Approved by OMB
3060–0678

APPLICATION FOR EARTH STATION SPECIAL TEMPORARY AUTHORITY

APPLICANT INFORMATIONEnter a description of this application to identify it on the main menu:
Special Temporary Authority to Operate Ku–Band Earth Station (1.2m Antenna)

1. Applicant

Name:	Newcom International, Inc.	**Phone Number:**	305–627–6000
DBA Name:		**Fax Number:**	305–627–6001
Street:	15590 NW 15th Avenue	**E–Mail:**	jaime. dickinson@newcominternational. com
City:	MIAMI	**State:**	FL
Country:	USA	**Zipcode:**	33169 –
Attention:	Mr. Jaime Dickinson		

GRANTED
International Bureau

File # SES-STA-20130904-00776
Call Sign None Grant Date 9-10-13
(or other identifier)
Term Dates
From 9-10-13 To: 10-10-13
Approved: Paul E. Blais

Applicant: Newcom International, Inc.
Call Sign: No Call Sign
File Number: SES-STA-20130904-00776
Special Temporary Authority (STA)

Newcom International, Inc. (Newcom International) is granted STA, under special operation conditions, for 30 days to access Satmex 6 satellite at orbital location 113° W.L., Satmex 8 satellite at orbital location 116.8° W.L, and Telstar 11N satellite at orbital location 322.5° E.L. to ensure remote infrastructure in Africa and Latin America, including hospitals located in rural, underserved areas, maintains reliable connectivity with United States telecommunications infrastructure to enable both basic lifeline communications as well as advanced telemedicine applications.

1. Operations will be located at Newcom International's flagship teleport in Miami, Florida at coordinates 25°54'59.3" N.L. / 80°13'29.2" W.L.

2. Operations will transmit in the 14.0-14.50 GHz frequencies and receive in the 11.7-12.2 GHz frequencies using four 1.2 meter antennas of Channel Master model 62-12362-01 and Patriot TX-INT120KUG with antenna gain of 43.3 dBi at 14.250 GHz.

3. Operations with total input power to antenna flange at level 3.9 Watts, maximum Effective Isotropic Radiated Power (eirp) will not exceed 49.2 dBW, and maximum eirp density will not exceed 26.12 dBW/4kHz.

4. Operations, shall not cause harmful interference to, and shall not claim protection from, interference caused to it by any other lawfully operating station and it shall cease transmission(s) immediately upon notice of such interference.

5. Any action taken or expense incurred as a result of operations pursuant to this STA is solely at Newcom International's risk.

6. This action is issued pursuant to Section 0.261 of the Commission's rules on delegated authority, 47 C.F.R. §0.261, and is effective immediately.

GRANTED
International Bureau

File # SES-STA20130904-00776
Call Sign None Grant Date 9-10-13
(or other identifier)
Term Dates
From 9-10-13 To: 10-10-13
Approved:

2. Contact

Name:	Frank G. Lamancusa	**Phone Number:**	202–373–6812
Company:	Bingham McCutchen LLP	**Fax Number:**	202–373–6001
Street:	2020 K St., NW	E–Mail:	frank.lamancusa@bingham.com
City:	Washington	**State:**	DC
Country:	USA	**Zipcode:**	20006 –
Attention:		**Relationship:**	Legal Counsel

(If your application is related to an application filed with the Commission, enter either the file number or the IB Submission ID of the related application. Please enter only one.)

3. Reference File Number or Submission ID

4a. Is a fee submitted with this application?

◉ If Yes, complete and attach FCC Form 159. If No, indicate reason for fee exemption (see 47 C.F.R.Section 1.1114).

○ Governmental Entity ○ Noncommercial educational licensee

○ Other(please explain):

4b. Fee Classification CGX – Fixed Satellite Transmit/Receive Earth Station

5. Type Request

◉ Use Prior to Grant ○ Change Station Location ○ Other

6. Requested Use Prior Date
09/10/2013

7. CityMiami	8. Latitude (dd mm ss.s h) 25 54 59.3 N
9. State FL	10. Longitude (dd mm ss.s h) 80 13 29.2 W

11. Please supply any need attachments.

Attachment 1: Exhibit A   Attachment 2: Exhibit B   Attachment 3:

12. Description. (If the complete description does not appear in this box, please go to the end of the form to view it in its entirety.)

```
Short-term authority to operate Ku-band earth station facility during pendency of
permanent earth station application.
```

13. By checking Yes, the undersigned certifies that neither applicant nor any other party to the application is subject to a denial of Federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti–Drug Act of 1988, 21 U.S.C. Section 862, because of a conviction for possession or distribution of a controlled substance. See 47 CFR 1.2002(b) for the meaning of "party to the application" for these purposes.

(●) Yes ( ) No

14. Name of Person Signing Jaime Dickinson	15. Title of Person Signing President & CEO

WILLFUL FALSE STATEMENTS MADE ON THIS FORM ARE PUNISHABLE BY FINE AND / OR IMPRISONMENT (U.S. Code, Title 18, Section 1001), AND/OR REVOCATION OF ANY STATION AUTHORIZATION (U.S. Code, Title 47, Section 312(a)(1)), AND/OR FORFEITURE (U.S. Code, Title 47, Section 503).

FCC NOTICE REQUIRED BY THE PAPERWORK REDUCTION ACT

The public reporting for this collection of information is estimated to average 2 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the required data, and completing and reviewing the collection of information. If you have any comments on this burden estimate, or how we can improve the collection and reduce the burden it causes you, please write to the Federal Communications Commission, AMD–PERM, Paperwork Reduction Project (3060–0678), Washington, DC 20554. We will also accept your comments regarding the Paperwork Reduction Act aspects of this collection via the Internet if you send them to PRA@fcc.gov. PLEASE DO NOT SEND COMPLETED FORMS TO THIS ADDRESS.

Remember – You are not required to respond to a collection of information sponsored by the Federal government, and the government may not conduct or sponsor this collection, unless it displays a currently valid OMB control number or if we fail to provide you with this notice. This collection has been assigned an OMB control number of 3060–0678.

THE FOREGOING NOTICE IS REQUIRED BY THE PAPERWORK REDUCTION ACT OF 1995, PUBLIC LAW 104–13, OCTOBER 1, 1995, 44 U.S.C. SECTION 3507.

EXHIBIT A – REQUEST FOR SPECIAL TEMPORARY AUTHORITY

NewCom International, Inc. ("NewCom"), pursuant to Section 25.120 of the Commission's Rules, 47 C.F.R. § 25.120, hereby requests Special Temporary Authority ("STA") for short-term transmit and receive operation of a non-common carrier fixed earth station operating in the conventional Ku-band. The proposed service will involve four (4) antennas, two of which will uplink exclusively to the Satmex 6 satellite at 113 degrees west longitude, one of which will uplink to the Satmex 8 satellite at 116.8 degrees west longitude, and one of which will uplink to the Telstar 11N satellite at 322.5 degrees east longitude. STA authority is sought for a period of 30 days beginning September 10, 2013, concluding October 10, 2013. Grant of this request will serve the public interest by ensuring that remote infrastructure in Africa and Latin America, including hospitals located in rural, underserved areas, maintains reliable connectivity with United States telecommunications infrastructure to enable both basic lifeline communications as well as advanced telemedicine applications.

NewCom is a premium provider of advanced fixed satellite services, specializing in custom engineered solutions for government, telecom, healthcare, oil & gas and multimedia end users. NewCom is a leading provider of emergency communications services for government, military and law enforcement, and has designed its Emergency Communications Response ("ECR") solution as a cost-effective contingency plan or back up should regular communications go down, capable of supporting unified voice, video, data and content applications seamlessly. ECR also supports on-the-go communications centers for mobile military and public safety corps units.

NewCom has a long history of providing emergency communications to first responders unable to utilize permanent telecommunications infrastructure due to manmade or natural disaster. For example, NewCom was one of the first telecommunications providers to reach Joplin, Missouri in the aftermath of the EF5 multiple vortex tornado that devastated the city in 2011, deploying Very Small Aperture Terminals ("VSATs") at the request of the American Red Cross in the parking lot of the Freeman Hospital to restore disrupted communications to the hospital and medical staff.[1]

The instant earth station will serve as a hub for remote facilities spread throughout underserved or unserved areas of Africa and Latin America, utilized to provide mission critical service, including lifeline communications to hospitals, medical facilities and educational institutions served by NewCom's downstream customers. Without connectivity via the above-referenced satellites to NewCom's flagship Miami teleport, these downstream customers will in many instances be left without lifeline communications. NewCom expects to file a permanent application for authority to communicate with the above-referenced satellites shortly after filing this request for STA to ensure that the aforementioned downstream customers have continuous, uninterrupted access to lifeline communications via NewCom's Miami teleport and complementary terrestrial infrastructure.

---

[1] For additional information, please see SES-STA-20110526-00638.

All four (4) 1.2 meter antennas will be located within one (1) second longitude/latitude of the following coordinates: 25°54'59.3" N / 80°13'29.2" W. The transmit and receive carriers NewCom seeks to operate will be within the conventional Ku-band. Each carrier will be a full-duplex 1024 Kbps circuit with ¾ forward error correction coding and quad phase RF modulation. Maximum RF power at the antenna flange will not exceed 4 Watts, and maximum EIRP will not exceed 49.42 dBW or 26.12 dBW/4KHz. Furthermore, the accompanying radiation hazard analysis ("Exhibit B") demonstrates that the antennas can be operated safely within the guidelines established by the Office of Engineering and Technology ("OET") for human exposure to RF electromagnetic fields.

In summary, grant of this STA will enable NewCom to ensure uninterrupted lifeline communications for important downstream customers, including customers serving hospitals and medical facilities in underserved or unserved areas of Africa and Latin America with no alternative communication options. Additionally, these antennas pose no interference threat to other occupants of the Ku-band and are not an environmental or human safety threat. Accordingly, this application is in the public interest and should be granted.

EXHIBIT B – RADIATION HAZARD STUDY

Channel Master Model 62-12362-01 Antenna

1.0 Introduction

NewCom International, Inc. ("NewCom") intends to deploy a transmit/receive 1.2m antenna at its flagship teleport in Miami, Florida. This fixed satellite antenna has 43.3 dBi gain, and will be equipped with a 4 Watt transceiver. Maximum output from the transceiver will be limited to 4 Watts and EIRP will not exceed 49.3 dBW.

2.0 Antenna Analysis Method

This report is developed in accordance with the prediction methods contained in OET Bulletin No. 65, Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields, Edition 97-01, pp 26-30. The maximum level of non-ionizing radiation to which employees may be exposed is limited to a power density level of 5 milliwatts per square centimeter (5 mW/cm2) averaged over any 6 minute period in a controlled environment and the maximum level of non-ionizing radiation to which the general public is exposed is limited to a power density level of 1 milliwatt per square centimeter (1 mW/cm2) averaged over any 30 minute period in an uncontrolled environment. These calculations demonstrate that the radiation levels associated with NewCom's short-term testing are within acceptable limits when compared to the levels established for Maximum Permissible Exposure ("MPE") defined in Bulletin 65, Appendix A for Occupational/Controlled Limits and General Population/Uncontrolled Limits.

3.1 1.2m Antenna Specifications

The proposed antenna is a Channel Master model 62-12362-01 transmit/receive antenna equipped with a 4 Watt transceiver. The parameters for this antenna are shown in the table below.

Antenna Actual Diameter	**1.2 meters**
Antenna Surface Area	**1.13 sq. meters**
Antenna Isotropic Gain	**43.3 dBi**
Number of Identical Adjacent Antennas*	**0**
Nominal Antenna Efficiency (η)	**67 %**
Nominal Frequency	**14250 MHz**
Nominal Wavelength (λ)	**0.0211 meters**
Maximum Transmit Power / Carrier	**4 Watts**
Number of Carriers	**1**
Total Transmit Power	**4 Watts**
W/G Loss from Transmitter to Feed	**0.1 dB**
Total Feed Input Power	**3.9 Watts**
Near Field Limit	$R_{nf} = D^2/4\lambda = 17$ **meters**
Far Field Limit	$R_{ff} = 0.6\ D^2/\lambda = 41$ **meters**
Transition Region	R_{nf} **to** R_{ff}

A/75694508.1

Note that the worst-case radiation hazards exist along the beam axis. Under normal circumstances, it is highly unlikely that the antenna axis will be aligned with any occupied area since that would represent a blockage to the desired signals, thus rendering the link unuseable.

In the following sections, the power density in the above regions, as well as other critically important areas will be calculated and evaluated. The calculations are done in the order discussed in OET Bulletin 65.

3.2 Main Reflector Region

The power density at the reflector surface can be calculated from the expression:

PD_{refl} = 4P/A = 1.38 mW/cm² (1)

Where: P = total power at feed, milliwatts

A = Total area of reflector, sq. cm

In the normal range of transmit powers for this satellite antenna, the power densities at or around the reflector surface are expected to exceed safe levels. Please note that precautionary measures will be taken during the individual installations of the antenna to ensure that this area will be inaccessible to the general public. Operators and technicians have received training specifying this area as a high exposure area. Furthermore, procedures have been established that ensure all transmitters are turned off before access to this area by maintenance personnel is possible.

3.3 On-Axis Near Field Region

The geometrical limits of the radiated power in the near field approximate a cylindrical volume with a diameter equal to that of the antenna. In the near field, the power density is neither uniform nor does its value vary uniformly with distance from the antenna. For the purpose of considering radiation hazard it is assumed that the on-axis flux density is at its maximum value throughout the length of this region. The length of this region, i.e., the distance from the antenna to the end of the near field, is computed as Rnf above.

The power density within the on-axis near field region can be calculated from the expression:

$PD_{nf} = (16\,\eta\, P)/(\pi\, D^2) =$ 0.93 mW/cm² (2)
from 0 to 17 meters

Evaluation	
Uncontrolled Environment:	**Complies to FCC Limits**
Controlled Environment:	**Complies to FCC Limits**

* Power Density Limit for Controlled and Uncontrolled Environment is met in the Near Field Region.

3.4 On-Axis Transition Field Region

The transition region is located between the near and far field regions. As stated in Bulletin 65, the power density begins to vary inversely with distance in the transition region. The maximum power density in the transition region will not exceed that calculated for the near field region, and the transition region begins at that value. The maximum value for a given distance within the transition region may be computed for the point of interest according to the following methodology:

We use the equation below (3) to determine the safe on-axis distances required for the two occupancy conditions:

PD_t =	**$(PD_{nf})(R_{nf})/R$ = dependent on R (3)** **= 0.93 mW/cm^2 at R = 17 m**
where:	**PD_{nf} = near field power density**
	R_{nf} = near field distance
	R = distance to point of interest
For:	**17 < R < 41 meters**

Evaluation

Uncontrolled Environment Safe Operating Distance,(meters), R_{safeu}:	17 **
Controlled Environment Safe Operating Distance,(meters), R_{safec}:	17 **

** Power Density Limit for Controlled and Uncontrolled Environments is met in the Transition Field Region

3.5 On-Axis Far-Field Region

The on-axis power density in the far field region (PD_{ff}) varies inversely with the square of the distance as follows:

We use the equation below (4) to determine the safe on-axis distances required for the two occupancy conditions:

PD_{ff} =	**$PG/(4\pi R^2)$ = dependent on R (4)**
where:	**P = total power at feed**
	G = Numeric Antenna gain in the direction of interest relative to isotropic radiator
	R = distance to the point of interest
For:	**R > R_{ff} = 41 meters**
	PD_{ff} = 0.394 mW/cm^2 at R_{ff}

Evaluation

Uncontrolled Environment Safe Operating Distance,(meters), R_{safeu}:	**41**
Controlled Environment Safe Operating Distance,(meters), R_{safec}:	**41**

3.6 Off-Axis Far-Field Region

In the far field region power is distributed in a pattern of maxima and minima (sidelobes) as a function of the off-axis angle between the antenna center line and the point of interest. Off-axis power density in the far field can be estimated using the antenna radiation patterns prescribed for the antenna in use. Usually this will correspond to the antenna gain pattern envelope defined by the FCC or the ITU, which takes the form of:

$G_{off} = 32 - 25\log(\Theta)$ (5)
for Θ from 1 to 48 degrees; -10 dBi from 48 to 180 degrees
(Applicable for commonly used satellite transmit antennas)

Considering that satellite antenna beams are aimed skyward, power density in the far field will usually not be a problem except at low look angles. In these cases, the off axis gain reduction may be used to further reduce the power density levels.

For example: At one (1) degree off axis at the far-field limit, we can calculate the power density as:

$G_{off} = 32 - 25\log(1) = 32 - 0$ dBi = 1585 numeric

Evaluation
$PD_{1\ deg\ off\text{-}axis} = PD_{ff} \times 1585/G = 0.029$ mW/cm²

3.7 Off-Axis Power Density in the Near-Field and Transitional Region

According to Bulletin 65, off-axis calculations in the near field may be performed as follows: assuming that the point of interest is at least one antenna diameter removed from the center of the main beam, the power density at that point is at least a factor of 100 (20 dB) less than the value calculated for the equivalent on-axis power density in the main beam. Therefore, for regions at least 1.2 meters away from the center line of the dish, whether behind, below, or in front of the antenna's main beam, the power density exposure is at least 20 dB below the main beam level as follows:

$PD_{nf(off\text{-}axis)} = PD_{nf}/100 = 0.0093$ mW/cm² at D off axis (6)

Evaluation of Safe Occupancy Area in Front of Antenna

The safe distance (S) from a vertical axis passing through the dish center to a safe off axis location in front of the antenna can be determined based on the dish diameter rule above (6). Assuming a flat terrain in front of the antenna, the relationship is:

S = (D/ sin α) + (2h - D - 2)/(2 tan α) (7)

Where: α = minimum elevation angle of antenna
D = dish diameter in meters
h = maximum height of object to be cleared, meters

For distances equal or greater than determined by equation (7), the radiation hazard will be below safe levels for all but the most powerful stations (> 4 kilowatts RF at the feed).

For D = 1.2 meters
h = 1 meter

Then:

α	**S**
10	**3.5 meters**
15	**2.24 meters**
20	**1.86 meters**
25	**1.55 meters**
30	**1.36 meters**
35	**1.24 meters**
45	**1.1 meters**

4.0 Expected Radiation Levels

Region / Antenna	Antenna Surface Area (mW/cm^2)	Near Field Dist. (m) (mW/cm2)	Far Field Dist. (m) (mW/cm2)	Transition (Midpoint) Dist. (m) (mW/cm2)
1.2 m / 3.9 W BUC		17	41	29
	1.13	0.93	0.394	0.231

A/75694508.1

5.0 Conclusions

Based on the above analysis, it is concluded that harmful levels of radiation will not exist in regions normally occupied by the public or the antenna's operating personnel. It is still recommended that all personnel be trained in RF safety when working around or maintaining this type of antenna. Furthermore, it will be stressed that transmitters always be turned off during maintenance in accordance with standard operating procedures.

Patriot TX-INT120KUG Antenna

1.0 Introduction

NewCom intends to deploy a transmit/receive 1.2m antenna at its flagship teleport in Miami, Florida. This fixed satellite antenna has 43.4 dBi gain, and will be equipped with a 4 Watt transceiver. Maximum output from the transceiver will be limited to 4 Watts and EIRP will not exceed 49.4 dBW.

2.0 Antenna Analysis Method

This report is developed in accordance with the prediction methods contained in OET Bulletin No. 65, Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields, Edition 97-01, pp 26-30. The maximum level of non-ionizing radiation to which employees may be exposed is limited to a power density level of 5 milliwatt per square centimeter (5 mW/cm2) averaged over any 6 minute period in a controlled environment and the maximum level of non-ionizing radiation to which the general public is exposed is limited to a power density level of 1 milliwatt per square centimeter (1 mW/cm2) averaged over any 30 minute period in an uncontrolled environment. These calculations demonstrate that the radiation levels associated with NewCom's short-term testing are within acceptable limits when compared to the levels established for Maximum Permissible Exposure ("MPE") defined in Bulletin 65, Appendix A for Occupational/Controlled Limits and General Population/Uncontrolled Limits.

3.1 1.2 m Antenna Specifications

The proposed antenna is a Patriot TX-INT120KUG transmit/receive antenna equipped with a 4 Watt transceiver. The parameters for this antenna are shown in the table below.

Antenna Actual Diameter	**1.2 meters**
Antenna Surface Area	**1.13 sq. meters**
Antenna Isotropic Gain	**43.4 dBi**
Number of Identical Adjacent Antennas*	**0**
Nominal Antenna Efficiency (η)	**68.5 %**
Nominal Frequency	**14250 MHz**
Nominal Wavelength (λ)	**0.0211 meters**
Maximum Transmit Power / Carrier	**4 Watts**
Number of Carriers	**1**

A/75694508.1

Total Transmit Power	**4 Watts**
W/G Loss from Transmitter to Feed	**0.1 dB**
Total Feed Input Power	**3.9 Watts**
Near Field Limit	$R_{nf} = D^2/4\lambda = 17$ **meters**
Far Field Limit	$R_{ff} = 0.6\ D^2/\lambda = 41$ **meters**
Transition Region	R_{nf} **to** R_{ff}

Note that the worst-case radiation hazards exist along the beam axis. Under normal circumstances, it is highly unlikely that the antenna axis will be aligned with any occupied area since that would represent a blockage to the desired signals, thus rendering the link unuseable.

In the following sections, the power density in the above regions, as well as other critically important areas will be calculated and evaluated. The calculations are done in the order discussed in OET Bulletin 65.

3.2 Main Reflector Region

The power density at the reflector surface can be calculated from the expression:

$PD_{refl} =$	$4P/A =$	**1.38 mW/cm²** (1)
Where:	**P = total power at feed, milliwatts**	
	A = Total area of reflector, sq. cm	

In the normal range of transmit powers for this satellite antenna, the power densities at or around the reflector surface are expected to exceed safe levels. Please note that precautionary measures will be taken during the individual installations of the antenna to ensure that this area will be inaccessible to the general public. Operators and technicians have received training specifying this area as a high exposure area. Furthermore, procedures have been established that ensure all transmitters are turned off before access to this area by maintenance personnel is possible.

3.3 On-Axis Near Field Region

The geometrical limits of the radiated power in the near field approximate a cylindrical volume with a diameter equal to that of the antenna. In the near field, the power density is neither uniform nor does its value vary uniformly with distance from the antenna. For the purpose of considering radiation hazard it is assumed that the on-axis flux density is at its maximum value throughout the length of this region. The length of this region, i.e., the distance from the antenna to the end of the near field, is computed as Rnf above.

The power density within the on-axis near field region can be calculated from the expression:

$PD_{nf} = (16\ \eta\ P)/(\pi\ D^2) =$ **0.945 mW/cm² (2)**
from 0 to 17 meters

Evaluation

A/75694508.1

Uncontrolled Environment:	**Complies to FCC Limits**
Controlled Environment:	**Complies to FCC Limits**

* Power Density Limit for Controlled and Uncontrolled Environment is met in the Near Field Region.

3.4 On-Axis Transition Field Region

The transition region is located between the near and far field regions. As stated in Bulletin 65, the power density begins to vary inversely with distance in the transition region. The maximum power density in the transition region will not exceed that calculated for the near field region, and the transition region begins at that value. The maximum value for a given distance within the transition region may be computed for the point of interest according to the following methodology:

We use the equation below (3) to determine the safe on-axis distances required for the two occupancy conditions:

PD_t =	**$(PD_{nf})(R_{nf})/R$ = dependent on R (3)** **= 0.945 mW/cm^2 at R = 17 m**
where:	**PD_{nf} = near field power density**
	R_{nf} = near field distance
	R = distance to point of interest
For:	**$17 < R < 41$ meters**

Evaluation	
Uncontrolled Environment Safe Operating Distance,(meters), R_{safeu}:	**17 m ******
Controlled Environment Safe Operating Distance,(meters), R_{safec}:	**17 m ******

** Power Density Limit for Controlled and Uncontrolled Environment is met in the Near Field Region.

3.5 On-Axis Far-Field Region

The on-axis power density in the far field region (PD_{ff}) varies inversely with the square of the distance as follows:

We use the equation below (4) to determine the safe on-axis distances required for the two occupancy conditions:

PD_{ff} = $PG/(4\pi R^2)$ = dependent on R (4)
where: P = total power at feed

G = Numeric Antenna gain in the direction of interest relative to isotropic radiator

R = distance to the point of interest

For: $R > R_{ff}$ = 41 meters

PD_{ff} = 0.404 mW/cm² at R_{ff}

Evaluation

Uncontrolled Environment Safe Operating Distance,(meters), R_{safeu}:	**41**
Controlled Environment Safe Operating Distance,(meters), R_{safec}:	**41**

3.6 Off-Axis Far-Field Region

In the far field region power is distributed in a pattern of maxima and minima (sidelobes) as a function of the off-axis angle between the antenna center line and the point of interest. Off-axis power density in the far field can be estimated using the antenna radiation patterns prescribed for the antenna in use. Usually this will correspond to the antenna gain pattern envelope defined by the FCC or the ITU, which takes the form of:

$G_{off} = 32 - 25\log(\Theta)$ (5)
for Θ from 1 to 48 degrees; -10 dBi from 48 to 180 degrees
(Applicable for commonly used satellite transmit antennas)

Considering that satellite antenna beams are aimed skyward, power density in the far field will usually not be a problem except at low look angles. In these cases, the off axis gain reduction may be used to further reduce the power density levels.

For example: At one (1) degree off axis at the far-field limit, we can calculate the power density as:

$G_{off} = 32 - 25\log(1) = 32 - 0$ dBi = 1585 numeric

Evaluation

$PD_{1\ deg\ off\text{-}axis} = PD_{ff} \times 1585/G = 0.029$ mW/cm²

3.7 Off-Axis Power Density in the Near-Field and Transitional Region

According to Bulletin 65, off-axis calculations in the near field may be performed as follows: assuming that the point of interest is at least one antenna diameter removed from the center of the main beam, the power density at that point is at least a factor of 100 (20 dB) less than the value calculated for the equivalent on-axis power density in the main beam. Therefore, for regions at least 1.2 meters away from the center line of the dish, whether behind, below, or in front of the antenna's main beam, the power density exposure is at least 20 dB below the main beam level as follows:

$PD_{nf(off\text{-}axis)} = PD_{nf}/100 = 0.00945$ mW/cm² at D off axis (6)

Evaluation of Safe Occupancy Area in Front of Antenna

The safe distance (S) from a vertical axis passing through the dish center to a safe off axis location in front of the antenna can be determined based on the dish diameter rule above (6). Assuming a flat terrain in front of the antenna, the relationship is:

$S = (D/\sin\alpha) + (2h - D - 2)/(2\tan\alpha)$ (7)

Where: α = minimum elevation angle of antenna
D = dish diameter in meters
h = maximum height of object to be cleared, meters

For distances equal or greater than determined by equation (7), the radiation hazard will be below safe levels for all but the most powerful stations (> 4 kilowatts RF at the feed).

For D = 1.2 meters
h = 1 meter

Then:

α	S
10	3.5 meters
15	2.24 meters
20	1.86 meters
25	1.55 meters
30	1.36 meters
35	1.24 meters
45	1.1 meters

4.0 Expected Radiation Levels

Region / Antenna	Antenna Surface Area (mW/cm^2)	Near Field Dist. (m) (mW/cm2)	Far Field Dist. (m) (mW/cm2)	Transition (Midpoint) Dist. (m) (mW/cm2)
1.2 m / 3.9 W BUC		17	41	29
	1.13	0.945	0.404	0.554

A/75694508.1

5.0 Conclusions

Based on the above analysis, it is concluded that harmful levels of radiation will not exist in regions normally occupied by the public or the antenna's operating personnel. It is still recommended that all personnel be trained in RF safety when working around or maintaining this type of antenna. Furthermore, it will be stressed that transmitters always be turned off during maintenance in accordance with standard operating procedures.