

I . FREQUENCY COORDINATION REPORTS

Micronet Communications, Inc.

812 Lexington Dr
Plano, Texas 75075
972-422-7200

SUPPLEMENTAL SHOWING PART 101.103(D)

File Number: M1909812 5.93 GHz
Licensee: Alaska Communications Internet, LLC

Page 1

Pursuant to Parts 25.203 and 101.103(d) of the FCC Rules and Regulations, a frequency coordination study was conducted by Micronet Communications, Inc. for the following proposed earth station:

Trident Naknek, AK

The results of the study indicate that no unacceptable interference will result with existing, proposed or prior coordinated radio facilities.

Coordination was performed with existing, proposed and prior coordinated carriers within coordination range on the following dates:

04/16/2019 Original PCN (Expedited response requested by 04/30/2019)
There were no unresolved interference objections.
05/2/2019 Major Mod (Expedited response requested by 05/06/2019)
There were no unresolved interference objections.

The attached coordination data was forwarded on the latest date to the following parties within coordination range or their authorized coordination agents:

NUSHAGAK ELECTRIC AND TELEPHONE COOPERATIVE INC.
RADIO DYNAMICS
UNITED UTILITIES, INC.
WIRELESS APPLICATIONS CORP

Respectfully Submitted,



Jeremy Boyce
Systems Engineer

Attached: 1 data sheet

Micronet Communications, Inc.
 812 Lexington Dr
 Plano, Texas 75075
 972-422-7200

File: M1909812

=====

TECHNICAL CHARACTERISTICS OF TRANSMIT RECEIVE EARTH STATION

=====

Company:	Alaska Communications Internet, LLC		
Site Name, State:	Trident Naknek, AK		
Call Sign:	E170205		
Latitude	(NAD83)	58 43	41.4 N
Longitude	(NAD83)	157 0	26.2 W
Elevation AMSL	(ft/m)	9.84	3.00
Receive Frequency Range	(MHz)	3700-4200	
Transmit Frequency Range	(MHz)	5925-6425	
Range of Satellite Orbital Long.	(deg W)	114.00	116.00
Range of Azimuths from North	(deg)	132.50	134.51
Antenna Centerline	(ft/m)	5.91	1.80
Antenna Elevation Angles	(deg)	13.88	14.67

Equipment Parameters		Receive	Transmit
Antenna Gain, Main Beam	(dbI)	38.00	42.00
15 DB Half Beamwidth	(deg)	2.45	1.65
Antennas	Receive: GENERAL DYNAMICS 1251 (2.4M)		
	Transmit: GENERAL DYNAMICS 1251 (2.4M)		
Max Transmitter Power	(dbW/4KHz)		-12.46
Max EIRP Main Beam	(dbW/4KHz)		29.54
Modulation / Emission Designator	DIGITAL	5M60G7W	72M0G7W

Coordination Parameters		Receive	Transmit
Max Greater Circle Distances	(km)	444.36	172.59
Max Rain Scatter Distances	(km)	373.72	100.00
Max Interference Power Long Term	(dbW)	-158.60	-154.80
Max Interference Power Short Term	(dbW)	-149.90	-130.80
Rain Zone / Radio Zone		3	A

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SUPPLEMENTAL SHOWING PART 101.103(D)

File Number: N1909812 5.93 GHz
Licensee: Alaska Communications Internet, LLC

Page 1

Pursuant to Parts 25.203 and 101.103(d) of the FCC Rules and Regulations, a frequency coordination study was conducted by Micronet Communications, Inc. for the following proposed earth station:

Trident Akutan, AK

The results of the study indicate that no unacceptable interference will result with existing, proposed or prior coordinated radio facilities.

Coordination was performed with existing, proposed and prior coordinated carriers within coordination range on the following dates:

04/16/2019 Original PCN (Expedited response requested by 04/30/2019)
There were no unresolved interference objections.
05/2/2019 Major Mod (Expedited response requested by 05/06/2019)
There were no unresolved interference objections.

The attached coordination data was forwarded on the latest date to the following parties within coordination range or their authorized coordination agents:

(No licensees within range)

Respectfully Submitted,



Jeremy Boyce
Systems Engineer

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Micronet Communications, Inc.
 812 Lexington Dr
 Plano, Texas 75075
 972-422-7200

File: N1909812

=====

TECHNICAL CHARACTERISTICS OF TRANSMIT RECEIVE EARTH STATION

=====

Company:	Alaska Communications Internet, LLC		
Site Name, State:	Trident Akutan, AK		
Call Sign:	E170205		
Latitude	(NAD83)	54 7	59.3 N
Longitude	(NAD83)	165 47	22.1 W
Elevation AMSL	(ft/m)	18.96	5.78
Receive Frequency Range	(MHz)	3700-4200	
Transmit Frequency Range	(MHz)	5925-6425	
Range of Satellite Orbital Long.	(deg W)	114.00	116.00
Range of Azimuths from North	(deg)	122.54	124.41
Antenna Centerline	(ft/m)	20.01	6.10
Antenna Elevation Angles	(deg)	12.78	13.80

Equipment Parameters		Receive	Transmit
Antenna Gain, Main Beam	(dbI)	38.00	42.00
15 DB Half Beamwidth	(deg)	2.45	1.65
Antennas	Receive: GENERAL DYNAMICS 1251 (2.4M)		
	Transmit: GENERAL DYNAMICS 1251 (2.4M)		
Max Transmitter Power	(dbW/4KHz)		-9.46
Max EIRP Main Beam	(dbW/4KHz)		32.54
Modulation / Emission Designator	DIGITAL	5M60G7W	72M0G7W

Coordination Parameters		Receive	Transmit
Max Greater Circle Distances	(km)	452.37	186.30
Max Rain Scatter Distances	(km)	376.27	100.00
Max Interference Power Long Term	(dbW)	-158.60	-154.80
Max Interference Power Short Term	(dbW)	-149.90	-130.80
Rain Zone / Radio Zone		3	A

Micronet Communications, Inc.

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Plano, Texas 75075
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SUPPLEMENTAL SHOWING PART 101.103(D)

File Number: R1909812 5.93 GHz
Licensee: Alaska Communications Internet, LLC

Page 1

Pursuant to Parts 25.203 and 101.103(d) of the FCC Rules and Regulations, a frequency coordination study was conducted by Micronet Communications, Inc. for the following proposed earth station:

Trident Sand Point, AK

The results of the study indicate that no unacceptable interference will result with existing, proposed or prior coordinated radio facilities.

Coordination was performed with existing, proposed and prior coordinated carriers within coordination range on the following dates:

04/16/2019 Original PCN (Expedited response requested by 04/30/2019)
There were no unresolved interference objections.
05/2/2019 Major Mod (Expedited response requested by 05/06/2019)
There were no unresolved interference objections.

The attached coordination data was forwarded on the latest date to the following parties within coordination range or their authorized coordination agents:

(No licensees within range)

Respectfully Submitted,



Jeremy Boyce
Systems Engineer

Attached: 1 data sheet

Micronet Communications, Inc.
 812 Lexington Dr
 Plano, Texas 75075
 972-422-7200

File: R1909812

=====

TECHNICAL CHARACTERISTICS OF TRANSMIT RECEIVE EARTH STATION

=====

Company: Alaska Communications Internet, LLC
 Site Name, State: Trident Sand Point, AK
 Call Sign: E170205
 Latitude (NAD83) 55 20 10.9 N
 Longitude (NAD83) 160 30 8.3 W
 Elevation AMSL (ft/m) 9.84 3.00
 Receive Frequency Range (MHz) 3700-4200
 Transmit Frequency Range (MHz) 5925-6425
 Range of Satellite Orbital Long. (deg W) 114.00 116.00
 Range of Azimuths from North (deg) 127.97 129.93
 Antenna Centerline (ft/m) 5.91 1.80
 Antenna Elevation Angles (deg) 14.65 15.57

Equipment Parameters		Receive	Transmit
Antenna Gain, Main Beam	(dbI)	38.00	42.00
15 DB Half Beamwidth	(deg)	2.45	1.65
Antennas	Receive: GENERAL DYNAMICS 1251 (2.4M) Transmit: GENERAL DYNAMICS 1251 (2.4M)		
Max Transmitter Power	(dbW/4KHz)		-9.46
Max EIRP Main Beam	(dbW/4KHz)		32.54
Modulation / Emission Designator	DIGITAL	5M60G7W	72M0G7W

Coordination Parameters		Receive	Transmit
Max Greater Circle Distances	(km)	439.61	181.04
Max Rain Scatter Distances	(km)	372.18	100.00
Max Interference Power Long Term	(dbW)	-158.60	-154.80
Max Interference Power Short Term	(dbW)	-149.90	-130.80
Rain Zone / Radio Zone		3	A

Micronet Communications, Inc.

812 Lexington Dr
Plano, Texas 75075
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SUPPLEMENTAL SHOWING PART 101.103(D)

File Number: T1909812 5.93 GHz
Licensee: Alaska Communications Internet, LLC

Page 1

Pursuant to Parts 25.203 and 101.103(d) of the FCC Rules and Regulations, a frequency coordination study was conducted by Micronet Communications, Inc. for the following proposed earth station:

Pebble Mine Illiamna, AK

The results of the study indicate that no unacceptable interference will result with existing, proposed or prior coordinated radio facilities.

Coordination was performed with existing, proposed and prior coordinated carriers within coordination range on the following dates:

04/16/2019 Original PCN (Expedited response requested by 04/30/2019)
There were no unresolved interference objections.
05/02/2019 Major Mod (Expedited response requested by 05/06/2019)
There were no unresolved interference objections.

The attached coordination data was forwarded on the latest date to the following parties within coordination range or their authorized coordination agents:

COMSEARCH INC
NUSHAGAK ELECTRIC AND TELEPHONE COOPERATIVE INC.
RADIO DYNAMICS
UNITED UTILITIES, INC.
WIRELESS APPLICATIONS CORP

Respectfully Submitted,



Jeremy Boyce
Systems Engineer

Attached: 1 data sheet

Micronet Communications, Inc.
 812 Lexington Dr
 Plano, Texas 75075
 972-422-7200

File: T1909812

=====

TECHNICAL CHARACTERISTICS OF TRANSMIT RECEIVE EARTH STATION

=====

Company:	Alaska Communications Internet, LLC		
Site Name, State:	Pebble Mine Iliamna, AK		
Call Sign:	E170205		
Latitude	(NAD83)	59 45	26.0 N
Longitude	(NAD83)	154 54	22.8 W
Elevation AMSL	(ft/m)	150.07	45.74
Receive Frequency Range	(MHz)	3700-4200	
Transmit Frequency Range	(MHz)	5925-6425	
Range of Satellite Orbital Long.	(deg W)	114.00	116.00
Range of Azimuths from North	(deg)	134.92	136.95
Antenna Centerline	(ft/m)	5.91	1.80
Antenna Elevation Angles	(deg)	13.95	14.68

Equipment Parameters		Receive	Transmit
Antenna Gain, Main Beam	(dbI)	38.00	42.00
15 DB Half Beamwidth	(deg)	2.45	1.65
Antennas	Receive: GENERAL DYNAMICS 1241 (2.4M)		
	Transmit: GENERAL DYNAMICS 1241 (2.4M)		
Max Transmitter Power	(dbW/4KHz)		-12.46
Max EIRP Main Beam	(dbW/4KHz)		29.54
Modulation / Emission Designator	DIGITAL	5M60G7W	72M0G7W

Coordination Parameters		Receive	Transmit
Max Greater Circle Distances	(km)	445.44	172.99
Max Rain Scatter Distances	(km)	373.58	100.00
Max Interference Power Long Term	(dbW)	-158.60	-154.80
Max Interference Power Short Term	(dbW)	-149.90	-130.80
Rain Zone / Radio Zone		3	A

II. RADIATION HAZARD ANALYSES

ANALYSIS OF NON-IONIZING RADIATION
for Alaska Communications Internet LLC
Site: Trident Naknek State: AK
Latitude: 58 43 41.4 Longitude: 157 0 26.2 (NAD83)
05-02-2019

The Office of Science and Technology Bulletin, No. 65, October 1985 and revised August 1997, specifies that the maximum level of non-ionizing radiation that a person may be exposed to over a six minute period is an average power density equal to 5 mW/cm**2 (five milliwatts per centimeter squared) for a controlled environment. For an uncontrolled environment, the maximum level of non-ionizing radiation that a person may be exposed to over a thirty minute period is an average power density equal to 1 mW/cm**2 (one milliwatt per centimeter squared). It is the purpose of this report to determine the maximum power flux densities of the earth station in the far zone, near zone, transition zone, at the main reflector surface, and between the antenna edge and the ground.

Parameters which were used in the calculations:

=====
Antenna Diameter, (D) = 2.4000 m
Antenna Surface Area (Sa) = $\pi(D^2)/4$ = 4.5239 m**2
Wavelength at 6.1750 GHz (λ) = 0.0485 m
Transmit Power at Flange (P) = 20.0000 Watts
Antenna Gain at Earth Site (GES) = 42.0000 dBi = 15848.9319
Power Ratio:
AntiLog(GES/10)
pi = 3.1415927
Antenna Aperture Efficiency (n) = 0.6000

1. FAR ZONE CALCULATIONS

=====

$$\text{Distance to the Far Zone} \quad (Df) = \frac{(n)(D^{**2})}{\text{lambda}} = 71.2577 \text{ m}$$

$$\text{Far Zone Power Density} \quad (Rf) = \frac{(GES)(P)}{4 * \text{pi} * (Df^{**2})} = 4.9677 \text{ W/m}^{**2}$$

$$= 0.4968 \text{ mW/cm}^{**2}$$

2. NEAR ZONE CALCULATIONS

=====

Power Flux Density is considered to be at a maximum value throughout the entire length of this Zone. The Zone is contained within a cylindrical volume which has the same diameter as the antenna. Beyond the Near Zone, the Power Flux Density will decrease with distance from the Antenna.

$$\text{Distance to the Near Zone} \quad (Dn) = \frac{D^{**2}}{4 * \text{lambda}} = 29.6907 \text{ m}$$

$$\text{Near Zone Power Density} \quad (Rn) = \frac{16.0(n)P}{\text{pi}(D^{**2})} = 10.6103 \text{ W/m}^{**2}$$

$$= 1.0610 \text{ mW/cm}^{**2}$$

3. TRANSITION ZONE CALCULATIONS

=====

The Power Density begins to decrease with distance in the Transition Zone. While the Power Density decreases inversely with distance in the Transition Zone, the Power Density decreases inversely with the square of the distance in the Far Zone. Since the maximum Power Density in the Transition Zone will not exceed the Near Zone values, it is not calculated.

4. MAIN REFLECTOR ZONE

=====

$$\begin{aligned} \text{Main Reflector Power Density} &= \frac{2(P)}{S_a} &= 8.8419 \text{ W/m}^2 \\ & &= 0.8842 \text{ mW/cm}^2 \end{aligned}$$

5. ZONE BETWEEN THE MAIN REFLECTOR AND THE GROUND

=====

Applying uniform illumination of the Main Reflector Surface:

$$\begin{aligned} \text{Main to Ground Power Density} &= \frac{P}{S_a} &= 4.4210 \text{ W/m}^2 \\ & &= 0.4421 \text{ mW/cm}^2 \end{aligned}$$

CALCULATED SAFETY MARGINS SUMMARY
AND EVALUATION

Controlled Safety Margin = 5.0 - Calculated Zone Value (mW/cm**2)

Zones	Safety Margins (mW/cm**2)	Conclusions
1. Far Zone	4.5032	Complies with ANSI
2. Near Zone	3.9390	Complies with ANSI
3. Transition Zone	Rf < Rt < Rn	Complies with ANSI
4. Main Reflector Surface	4.1158	Complies with ANSI
5. Main Reflector to Ground	4.5579	Complies with ANSI

Uncontrolled Safety Margin = 1.0 - Calculated Zone Value (mW/cm**2)

Zones	Safety Margins (mW/cm**2)	Conclusions
1. Far Zone	0.5032	Complies with ANSI
2. Near Zone	-0.0610	POTENTIALLY HAZARDOUS
3. Transition Zone	Rf < Rt < Rn	Complies with ANSI
4. Main Reflector Surface	0.1158	Complies with ANSI
5. Main Reflector to Ground	0.5579	Complies with ANSI

6. EVALUATION

=====

A. Controlled Environment

B. Uncontrolled Environment

The NEAR ZONE does not comply with the ANSI standards!

The system will be FENCED so that no one can enter the affected Zone while the system is in use. Additionally, the system will be shut down for servicing.

ANALYSIS OF NON-IONIZING RADIATION
for Alaska Communications Internet LLC
Site: Trident Akutan State: AK
Latitude: 54 7 59.3 Longitude: 165 47 22.1 (NAD83)
05-02-2019

The Office of Science and Technology Bulletin, No. 65, October 1985 and revised August 1997, specifies that the maximum level of non-ionizing radiation that a person may be exposed to over a six minute period is an average power density equal to 5 mW/cm**2 (five milliwatts per centimeter squared) for a controlled environment. For an uncontrolled environment, the maximum level of non-ionizing radiation that a person may be exposed to over a thirty minute period is an average power density equal to 1 mW/cm**2 (one milliwatt per centimeter squared). It is the purpose of this report to determine the maximum power flux densities of the earth station in the far zone, near zone, transition zone, at the main reflector surface, and between the antenna edge and the ground.

Parameters which were used in the calculations:

```

=====
Antenna Diameter,          (D) = 2.4000 m
Antenna Surface Area      (Sa) = pi(D**2)/4      = 4.5239 m**2
Wavelength at 6.1750 GHz (lambda) = 0.0485 m
Transmit Power at Flange  (P) = 40.0000 Watts
Antenna Gain at Earth Site (GES) = 42.0000 dBi    = 15848.9319
                                                Power Ratio:
                                                AntiLog(GES/10)
pi                          = 3.1415927
Antenna Aperture Efficiency (n) = 0.6000

```

1. FAR ZONE CALCULATIONS

=====

$$\text{Distance to the Far Zone} \quad (Df) = \frac{(n)(D^{**2})}{\text{lambda}} = 71.2577 \text{ m}$$

$$\text{Far Zone Power Density} \quad (Rf) = \frac{(GES)(P)}{4*pi*(Df^{**2})} = 9.9354 \text{ W/m}^{**2}$$

$$= 0.9935 \text{ mW/cm}^{**2}$$

2. NEAR ZONE CALCULATIONS

=====

Power Flux Density is considered to be at a maximum value throughout the entire length of this Zone. The Zone is contained within a cylindrical volume which has the same diameter as the antenna. Beyond the Near Zone, the Power Flux Density will decrease with distance from the Antenna.

$$\text{Distance to the Near Zone} \quad (Dn) = \frac{D^{**2}}{4*lambda} = 29.6907 \text{ m}$$

$$\text{Near Zone Power Density} \quad (Rn) = \frac{16.0(n)P}{pi(D^{**2})} = 21.2207 \text{ W/m}^{**2}$$

$$= 2.1221 \text{ mW/cm}^{**2}$$

3. TRANSITION ZONE CALCULATIONS

=====

The Power Density begins to decrease with distance in the Transition Zone. While the Power Density decreases inversely with distance in the Transition Zone, the Power Density decreases inversely with the square of the distance in the Far Zone. Since the maximum Power Density in the Transition Zone will not exceed the Near Zone values, it is not calculated.

4. MAIN REFLECTOR ZONE

=====

$$\begin{aligned} \text{Main Reflector Power Density} &= \frac{2(P)}{S_a} &= 17.6839 \text{ W/m}^2 \\ & &= 1.7684 \text{ mW/cm}^2 \end{aligned}$$

5. ZONE BETWEEN THE MAIN REFLECTOR AND THE GROUND

=====

Applying uniform illumination of the Main Reflector Surface:

$$\begin{aligned} \text{Main to Ground Power Density} &= \frac{P}{S_a} &= 8.8419 \text{ W/m}^2 \\ & &= 0.8842 \text{ mW/cm}^2 \end{aligned}$$

CALCULATED SAFETY MARGINS SUMMARY
AND EVALUATION

Controlled Safety Margin = 5.0 - Calculated Zone Value (mW/cm**2)

Zones	Safety Margins (mW/cm**2)	Conclusions
1. Far Zone	4.0065	Complies with ANSI
2. Near Zone	2.8779	Complies with ANSI
3. Transition Zone	Rf < Rt < Rn	Complies with ANSI
4. Main Reflector Surface	3.2316	Complies with ANSI
5. Main Reflector to Ground	4.1158	Complies with ANSI

Uncontrolled Safety Margin = 1.0 - Calculated Zone Value (mW/cm**2)

Zones	Safety Margins (mW/cm**2)	Conclusions
1. Far Zone	0.0065	Complies with ANSI
2. Near Zone	-1.1221	POTENTIALLY HAZARDOUS
3. Transition Zone	Rf < Rt < Rn	Complies with ANSI
4. Main Reflector Surface	-0.7684	POTENTIALLY HAZARDOUS
5. Main Reflector to Ground	0.1158	Complies with ANSI

6. EVALUATION

=====

A. Controlled Environment

B. Uncontrolled Environment

The NEAR ZONE does not comply with the ANSI standards!

The system will be FENCED so that no one can enter the affected Zone while the system is in use. Additionally, the system will be shut down for servicing.

The MAIN Reflector Surface ZONE does not comply with the ANSI standards!

The system will be FENCED so that no one can enter the affected Zone while the system is in use. Additionally, the system will be shut down for servicing.

ANALYSIS OF NON-IONIZING RADIATION
for Alaska Communications Internet LLC
Site: Trident Sand Point State: AK
Latitude: 55 20 10.9 Longitude: 160 30 8.3 (NAD83)
05-02-2019

The Office of Science and Technology Bulletin, No. 65, October 1985 and revised August 1997, specifies that the maximum level of non-ionizing radiation that a person may be exposed to over a six minute period is an average power density equal to 5 mW/cm**2 (five milliwatts per centimeter squared) for a controlled environment. For an uncontrolled environment, the maximum level of non-ionizing radiation that a person may be exposed to over a thirty minute period is an average power density equal to 1 mW/cm**2 (one milliwatt per centimeter squared). It is the purpose of this report to determine the maximum power flux densities of the earth station in the far zone, near zone, transition zone, at the main reflector surface, and between the antenna edge and the ground.

Parameters which were used in the calculations:

=====
Antenna Diameter, (D) = 2.4000 m
Antenna Surface Area (Sa) = $\pi(D^2)/4$ = 4.5239 m**2
Wavelength at 6.1750 GHz (λ) = 0.0485 m
Transmit Power at Flange (P) = 40.0000 Watts
Antenna Gain at Earth Site (GES) = 42.0000 dBi = 15848.9319
Power Ratio:
AntiLog(GES/10)
pi = 3.1415927
Antenna Aperture Efficiency (n) = 0.6000

1. FAR ZONE CALCULATIONS
=====

$$\begin{aligned} \text{Distance to the Far Zone} \quad (D_f) &= \frac{(n)(D^{**2})}{\text{lambda}} = 71.2577 \text{ m} \\ \\ \text{Far Zone Power Density} \quad (R_f) &= \frac{(GES)(P)}{4\pi(D_f^{**2})} = 9.9354 \text{ W/m}^{**2} \\ &= 0.9935 \text{ mW/cm}^{**2} \end{aligned}$$

2. NEAR ZONE CALCULATIONS
=====

Power Flux Density is considered to be at a maximum value throughout the entire length of this Zone. The Zone is contained within a cylindrical volume which has the same diameter as the antenna. Beyond the Near Zone, the Power Flux Density will decrease with distance from the Antenna.

$$\begin{aligned} \text{Distance to the Near Zone} \quad (D_n) &= \frac{D^{**2}}{4\text{lambda}} = 29.6907 \text{ m} \\ \\ \text{Near Zone Power Density} \quad (R_n) &= \frac{16.0(n)P}{\pi(D^{**2})} = 21.2207 \text{ W/m}^{**2} \\ &= 2.1221 \text{ mW/cm}^{**2} \end{aligned}$$

3. TRANSITION ZONE CALCULATIONS
=====

The Power Density begins to decrease with distance in the Transition Zone. While the Power Density decreases inversely with distance in the Transition Zone, the Power Density decreases inversely with the square of the distance in the Far Zone. Since the maximum Power Density in the Transition Zone will not exceed the Near Zone values, it is not calculated.

4. MAIN REFLECTOR ZONE

=====

$$\begin{aligned} \text{Main Reflector Power Density} &= \frac{2(P)}{S_a} &= 17.6839 \text{ W/m}^2 \\ & &= 1.7684 \text{ mW/cm}^2 \end{aligned}$$

5. ZONE BETWEEN THE MAIN REFLECTOR AND THE GROUND

=====

Applying uniform illumination of the Main Reflector Surface:

$$\begin{aligned} \text{Main to Ground Power Density} &= \frac{P}{S_a} &= 8.8419 \text{ W/m}^2 \\ & &= 0.8842 \text{ mW/cm}^2 \end{aligned}$$

CALCULATED SAFETY MARGINS SUMMARY
AND EVALUATION

Controlled Safety Margin = 5.0 - Calculated Zone Value (mW/cm**2)

Zones	Safety Margins (mW/cm**2)	Conclusions
1. Far Zone	4.0065	Complies with ANSI
2. Near Zone	2.8779	Complies with ANSI
3. Transition Zone	Rf < Rt < Rn	Complies with ANSI
4. Main Reflector Surface	3.2316	Complies with ANSI
5. Main Reflector to Ground	4.1158	Complies with ANSI

Uncontrolled Safety Margin = 1.0 - Calculated Zone Value (mW/cm**2)

Zones	Safety Margins (mW/cm**2)	Conclusions
1. Far Zone	0.0065	Complies with ANSI
2. Near Zone	-1.1221	POTENTIALLY HAZARDOUS
3. Transition Zone	Rf < Rt < Rn	Complies with ANSI
4. Main Reflector Surface	-0.7684	POTENTIALLY HAZARDOUS
5. Main Reflector to Ground	0.1158	Complies with ANSI

6. EVALUATION

=====

A. Controlled Environment

B. Uncontrolled Environment

The NEAR ZONE does not comply with the ANSI standards!

The system will be FENCED so that no one can enter the affected Zone while the system is in use. Additionally, the system will be shut down for servicing.

The MAIN Reflector Surface ZONE does not comply with the ANSI standards!

The system will be FENCED so that no one can enter the affected Zone while the system is in use. Additionally, the system will be shut down for servicing.

ANALYSIS OF NON-IONIZING RADIATION
for Alaska Communications Internet LLC
Site: Pebble Mine Illiamna State: AK
Latitude: 59 45 25.9 Longitude: 154 54 22.8 (NAD83)
05-02-2019

The Office of Science and Technology Bulletin, No. 65, October 1985 and revised August 1997, specifies that the maximum level of non-ionizing radiation that a person may be exposed to over a six minute period is an average power density equal to 5 mW/cm**2 (five milliwatts per centimeter squared) for a controlled environment. For an uncontrolled environment, the maximum level of non-ionizing radiation that a person may be exposed to over a thirty minute period is an average power density equal to 1 mW/cm**2 (one milliwatt per centimeter squared). It is the purpose of this report to determine the maximum power flux densities of the earth station in the far zone, near zone, transition zone, at the main reflector surface, and between the antenna edge and the ground.

Parameters which were used in the calculations:

=====
Antenna Diameter, (D) = 2.4000 m
Antenna Surface Area (Sa) = $\pi(D^2)/4$ = 4.5239 m**2
Wavelength at 6.1750 GHz (λ) = 0.0485 m
Transmit Power at Flange (P) = 20.0000 Watts
Antenna Gain at Earth Site (GES) = 42.0000 dBi = 15848.9319
Power Ratio:
AntiLog(GES/10)
pi = 3.1415927
Antenna Aperture Efficiency (n) = 0.6000

1. FAR ZONE CALCULATIONS

=====

$$\text{Distance to the Far Zone} \quad (Df) = \frac{(n)(D^{**2})}{\text{lambda}} = 71.2577 \text{ m}$$

$$\text{Far Zone Power Density} \quad (Rf) = \frac{(GES)(P)}{4*\text{pi}*(Df^{**2})} = 4.9677 \text{ W/m**2}$$

$$= 0.4968 \text{ mW/cm**2}$$

2. NEAR ZONE CALCULATIONS

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Power Flux Density is considered to be at a maximum value throughout the entire length of this Zone. The Zone is contained within a cylindrical volume which has the same diameter as the antenna. Beyond the Near Zone, the Power Flux Density will decrease with distance from the Antenna.

$$\text{Distance to the Near Zone} \quad (Dn) = \frac{D^{**2}}{4*\text{lambda}} = 29.6907 \text{ m}$$

$$\text{Near Zone Power Density} \quad (Rn) = \frac{16.0(n)P}{\text{pi}(D^{**2})} = 10.6103 \text{ W/m**2}$$

$$= 1.0610 \text{ mW/cm**2}$$

3. TRANSITION ZONE CALCULATIONS

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The Power Density begins to decrease with distance in the Transition Zone. While the Power Density decreases inversely with distance in the Transition Zone, the Power Density decreases inversely with the square of the distance in the Far Zone. Since the maximum Power Density in the Transition Zone will not exceed the Near Zone values, it is not calculated.

4. MAIN REFLECTOR ZONE

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$$\begin{aligned} \text{Main Reflector Power Density} &= \frac{2(P)}{S_a} &= 8.8419 \text{ W/m}^2 \\ & &= 0.8842 \text{ mW/cm}^2 \end{aligned}$$

5. ZONE BETWEEN THE MAIN REFLECTOR AND THE GROUND

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Applying uniform illumination of the Main Reflector Surface:

$$\begin{aligned} \text{Main to Ground Power Density} &= \frac{P}{S_a} &= 4.4210 \text{ W/m}^2 \\ & &= 0.4421 \text{ mW/cm}^2 \end{aligned}$$

CALCULATED SAFETY MARGINS SUMMARY
AND EVALUATION

Controlled Safety Margin = 5.0 - Calculated Zone Value (mW/cm**2)

Zones	Safety Margins (mW/cm**2)	Conclusions
1. Far Zone	4.5032	Complies with ANSI
2. Near Zone	3.9390	Complies with ANSI
3. Transition Zone	Rf < Rt < Rn	Complies with ANSI
4. Main Reflector Surface	4.1158	Complies with ANSI
5. Main Reflector to Ground	4.5579	Complies with ANSI

Uncontrolled Safety Margin = 1.0 - Calculated Zone Value (mW/cm**2)

Zones	Safety Margins (mW/cm**2)	Conclusions
1. Far Zone	0.5032	Complies with ANSI
2. Near Zone	-0.0610	POTENTIALLY HAZARDOUS
3. Transition Zone	Rf < Rt < Rn	Complies with ANSI
4. Main Reflector Surface	0.1158	Complies with ANSI
5. Main Reflector to Ground	0.5579	Complies with ANSI

6. EVALUATION

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A. Controlled Environment

B. Uncontrolled Environment

The NEAR ZONE does not comply with the ANSI standards!

The system will be FENCED so that no one can enter the affected Zone while the system is in use. Additionally, the system will be shut down for servicing.