

**ACS Internet LLC  
VSAT Network License Application**

**Technical Appendix**

- I. Frequency Coordination Reports
- II. Radiation Hazard Analyses

# I. Frequency Coordination Reports

## **Micronet Communications, Inc.**

720 F Avenue, Suite 100  
Plano, Texas 75074  
972-422-7200

SUPPLEMENTAL SHOWING PART 101.103(D)

File Number: K1726405 5.93 GHz  
Licensee: Alaska Communications Internet, LLC

Page 1

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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:

### **Hub, 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:

10/20/2017 Original PCN (Expedited response requested by 11/03/2017)  
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:

ACS LONG DISTANCE LICENSE SUB, LLC  
ACS OF ANCHORAGE LICENSE SUB, INC.  
ACS OF ANCHORAGE LICENSE SUB, LLC  
ACS WIRELESS LICENSE SUB, LLC  
ALASCOM, INC.  
ALASKA PIPELINE COMPANY  
ALASKA PUBLIC TELECOMMUNICATIONS, INC  
ALASKA RAILROAD CORPORATION  
AT&T MOBILITY SPECTRUM LLC  
CHUGACH ELECTRIC ASSOCIATION, INC.  
COMSEARCH INC  
ENSTAR NATURAL GAS CO., A DIVISION OF SEMCO ENERGY, INC.  
GCI COMMUNICATION CORP.  
HOMER ELECTRIC ASSOCIATION  
MATANUSKA TELEPHONE ASSOCIATION  
MATANUSKA-SUSITNA, BOROUGH OF  
MICRONET COMMUNICATIONS INC  
MTA COMMUNICATIONS  
NORSTAR PIPELINE COMPANY, INC. AN ALASKA CORPORATION WHOLLY OWNE  
RADIO DYNAMICS  
STATE OF ALASKA  
VERIZON WIRELESS (VAW) LLC  
WIRELESS APPLICATIONS CORP

**Micronet Communications, Inc.**

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SUPPLEMENTAL SHOWING PART 101.103(D)

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5.93 GHz

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Page 2

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Respectfully Submitted,

A handwritten signature in black ink that reads "Jeremy B. Lewis". The signature is written in a cursive style with a large initial 'J' and a distinct 'B'.

Jeremy Lewis  
Systems Engineer

Attached: 1 data sheet

Micronet Communications, Inc.  
 720 F Avenue, Suite 100  
 Plano, Texas 75074  
 972-422-7200

File: K1726405

=====

TECHNICAL CHARACTERISTICS OF TRANSMIT RECEIVE EARTH STATION

=====

Company:	Alaska Communications Internet, LLC		
Site Name, State:	Hub, AK		
Call Sign:			
Latitude	(NAD83)	61 8	28.4 N
Longitude	(NAD83)	149 52	30.7 W
Elevation AMSL	(ft/m)	134.51	41.00
Receive Frequency Range	(MHz)	3704-3776	
Transmit Frequency Range	(MHz)	5929-6001	
Range of Satellite Orbital Long.	(deg W)	114.00	115.00
Range of Azimuths from North	(deg)	140.45	141.49
Antenna Centerline	(ft/m)	34.12	10.40
Antenna Elevation Angles	(deg)	14.62	14.94

Equipment Parameters		Receive	Transmit
Antenna Gain, Main Beam	(dbI)	41.60	45.60
15 DB Half Beamwidth	(deg)	1.50	1.00
Antennas	Receive: PRODELIN 1383 (3.8 M)		
	Transmit: PRODELIN 1383 (3.8M)		
Max Transmitter Power	(dbW/4KHz)		-19.20
Max EIRP Main Beam	(dbW/4KHz)		26.40
Modulation / Emission Designator	DIGITAL 7M00G7W		

Coordination Parameters		Receive	Transmit
Max Greater Circle Distances	(km)	351.92	162.77
Max Rain Scatter Distances	(km)	281.38	100.00
Max Interference Power Long Term	(dbW)	-140.60	-154.00
Max Interference Power Short Term	(dbW)	-118.40	-130.80
Rain Zone / Radio Zone		3	A

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Jeremy Lewis  
Systems Engineer

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Site Name, State:	Hub, AK		
Call Sign:			
Latitude	(NAD83)	61 8	28.4 N
Longitude	(NAD83)	149 52	30.7 W
Elevation AMSL	(ft/m)	134.51	41.00
Receive Frequency Range	(MHz)	3704-3776	
Transmit Frequency Range	(MHz)	5929-5944.85	
Range of Satellite Orbital Long.	(deg W)	114.00	115.00
Range of Azimuths from North	(deg)	140.45	141.49
Antenna Centerline	(ft/m)	34.12	10.40
Antenna Elevation Angles	(deg)	14.62	14.94

Equipment Parameters		Receive	Transmit
Antenna Gain, Main Beam	(dbI)	41.60	45.60
15 DB Half Beamwidth	(deg)	1.50	1.00
Antennas	Receive: PRODELIN 1383 (3.8 M)		
	Transmit: PRODELIN 1383 (3.8M)		
Max Transmitter Power	(dbW/4KHz)		-15.50
Max EIRP Main Beam	(dbW/4KHz)		30.10
Modulation / Emission Designator	DIGITAL 3M00G7W		

Coordination Parameters		Receive	Transmit
Max Greater Circle Distances	(km)	351.92	175.28
Max Rain Scatter Distances	(km)	281.38	100.00
Max Interference Power Long Term	(dbW)	-140.60	-154.00
Max Interference Power Short Term	(dbW)	-118.40	-130.80
Rain Zone / Radio Zone		3	A

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ALASKA RAILROAD CORPORATION  
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WIRELESS APPLICATIONS CORP



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File Number: M1726405

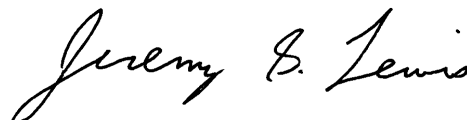
5.93 GHz

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Jeremy Lewis  
Systems Engineer

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 972-422-7200

File: M1726405

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TECHNICAL CHARACTERISTICS OF TRANSMIT RECEIVE EARTH STATION

=====

Company:	Alaska Communications Internet, LLC		
Site Name, State:	Hub, AK		
Call Sign:			
Latitude	(NAD83)	61 8	28.4 N
Longitude	(NAD83)	149 52	30.7 W
Elevation AMSL	(ft/m)	134.51	41.00
Receive Frequency Range	(MHz)	3704-3776	
Transmit Frequency Range	(MHz)	5929-6001	
Range of Satellite Orbital Long.	(deg W)	114.00	115.00
Range of Azimuths from North	(deg)	140.45	141.49
Antenna Centerline	(ft/m)	34.12	10.40
Antenna Elevation Angles	(deg)	14.62	14.94

Equipment Parameters		Receive	Transmit
Antenna Gain, Main Beam	(dbI)	41.60	45.60
15 DB Half Beamwidth	(deg)	1.50	1.00
Antennas	Receive: PRODELIN 1383 (3.8 M)		
	Transmit: PRODELIN 1383 (3.8M)		
Max Transmitter Power	(dbW/4KHz)		-21.00
Max EIRP Main Beam	(dbW/4KHz)		24.60
Modulation / Emission Designator	DIGITAL 9M50G7W		

Coordination Parameters		Receive	Transmit
Max Greater Circle Distances	(km)	351.92	156.69
Max Rain Scatter Distances	(km)	281.38	100.00
Max Interference Power Long Term	(dbW)	-140.60	-154.00
Max Interference Power Short Term	(dbW)	-118.40	-130.80
Rain Zone / Radio Zone		3	A

**Micronet Communications, Inc.**

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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:

**Anchorage, 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:

10/20/2017 Original PCN (Expedited response requested by 11/03/2017)  
There were no unresolved interference objections.

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ACS WIRELESS LICENSE SUB, LLC  
ALASCOM, INC.  
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VERIZON WIRELESS (VAW) LLC  
WIRELESS APPLICATIONS CORP

**Micronet Communications, Inc.**

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Page 2

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Respectfully Submitted,



Jeremy Lewis  
Systems Engineer

Attached: 1 data sheet

Micronet Communications, Inc.  
 720 F Avenue, Suite 100  
 Plano, Texas 75074  
 972-422-7200

File: N1726405

=====

TECHNICAL CHARACTERISTICS OF TRANSMIT RECEIVE EARTH STATION

=====

Company:	Alaska Communications Internet, LLC		
Site Name, State:	Anchorage, AK		
Call Sign:			
Latitude	(NAD83)	61 11	10.5 N
Longitude	(NAD83)	149 52	15.6 W
Elevation AMSL	(ft/m)	114.83	35.00
Receive Frequency Range	(MHz)	3704-3776	
Transmit Frequency Range	(MHz)	5929-5944.85	
Range of Satellite Orbital Long.	(deg W)	114.00	115.00
Range of Azimuths from North	(deg)	140.47	141.50
Antenna Centerline	(ft/m)	34.12	10.40
Antenna Elevation Angles	(deg)	14.59	14.90

Equipment Parameters		Receive	Transmit
Antenna Gain, Main Beam	(dbI)	37.60	41.60
15 DB Half Beamwidth	(deg)	1.50	1.00
Antennas	Receive: PRODELIN 1244 (2.4M)		
	Transmit: PRODELIN 1244 (2.4M)		
Max Transmitter Power	(dbW/4KHz)		-21.00
Max EIRP Main Beam	(dbW/4KHz)		20.60
Modulation / Emission Designator	DIGITAL 4M70G7W		

Coordination Parameters		Receive	Transmit
Max Greater Circle Distances	(km)	347.44	154.87
Max Rain Scatter Distances	(km)	281.43	100.00
Max Interference Power Long Term	(dbW)	-140.60	-154.00
Max Interference Power Short Term	(dbW)	-118.40	-130.80
Rain Zone / Radio Zone		3	A

**Micronet Communications, Inc.**

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Plano, Texas 75074  
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SUPPLEMENTAL SHOWING PART 101.103(D)

File Number: P1726405 5.93 GHz  
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Page 1

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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:

**St Paul, 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:

10/20/2017 Original PCN (Expedited response requested by 11/03/2017)  
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

Respectfully Submitted,



Jeremy Lewis  
Systems Engineer

Attached: 1 data sheet

Micronet Communications, Inc.  
 720 F Avenue, Suite 100  
 Plano, Texas 75074  
 972-422-7200

File: P1726405

=====

TECHNICAL CHARACTERISTICS OF TRANSMIT RECEIVE EARTH STATION

=====

Company:	Alaska Communications Internet, LLC		
Site Name, State:	St Paul, AK		
Call Sign:			
Latitude	(NAD83)	57 7	23.0 N
Longitude	(NAD83)	170 16	45.0 W
Elevation AMSL	(ft/m)	26.25	8.00
Receive Frequency Range	(MHz)	3704-3776	
Transmit Frequency Range	(MHz)	5929-6001	
Range of Satellite Orbital Long.	(deg W)	114.00	115.00
Range of Azimuths from North	(deg)	119.27	120.20
Antenna Centerline	(ft/m)	6.56	2.00
Antenna Elevation Angles	(deg)	8.96	9.45

Equipment Parameters		Receive	Transmit
Antenna Gain, Main Beam	(dbI)	41.60	45.60
15 DB Half Beamwidth	(deg)	1.00	1.00
Antennas	Receive: PRODELIN 1383 (3.8 M)		
	Transmit: PRODELIN 1383 (3.8M)		
Max Transmitter Power	(dbW/4KHz)		-26.20
Max EIRP Main Beam	(dbW/4KHz)		19.40
Modulation / Emission Designator	DIGITAL 3M20G7W		

Coordination Parameters		Receive	Transmit
Max Greater Circle Distances	(km)	369.72	146.43
Max Rain Scatter Distances	(km)	291.78	100.00
Max Interference Power Long Term	(dbW)	-140.60	-154.00
Max Interference Power Short Term	(dbW)	-118.40	-130.80
Rain Zone / Radio Zone		3	A

## II. Radiation Hazard Analyses

ANALYSIS OF NON-IONIZING RADIATION  
for Alaska Communications Internet LLC

**Site: Hub State: AK**

Latitude: 61 8 28.4 Longitude: 149 52 30.7 (NAD83)  
11-08-2017

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) = 3.8000 m  
Antenna Surface Area (Sa) =  $\pi(D^2)/4$  = 11.3411 m\*\*2  
Wavelength at 6.1750 GHz ( $\lambda$ ) = 0.0485 m  
Transmit Power at Flange (P) = 21.2000 Watts  
Antenna Gain at Earth Site (GES) = 45.6000 dBi = 36307.8055  
Power Ratio:  
AntiLog(GES/10)  
pi = 3.1415927  
Antenna Aperture Efficiency (n) = 0.6000



### 1. FAR ZONE CALCULATIONS

$$\text{Distance to the Far Zone} \quad (D_f) = \frac{(n) (D^{**2})}{\text{lambda}} = 178.6392 \text{ m}$$

$$\text{Far Zone Power Density} \quad (R_f) = \frac{(GES) (P)}{4 * \text{pi} * (D_f^{**2})} = 1.9194 \text{ W/m}^{**2}$$
$$= 0.1919 \text{ mW/cm}^{**2}$$

### 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.

$$\text{Distance to the Near Zone} \quad (D_n) = \frac{D^{**2}}{4 * \text{lambda}} = 74.4330 \text{ m}$$

$$\text{Near Zone Power Density} \quad (R_n) = \frac{16.0 (n) P}{\text{pi} (D^{**2})} = 4.4863 \text{ W/m}^{**2}$$
$$= 0.4486 \text{ mW/cm}^{**2}$$

### 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  
=====

$$\begin{aligned} \text{Main Reflector Power Density} &= \frac{2(P)}{S_a} = 3.7386 \text{ W/m}^2 \\ &= 0.3739 \text{ mW/cm}^2 \end{aligned}$$

5. ZONE BETWEEN THE MAIN REFLECTOR AND THE GROUND  
=====

Applying uniform illumination of the Main Reflector Surface:

$$\begin{aligned} \text{Main to Ground Power Density} &= \frac{P}{S_a} = 1.8693 \text{ W/m}^2 \\ &= 0.1869 \text{ mW/cm}^2 \end{aligned}$$

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	4.8081	Complies with ANSI
2. Near Zone	4.5514	Complies with ANSI
3. Transition Zone	Rf < Rt < Rn	Complies with ANSI
4. Main Reflector Surface	4.6261	Complies with ANSI
5. Main Reflector to Ground	4.8131	Complies with ANSI

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

Zones	Safety Margins (mW/cm**2)	Conclusions
1. Far Zone	0.8081	Complies with ANSI
2. Near Zone	0.5514	Complies with ANSI
3. Transition Zone	Rf < Rt < Rn	Complies with ANSI
4. Main Reflector Surface	0.6261	Complies with ANSI
5. Main Reflector to Ground	0.8131	Complies with ANSI

6. EVALUATION  
=====

- A. Controlled Environment
- B. Uncontrolled Environment
  - All Zones comply with ANSI Standards.

ANALYSIS OF NON-IONIZING RADIATION  
for Alaska Communications Internet LLC  
**Site: Anchorage State: AK**

Latitude: 61 11 10.5 Longitude: 149 52 15.6 (NAD83)  
11-08-2017

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) = 9.3300 Watts  
Antenna Gain at Earth Site (GES) = 41.6000 dBi = 14454.3977  
Power Ratio:  
AntiLog(GES/10)  
pi = 3.1415927  
Antenna Aperture Efficiency (n) = 0.6000

### 1. FAR ZONE CALCULATIONS

=====

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

$$\text{Far Zone Power Density} \quad (R_f) = \frac{(GES) (P)}{4 * \text{pi} * (D_f^{**2})} = 2.1135 \text{ W/m}^{**2}$$
$$= 0.2114 \text{ mW/cm}^{**2}$$

### 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.

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

$$\text{Near Zone Power Density} \quad (R_n) = \frac{16.0 (n) P}{\text{pi} (D^{**2})} = 4.9497 \text{ W/m}^{**2}$$
$$= 0.4950 \text{ mW/cm}^{**2}$$

### 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

=====

$$\begin{aligned} \text{Main Reflector Power Density} &= \frac{2(P)}{S_a} = 4.1248 \text{ W/m}^2 \\ &= 0.4125 \text{ mW/cm}^2 \end{aligned}$$

5. ZONE BETWEEN THE MAIN REFLECTOR AND THE GROUND

=====

Applying uniform illumination of the Main Reflector Surface:

$$\begin{aligned} \text{Main to Ground Power Density} &= \frac{P}{S_a} = 2.0624 \text{ W/m}^2 \\ &= 0.2062 \text{ mW/cm}^2 \end{aligned}$$

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	4.7886	Complies with ANSI
2. Near Zone	4.5050	Complies with ANSI
3. Transition Zone	Rf < Rt < Rn	Complies with ANSI
4. Main Reflector Surface	4.5875	Complies with ANSI
5. Main Reflector to Ground	4.7938	Complies with ANSI

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

Zones	Safety Margins (mW/cm**2)	Conclusions
1. Far Zone	0.7886	Complies with ANSI
2. Near Zone	0.5050	Complies with ANSI
3. Transition Zone	Rf < Rt < Rn	Complies with ANSI
4. Main Reflector Surface	0.5875	Complies with ANSI
5. Main Reflector to Ground	0.7938	Complies with ANSI

6. EVALUATION  
=====

- A. Controlled Environment
- B. Uncontrolled Environment
  - All Zones comply with ANSI Standards.

ANALYSIS OF NON-IONIZING RADIATION  
for Alaska Communications Internet LLC

**Site: St Paul State: AK**

Latitude: 57 7 23.0 Longitude: 170 16 45.0 (NAD83)  
11-08-2017

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:

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Antenna Diameter, (D) = 3.8000 m  
Antenna Surface Area (Sa) =  $\pi(D^2)/4$  = 11.3411 m\*\*2  
Wavelength at 6.1750 GHz ( $\lambda$ ) = 0.0485 m  
Transmit Power at Flange (P) = 1.9000 Watts  
Antenna Gain at Earth Site (GES) = 45.6000 dBi = 36307.8055  
Power Ratio:  
AntiLog(GES/10)  
pi = 3.1415927  
Antenna Aperture Efficiency (n) = 0.6000



### 1. FAR ZONE CALCULATIONS

$$\text{Distance to the Far Zone} \quad (D_f) = \frac{(n) (D^{**2})}{\text{lambda}} = 178.6392 \text{ m}$$

$$\text{Far Zone Power Density} \quad (R_f) = \frac{(GES) (P)}{4 * \text{pi} * (D_f^{**2})} = 0.1720 \text{ W/m}^{**2}$$
$$= 0.0172 \text{ mW/cm}^{**2}$$

### 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.

$$\text{Distance to the Near Zone} \quad (D_n) = \frac{D^{**2}}{4 * \text{lambda}} = 74.4330 \text{ m}$$

$$\text{Near Zone Power Density} \quad (R_n) = \frac{16.0 (n) P}{\text{pi} (D^{**2})} = 0.4021 \text{ W/m}^{**2}$$
$$= 0.0402 \text{ mW/cm}^{**2}$$

### 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  
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$$\begin{aligned} \text{Main Reflector Power Density} &= \frac{2(P)}{S_a} = 0.3351 \text{ W/m}^2 \\ &= 0.0335 \text{ mW/cm}^2 \end{aligned}$$

5. ZONE BETWEEN THE MAIN REFLECTOR AND THE GROUND  
=====

Applying uniform illumination of the Main Reflector Surface:

$$\begin{aligned} \text{Main to Ground Power Density} &= \frac{P}{S_a} = 0.1675 \text{ W/m}^2 \\ &= 0.0168 \text{ mW/cm}^2 \end{aligned}$$

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	4.9828	Complies with ANSI
2. Near Zone	4.9598	Complies with ANSI
3. Transition Zone	Rf < Rt < Rn	Complies with ANSI
4. Main Reflector Surface	4.9665	Complies with ANSI
5. Main Reflector to Ground	4.9832	Complies with ANSI

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

Zones	Safety Margins (mW/cm**2)	Conclusions
1. Far Zone	0.9828	Complies with ANSI
2. Near Zone	0.9598	Complies with ANSI
3. Transition Zone	Rf < Rt < Rn	Complies with ANSI
4. Main Reflector Surface	0.9665	Complies with ANSI
5. Main Reflector to Ground	0.9832	Complies with ANSI

6. EVALUATION  
=====

- A. Controlled Environment
  - B. Uncontrolled Environment
- All Zones comply with ANSI Standards.