Radio Frequency Safety Survey Report Prediction (RFSSRP) Prepared For:

Site Name: Commonwealth
FA#: 10037569
USID: 64393
Site ID: KYL05013
Address: 1560 University Drive
Lexington, KY 40502
County: Fayette
Latitude: N38-1-21.00
Longitude: W84-30-23.40

Additional Site Information

M-RFSC Name: Sherri Lewis
Site Structure Type: Rooftop

Report Information

Report Writer: Joshua Sharp **Report Generated Date:** August 10, 2016

Compliance Statement

AT&T Mobility Compliance Statement: Based on the information collected, AT&T Mobility is Compliant with FCC Rules and Regulations.

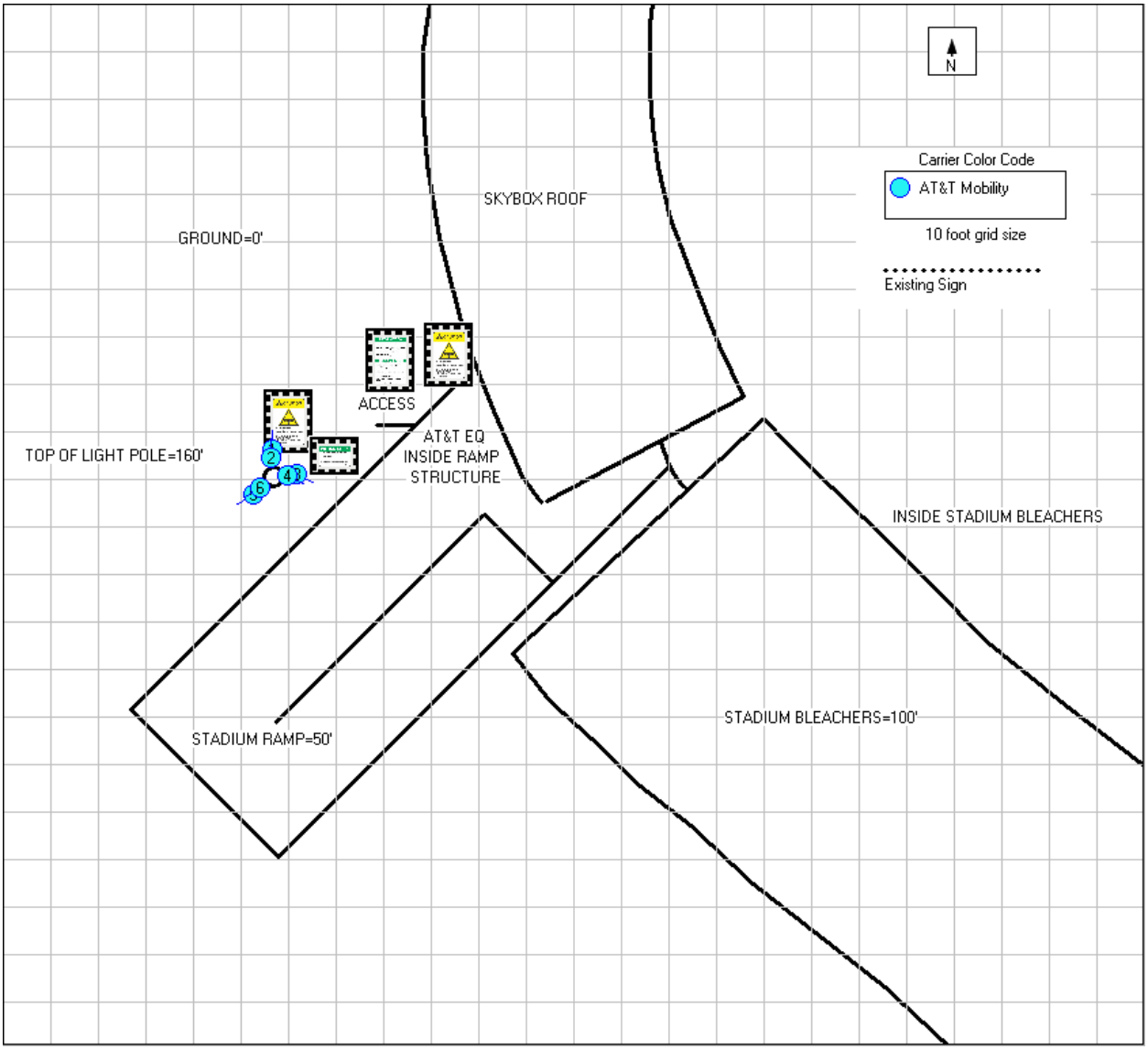
Table of Contents

1 General Summary

1.1 Site Summary

Existing RF Sign(s) at Access Point(s)	Info 1/Caution
Existing RF Sign(s) at AT&T Mobility Sectors	Alpha: Info 1/Caution Beta: None Gamma: None
Existing Barriers at AT&T Mobility Sectors	None
Existing RF Signs at Other Carrier Sectors	None
Existing RF Barriers at Other Carrier Sectors	None
Max Predictive Spatial Average MPE% & Location on Site (Occupational)	123.12% in front of AT&T Mobility Beta Sector Antenna #3
Max Predictive Spatial Average MPE% & Location on Site (General Public)	615.66% in front of AT&T Mobility Beta Sector Antenna #3
Max Predictive Spatial Average MPE% & Location at Ground (Occupational)	0.001% MPE
Max Predictive Spatial Average MPE% & Location at Ground (General Public)	0.005% MPE

2 Site Scale Map



Existing Signs Only (All Carriers)

3 Antenna Inventory

Ant #	Operator	Antenna Make	Antenna Model	Type	Frequency (MHz)	Az (deg)	Horizontal Beam width (deg)	Ant (ft)	Antenna Gain (dBd)	GSM Radios	LTE Radios	UMTS Radios	Total ERP (watts)	Mech. DT (deg)	X (ft)	Y (ft)	Z Bottom Tip Ground Level (ft)
1	AT&T Mobility	CCI	HPA-65R-BUU-H6 10DT	Panel	850	0	59	6.0	12.55			1	720	0	30	75	125.0
1	AT&T Mobility	CCI	HPA-65R-BUU-H6 06DT	Panel	1900	0	60	6.0	14.91			1	1858	0	30	75	125.0
1	AT&T Mobility	CCI	HPA-65R-BUU-H6 03DT	Panel	2300	0	59	6.0	15.26		1		1678	0	30	75	125.0
2	AT&T Mobility	ANDREW	SBNH-1D6565B 03DT	Panel	700	0	71	6.0	12.68		1		556	0	30	73	118.1
2	AT&T Mobility	ANDREW	SBNH-1D6565B 03DT	Panel	2100	0	63	6.0	15.92		1		1562	0	30	73	118.1
2	AT&T Mobility	ANDREW	SBNH-1D6565B 03DT	Panel	1900	0	57	6.0	15.91		1		2341	0	30	73	118.1
3	AT&T Mobility	CCI	HPA-65R-BUU-H6 08DT	Panel	850	120	62	6.0	12.55			1	720	0	36	70	125.0
3	AT&T Mobility	CCI	HPA-65R-BUU-H6 06DT	Panel	1900	120	60	6.0	14.91			1	1858	0	36	70	125.0
3	AT&T Mobility	CCI	HPA-65R-BUU-H6 02DT	Panel	2300	120	59	6.0	15.25		1		1674	0	36	70	125.0
4	AT&T Mobility	ANDREW	SBNH-1D6565B 02DT	Panel	700	120	71	6.0	12.72		1		561	0	34	70	118.1
4	AT&T Mobility	ANDREW	SBNH-1D6565B 02DT	Panel	2100	120	63	6.0	16.02		1		1600	0	34	70	118.1
4	AT&T Mobility	ANDREW	SBNH-1D6565B 02DT	Panel	1900	120	57	6.0	15.90		1		2332	0	34	70	118.1
5	AT&T Mobility	CCI	HPA-65R-BUU-H6 08DT	Panel	850	240	62	6.0	12.55			1	720	0	26	66	125.0
5	AT&T Mobility	CCI	HPA-65R-BUU-H6 06DT	Panel	1900	240	60	6.0	14.91			1	1858	0	26	66	125.0
5	AT&T Mobility	CCI	HPA-65R-BUU-H6 03DT	Panel	2300	240	59	6.0	15.26		1		1678	0	26	66	125.0
6	AT&T Mobility	ANDREW	SBNH-1D6565B 04DT	Panel	700	240	71	6.0	12.82		1		574	0	28	67	118.1
6	AT&T Mobility	ANDREW	SBNH-1D6565B 03DT	Panel	2100	240	63	6.0	15.92		1		1562	0	28	67	118.1
6	AT&T Mobility	ANDREW	SBNH-1D6565B 03DT	Panel	1900	240	57	6.0	15.91		1		2341	0	28	67	118.1

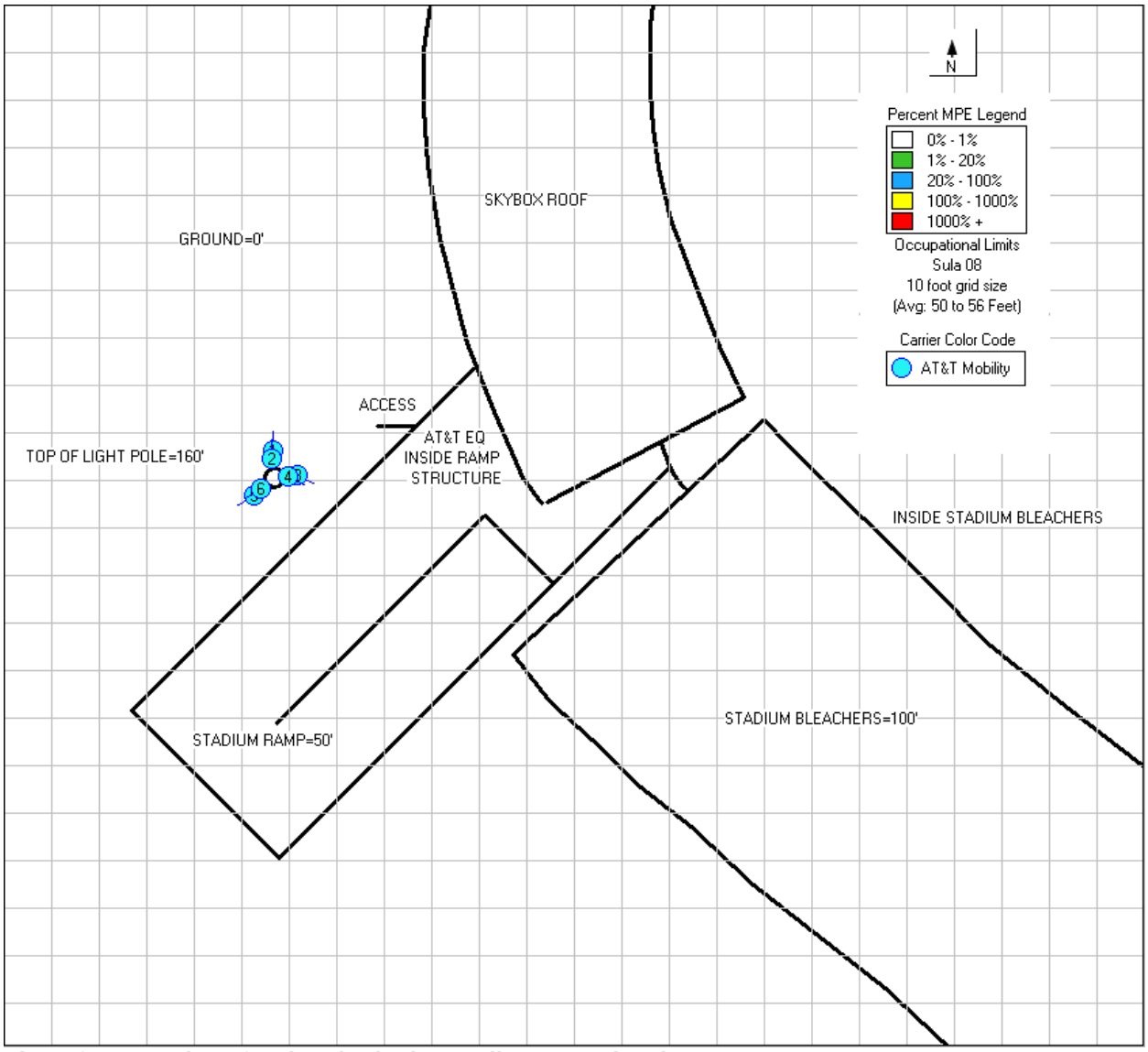
Note: Waterford Consultants has assumed transmission parameters for Unknown RF emitters based on similar installations found at other radio communications sites. Generic antenna models have been used where existing antenna part numbers or radiation patterns are not available. The frequencies presented in this table may have been assumed in order to represent the approximate band of operation and to support a worst-case calculation of power density.

4 Predicted Emission Levels and Discussion

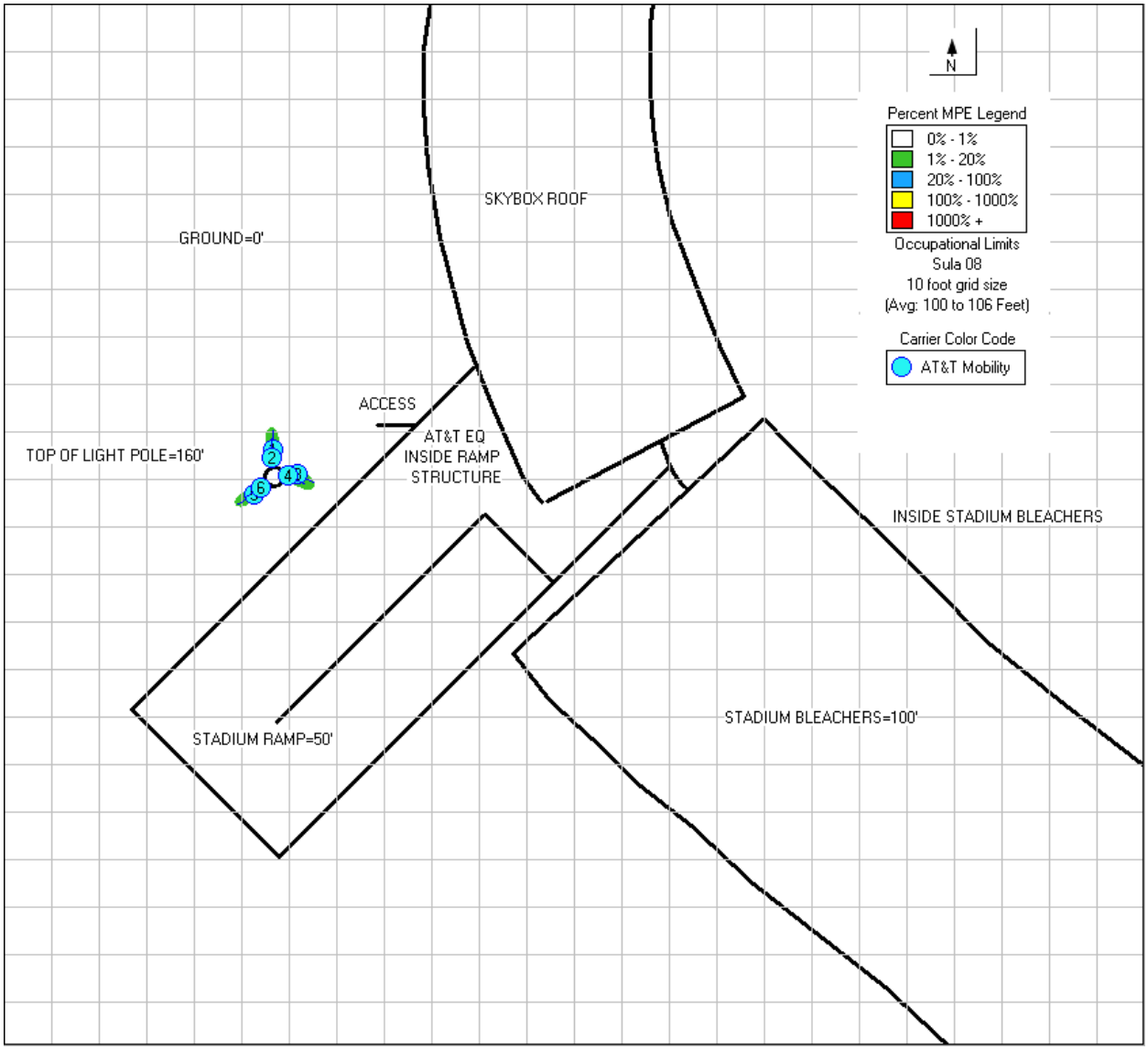
The following plots show the spatial average predicted power density levels in the reference plane indicated as a percentage of the Occupational Limits.

The reference plane for the plot is the roof level, as indicated in the caption. For example, “Avg 10 to 16 Feet” refers to the spatial average predicted power density level between 10 and 16 feet above the main level. Plots are produced for each accessible level. Levels that are not accessible will not be shown. Only accessible areas in a plot are relevant. Areas not accessible or in free space, off the edge of a roof or equipment penthouse, do not affect compliance.

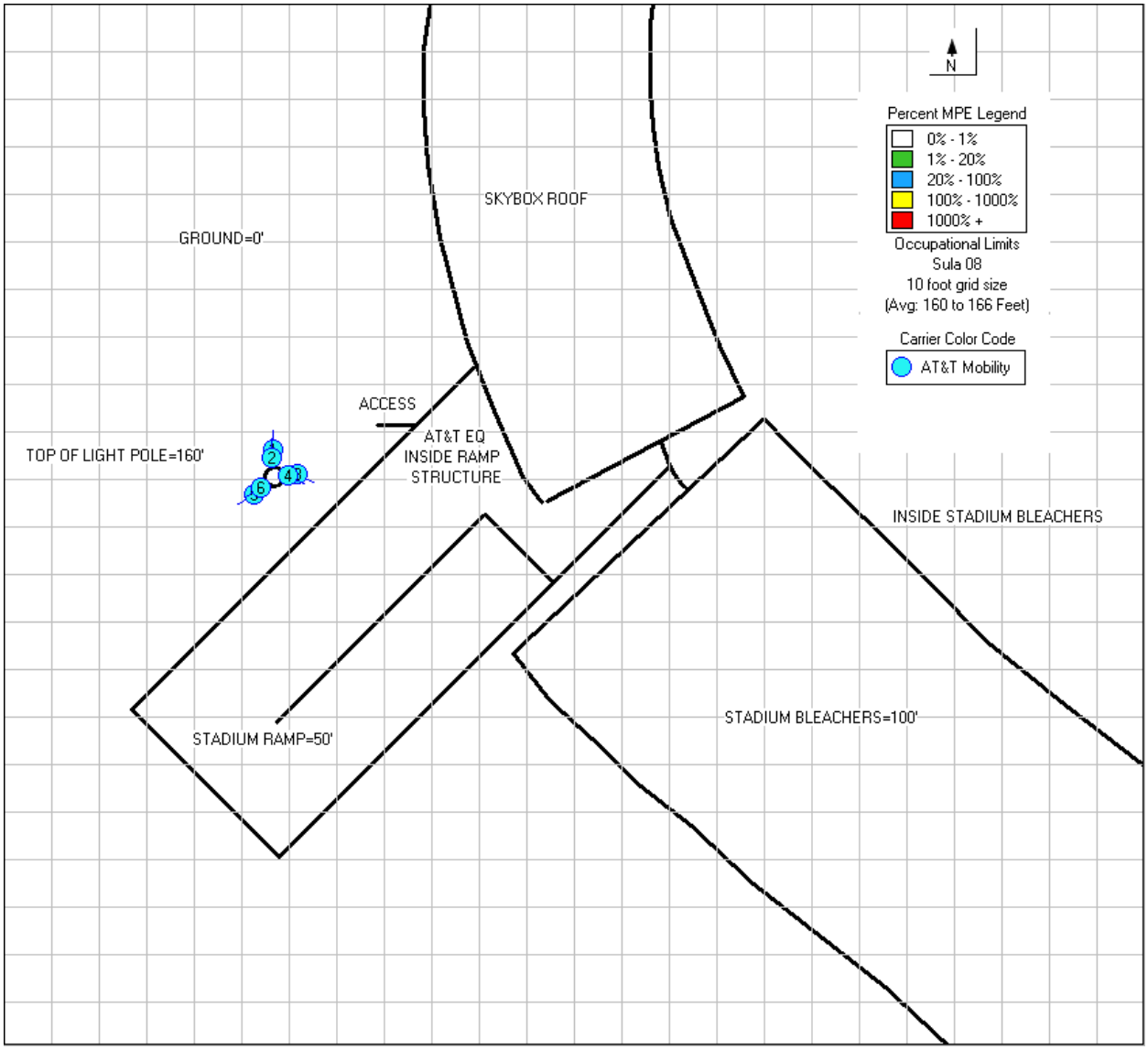
4.1 Predictive AT&T Mobility's RF Contribution Only on the Site



The reference plane for the plot is the stadium ramp level.

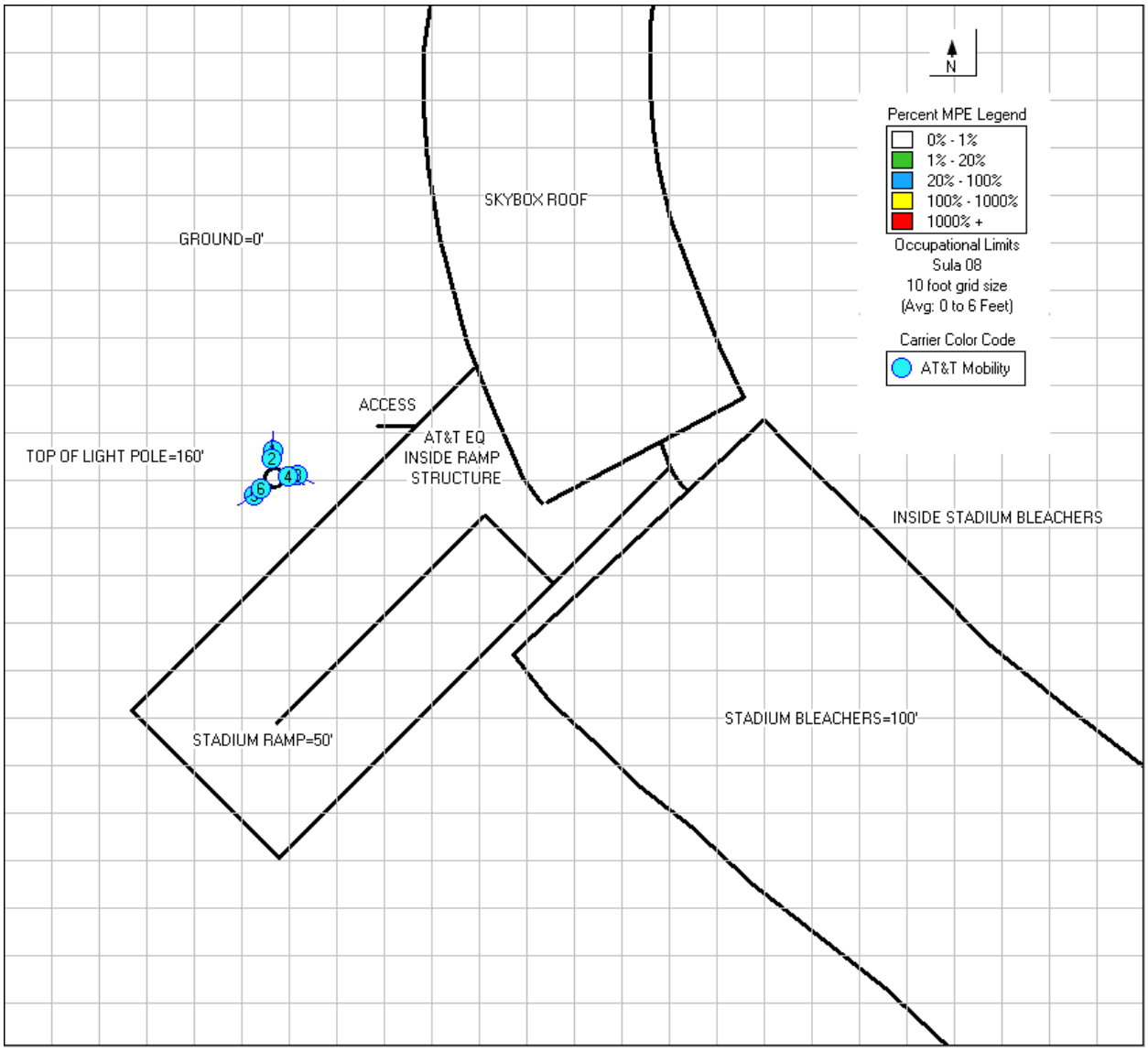


The reference plane for the plot is the stadium bleachers level.



The reference plane for the plot is the light pole level.

4.2 Predictive RF Contribution from All Sources at Ground Level



The reference plane for the plot is ground level.

5 Statement of Compliance

5.1 Statement of AT&T Mobility Compliance

At the time of our audit, AT&T Mobility is in **compliance** with the FCC's OET Rules and Regulations. No action is required.

5.2 Recommendations

No actions are required at this time.

6 Appendix A

6.1 Technical Framework

The FCC requires licensees to ensure that persons are not exposed to radiofrequency electromagnetic energy power densities in excess of the applicable MPE (Maximum Permissible Exposure) limits. These rules apply to both Occupational Personnel and the General Population. Applicable FCC rules are found at 47 C.F.R. § § 1.1307(b)(3) and 1.1310. The FCC rules define two tiers of permissible exposure differentiated by the situation in which the exposure takes place and/or the status of the individuals who are subject to exposure.

General Population / uncontrolled exposure limits apply to those situations in which persons may not be aware of the presence of electromagnetic energy, where exposure is not employment-related, or where persons cannot exercise control over their exposure.

Occupational / controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment, have been made fully aware of the potential for exposure, and can exercise control over their exposure.

Maximum Permissible Exposure ("MPE") is defined in OET 65 as being 100% of the exposure limits for the situation or tier of permissible exposure. These limits are listed as follows:

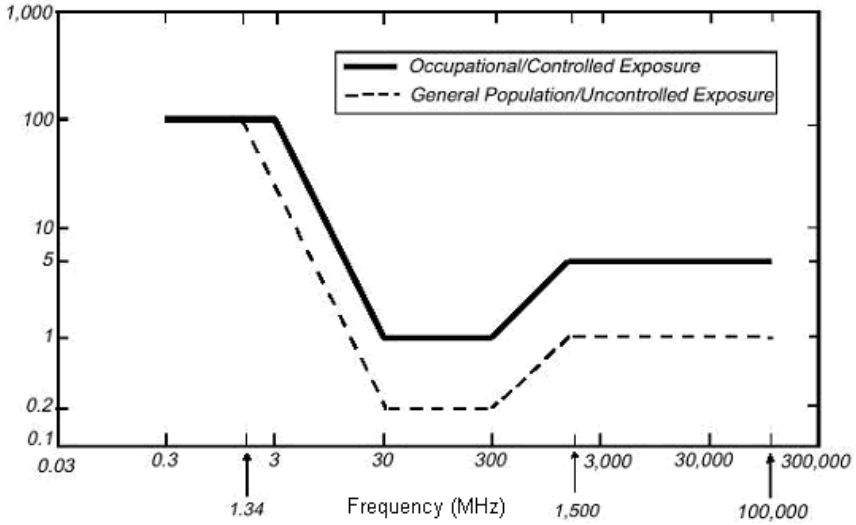
Limits for Occupational/Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field (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/f2)*	6
30-300	61.5	0.163	1.0	6
300-1500	--		f/300	6
1500-100,000	--		5	6

Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field (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	842/f	2.19/f	(180/f2)*	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



FCC Limits for Maximum Permissible Exposure (MPE)
Plane-wave Equivalent Power Density

For any area in excess of 100% General Population MPE, access controls with appropriate RF alerting signage must be put in place and maintained to restrict access to authorized personnel. Subject to other site security requirements, Occupational Personnel trained in RF safety and equipped with personal protective equipment designed for safe work in the vicinity of RF may be granted access. Controls such as physical barriers to entry imposed by locked doors, locked passageways, or other access control mechanisms may be supplemented by alarms that alert the individual and notify site management of a breach in access control. Controls may include administrative policies and procedures requiring personal protective equipment (e.g. RF personal monitor), proof of RF training to obtain site access cards, presentation of appropriate RF awareness training certifications to security personnel or other measures designed to prevent uncontrolled access.

RF alerting signs are not necessarily required, and by FCC guidelines, alone do not constitute compliance, posting of the appropriate **NOTICE**, **CAUTION,** or **WARNING** signs at areas of concern is considered good practice. The signs below are examples of signs meeting FCC guidelines.

Power density decreases significantly over a short distance from any antenna. Specifically with respect to directional panel antennas, the design, orientation in azimuth and elevation as documented, reasonably precludes potential to exceed MPE limits at any location other than directly in front of the antenna. Areas in front of the antenna that are restricted by barriers, would require climbing or are otherwise beyond the reach of a standing individual of average height are not considered accessible. Analysis or measurement of instantaneous energy levels is performed for use as proof of compliance with FCC rules and regulations applicable to non-occupational persons, those individuals who are not authorized to access portions of the antenna support structure above ground level. To assess time-average

exposure for occupational personnel working within secured areas of the site, on the supporting structure, or in the immediate proximity of the antenna equipment is a separate study requiring detailed ergonomic information.

FCC regulations regarding Radiofrequency radiation exposure, expressed in 47 CFR § 1.1310 are further clarified with respect to the value of 5% of exposure limits for the subject transmitters in the following section of 47 CFR § 1.1307 (b):

> *(3) In general, when the guidelines specified in § 1.1310 are exceeded in an accessible area due to the emissions from multiple fixed transmitters, actions necessary to bring the area into compliance are the shared responsibility of all licensees whose transmitters produce, at the area in question, power density levels that exceed 5% of the power density exposure limit applicable to their particular transmitter or field strength levels that, when squared, exceed 5% of the square of the electric or magnetic field strength limit applicable to their particular transmitter. Owners of transmitter sites are expected to allow applicants and licensees to take reasonable steps to comply with the requirements contained In § 1.1307(b) and, where feasible, should encourage co-location of transmitters and common solutions for controlling access to areas where the RF exposure limits contained in § 1.1310 might be exceeded.*

Following these FCC requirements, predictive modeling has been performed to evaluate power density resulting from client transmitters as a percentage of the power density MPE limit applicable to their transmitters. These results are presented in Section 4.

The site should be routinely inspected and this or a similar report updated with any changes to the RF environment including:

- Adding new antennas
- Removing of any existing antennas
- Change in the radiating power or number of RF emitters

Waterford Consultants recommends coordinating with all wireless tenants before performing services in front of or near any transmitting antennas. During these activities, it may be appropriate to utilize Lockout/Tagout Procedures as specified in ATT-002-290-078, “RF Exposure: Responsibilities, Procedures & Guidelines” for scheduled outages to eliminate RF hazards during these activities.

7 Appendix B

7.1 Qualifications of Waterford Consultants, LLC

With more than 100 team-years of experience, Waterford Consultants, LLC [Waterford] provides technical consulting services to clients in the Radio Communications and antenna locating industry. Waterford retains professional engineers who are placed in responsible charge of the processes for analysis.

Waterford is familiar with 47 C.F.R. § § 1.1307(b)(3) and 1.1310 along with the general Rules, Regulations and policies of the FCC. Waterford work processes incorporate all specifications of FCC Office of Engineering and Technology, Bulletin 65 ("OET65"), from the website: www.fcc.gov/oet/rfsafety and follow criteria detailed in 47 CFR § 1.1310 "Radiofrequency radiation exposure Limits".

Within the technical and regulatory framework detailed above, Waterford developed tools according to recognized and generally accepted good engineering practices. Permissible exposure limits are band specific, and the Waterford computerized modeling tools correctly calculate permissible exposure based on the band(s) specified in the input data. Only clients and client representatives are authorized to provide input data through the Waterford web portal. In securing that authorization, clients and client representatives attest to the accuracy of all input data.

Waterford Consultants, LLC attests to the accuracy of the engineering calculations computed by those modeling tools. Furthermore, Waterford attests that the results of those engineering calculations are correctly summarized in this report.

8 Appendix C

8.1 RoofMaster™

RoofMaster™ is the software package that Waterford Consultants created to model RF environments associated with multiple emitters where the potential exists for human exposure. Based on the computational guidelines set forth in OET Bulletin 65 from the Federal Communications Commission (FCC), RoofMaster™ considers the operating parameters of specified RF sources to predict the overall Maximum Permissible Exposure possible at a given location. These theoretical results represent worst-case predictions as emitters are assumed to be operating at 100% duty cycle.

From the FCC document:

> *"The revised OET Bulletin 65 has been prepared to provide assistance in determining whether proposed or existing transmitting facilities, operations or devices comply with limits for human exposure to radiofrequency (RF) fields adopted by the Federal Communications Commission (FCC). The bulletin offers guidelines and suggestions for evaluating compliance."*

http://transition.fcc.gov/Bureaus/Engineering_Technology/Documents/bulletins/oet65/oet65.pdf

9 Appendix D

9.1 Statement of Limiting Conditions

Waterford Consultants has received data pertaining to RF environment provided by the client. Waterford Consultants will not be responsible for matters of a legal nature that affect the site or property. The property has been analyzed under the premise that it is under responsible ownership and management and our client has the legal right to conduct business at this facility.

Due to the complexity of some wireless sites, Waterford Consultants has created this report utilizing best industry practices and due diligence. Waterford Consultants cannot be held accountable or responsible for anomalies or discrepancies due to actual site conditions (i.e., mislabelling of antennas or equipment, inaccessible cable runs, inaccessible antennas or equipment, etc.) or information or data supplied by Wireless Carrier, the site manager, or their affiliates, subcontractors or assigns.

Waterford Consultants has provided the results of a computer generated model in this MPE Site Compliance Report to show approximate dimensions of the site, and the model results is included to assist the reader of the compliance report to visualize the site area, and to provide supporting documentation for Waterford Consultants' recommendations.

Waterford Consultants will not be responsible for any existing conditions or for any engineering or testing that might be required to discover whether adverse safety conditions exist. Because Waterford Consultants is not an expert in the field of mechanical engineering or building maintenance, this MPE Site Compliance Report must not be considered a structural or physical engineering report.

Waterford Consultants obtained information used in this MPE Site Compliance Report from sources that Waterford Consultants considers reliable and believes them to be true and correct. Waterford Consultants does not assume any responsibility for the accuracy of such items that were furnished by other parties.