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 for Expired Ku–band earth station E930489 Littleton, Co

1. Applicant

Name:	Comcast Cable Communications Management, LLC	**Phone Number:**	215–286–7454
DBA Name:		**Fax Number:**	215–286–1022
Street:	One Comcast Center	**E–Mail:**	sheila_smith@cable.comcast.com
	1701 John F. Kennedy Boulevard		
City:	Philadelphia	**State:**	PA
Country:	USA	**Zipcode:**	19103 –2838
Attention:	Sheila Smith		

60 days "With conditions"

GRANTED
International Bureau

File #SES-STA-20190828-01117

Call Sign E930489 Grant Date 09/30/2019
(or other identifier)

Term Dates
From: 09/30/2019 To: 11/29/2019

Approved: Paul E Blais

2. Contact

Name:	Catherine Fox	**Phone Number:**	215 286−8818
Company:	Comcast Cable Communications Management, LLC	**Fax Number:**	
Street:	One Comcast Center 1701 John F. Kennedy Boulevard	E−Mail:	Catherine_Fox@Comcast.com
City:	Philadelphia	**State:**	PA
Country:	USA	**Zipcode:**	19103 −2838
Attention:		**Relationship:**	

(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 IB2019003116

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
09/06/2019

7. CityLittleton	8. Latitude (dd mm ss.s h) 39 30 50.0 N
9. State CO	10. Longitude (dd mm ss.s h) 105 1 30.5 W

11. Please supply any need attachments.

Attachment 1: Radhaz Attachment 2: STA Narrative 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.)

Special Temporary Authority per attached for expired Call Sign E930489

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 Catherine Fox	15. Title of Person Signing Deputy General Counsel

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).

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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.

Applicant: Comcast Cable Communications Management, LLC
Call Sign: E930489
File No.: SES-STA-20190828-01117
Special Temporary Authority ("STA")

Comcast Cable Communications Management, LLC ("Comcast") is granted Special Temporary Authorization for 60 days to operate its licensed fixed Ku-band Transmit-Only satellite earth station located at geographic coordinates 39° 30' 50"N, 105° 01' 30.5" W in Littleton, CO with the listed satellites at their permanent orbital location in the frequency band 14000-14500 MHz (Earth-to-space) under the following conditions:

1. Operations shall comply with 47 C.F.R. § 25.212.

2. Operations with Ku-band satellites: AMC 6 (S2347), AMC 15(S2180), AMC 21 (S2676), Anik F1R (S2674), Anik F2 (S2646), Anik F3 (S2703), Arsat 2 (S2956), Eutelsat 113 West A (S2695), Eutelsat 115 West B (S2938), Eutelsat 117 West A (S2873), Eutelsat 117 West B (S2926), Galaxy 3C (S2381), Horizons 1 (S2475), Galaxy 16 (S2687), Galaxy 17 (S2715), Galaxy 18 (S2733), Galaxy 19 (S2647), Galaxy 28 (S2160), Intelsat 16 (S2750), Intelsat 30 (S2887), Intelsat 31 (S2924), SES-1 (S2807), SES- 2 (S2826), SES-3 (S2892), SES-10 (S2950), SES-15 (S2951), Star One C2 (S2678), and Star One C3 (S2845) with only frequency 14000 MHz.

3. All operations shall be on an unprotected and non-harmful interference basis, Comcast, 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 and must inform the Commission, in writing, immediately of such an event.

4. The licensee shall take all necessary measures to ensure that the antenna does not create potential exposure of humans to radiofrequency radiation in excess of the FCC exposure limits defined in 47 CFR 1.1307(b) and 1.1310 wherever such exposures might occur. Measures must be taken to ensure compliance with limits for both occupational/ controlled exposure and for general population/uncontrolled exposure, as defined in these rule sections. Compliance can be accomplished in most cases by appropriate restrictions, such as fencing. Requirements for restrictions can be determined by predictions based on calculations, modeling, or by field measurements. The FCC's OET Bulletin 65 (available on-line at www.fcc.gov/oet/rfsafety) provides information on predicting exposure levels and on methods for ensuring compliance, including the use of warning and alerting signs and protective equipment for workers.

5. Grant of this STA is without prejudice to any determination that the Commission may make regarding pending or future Comcast applications.

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

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 upon release.

60 days "With Conditions"

GRANTED
International Bureau

File # SES-STA-20190828-01117

Call Sign E930489 Grant Date 09/30/2019
(or other identifier)

Term Dates
From: 09/30/2019 To: 11/29/2019

Approved: Paul E Blais

REQUEST FOR SPECIAL TEMPORARY AUTHORITY

Comcast Cable Communications Management, LLC ("Comcast") requests Special Temporary Authority ("STA") to operate a previously licensed transmit Ku-band earth station facility (E930489) for a period of sixty (60) days beginning September 13, 2019. The purpose of this STA is to authorize interim operation of this facility pending action on a forthcoming license application for permanent operating authority. As set forth below, FCC approval of this request will serve the public interest, convenience and necessity.

Section 25.120(b)(1) of the Commission's rules provides that STA may be granted upon a finding of "extraordinary circumstances requiring temporary operations in the public interest and that a delay in the institution of service would seriously prejudice the public interest."[1] Section 25.120(b)(3) further provides that the Commission may grant STAs for a period of sixty (60) days without placing the request on public notice where the applicant plans to file a request for regulatory authority. Comcast submits that the instant request satisfies both rule sections.

The subject earth station is located at Comcast's national transmission center in Littleton, Colorado. Comcast uses the Littleton complex to distribute video programming to its cable television headends throughout the country, and to otherwise provide support to its various media operations. Comcast holds many FCC authorizations for earth stations located at the Littleton complex. In the past year, it has filed timely renewal applications for dozens of earth station authorizations and also surrendered the authorizations for numerous earth stations. Due to an accidental administrative error, however, the license for this station expired on December 10, 2018 without a renewal application being filed. This STA application is being filed promptly after discovery of the inadvertent error.

No party will be prejudiced by FCC grant of this STA request. The subject station (which is not being operated) was previously licensed and the transmit frequencies remain protected in the frequency coordinator's database. Moreover, a new radiation hazard study has been completed for this facility (*see* Attachment A).

Favorable action on this request will also serve the public interest. As indicated, the station is being used to distribute video programming to Comcast customers nationwide and will be operated in accordance with the technical parameters set forth on the station's most recent license authorization. Grant of the requested STA will thus simply reinstate the operational authority of an earth station that has been used by Comcast for many years without prejudice to any party. Accordingly, Comcast submits that FCC approval of this request for STA is warranted.

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[1] 47 C.F.R. § 25.120(b)(1).

STA Application Amendment

Comcast Communications Management, LLC ("Comcast") is seeking a STA to allow it to resume operations from a previously-licensed facility. The subject station is used to provide transmission service, on a case-by-case basis (as circumstances require), to Ku-band satellites included in the following list (each of which is on the approved space station list):

AMC 6
AMC 15
AMC 21
Anik F1R
Anik F2
Anik F3
Arsat 2
Ciel 2
EchoStar 9/Galaxy 23
Eutelsat 113 West A
Eutelsat 115 West B
Eutelsat 117 West A
Eutelsat 117 West B
Galaxy 3C
Galaxy 13/Horizons 1
Galaxy 16
Galaxy 17
Galaxy 18
Galaxy 19
Galaxy 28
Intelsat 16
Intelsat 30
Intelsat 31
Nimiq 5
QuetzSat 1
SES 1
SES 2
SES 3
SES 10
SES 15
Star One C2
Star One C3

Analysis of Non-Ionizing Radiation for a 9.1-Meter Earth Station System

This report analyzes the non-ionizing radiation levels for a 9.1-meter earth station system. The analysis and calculations performed in this report comply with the methods described in the FCC Office of Engineering and Technology Bulletin, No. 65 first published in 1985 and revised in 1997 in Edition 97-01. The radiation safety limits used in the analysis are in conformance with the FCC R&O 96-326. Bulletin No. 65 and the FCC R&O specifies that there are two separate tiers of exposure limits that are dependant on the situation in which the exposure takes place and/or the status of the individuals who are subject to the exposure. The Maximum Permissible Exposure (MPE) limits for persons in a General Population/Uncontrolled environment are shown in Table 1. The General Population/Uncontrolled MPE is a function of transmit frequency and is for an exposure period of thirty minutes or less. The MPE limits for persons in an Occupational/Controlled environment are shown in Table 2. The Occupational MPE is a function of transmit frequency and is for an exposure period of six minutes or less. The purpose of the analysis described in this report is to determine the power flux density levels of the earth station in the far-field, near-field, transition region, between the subreflector or feed and main reflector surface, at the main reflector surface, and between the antenna edge and the ground and to compare these levels to the specified MPEs.

Table 1. Limits for General Population/Uncontrolled Exposure (MPE)

Frequency Range (MHz)	Power Density (mW/cm^2)
30-300	0.2
300-1500	Frequency (MHz)*(0.8/1200)
1500-100,000	1.0

Table 2. Limits for Occupational/Controlled Exposure (MPE)

Frequency Range (MHz)	Power Density (mW/cm^2)
30-300	1.0
300-1500	Frequency (MHz)*(4.0/1200)
1500-100,000	5.0

Table 3. Formulas and Parameters Used for Determining Power Flux Densities

Parameter	Symbol	Formula	Value	Units
Antenna Diameter	D	Input	9.1	m
Antenna Surface Area	$A_{surface}$	$\pi D^2 / 4$	65.04	m^2
Subreflector Diameter	D_{sr}	Input	121.9	cm
Area of Subreflector	A_{sr}	$\pi D_{sr}^2/4$	11674.54	cm^2
Frequency	F	Input	14250	MHz
Wavelength	λ	300 / F	0.021053	m
Transmit Power	P	Input	1500.00	W
Antenna Gain (dBi)	G_{es}	Input	60.9	dBi
Antenna Gain (factor)	G	$10^{Ges/10}$	1230268.8	n/a
Pi	π	Constant	3.1415927	n/a
Antenna Efficiency	η	$G\lambda^2/(\pi^2D^2)$	0.67	n/a

1. Far Field Distance Calculation

The distance to the beginning of the far field can be determined from the following equation:

Distance to the Far Field Region

$$R_{ff} = 0.60\ D^2 / \lambda \quad (1)$$
$$= 2360.1\ m$$

The maximum main beam power density in the far field can be determined from the following equation:

On-Axis Power Density in the Far Field

$$S_{ff} = G\ P / (4\ \pi\ R_{ff}^2) \quad (2)$$
$$= 26.365\ W/m^2$$
$$= 2.636\ mW/cm^2$$

2. Near Field Calculation

Power flux density is considered to be at a maximum value throughout the entire length of the defined Near Field region. The region is contained within a cylindrical volume having the same diameter as the antenna. Past the boundary of the Near Field region, the power density from the antenna decreases linearly with respect to increasing distance.

The distance to the end of the Near Field can be determined from the following equation:

Extent of the Near Field

$$R_{nf} = D^2 / (4\ \lambda) \quad (3)$$
$$= 983.4\ m$$

The maximum power density in the Near Field can be determined from the following equation:

Near Field Power Density

$$S_{nf} = 16.0\ \eta\ P / (\pi\ D^2) \quad (4)$$
$$= 61.547\ W/m^2$$
$$= 6.155\ mW/cm^2$$

3. Transition Region Calculation

The Transition region is located between the Near and Far Field regions. The power density begins to decrease linearly with increasing distance in the Transition region. While the power density decreases inversely with distance in the Transition region, the power density decreases inversely with the square of the distance in the Far Field region. The maximum power density in the Transition region will not exceed that calculated for the Near Field region. The power density calculated in Section 1 is the highest power density the antenna can produce in any of the regions away from the antenna. The power density at a distance R_t can be determined from the following equation:

Transition Region Power Density

$$S_t = S_{nf}\ R_{nf} / R_t \quad (5)$$
$$= 6.155\ mW/cm^2$$

4. Region between the Main Reflector and the Subreflector

Transmissions from the feed assembly are directed toward the subreflector surface, and are reflected back toward the main reflector. The most common feed assemblies are waveguide flanges, horns or subreflectors. The energy between the subreflector and the reflector surfaces can be calculated by determining the power density at the subreflector surface. This can be determined from the following equation:

Power Density at the Subreflector

$$S_{sr} = 4000\ P / A_{sr} = 513.939\ mW/cm^2 \quad (6)$$

5. Main Reflector Region

The power density in the main reflector is determined in the same manner as the power density at the subreflector. The area is now the area of the main reflector aperture and can be determined from the following equation:

Power Density at the Main Reflector Surface

$$S_{surface} = 4\ P / A_{surface} = 92.253\ W/m^2 = 9.225\ mW/cm^2 \quad (7)$$

6. Region between the Main Reflector and the Ground

Assuming uniform illumination of the reflector surface, the power density between the antenna and the ground can be determined from the following equation:

Power Density between Reflector and Ground

$$S_g = P / A_{surface} = 23.063\ W/m^2 = 2.306\ mW/cm^2 \quad (8)$$

7. Summary of Calculations

Table 4. Summary of Expected Radiation levels for Uncontrolled Environment

Region	Calculated Maximum Radiation Power Density Level (mW/cm^2)		Hazard Assessment
1. Far Field (R_{ff} = 2360.1 m)	S_{ff}	2.636	Potential Hazard
2. Near Field (R_{nf} = 983.4 m)	S_{nf}	6.155	Potential Hazard
3. Transition Region ($R_{nf} < R_t < R_{ff}$)	S_t	6.155	Potential Hazard
4. Between Main Reflector and Subreflector	S_{sr}	513.939	Potential Hazard
5. Main Reflector	$S_{surface}$	9.225	Potential Hazard
6. Between Main Reflector and Ground	S_g	2.306	Potential Hazard

Table 5. Summary of Expected Radiation levels for Controlled Environment

Region	Calculated Maximum Radiation Power Density Level (mW/cm^2)		Hazard Assessment
1. Far Field (R_{ff} = 2360.1 m)	S_{ff}	2.636	Satisfies FCC MPE
2. Near Field (R_{nf} = 983.4 m)	S_{nf}	6.155	Potential Hazard
3. Transition Region ($R_{nf} < R_t < R_{ff}$)	S_t	6.155	Potential Hazard
4. Between Main Reflector and Subreflector	S_{sr}	513.939	Potential Hazard
5. Main Reflector	$S_{surface}$	9.225	Potential Hazard
6. Between Main Reflector and Ground	S_g	2.306	Satisfies FCC MPE

It is the applicant's responsibility to ensure that the public and operational personnel are not exposed to harmful levels of radiation.

8. Conclusions

Based on the above analysis it is concluded that the FCC MPE guidelines have been exceeded (or met) in the regions of Table 4 and 5. The applicant proposes to comply with the MPE limits by one or more of the following methods.

Radiation hazard signs will be posted while this earth station is in operation.

Due to the remote and secure location of the proposed earth station antenna at the Douglas Teleport, the area of operation around the antenna will be limited to those that have knowledge of the potential for radiation exposure. The applicant will ensure that no buildings or other obstacles will be in the areas that exceed the MPE levels.

Radiation Hazard Report

Means of Compliance Controlled Areas

The earth station's operational staff will not have access to the areas that exceed the MPE levels while the earth station is in operation.

The transmitters will be turned off during antenna maintenance

The applicant agrees to abide by the conditions specified in Condition 5208 provided below:

> *Condition 5208 - The licensee shall take all necessary measures to ensure that the antenna does not create potential exposure of humans to radiofrequency radiation in excess of the FCC exposure limits defined in 47 CFR 1.1307(b) and 1.1310 wherever such exposures might occur. Measures must be taken to ensure compliance with limits for both occupational/controlled exposure and for general population/uncontrolled exposure, as defined in these rule sections. Compliance can be accomplished in most cases by appropriate restrictions such as fencing. Requirements for restrictions can be determined by predictions based on calculations, modeling or by field measurements. The FCC's OET Bulletin 65 (available on-line at www.fcc.gov/oet/rfsafety) provides information on predicting exposure levels and on methods for ensuring compliance, including the use of warning and alerting signs and protective equipment for worker.*

I HEREBY CERTIFY THAT I AM THE TECHNICALLY QUALIFIED PERSON RESPONSIBLE FOR THE PREPARATION OF THE RADIATION HAZARD REPORT, AND THAT IT IS COMPLETE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

BY: _____

Gary K. Edwards
Senior Manager
COMSEARCH
19700 Janelia Farm Boulevard
Ashburn, VA 20147

DATED: August 27, 2019