RF EMISSIONS COMPLIANCE REPORT

Prepared for:

Crown Castle
8000 Avalon Boulevard, Suite 700
Alpharetta , GA 30009

Site:

Scenario 279

February 1, 2024

This site will be in compliance with

FCC Regulations and MPE Limits:

Crown Castle Is 1.434% of General Population (GP) Limit

(0.287% of Occupational (Occ) Limit)

Analysis completed using Waterford's NIERTool© software

Only clients and client representatives are authorized to provide input data through the Waterford web portal. In securing that authorization, clients and client representatives warrant the accuracy of all input data. Waterford Consultants, LLC attests to the accuracy of the engineering calculations. Waterford also attests that the results of those engineering calculations are correctly summarized in this report.

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RF EMISSIONS COMPLIANCE STATEMENT

Site:
Scenario 279

Compliance Statement

Subject site COMPLIES with Radiofrequency Radiation Exposure Limits of 47 C.F.R. §§ 1.1307(b)(3) and 1.1310.

Ground Level Site Summary

Predicted cumulative RF power density at ground level as a percentage of the FCC General Population limits. This result is the sum of the maximum ground level MPE for each RF emitter by band of operation. Sites below 100% are in full compliance.

Source	Predicted Power Density, % of Limit (GP)
WSP 1 28000 MHz	1.434 %
Sum of Listed Sources	**1.434%**

Antenna Level Site Summary

Predicted cumulative RF power density at elevated levels near the antenna(s) has been evaluated with respect to the FCC General Population limits. The mitigation measures recommended herein are necessary to achieve and maintain compliance at the site based on the following assessment:

Antenna Level Assessment

Signage directives for this report are specified in the Elevation Detail Plot which depicts predicted RF power density near the antenna as a percentage of the FCC General Population limits. Areas exceeding 100% of the General Population limits are depicted as blue. Any work required within areas exceeding 100% of the limits should be coordinated with wireless operators or performed by personnel trained in RF safety and equipped with personal protection equipment. Workers in areas depicted as green or clear will not be exposed to hazardous levels of RF energy and no action is required to maintain a safe working environment.

As shown in the Elevation Detail Plot, the following keep-back distances to the FCC limits have been determined:

Reference Level	Maximum Level: General Population (%)	Maximum Level: Occupational (%)
Ground Level	1.434	0.287
Antenna Level	371.038	74.208

Distance to FCC 100% MPE Limits at Antenna Level

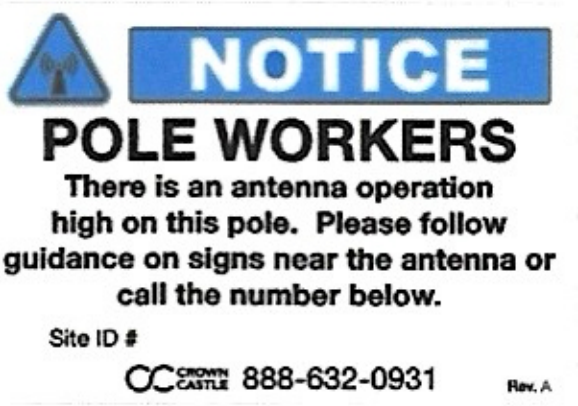
- Vertical Stand Off Distance (General Population) 3 feet
- Vertical Stand Off Distance (Occupational) N/A
- Horizontal Stand Off Distance (General Population) 6 feet
- Horizontal Stand Off Distance (Occupational) N/A

Distance to FCC 100% MPE Limits at Ground Level

- Horizontal Stand Off Distance (General Population) N/A
- Horizontal Stand Off Distance (Occupational) N/A

RF Alerting Signage

The "Notice" sign must be posted near the bottom of the pole or on the shroud any time there is a zone near the antenna that exceeds the General Population limit. This sign should be mounted where it is easily visible to workers on the ground as they approach the pole. Suggested locations include on the pole about 8-10' from the ground or on the front of the equipment shroud if it is mounted on the pole.



The "Notice" sign must be posted on the antenna any time there is an area that exceeds the FCC General Public exposure limit. The keep-back distance for the General Population limit must be filled in on the sign as depicted below. This sign must be mounted on or just below the radiating antenna so that it is maximally visible to workers approaching the antenna in a lift or bucket truck. If there is more than one radiating antenna and they are less than 5' apart then the sign should be mounted on or near the lower antenna. If there are multiple radiating antennas and they are >5' apart then separate signs should be mounted on or near each antenna.



Technical Framerwork: Basis for Compliance Statement

The compliance framework is derived from the Federal Communications Commission (FCC) Rules and Regulations for preventing human exposure in excess of the applicable Maximum Permissible Exposure ("MPE") limits listed in Table 1 of 47 C.F.R. § 1.1310. Calculations using input data provided to Waterford by client or client's representative numerically confirm the subject site can operate at a 100% duty cycle without exceeding the FCC MPE limits in areas of uncontrolled access.

At this site, the radio frequency (RF) power density resulting from each transmitter at any location may be expressed as a percentage of the frequency-specific limits and added to determine if 100% of the exposure limit has been exceeded. 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. Based on the criteria for these classifications, continuous exposure to RF power density levels below the FCC General Population limits is not hazardous. The FCC General Population limits are 5 times more restrictive than the Occupational limits.

	Limits for General Population/ Uncontrolled Exposure		*Limits for Occupational/ Controlled Exposure*	
Frequency (MHz)	Power Density (mW/cm^2)	Averaging Time (minutes)	Power Density (mW/cm^2)	Averaging Time (minutes)
30-300	0.2	30	1	6
300-1500	f/1500	30	f/300	6
1500-100,000	1.0	30	5.0	6

In situations where the predicted MPE exceeds the General Population threshold in an accessible area because of emissions from multiple transmitters, FCC licensees that contribute greater than 5% of the aggregate MPE share responsibility for mitigation.

For any location where radiofrequency (RF) power densities exceed 100% MPE of the General Population limits, access controls with appropriate RF alerting signage must be available to be visible upon approach from any direction to provide notification of potential conditions within these areas. Subject to other site security requirements, occupational personnel should be trained in RF safety and equipped with personal protective equipment (e.g. RF personal monitor) designed for safe work in the vicinity of RF emitters. Waterford Consultants, LLC recommends that any work activity in these designated areas or in front of any transmitting antennas be coordinated with the wireless operators.

Predictive Modeling

Based on the computational guidelines set forth in FCC Office of Engineering and Technology, Bulletin 65 ("OET65"), Waterford Consultants, LLC has developed software to predict the overall MPE possible at any particular location given the spatial orientation and operating parameters of multiple RF sources. These theoretical results represent worst-case predictions as emitters are assumed to be operating at 100% duty cycle.

The tabular analysis in this report calculates the spatial peak power density produced at ground level from each RF emitter. The far field power density in milliWatts per square centimeter is expressed as Sff = 33.4 x ERP / R2 where ERP is the Effective Radiated Power along a specific azimuth in Watts and R is the distance from the antenna radiation center in meters. The antenna manufacturer's horizontal and vertical radiation patterns have been considered in determining the ERP in any direction. This computation is based on the maximum ERP and includes a 1.6-fold increase in field strength due to ground reflection. The result provides a conservative estimate of spatially averaged power density at ground level and may be higher than predicted MPE in the graphical plots described below.

As the limits are frequency dependent, the contribution of any RF source at a specific location may be expressed as a percentage of the FCC General Population MPE limits at the associated operating frequency. The percentage contributions from all RF sources are added to determine the overall exposure level. If this result is less than 100%, the predicted cumulative exposure level is below the General Population limits set forth in the FCC Rules. The cumulative MPE depicted on the summary page is the summation of maximum MPE values for each emitter regardless of antenna orientation.

A graphical plot of calculated spatially averaged RF power density, based on the Cylindrical Model as described in OET65, predicts spatially averaged MPE conditions at areas in near proximity to the antenna. In the vertical display, predicted MPE is depicted at the center of the 6 ft vertical zone that a person could occupy.

Qualifications of Waterford

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.

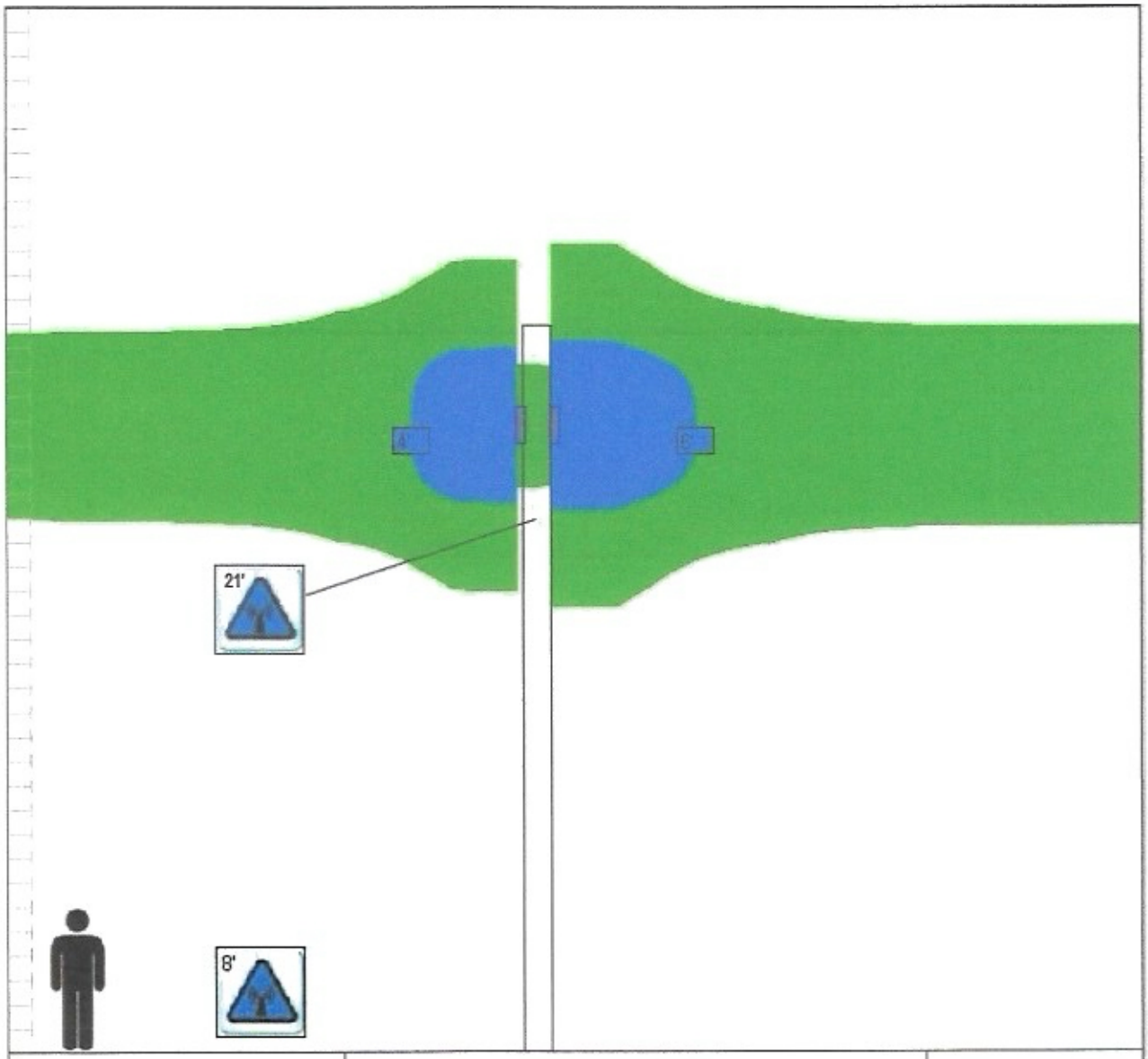
Waterford Consultants, LLC attests to the accuracy of the engineering calculations computed by those modeling tools. Furthermore, Waterford attests that the results of those engineering calculations are correctly summarized in this report.

Antenna Inventory

#	Operator	Make	Model	Freq (MHz)	Az (deg)	Tilt (deg)	HorBW (deg)	Ant (ft)	TPO (w)	Paths	Loss (db)	Ant Gain	Radiated Power (W)	RC AGL (ft)
1	WSP 1	[redacted]											1586.620 EIRP	25
2	WSP 1												1586.620 EIRP	25
3	WSP 1												1586.620 EIRP	25

ELEVATION DETAIL

Predicted MPE depicted at the center of the 6 ft vertical zone that a person could occupy



GP Limit Exceeded at: 22' AGL
Control #:96480
Structure Type: Standard
Antenna Rad. Center Height: 25'

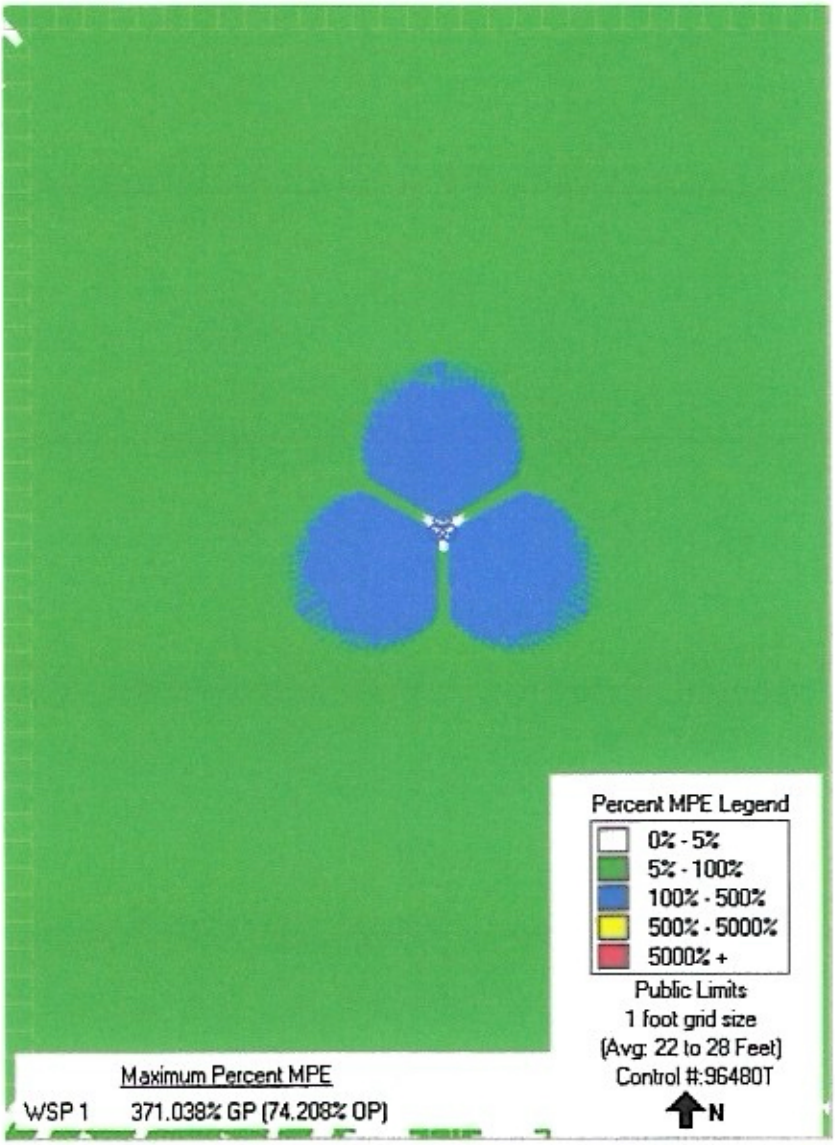
NOTICE
POLE WORKERS
There is an antenna operation high on this pole. Please follow guidance on signs near the antenna or call the number below.
Site ID #
CCSG 888-632-0931 Rev A

NOTICE
Keep Back ____ FT From this Antenna.
FCC RF Public Exposure Limits May Be Exceeded Within This Distance.
Call 888-632-0931 for Instructions.
Site ID # Rev A

Percent MPE Legend
- 0% - 5%
- 5% - 100%
- 100% - 500%
- 500% - 5000%
- 5000% +

Public Limits
1 foot grid size
(Elevation View)

TOP DOWN DETAIL



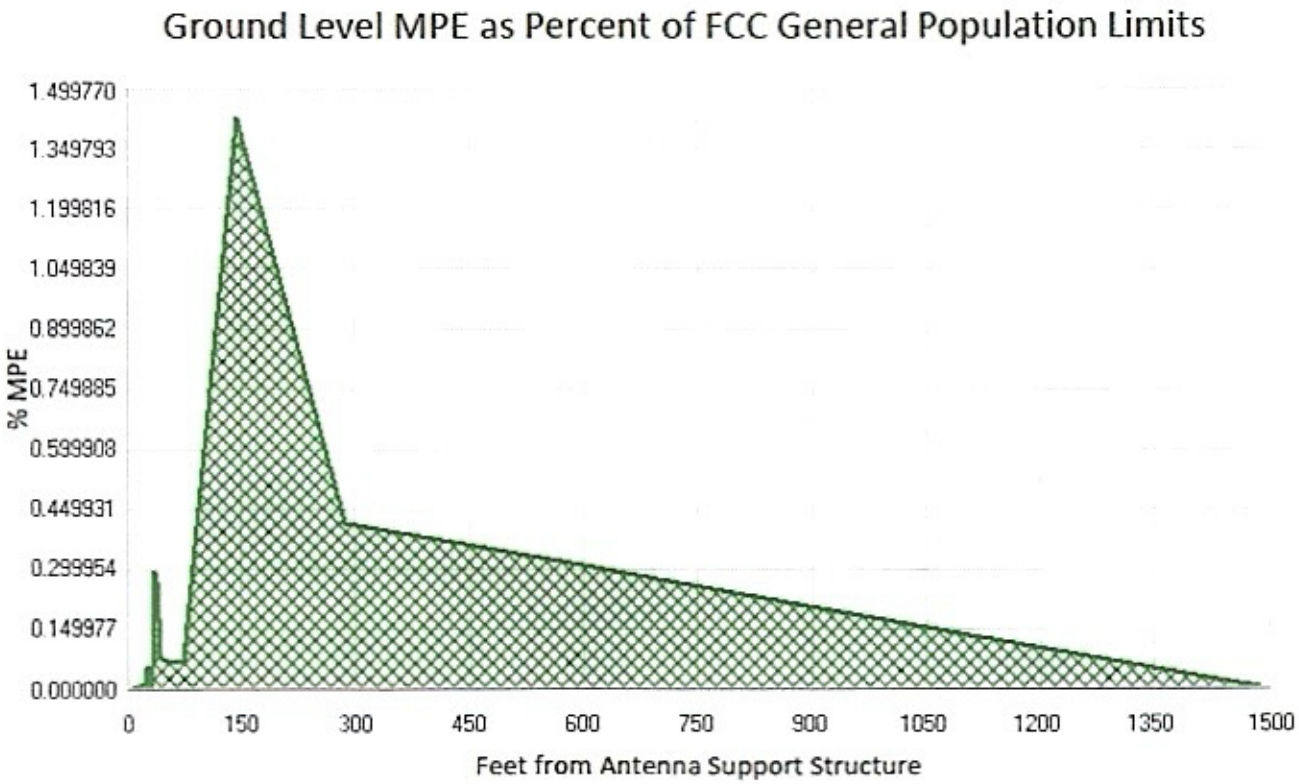
GROUND LEVEL MPE BY RF EMITTER

The maximum ground level MPE along the azimuth of orientation for each RF emitter by band of operation is listed below. The computational approach is described in the Predictive Modeling section. The maximum MPE by operator and band is contributive to the cumulative ground level MPE summary table presented above.

WSP 1
Scenario 279
ERICSSON - SON_SM6705 CM2 02.07.22 28GHz VZW 0° Sector

Maximum Exposure Limit - 28000 MHz
Limit (GP): 1000.000 µW/cm^2

EiRP		**Height**		**Downtilt**	
(Watts)	1586.620	(feet)	25.000	(Degrees)	0



Maximum power density at ground level: 14.338 µW/cm^2

Highest percentage of Maximum Exposure Limit: 1.434 %

WSP 1

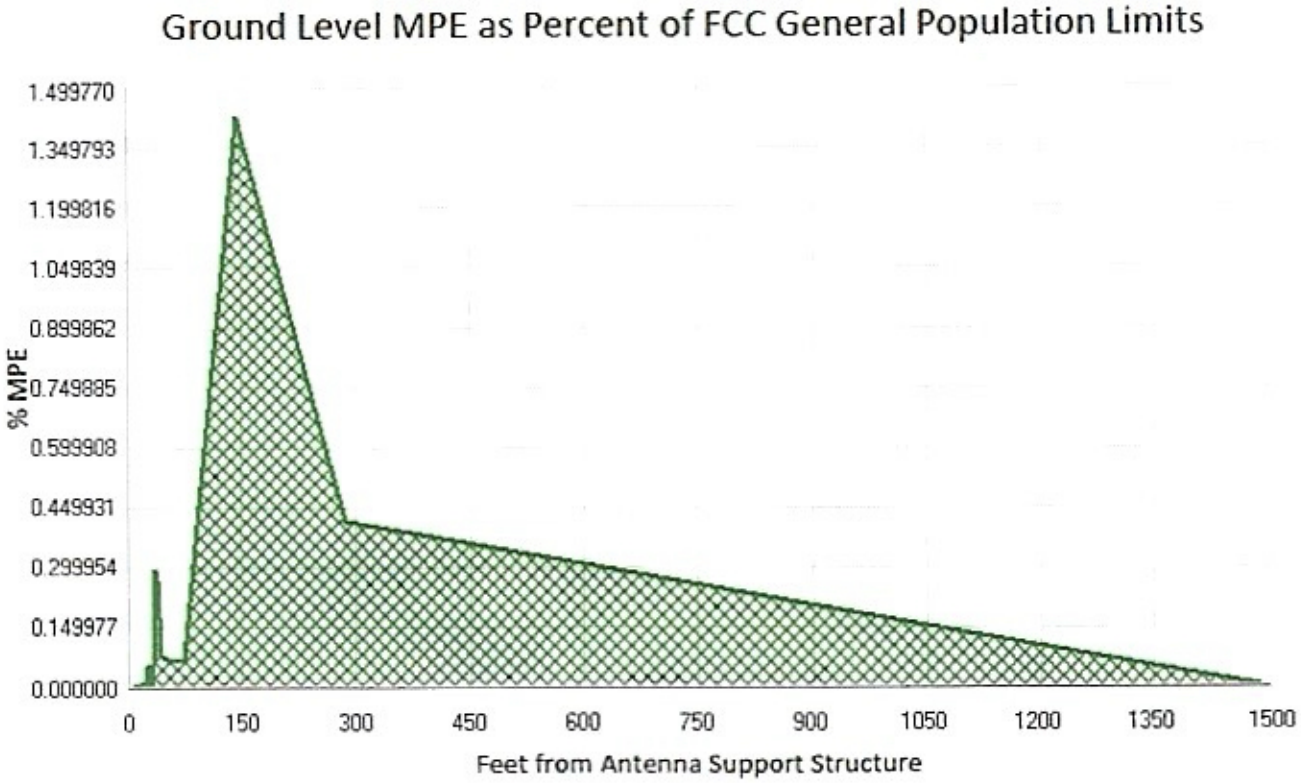
Scenario 279

ERICSSON - SON_SM6705 CM2 02.07.22 28GHz VZW 120° Sector

Maximum Exposure Limit - 28000 MHz

Limit (GP): 1000.000 µW/cm^2

EiRP		**Height**		**Downtilt**	
(Watts)	1586.620	(feet)	25.000	(Degrees)	0



Maximum power density at ground level: 14.338 µW/cm^2

Highest percentage of Maximum Exposure Limit: 1.434 %

WSP 1

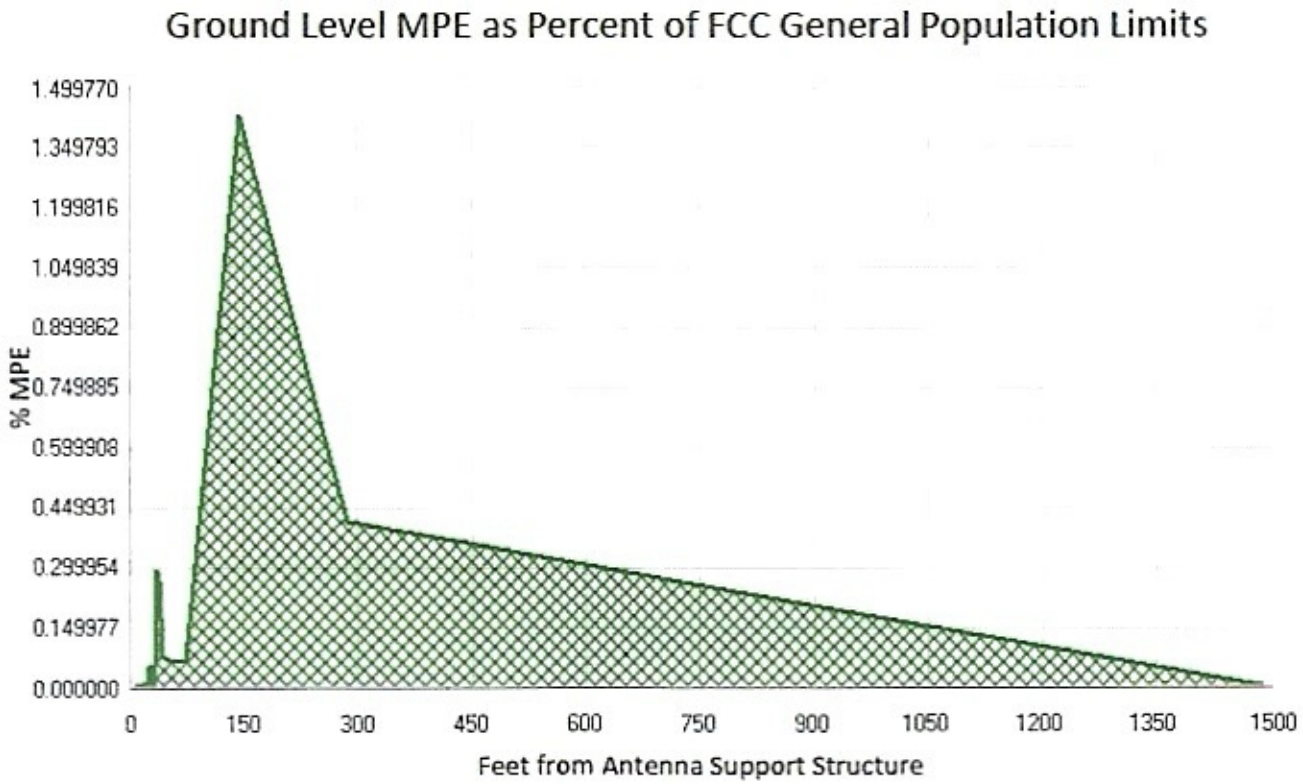
Scenario 279

ERICSSON - SON_SM6705 CM2 02.07.22 28GHz VZW 240° Sector

Maximum Exposure Limit - 28000 MHz

Limit (GP): 1000.000 µW/cm^2

EiRP		**Height**		**Downtilt**	
(Watts)	1586.620	**(feet)**	25.000	**(Degrees)**	0



Maximum power density at ground level: 14.338 µW/cm^2

Highest percentage of Maximum Exposure Limit: 1.434 %