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October 23, 2014

Connecticut Siting Council

Subject: New Cingular Wireless PCS, LLC (“AT&T”) – S3393 – 199 Brickyard Road, Farmington, CT

Dear Connecticut Siting Council:

C Squared Systems has been retained by New Cingular Wireless PCS, LLC (“AT&T”) to investigate RF Power Density levels for the AT&T antenna arrays, to be installed on the proposed monopole tower, to be located at 199 Brickyard Road in Farmington, CT.

Calculations were done in accordance with FCC OET Bulletin 65. These worst-case calculations assume that all transmitters are simultaneously operating at full power and that there is 0 dB of cable loss. The calculation point is 6 feet above ground level to model the RF power density at the head of a person standing at the base of the tower.

Due to the directional nature of the proposed AT&T antennas, the majority of the RF power is focused out towards the horizon. As a result, there will be less RF power directed below the antennas relative to the horizon, and consequently lower power density levels around the base of the tower. Please refer to the Attachment for the vertical patterns of the proposed AT&T antennas. The calculated results below include a nominal 10 dB off-beam pattern loss to account for the lower relative gain directly below the antennas.

**AT&T Antennas**

Location	Carrier	Vertical Distance to Antenna (Ft.)	Operating Frequency (MHz)	Number of Trans.	Effective Radiated Power (ERP) Per Transmitter (Watts)	Power Density (mw/cm <sup>2</sup> )	Limit	%MPE
Ground Level	AT&T UMTS	140	880	1	1028	0.0021	0.5867	0.35%
	AT&T UMTS	140	1900	1	1265	0.0025	1.0000	0.25%
	AT&T LTE	140	710	2	1254	0.0050	0.4733	1.06%
	AT&T LTE	140	880	1	1543	0.0031	0.5867	0.53%
	AT&T LTE	140	1900	3	1897	0.0114	1.0000	1.14%
	AT&T LTE	140	2300	1	2179	0.0044	1.0000	0.44%
<b>Total</b>								<b>3.77%</b>

In addition, there will be 3 more antennas mounted on the proposed tower. These 3 antennas are independent of the proposed AT&T installation. The calculations below are based on the worst case assumptions of input frequency for the power density limit and the maximum power input to the antenna allowed by the manufacturer. No off-beam pattern loss is included.

**Non-AT&T Antennas**

Location	Carrier	Vertical Distance to Antenna (Ft.)	Operating Frequency (MHz)	Number of Trans.	Effective Radiated Power (ERP) Per Transmitter (Watts)	Power Density (mw/cm <sup>2</sup> )	Limit	%MPE
Ground Level	WBMW	175	98	1	1000	0.0126	0.2000	6.30%
	Dunning	160	VHF	1	1000	0.0152	0.2000	7.58%
	Marcus	170	450-512	1	500	0.0334	0.3000	11.15%
<b>Total</b>								<b>25.03%</b>

**Summary:** Under worst-case assumptions, RF Power Density levels for the proposed AT&T antenna arrays will not exceed 3.77%<sup>1</sup> of the FCC MPE limit for General Public/Uncontrolled Environments. Under worst-case assumptions, RF Power Density levels for the 3 proposed non-AT&T antennas will not exceed 25.03%<sup>2</sup> of the FCC MPE limit for General Public/Uncontrolled Environments. The combined RF Power Density levels for all antennas on the proposed tower will not exceed 28.80% of the FCC MPE limit for General Public/Uncontrolled Environments.

Sincerely,

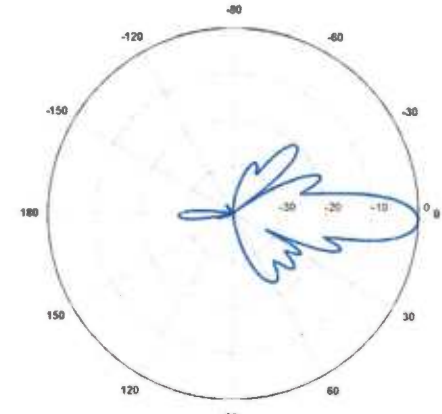
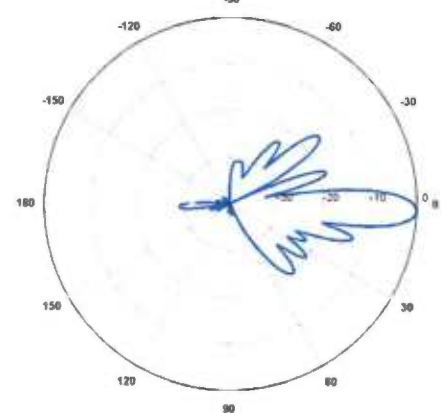
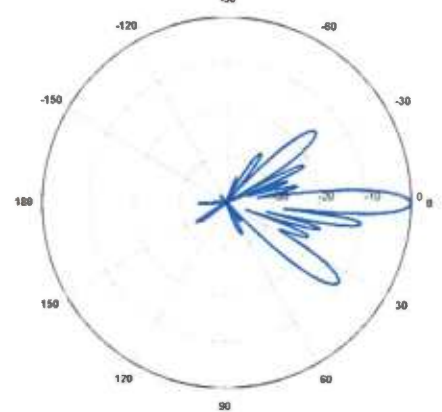


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<sup>1</sup> The total %MPE is a summation of each unrounded contribution. Therefore, summing each rounded value may not reflect the total value listed in the table.

<sup>2</sup> The total %MPE is a summation of each unrounded contribution. Therefore, summing each rounded value may not reflect the total value listed in the table.

**Attachment: AT&T's Antenna Data Sheets and Electrical Patterns**

<p><b>750 MHz</b></p> <p>Manufacturer: CCI Products            Model #: HPA-65R-BUU-H8            Frequency Band: 698-806 MHz            Gain: 13.2 dBd            Vertical Beamwidth: 10.1°            Horizontal Beamwidth: 65°            Polarization: Dual Pol ± 45°            Size L x W x D: 92.4" x 14.8" x 7.4"</p>	
<p><b>850 MHz</b></p> <p>Manufacturer: CCI Products            Model #: HPA-65R-BUU-H8            Frequency Band: 824-894 MHz            Gain: 14.1 dBd            Vertical Beamwidth: 8.4°            Horizontal Beamwidth: 61°            Polarization: Dual Pol ± 45°            Size L x W x D: 92.4" x 14.8" x 7.4"</p>	
<p><b>1900 MHz</b></p> <p>Manufacturer: CCI Products            Model #: HPA-65R-BUU-H8            Frequency Band: 1850-1990 MHz            Gain: 15.0 dBd            Vertical Beamwidth: 5.6°            Horizontal Beamwidth: 62°            Polarization: Dual Pol ± 45°            Size L x W x D: 92.4" x 14.8" x 7.4"</p>	

**2300 MHz**

Manufacturer: CCI Products

Model #: HPA-65R-BUU-H8

Frequency Band: 2305-2360 MHz

Gain: 15.6 dBd

Vertical Beamwidth: 4.5°

Horizontal Beamwidth: 60°

Polarization: Dual Pol  $\pm 45^\circ$

Size L x W x D: 92.4" x 14.8" x 7.4"

