
Marshall (20200720)
Radio Frequency (RF) Site Compliance Report



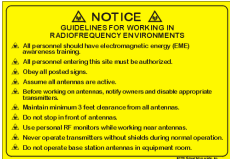




6th St, Marshall, AK 99585



Radio Frequency Exposure Pre-Installation FCC Compliance Assessment

Site Specific Information				
Site Name	Marshall (20200720)	Categorically Excluded?		No
Street Address	6th St.			
City, State, Zip	Marshall, AK 99585	5% Contributor		No
Multi-License Facility	No	GCI's Max % MPE (Predictive - Occupational) * refer section 4	Adjacent Building-1 Slanted Roof	17.91%
			Adjacent Building-2 Slanted Roof	4.88%
			Ground	1013.54%
Structure Type	Pole	GCI's Max % MPE ((Measured - Occupational)		N/A
Broadcast Equipment	No	Assessment Date		10/21/2020
# of Access Points	N/A			

Compliance Status	Site will be FCC complaint, if GCB recommended mitigation as per the table below is implemented.
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<u>GCI Signage Details</u>					
	Guidelines	Notice	Caution	Warning	Barrier/Marker
Adjacent Building-1 Slanted Roof	<input type="checkbox"/> [#]	<input type="checkbox"/> [#]	<input type="checkbox"/> [#]	<input type="checkbox"/> [#]	<input type="checkbox"/>
Adjacent Building-2 Slanted Roof	<input type="checkbox"/> [#]	<input type="checkbox"/> [#]	<input type="checkbox"/> [#]	<input type="checkbox"/> [#]	<input type="checkbox"/>
On the Ground Level	<input checked="" type="checkbox"/> [5]	<input type="checkbox"/> [#]	<input type="checkbox"/> [#]	<input checked="" type="checkbox"/> [5]	53ft (25ft+3ft+25ft)
Base of Antenna (On the Pole)	<input checked="" type="checkbox"/> [1]	<input type="checkbox"/> [#]	<input type="checkbox"/> [#]	<input checked="" type="checkbox"/> [1]	<input type="checkbox"/>

Additional Compliance Requirements(s):			
Consultant Legal Name	GCB Services	Phone/Fax	(703) 564-2297
Address	8201 Greensboro Drive, Suite 300, McLean, VA 22102		

Contents

- 1. Summary 4
- 2. Site Characteristics 5
 - a. Access information..... 5
 - b. Structure 5
- 3. Antenna Inventory 5
- 4. Theoretical Study 6
 - a. Predictive Model: Emission on Adjacent Building-1 and Adjacent Building-2 Slanted Roof Level 6
 - b. Predictive Model: Emission on the ground Level 8
 - c. Predictive Model: Emission in front of the antenna Level..... 9
- 5. Conclusion from theoretical analysis 10
 - a. GCI Signage/Barrier Diagram..... 11
- 6. Appendix B: RF Consultant Certifications 13
 - a. Preparer Certification 13
 - b. Reviewer Certification 13
- 7. Appendix C: Reference Information 14
 - a. FCC Rules & Regulations 14
 - b. RF Signage 15
 - c. Physical Barriers 15
 - d. Indicative Markers 15

1. Summary

GCI has contracted with GCB Services, an independent consulting firm, to conduct a Radio Frequency Exposure Compliance Assessment of the **Marshall (20200720)** cell site. This report contains a detailed summary of the Radio Frequency environment as it relates to Federal Communications Commission (FCC) and Occupational Safety & Health Administration (OSHA) Rules and Regulations for all individuals.

This compliance assessment and report has been prepared by:

Preparer	
Name	Manvendra Singh
Title	RF Associate
Date	10/21/2020

This report utilizes the following **for predictive modeling of the ambient RF environment:**

MPE Modeling Program: ROOFMASTER 19.12.13.19

Required Modeling Assumptions: 100% Duty Cycle and Maximum Total Power Output.

Additional Modeling Assumptions:

For this report, in the simulation we have shown the maximum RF energy density considering worst-case analysis by assuming that all antennas are operating at full power all times.

In OET-65, the Cylindrical Model is presented as an approach to determine the spatially averaged power density in the near field directly in front of an antenna. In order to implement this model in all directions, RoofMaster™ utilizes the antenna manufacturer horizontal pattern data. Additionally, RoofMaster™ incorporates factors that reduce the power density by the inverse square of horizontal and vertical distance beyond the near field region.

For areas on the rooftop where MPE levels are more than 20% occupational, reports show location of signage and barriers around restricted areas. These restricted areas should not be entered without taking proper steps towards reducing carrier power or tuning the site down. Personal accessing these restricted areas should carry a personal RF monitor.

For unknown antennas on the rooftop, GCB will use generic antennas listed as “Unknown”. We will use max output power to model the site. Operating frequency information for unknown antenna will be selected such as to get per max antenna gain.

2. Site Characteristics

a. Access information

- No site visit was done. This report is for desktop study only.

All access points locked at time of assessment?

N/A

b. Structure

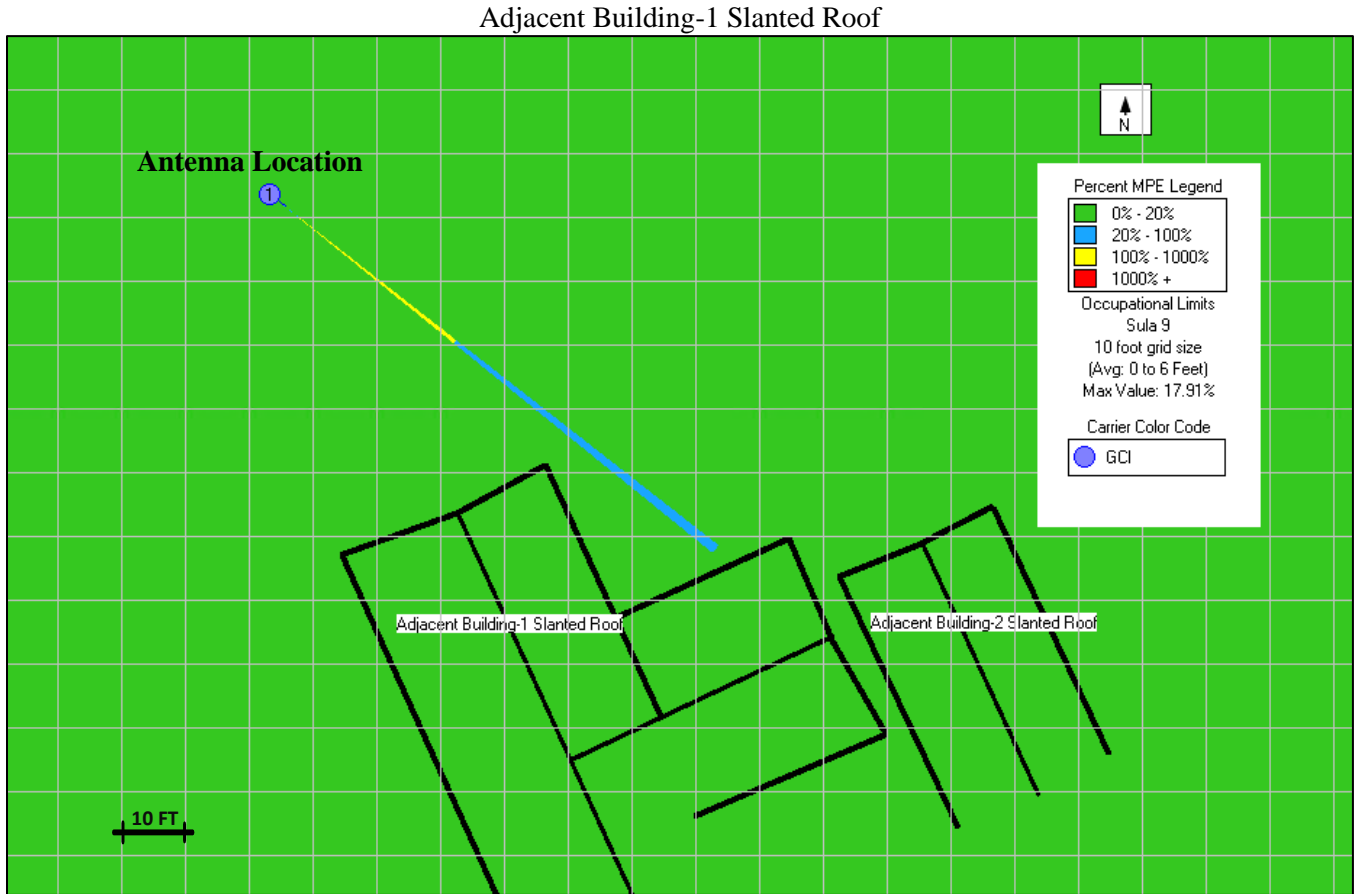
Description	GCI antennas are mounted at the height of 4.9' (bottom tip) from ground level. This site has only one transmitting antenna at azimuth of 129.4°.
Site Latitude (NAD 83)	61.880924°
Site Longitude (NAD 83)	-162.086768°

3. Antenna Inventory

Ant #	Carrier	Frequency (MHz)	ERP (Watts)	Manufacturer	Model	(ft) X	(ft) Y	Gain (dBd)	Azimuth	HBW	Length (m)
1	GCI	6135	5081945	GD Satcom	1385 ~ 3.8m VSAT ANTENNA	16.5	106.2	44.05	129.4	0.9	3.8

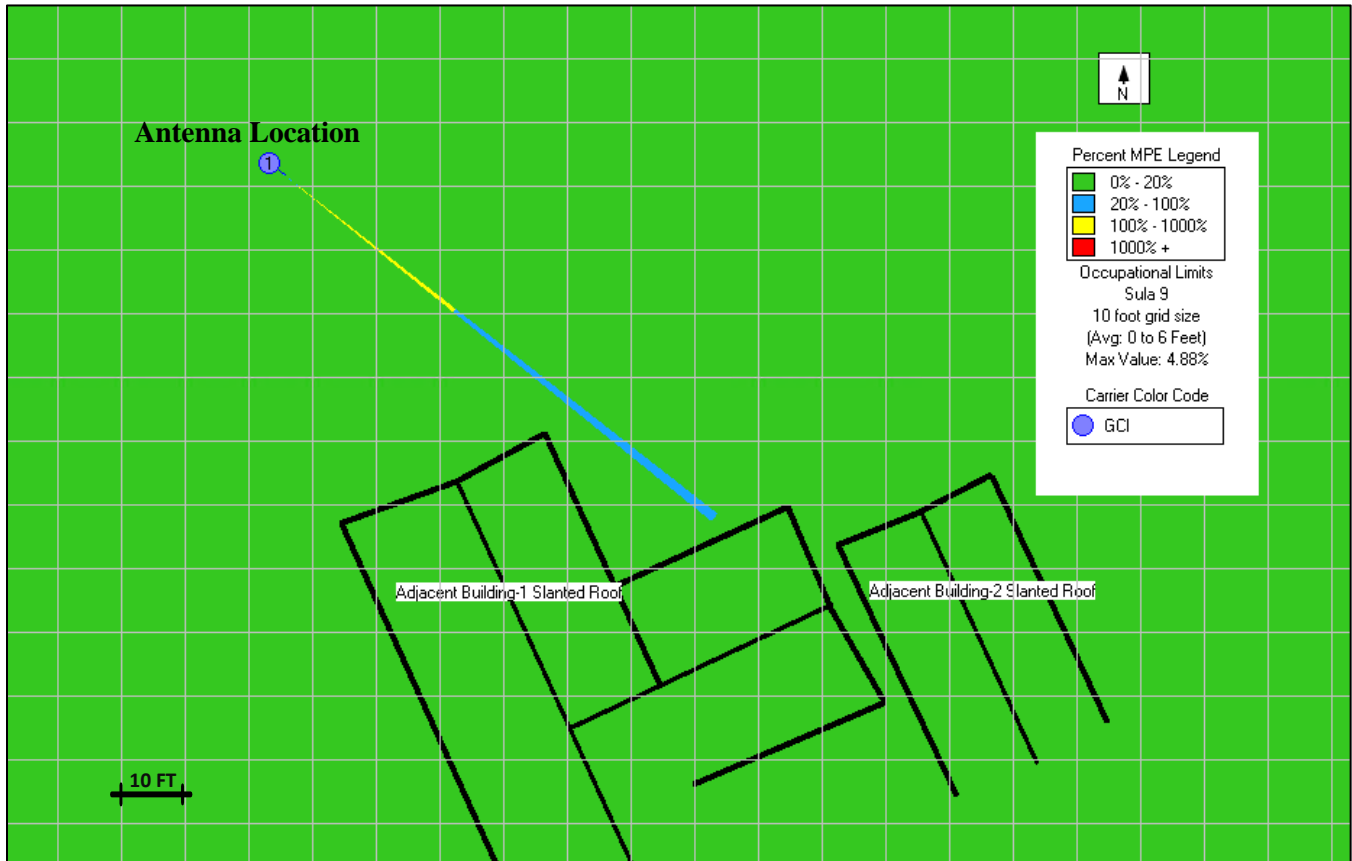
4. Theoretical Study

a. Predictive Model: Emission on Adjacent Building-1 and Adjacent Building-2 Slanted Roof Level



Maximum MPE% Predicted for this level is 17.91% of Occupational standard contribution of all existing transmitters.

Adjacent Building-2 Slanted Roof



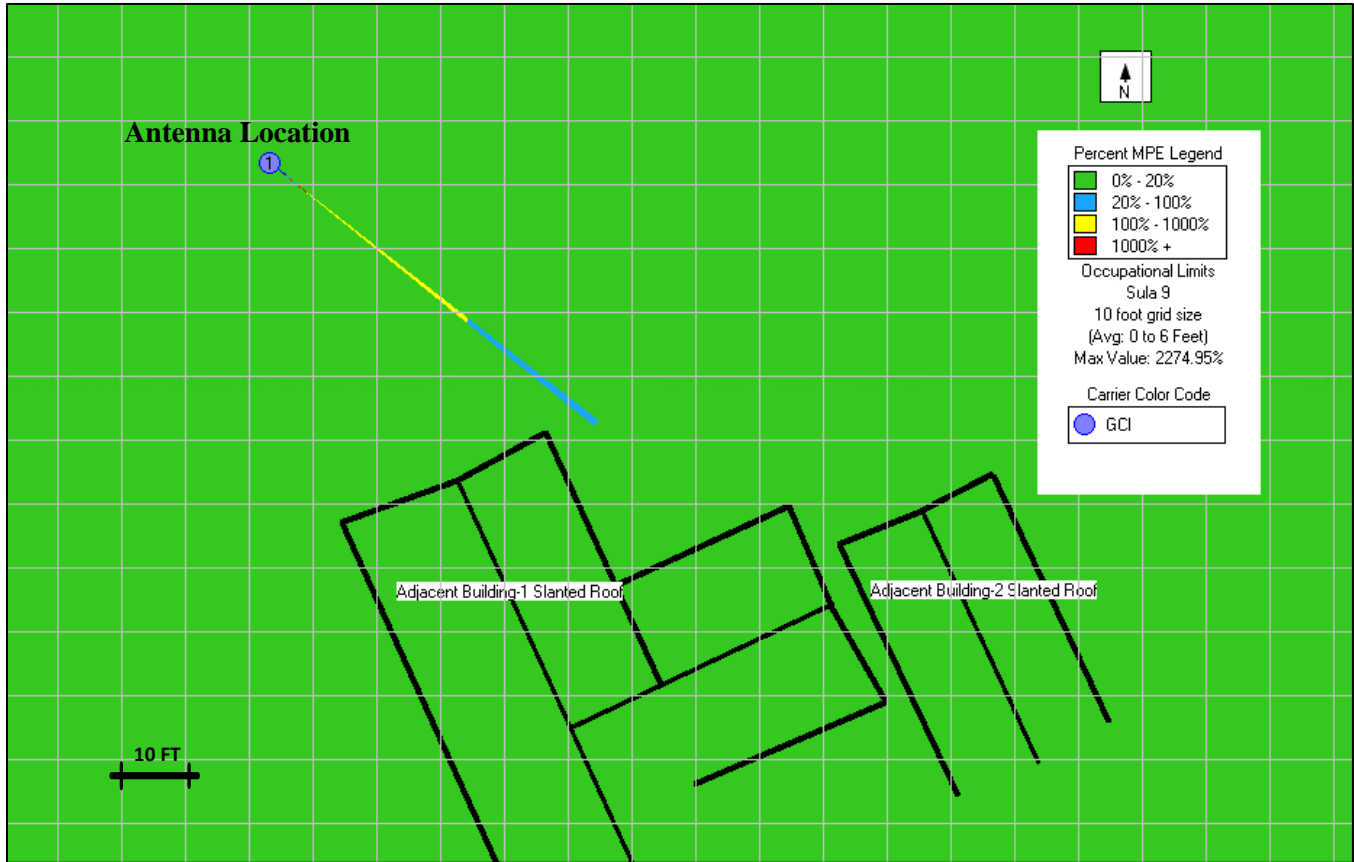
Maximum MPE% Predicted for this level is 4.88% of Occupational standard contribution of all existing transmitters.

b. Predictive Model: Emission on the ground Level



Maximum MPE% Predicted for this level is 1013.54% of Occupational standard contribution of all existing transmitters.

c. Predictive Model: Emission in front of the antenna Level



Maximum MPE% Predicted for this level is 2274.95% of Occupational standard contribution of all existing transmitters.

Note: - MPE% at this level is 2274.95% of Occupational standard. However, the excessive emission in front of the antenna is in freespace. This excess emission is not on the walking surface (ground level). Above plot is the top view of the emission analysis.

5. Conclusion from theoretical analysis

On the Adjacent Building-1 Slanted Roof Level

The RF emission based on GCB simulation is 17.91% of the Occupational limits. FCC requires mitigation for emission more than 20% occupational standards. No mitigation required on the slanted adjacent building 1.

On the Adjacent Building-2 Slanted Roof Level

The RF emission based on GCB simulation is 4.88% of the Occupational limits. FCC requires mitigation for emission more than 20% occupational standards. No mitigation required on the slanted adjacent building 2.

On the ground Level

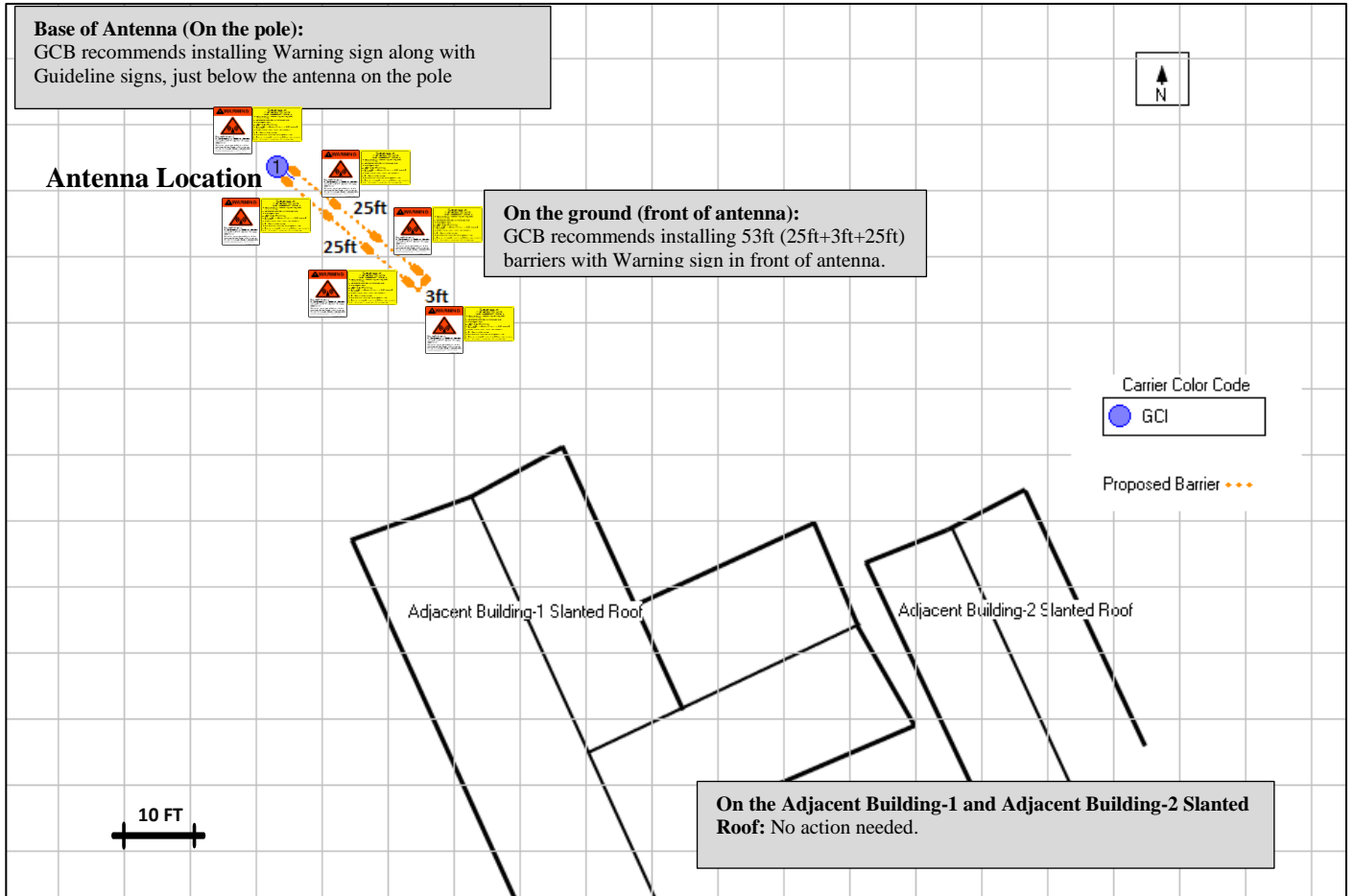
The RF emission based on GCB simulation is 1013.54% of the Occupational limits. FCC requires mitigation for emission more than 20% occupational standards. Mitigation required on the ground.

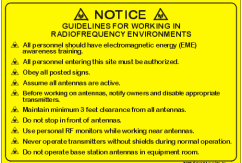




Antenna Level: Emission level in front of the antenna

RF emission in front of the antenna is 2274.95% of the Occupational limits. However, the excessive emission in front of the antenna is in freespace. This excess emission is not on the walking surface (ground level).

Mitigation is required just below of the antenna.

a. GCI Signage/Barrier Diagram



GCL Signage Details					
	Guidelines	Notice	Caution	Warning	Barrier/Marker
Adjacent Building-1 Slanted Roof	<input type="checkbox"/> [#]	<input type="checkbox"/> [#]	<input type="checkbox"/> [#]	<input type="checkbox"/> [#]	<input type="checkbox"/>
Adjacent Building-2 Slanted Roof	<input type="checkbox"/> [#]	<input type="checkbox"/> [#]	<input type="checkbox"/> [#]	<input type="checkbox"/> [#]	<input type="checkbox"/>
On the Ground Level	<input checked="" type="checkbox"/> [5]	<input type="checkbox"/> [#]	<input type="checkbox"/> [#]	<input checked="" type="checkbox"/> [5]	53ft (25ft+3ft+25ft)
Base of Antenna (On the Pole)	<input checked="" type="checkbox"/> [1]	<input type="checkbox"/> [#]	<input type="checkbox"/> [#]	<input checked="" type="checkbox"/> [1]	<input type="checkbox"/>

Signage/Barrier Installation Detail

On the Adjacent Building-1 Slanted Roof

No action needed.

On the Adjacent Building-2 Slanted Roof:

No action needed.

Base of Antenna (On the pole)

GCB recommends installing Warning sign with Guideline sign just below the antenna.

On the Ground Level:

GCB recommends installing 53ft (25ft+3ft+25ft) barriers with Warning sign in front of the antenna.

6. Appendix B: RF Consultant Certifications

a. Preparer Certification

I, Manvendra Singh, the preparer of this report, am fully aware of and familiar with the Rules and Regulations of both the Federal Communications Commissions (FCC) and the Occupational Safety and Health Administration (OSHA) with regard to Human Exposure to Radio Frequency Radiation. I am also fully aware of and familiar with the GCI Wireless Signage & Demarcation Policy. I have reviewed this Radio Frequency Exposure Assessment report and believe it to be both true and accurate to the best of my knowledge.

Manvendra Singh

b. Reviewer Certification

I, Gyan Sharma, the reviewer and approved of this report, am fully aware of and familiar with the Rules and Regulations of both the Federal Communications Commissions (FCC) and the Occupational Safety and Health Administration (OSHA) with regard to Human Exposure to Radio Frequency Radiation. I am also fully aware of and familiar with the GCI Wireless Signage & Demarcation Policy. I have reviewed this Radio Frequency Exposure Assessment report and believe it to be both true and accurate to the best of my knowledge.

Gyan Sharma

7. Appendix C: Reference Information

a. FCC Rules & Regulations

The Federal Communications Commission (FCC) has established safety guidelines relating to RF exposure from cell sites. The FCC developed those standards, known as Maximum Permissible Exposure (MPE) limits, in consultation with numerous other federal agencies, including the Environmental Protection Agency, the Food and Drug Administration, and the Occupational Safety and Health Administration. The standards were developed by expert scientists and engineers after extensive reviews of the scientific literature related to RF biological effects. The FCC explains that its standards “incorporate prudent margins of safety.” The following represents explanations of the most applicable information:

Two Classifications for Exposure Limits

<u>Occupational</u> – Applies to situations in which persons are “exposed as a consequence of their <i>employment</i> ” and are “ <i>fully aware</i> of the potential for exposure and can <i>exercise control</i> over their exposure”.	<u>General Population</u> – Applies to situations in which persons are “exposed as a consequence of their employment <i>may not be made fully aware</i> of the potential for exposure or <i>cannot exercise control</i> over their exposure”. Generally speaking, those without significant and documented RF Safety & Awareness training would be in the General Population classification.
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Environment Classification

<u>Controlled</u> – Applies to environments that are restricted or “controlled” in order to prevent access from members of the General Population classification.	<u>Uncontrolled</u> – Applies to environments that are unrestricted or “uncontrolled” that allow access from members of the General Population classification.
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<i>Limits for Occupational/Controlled Exposure</i>		
Frequency	Power Density	Averaging Time
Range	(S)	$ E ^2$, $ H ^2$, or S
(MHz)	(mW/cm ²)	(minutes)
300-1500	$f/300$	6
1500-100,000	5	6
<i>Limits for General Population/Uncontrolled Exposure</i>		
Frequency	Power Density	Averaging Time
Range	(S)	$ E ^2$, $ H ^2$, or S
(MHz)	(mW/cm ²)	(minutes)
300-1500	$f/1500$	30
1500-100,000	1	30
<i>f = frequency in MHz</i>		

Significant Contribution to the RF Environment

Any carrier contributing an aggregate MPE percentage of 5 or more (to the applicable RF Environment Classification) is defined as a significant contributor. This means that if any area is determined to be out of compliance with FCC rules, all significant contributors are jointly responsible for correcting any deficiencies.

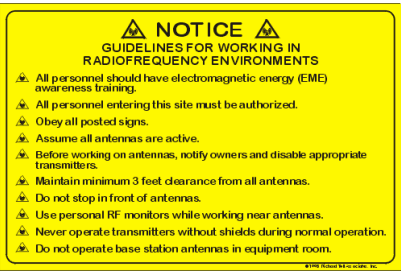



a. Occupational Safety and Health Administration (OSHA) Requirements

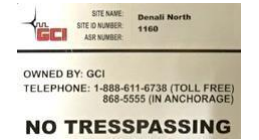
A formal adopter of FCC Standards, OSHA stipulates that those in the Occupational classification must complete training in the following: RF Safety, RF Awareness, and Utilization of Personal Protective Equipment. OSHA also provides options for Hazard Prevention and Control:

Hazard Prevention	Control
<ul style="list-style-type: none"> Utilization of good equipment Enact control of hazard areas Limit exposures Employ medical surveillance and accident response 	<ul style="list-style-type: none"> Employ Lockout/Tag out Utilize personal alarms & protective clothing Prevent access to hazardous locations Develop or operate an administrative control program

b. RF Signage

Areas or portions of any transmitter site may be susceptible to high power densities that could cause personnel exposures in excess of the FCC guidelines. These areas must be demarcated by conspicuously posted signage that identifies the potential exposure. Signage **MUST** be viewable regardless of the viewer’s position.

GUIDELINES	NOTICE	CAUTION	WARNING
<p>This sign will inform anyone of the basic precautions to follow when entering an area with transmitting radiofrequency equipment.</p>	<p>This sign indicates that RF emissions may exceed the FCC General Population MPE limit.</p>	<p>This sign indicates that RF emissions may exceed the FCC Occupational MPE limit.</p>	<p>This sign indicates that RF emissions may exceed at least 10x the FCC Occupational MPE limit.</p>
			

INFORMATION SIGN	
<p>Information signs are used as a means to provide contact information for any questions or concerns. They will include specific cell site identification information and the GCI Wireless Network Operations Center phone number.</p>	

c. Physical Barriers

Physical barriers are control measures that require awareness and participation of personnel. Physical barriers are employed as an additional administration control to complement RF signage and physically demarcate an area in which RF exposure levels may exceed the FCC General Population limit.

d. Indicative Markers

Indicative markers are visible control measures that require awareness and participation of personnel, as they cannot physically prevent someone from entering an area of potential concern. Indicative markers are employed as an additional administration control to complement RF signage and visually demarcate an area in which RF exposure levels may exceed the FCC General Population limit.