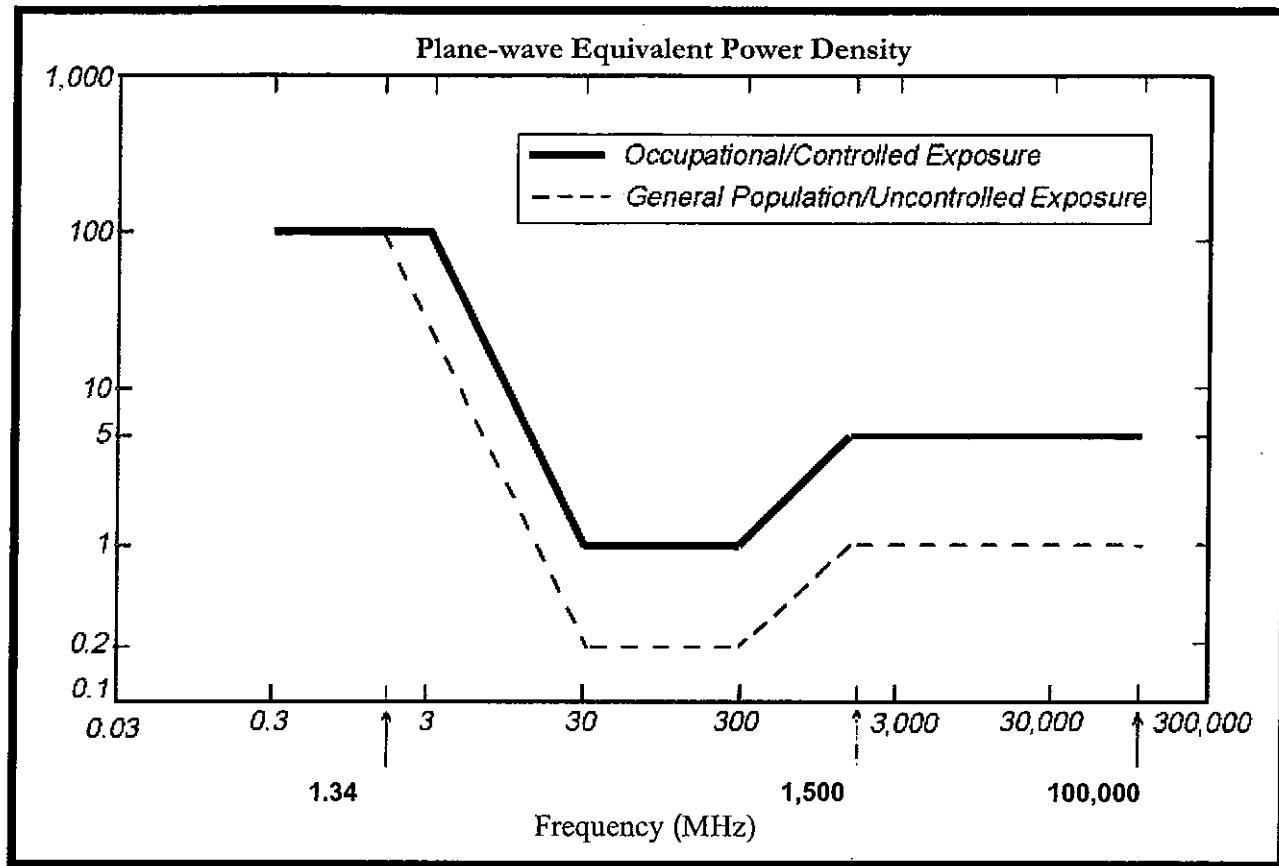
(B) Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f ²)*	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	f/1500	30
1500-100,000	-	-	1.0	30

f = frequency in MHz * Plane-wave equivalent power density

NOTE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.





Date: December 7, 2009

Eva Morales
Crown Castle USA Inc.
46 Broadway
Albany, NY 12204

Crown Castle USA Inc.
2000 Corporate Drive
Canonsburg, PA 15317
(724) 416-2000

Subject: Structural Opinion Letter

Carrier Designation: Verizon Wireless Co-Locate
Carrier Site Number:
Carrier Site Name:

Crown Castle Designation: Crown Castle BU Number: 800529
Crown Castle Site Name: CT HAMDEN NORTH CAC
Crown Castle JDE Job Number: 127464
Crown Castle WO Number: 307574

Site Data: 890 EVERGREEN AVENUE, Hamden, CT, New Haven County
Latitude 41°24'24.2", **Longitude** -72°54'15.2"
100 Foot – Stealth Silo Tower

Dear Eva Morales,

Crown Castle USA Inc. is pleased to submit this "Structural Opinion Letter" for the structural integrity of the aforementioned tower. This evaluation has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 307574. The purpose of the opinion letter is to determine the suitability of the tower with the proposed, existing, and reserved loading as specified in Tables 1 & 2 on the next page. This opinion is consistent with the guidelines as stated in the TIA/EIA 222-F standard and local code requirements based upon a fastest mile wind speed of 85 mph.

Based on a comparison of the original design loads (including wind speeds), the current loads, and the proposed loads, we have determined the tower structure and foundation ARE sufficient for the proposed loading.

We at the *Crown Castle Engineering Department* appreciate the opportunity of providing our continuing professional services to you. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted,

Aaron C. Poot, P.E.
Engineering Supervisor

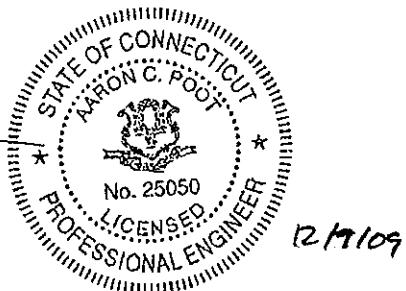


Table 1 – Proposed Antenna and Cable Information

Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount Information	Number of Feed Lines	Feed Line Size (in)
95	1	ANDREW	LNX-6514DS-T4M	-	-	-
	2	POWERWAVE TECHNOLOGIES	P65.16.XL.2			
	3	RYMSA WIRELESS	MG D3-800TV			
	6	ANDREW	DB844H90E-XY			

*All proposed equipment is to be installed internally of the Silo Tower and will present no new wind area to the structure

Table 2 – Existing and Reserved Antenna and Cable Information

Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
104	1	DECIBEL	DB806-XC	1	7/8
100	3*	ANDREW	TMZXXX-6516-R2M	12	1-5/8
	3*	RFS/CELWAVE	ATMPP1412D-1CWA		
	3*	RFS/CELWAVE	ATMAA1412D-1A20		
95	12**	SWEDCOM	ALP 9212-N	12	1-5/8
90	1	DECIBEL	DB411-A	2	1/2
85	9	SWEDCOM	ALP 11011-N	9	7/8
	6	ADC	DUAL BAND 800/1900 FULL BAND MASTHEAD		
	3	POWERWAVE TECHNOLOGIES	LGP13519		
	1	CSA WIRELESS	A-18A24N-U		
75	1	CSA WIRELESS	A-18A24N-U	1	1-5/8
	10	DECIBEL	DB844H90E-XY	10	1-5/8
65	3*	KATHREIN	742 213	6	1-5/8

* Reserved equipment

**Equipment to be replaced with Proposed, feedlines will remain.

***All existing and reserved equipment are installed internally of the Silo Tower and present no new wind area to the structure

Table 3 – Original Tower Manufacturer Design Antenna and Cable Information

Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
95	12	ALLGON	7129.16.33	-	-
85	12	ALLGON	7120.16	-	-
75	12	DECIBEL	844H90EXY	-	-

All design equipment considered to be installed internally of the Silo Tower