



Global RF SolutionsSM

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Evaluation of Human Exposure to Radio Frequency Emissions



**Preliminary Analysis of Site B230-
Roman Cabrini Church
Tucson, AZ**

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1. SUMMARY AND CONCLUSION

Summary:

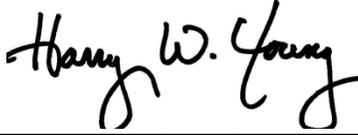
A **preliminary** analysis of this proposed Communications Facility has been completed to determine if it will be compliant with guidelines set forth by the Federal Communications Commission (FCC) with regards to maximum human exposure limits. The analysis has been performed with the use of predictive modeling software, and is only applicable to AT&T Mobility transmitting equipment at this location.

The Radio Frequency Power Density predictions have been done using 100% transmitter duty cycle. This will predict a worst-case scenario for safety reasons. The predictive software tool utilizes a cylindrical model that provides spatially averaged power density that is calculated in one square foot increments (pixels). The composite RF fields are displayed as a percentage of the exposure limit. The software tool utilized for predictive analysis is RoofView®, a product developed by Richard Tell Associates, Inc. The FCC recognizes this software tool as a valid means of determining Maximum Permissible Exposure levels (MPE).

Conclusion:

The predictive software analysis has shown that AT&T Mobility transmitter equipment located at this site **cannot exceed** the maximum permissible exposure levels for the FCC Public or FCC Occupational standards in readily accessible locations, i.e. ground level. This site **will be compliant** with FCC Guidelines as proposed, as long as it is built per the supplied drawings.

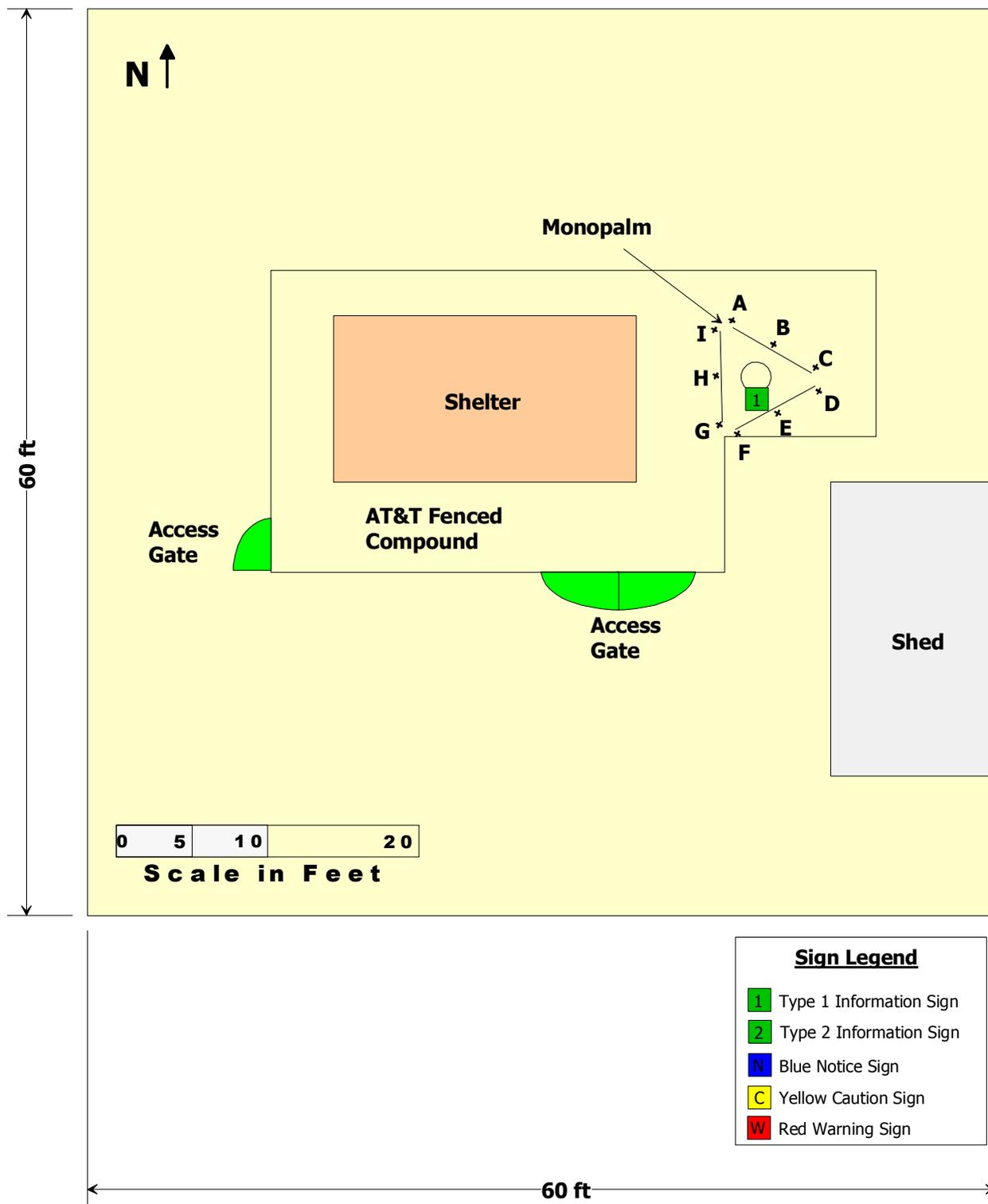
2. SITE DESCRIPTION

Site ID: Bechtel #B230-Roman Cabrin Church		USID: 133468 FA Code: 10573119			
Date of Evaluation: April 4, 2013	Contact Information: Robert Hammersmark 602- 625-2372		Site Evaluator (name): Harry Young Is a qualified Field Engineer for GRFS and has collected the data and completed the analysis for this report.		
		 Signed:			
Site Type	Building		Tower/Monopole	XX	Water Tower
Address: 3201 E. Presidio Road, Tucson, AZ 85716 Pima County					
GPS NAD83	N 32 15 51.23		W 110 55 28.95		
Access Restricted	Yes				

This site will be located on a mono-palm inside a communications compound on the ground of a church. Antenna access will be restricted by design, e.g. mounting height, location. Access is assumed to be not restricted to EME awareness trained personnel and an RF safety plan is assumed to be not in place.

2. SITE DESCRIPTION (continued)

This drawing depicts the antenna detail and recommended sign placement layout of the B230-Roman Cabrini Church communications facility. The antenna legend is on the following page.



2. SITE DESCRIPTION (continued)

This is the antenna legend for the drawing on the preceding page. UMTS and LTE transmitter power is assumed to be 40w per channel, the maximum power output of the RRU.

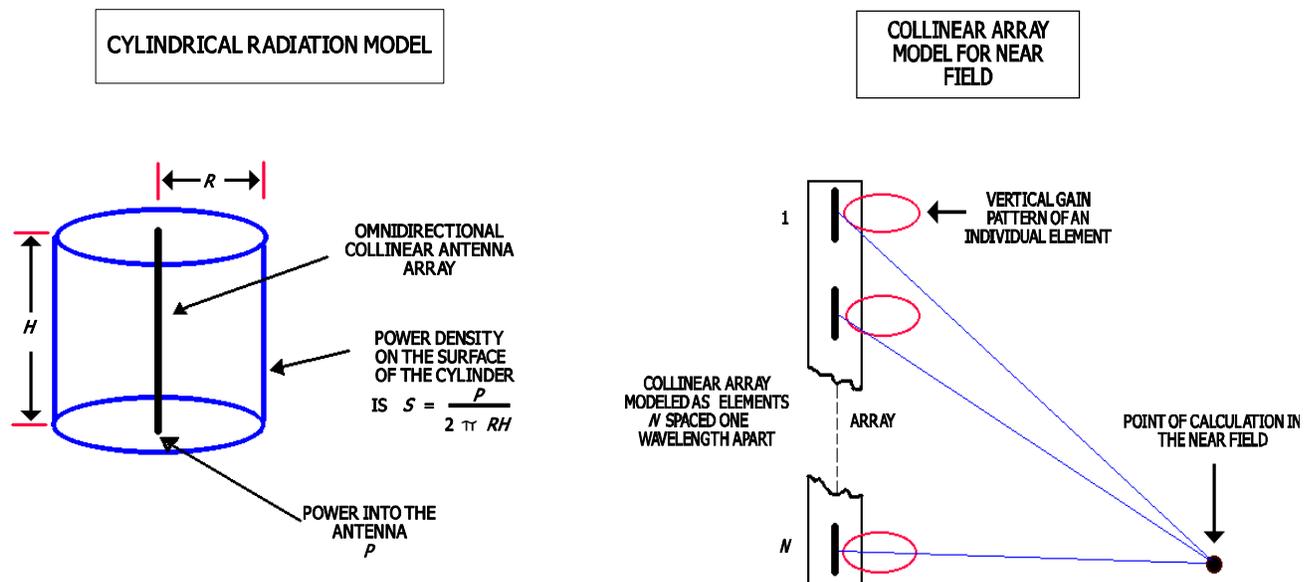
ID	Name	(MHz) Freq	Input Power	Calc Power	Mfg	Model	(ft) X	(ft) Y	(ft) Z	Type	Aper (ft)	dBd Gain	BWdth Pt Dir
A	AT&T	1930.00000		120.0	Kathrein	800 10766K	42.5	39.5	54.0	TX	8.0	16.6	65;30
B	AT&T	1930.00000		0.0	Kathrein	800 10766K	45.0	38.0	54.0	TX	8.0	16.6	65;30
C	AT&T	740.00000		80.0	Kathrein	800 10766K	48.0	36.5	54.0	TX	8.0	14.3	65;30
D	AT&T	1930.00000		120.0	Kathrein	800 10766K	48.0	34.5	54.0	TX	8.0	16.6	65;150
E	AT&T	1930.00000		0.0	Kathrein	800 10766K	45.0	33.5	54.0	TX	8.0	16.6	65;150
F	AT&T	740.00000		80.0	Kathrein	800 10766K	43.0	32.0	54.0	TX	8.0	14.3	65;150
G	AT&T	1930.00000		120.0	Kathrein	800 10766K	41.0	32.5	54.0	TX	8.0	16.6	65;270
H	AT&T	1930.00000		0.0	Kathrein	800 10766K	41.0	35.5	54.0	TX	8.0	16.6	65;270
I	AT&T	740.00000		80.0	Kathrein	800 10766K	41.0	38.5	54.0	TX	8.0	14.3	65;270

3. ANALYSIS

Site Modeling:

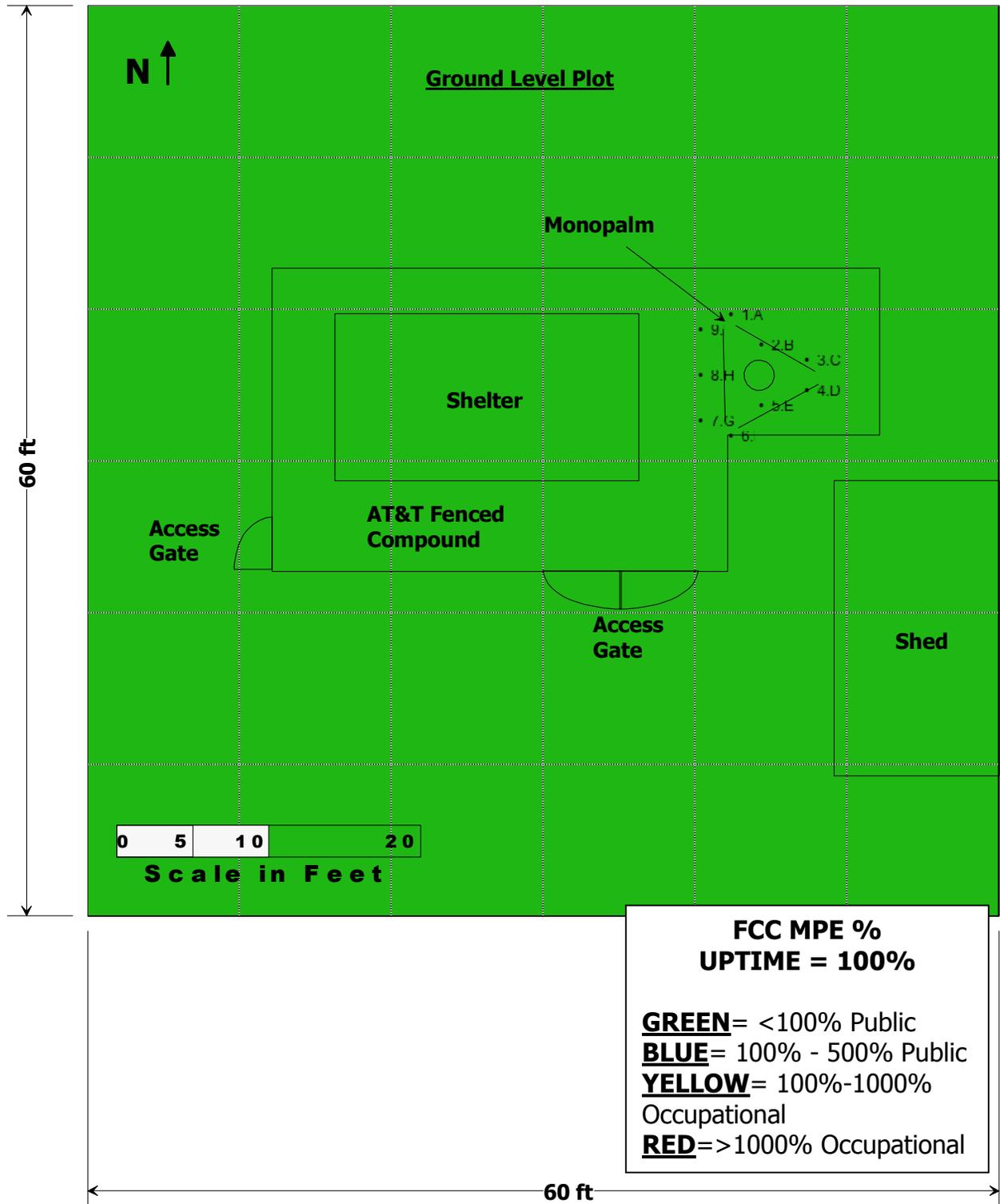
Electromagnetic energy (EME) exposure situations have been modeled at this site by using the following techniques. A cylindrical model in the near field of a vertical collinear antenna is run through a computer calculation engine. This model was used to compute the average power density on the surface of an imaginary cylinder, with a height equal to the antenna's aperture, and a radius equal to the distance of interest.

The collinear antenna model estimates the number of elements in the array and in the gain pattern of each element. The power density in the near field of the antenna is calculated by combining the contributions from each element in the array. The completed calculations of these models are plotted in the RESULTS section. The software tool utilized for predictive analysis is RoofView®, a product of Richard Tell Associates, Inc.



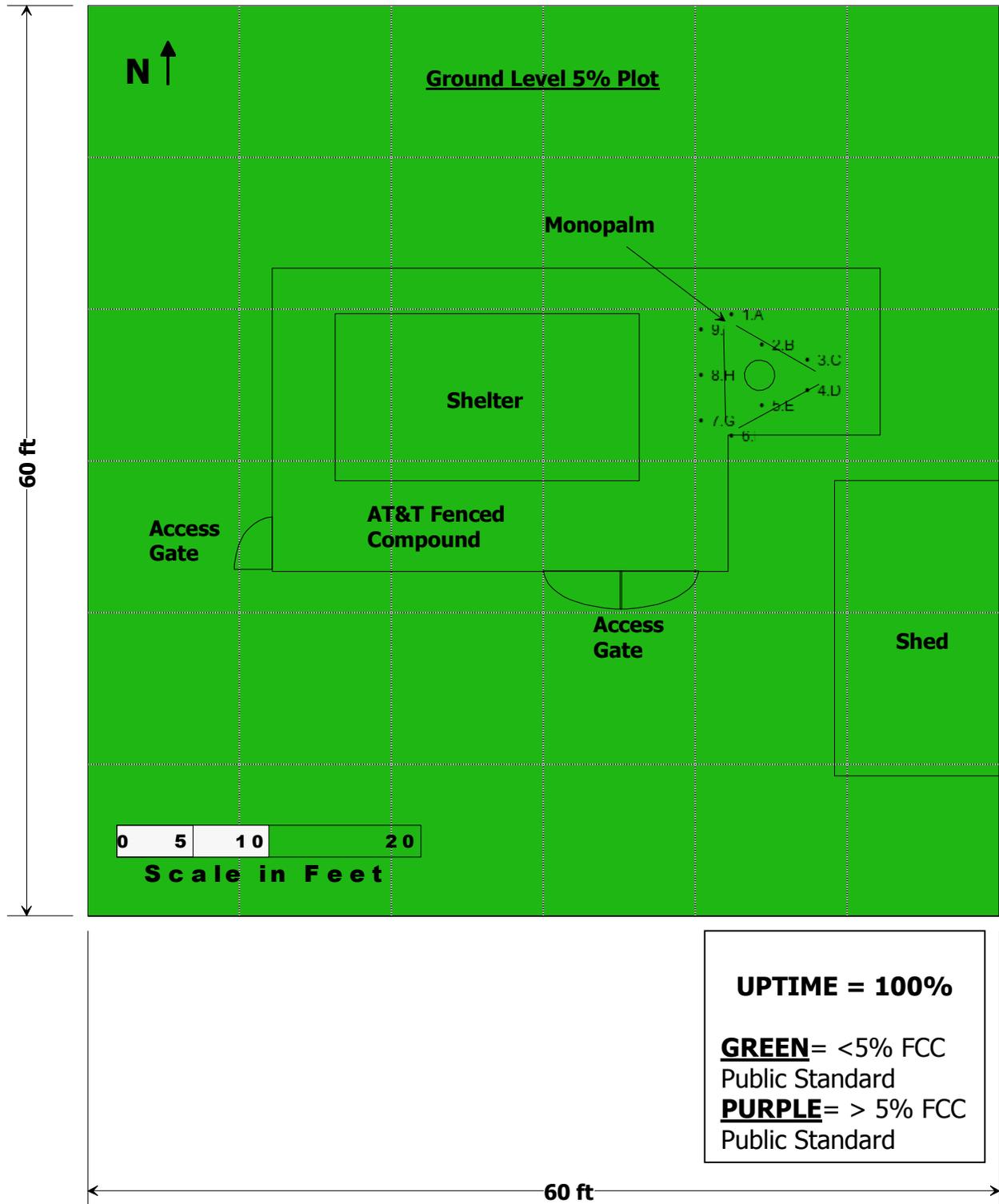
4. RESULTS

This is the predicted software plot using the FCC PUBLIC and FCC OCCUPATIONAL standards. The grid is in 10-foot increments. This shows that the MPE limits **cannot be exceeded** in accessible areas at this site.



4. RESULTS (continued)

This is the predicted software plot with the threshold set to 5% of the FCC PUBLIC standard for AT&T Mobility antennas only. All other antennas are turned off! The grid is in 10-foot increments.



5. RECOMMENDATIONS

AT&T Mobility will be compliant with FCC Guidelines at this site as proposed. AT&T Mobility is not required to implement additional mitigation to the proposal for this site.

The following are the signs recommended:
A Type 1 sign at the mono-palm.

The landlord must ensure that the antenna access will be restricted to personnel that have been authorized by AT&T Mobility (RF Safety Awareness trained personnel only). This would include all maintenance personnel and contractors accessing the antenna area (area directly in front of the antennas).

APPENDIX A- LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

(REFERENCE= TABLE 1. Title 47 CFR)

(A) Limits for Occupational/Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (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 (H) (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.