



**STATEMENT OF WILLIAM J. GETZ  
IN SUPPORT OF AN APPLICATION TO MODIFY  
VSAT NETWORK  
FIXED SATELLITE SERVICE LICENSE  
CALL SIGN: E060349  
FCC FILE NO. SES-MOD-20111220-01479**

I am a Radio Engineer, an employee in the firm of Carl T. Jones Corporation, with offices located in Springfield, Virginia. My education and experience are a matter of record with the Federal Communications Commission.

This office has been authorized by American Broadcasting Companies, Inc. to prepare this statement in support of an Application to modify the above-referenced VSAT Network Fixed Satellite Service License. Specifically, this application proposes to add two fixed HUB locations. No further changes are proposed herein. **The Applicant proposed to maintain HUB-1 to HUB-7 as presently licensed and all studies and data associated with these HUBs and the licensed remote antennas are incorporated herein by reference.**

This Statement and the supporting Exhibits set forth the operational guidelines for the intended modification of License and submits material to demonstrate compliance with the Commission's Rules regarding human exposure to radiofrequency (RF) energy.

HUB-8 Technical Operation and RFR Exposure Study

HUB-8 Technical Operation

The proposed HUB-8 fixed satellite earth station will be located at 1777 G Street, Fresno, California, atop the KFSN-TV studio building as described in the associated FCC Form 312. The proposed system will operate only through US licensed satellites and communicate between remote terminals and hub facilities all of which will be located in the United States. Exhibit 1 lists the VSAT operating parameters, the Elevation Limit and Azimuth Limit calculations, and the Input Density calculations relevant to the proposed HUB-8 operation.

The system as described, to include its component parts, meets the Commission's requirements for routine processing of earth station applications, and meets the Commission's Rules for VSAT system operation at Ku band frequencies, as outlined in Section 25.134 of the FCC Rules.

The HUB-8 Earth Station Antenna (ESA) is an Andrew Corporation ES37 antenna which is 3.7 meters in diameter. The planned input power to the antenna

system flange is 15.85 Watts, which is the input power required to produce the system carriers maximum EIRP of 63.9 dBW and 57.3 dBW as specified in the VSAT system design. The maximum EIRP from all carriers is 64.8 dBW, and the maximum EIRP density in a 4 kHz band is 30.4 dBW with any proposed combination of emissions.

The Maximum EIRP Density toward the horizon will meet the Commission's Rules for routine processing in spite of the extremely low elevation angle if operation toward the extreme western portion of the geostationary arc is necessary. The high antenna gain and the relatively low input powers act to keep the maximum density toward the horizon at a maximum of -20.11 dBW/4 kHz band. It is unlikely that operation will be conducted at this low elevation angle (15.4 degrees) because of potential attenuation of the signals at Ku frequencies when the path length through the lower portions of the atmosphere is long. Because of this, the EIRP density in a 4 kHz band is likely to be much lower than the maximum value during normal operation. The EIRP density toward the horizon will fall off rapidly when higher elevation angles are employed.

#### HUB-8 RFR Exposure Study

Each HUB facility requires individual RF safety practices as required by its individual operating parameters and the siting of the Earth Station Antenna. The RFR calculations performed herein were made according to the methods which are described in FCC OET Bulletin 65 (Pages 19 through 29), Edition 97-01, which is dated August 1997. Section 1.1310 of the Commission's Rules was used to obtain the limits of maximum power density for both Controlled and Uncontrolled Environments. Pursuant to Section 1.1310 of the Rules, a maximum power density of 1.0 mW/cm<sup>2</sup> is permitted in Uncontrolled Environments in the band 14000 through 14500 MHz.

The results of RFR calculations pertinent to HUB-8 are attached as Exhibit 2. As shown in Exhibit 2, the HUB-8 fixed satellite antenna system complies with the FCC limits for Uncontrolled Environments. The maximum power density at the surface of the antenna is 0.590 mW/cm<sup>2</sup>, only 58.96% of the guideline value for Uncontrolled Areas.

Within the confines of the Fresnel and Transition Zones, as well as at the surface of the antenna, the level of power density is well below that for Uncontrolled Areas. The maximum power density in the near field is 0.368 mW/cm<sup>2</sup> and the maximum power density in the nearest portion of the far field is 0.157 mW/cm<sup>2</sup>.

Because of the low power at the antenna feed (15.85 Watts, 12.0 dBW), very small fields are encountered in all directions from the antenna, save the locations between the antenna feed, sub-reflector and the main reflector. For this reason, it is advisable to keep persons out of the area between the antenna feed, the sub-reflector and the main reflector when the station is operating. The region between the antenna feed, sub-reflector and main reflector should be considered to be a controlled area, and all persons should be prevented from approaching this area when the antenna is energized. When access to this area is necessary for maintenance or repair, this ESA

can be shut down and control of the VSAT system can be accomplished through a secondary hub in this multi-hub VSAT network.

During normal operation, if all persons are kept out of the area between the antenna feed, the sub-reflector and the main antenna reflecting surface, the operation of the earth station as proposed herein is predicted to safely satisfy the requirements for an Uncontrolled Environment. Further, the Applicant recognizes that it is good operating practice to not activate the transmitting portion of the station's facilities before the antenna has been properly aimed skyward toward the correct satellite, and the path toward that satellite is known to be clear.

### HUB-9 Technical Operation and RFR Exposure Study

#### HUB-9 Technical Operation

The proposed HUB-9 fixed satellite earth station will be located at 190 North State Street, Chicago, Illinois, atop the WLS-TV studio building as described in the associated FCC Form 312. The proposed system will operate only through US licensed satellites and communicate between remote terminals and hub facilities all of which will be located in the United States. Exhibit 3 lists the VSAT operating parameters, the Elevation Limit and Azimuth Limit calculations, and the Input Density calculations relevant to the proposed HUB-9 operation.

The system as described, to include its component parts, meets the Commission's requirements for routine processing of earth station applications, and meets the Commission's Rules for VSAT system operation at Ku band frequencies, as outlined in Section 25.134 of the FCC Rules.

The HUB-9 Earth Station Antenna (ESA) is an Andrew Corporation ES37 antenna which is 3.7 meters in diameter. The planned input power to the antenna system flange is 15.85 Watts, which is the input power required to produce the system carriers maximum EIRP of 63.9 dBW and 57.3 dBW as specified in the VSAT system design. The maximum EIRP from all carriers is 64.8 dBW, and the maximum EIRP density in a 4 kHz band is 30.4 dBW with any proposed combination of emissions.

The Maximum EIRP Density toward the horizon will meet the Commission's Rules for routine processing in spite of the extremely low elevation angle if operation toward the extreme western portion of the geostationary arc is necessary. The high antenna gain and the relatively low input powers act to keep the maximum density toward the horizon at a maximum of -22.28 dBW/4 kHz band. It is unlikely that operation will be conducted at this low elevation angle (18.8 degrees) because of potential attenuation of the signals at Ku frequencies when the path length through the lower portions of the atmosphere is long. Because of this, the EIRP density in a 4 kHz band is likely to be much lower than the maximum value during normal operation. The EIRP density toward the horizon will fall off rapidly when higher elevation angles are employed.

### HUB-9 RFR Exposure Study

Each HUB facility requires individual RF safety practices as required by its individual operating parameters and the siting of the Earth Station Antenna. The RFR calculations performed herein were made according to the methods which are described in FCC OET Bulletin 65 (Pages 19 through 29), Edition 97-01, which is dated August 1997. Section 1.1310 of the Commission's Rules was used to obtain the limits of maximum power density for both Controlled and Uncontrolled Environments. Pursuant to Section 1.1310 of the Rules, a maximum power density of 1.0 mW/cm<sup>2</sup> is permitted in Uncontrolled Environments in the band 14000 through 14500 MHz.

The results of RFR calculations pertinent to HUB-9 are attached as Exhibit 4. As shown in Exhibit 4, the HUB-9 fixed satellite antenna system complies with the FCC limits for Uncontrolled Environments. The maximum power density at the surface of the antenna is 0.590 mW/cm<sup>2</sup>, only 58.96% of the guideline value for Uncontrolled Areas.

Within the confines of the Fresnel and Transition Zones, as well as at the surface of the antenna, the level of power density is well below that for Uncontrolled Areas. The maximum power density in the near field is 0.368 mW/cm<sup>2</sup> and the maximum power density in the nearest portion of the far field is 0.157 mW/cm<sup>2</sup>.

Because of the low power at the antenna feed (15.85 Watts, 12.0 dBW), very small fields are encountered in all directions from the antenna, save the locations between the antenna feed, sub-reflector and the main reflector. For this reason, it is advisable to keep persons out of the area between the antenna feed, the sub-reflector and the main reflector when the station is operating. The region between the antenna feed, sub-reflector and main reflector should be considered to be a controlled area, and all persons should be prevented from approaching this area when the antenna is energized. When access to this area is necessary for maintenance or repair, this ESA can be shut down and control of the VSAT system can be accomplished through a secondary hub in this multi-hub VSAT network.

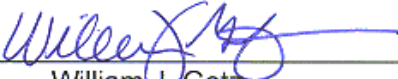
During normal operation, if all persons are kept out of the area between the antenna feed, the sub-reflector and the main antenna reflecting surface, the operation of the earth station as proposed herein is predicted to safely satisfy the requirements for an Uncontrolled Environment. Further, the Applicant recognizes that it is good operating practice to not activate the transmitting portion of the station's facilities before the antenna has been properly aimed skyward toward the correct satellite, and the path toward that satellite is known to be clear.

Conclusion

The operation of each earth station station satellite HUB described herein meets the Commission's requirements for safety of workers and the general public from excessive exposure to radiofrequency energy when operated within the guidelines outlined above. The proposed facilities also meet the Commission's requirements for Satellite Earth Stations and the Commission's VSAT Rules regarding routine processing and operation, and a grant of this application would be in the public interest.

This Engineering Statement, various entries in FCC Form 312 Main Form and Schedule B, and the calculations to predict expected power density per OET Bulletin 65 were prepared by me or under my supervision and are believed to be true and correct.

DATED: February 26, 2014

  
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William J. Getz

**Proposed HUB-8, Fresno, CA**  
VSAT Network Operating Parameters  
Call Sign E060349

VSAT System Design Parameters

<b>Maximum EIRP, All Carriers, All HUBs &amp; Remote-1</b>	64.8 dBW
<b>Carrier 1: Program Video, Audio, Voice, Data</b>	
Maximum EIRP	63.9 dBW
Maximum Bandwidth for Emission 9M00G7W	9000 kHz
Maximum EIRP Density per 4 kHz Segment	30.38 dBW/4kHz
<b>Carrier 2: Video, Audio, Voice, Data and Other</b>	
Maximum EIRP	57.3 dBW
Maximum Bandwidth for Emission 6M98G7W	6980 kHz
Maximum EIRP Density per 4 kHz Segment	24.88 dBW/4kHz

Input Density Values

Antenna Diameter	3.7 meters
Antenna Gain at Mid-Band	52.8 dBi
Carrier 1 Input Density	-22.42 dBW/4kHz
Carrier 2 Input Density	-27.92 dBW/4kHz
<b>Maximum Input Density (All Carriers)</b>	<b>-22.42 dBW/4kHz</b>

Azimuth and Elevation Sample Calculations

Earth Satellite Antenna Location: 1777 G Street, Fresno, CA  
Coordinates (NAD-83): 36-44-18.8 N.L. and 119-48-10.5 W.L.

<u>Location</u>	<u>Description</u>	<u>Azimuth</u>	<u>Elevation</u>
060° West	Eastern Limit	109.2	15.4
140° West	Western Limit	211.6	42.4

Section 25.209 Off-Axis Maximum Antenna Gain to Eastern Limit	2.31 dBi
Section 25.209 Off-Axis Maximum Antenna Gain to Western Limit	-8.68 dBi
Carrier 1 Maximum EIRP to Eastern Limit	13.41 dBW
Carrier 1 Maximum EIRP Density to Eastern Limit per 4 kHz segment	-20.11 dBW/4kHz
Carrier 2 Maximum EIRP to Eastern Limit	6.81 dBW
Carrier 2 Maximum EIRP Density to Eastern Limit per 4 kHz segment	-25.61 dBW/4kHz
Carrier 1 Maximum EIRP to Western Limit	2.42 dBW
Carrier 1 Maximum EIRP Density to Western Limit per 4 kHz segment	-31.11 dBW/4kHz
Carrier 2 Maximum EIRP to Western Limit	-4.18 dBW
Carrier 2 Maximum EIRP Density to Western Limit per 4 kHz segment	-36.60 dBW/4kHz
Maximum EIRP toward the Horizon	13.41 dBW
<b>Maximum EIRP Density toward the Horizon</b>	<b>-20.11 dBW/4kHz</b>

**Proposed HUB-8, Fresno, CA**  
VSAT Network RFR Power Density Calculations  
Call Sign E060349

Pursuant to Section 1.1310 of the FCC Rules the FCC Guideline values for frequencies used by the satellite Ku uplink system are as follows:

Uncontrolled RFR Environment Guideline Value	1.0 mW/cm <sup>2</sup>
Controlled RFR Environment Guideline Value	5.0 mW/cm <sup>2</sup>

VSAT System Operating Constants

Antenna Actual Diameter	3.7 meters
Antenna Isotropic Gain	52.8 dBi
Nominal Frequency	14250 MHz
Maximum EIRP (All Carriers)	64.8 dBw
Lowest Antenna Elevation Angle	15.4 deg

System Calculations

Antenna On-Axis Isotropic Power Gain	190546.1
Antenna 1 Degree Off-Axis Isotropic Power Gain	1584.9
Antenna Off-Axis Isotropic Power Gain at Lowest Elev. Angle	1.703
Aperature Efficiency ( $\eta$ )	0.624
Maximum Input Power (All Carriers)	15.85 watts
Antenna Surface Area	10.7521 sq. meters
Nominal Wavelength	0.02104 meters
Near Field Limit ( $R_{nf}$ )	162.7 meters
Far Field Limit ( $R_{ff}$ )	390.4 meters

note: The Transition Region extends from  $R_{nf}$  to  $R_{ff}$

RFR Power Density Calculations

**Power Density at the Surface of the Antenna** 0.5896 mW/cm<sup>2</sup>

OET Bulletin 65, Edition 97-01, Equation 11

Percent Uncontrolled Limit	58.96%
Percent Controlled Limit	11.79%

**Maximum Power Density On-Axis Near Field Region** 0.3680 mW/cm<sup>2</sup>

OET Bulletin 65, Edition 97-01, Equation 13

Percent Uncontrolled Limit	36.80%
Percent Controlled Limit	7.36%

**Maximum Power Density On-Axis in The Transition Region** 0.3680 mW/cm<sup>2</sup>

OET Bulletin 65, Edition 97-01, Equation 17

Percent Uncontrolled Limit	36.80%
Percent Controlled Limit	7.36%

**Maximum Power Density On-Axis in The Far-Field Region ( $S_{ff}$ )** 0.1576 mW/cm<sup>2</sup>

OET Bulletin 65, Edition 97-01, Equation 18

Percent Uncontrolled Limit	15.76%
Percent Controlled Limit	3.15%

**Maximum Power Density 1° Off-Axis in The Far-Field Region** 0.0013 mW/cm<sup>2</sup>

Off-Axis Power Gain/On-Axis Power Gain = 0.008317638

Off-Axis Power Density in Far Field and Beyond = Ratio x  $S_{ff}$

Percent Uncontrolled Limit	0.13%
Percent Controlled Limit	0.03%

**Evaluation of Safe Occupancy Area in Front of Antenna at Lowest Elevation Angle**

**Power Density One Meter from Antenna** 0.5498 mW/cm<sup>2</sup>

OET Bulletin 65, Edition 97-01, Equation 7

Percent Uncontrolled Limit	54.98%
Percent Controlled Limit	11.00%

**Power Density Two Meters from Antenna** 0.1375 mW/cm<sup>2</sup>

OET Bulletin 65, Edition 97-01, Equation 7

Percent Uncontrolled Limit	13.75%
Percent Controlled Limit	2.75%

**Power Density Three Meters from Antenna** 0.0611 mW/cm<sup>2</sup>

OET Bulletin 65, Edition 97-01, Equation 7

Percent Uncontrolled Limit	6.11%
Percent Controlled Limit	1.22%



**Proposed HUB-9, Chicago, IL**  
VSAT Network Operating Parameters  
Call Sign E060349

VSAT System Design Parameters

<b>Maximum EIRP, All Carriers, All HUBs &amp; Remote-1</b>	64.8 dBW
<b>Carrier 1: Program Video, Audio, Voice, Data</b>	
Maximum EIRP	63.9 dBW
Maximum Bandwidth for Emission 9M00G7W	9000 kHz
Maximum EIRP Density per 4 kHz Segment	30.38 dBW/4kHz
<b>Carrier 2: Video, Audio, Voice, Data and Other</b>	
Maximum EIRP	57.3 dBW
Maximum Bandwidth for Emission 6M98G7W	6980 kHz
Maximum EIRP Density per 4 kHz Segment	24.88 dBW/4kHz

Input Density Values

Antenna Diameter	3.7 meters
Antenna Gain at Mid-Band	52.8 dBi
Carrier 1 Input Density	-22.42 dBW/4kHz
Carrier 2 Input Density	-27.92 dBW/4kHz
<b>Maximum Input Density (All Carriers)</b>	<b>-22.42 dBW/4kHz</b>

Azimuth and Elevation Sample Calculations

Earth Satellite Antenna Location: 190 North State Street, Chicago, IL  
Coordinates (NAD-83): 41-53-08.8 N.L. and 87-37-41.7 W.L.

<u>Location</u>	<u>Description</u>	<u>Azimuth</u>	<u>Elevation</u>
060° West	Eastern Limit	141.9	34.1
140° West	Western Limit	242.8	18.8

Section 25.209 Off-Axis Maximum Antenna Gain to Eastern Limit	-6.32 dBi
Section 25.209 Off-Axis Maximum Antenna Gain to Western Limit	0.15 dBi
Carrier 1 Maximum EIRP to Eastern Limit	4.78 dBW
Carrier 1 Maximum EIRP Density to Eastern Limit per 4 kHz segment	-28.74 dBW/4kHz
Carrier 2 Maximum EIRP to Eastern Limit	-1.82 dBW
Carrier 2 Maximum EIRP Density to Eastern Limit per 4 kHz segment	-34.24 dBW/4kHz
Carrier 1 Maximum EIRP to Western Limit	11.25 dBW
Carrier 1 Maximum EIRP Density to Western Limit per 4 kHz segment	-22.28 dBW/4kHz
Carrier 2 Maximum EIRP to Western Limit	4.65 dBW
Carrier 2 Maximum EIRP Density to Western Limit per 4 kHz segment	-27.77 dBW/4kHz
Maximum EIRP toward the Horizon	11.25 dBW
<b>Maximum EIRP Density toward the Horizon</b>	<b>-22.28 dBW/4kHz</b>

**Proposed HUB-9, Chicago, IL**  
VSAT Network RFR Power Density Calculations  
Call Sign E060349

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Lowest Antenna Elevation Angle	18.8 deg

System Calculations

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Antenna 1 Degree Off-Axis Isotropic Power Gain	1584.9
Antenna Off-Axis Isotropic Power Gain at Lowest Elev. Angle	1.034
Aperature Efficiency ( $\eta$ )	0.624
Maximum Input Power (All Carriers)	15.85 watts
Antenna Surface Area	10.7521 sq. meters
Nominal Wavelength	0.02104 meters
Near Field Limit ( $R_{nf}$ )	162.7 meters
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note: The Transition Region extends from  $R_{nf}$  to  $R_{ff}$

RFR Power Density Calculations

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OET Bulletin 65, Edition 97-01, Equation 18

Percent Uncontrolled Limit	15.76%
Percent Controlled Limit	3.15%

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Off-Axis Power Gain/On-Axis Power Gain = 0.008317638

Off-Axis Power Density in Far Field and Beyond = Ratio x  $S_{ff}$

Percent Uncontrolled Limit	0.13%
Percent Controlled Limit	0.03%

**Evaluation of Safe Occupancy Area in Front of Antenna at Lowest Elevation Angle**

**Power Density One Meter from Antenna** 0.3339 mW/cm<sup>2</sup>

OET Bulletin 65, Edition 97-01, Equation 7

Percent Uncontrolled Limit	33.39%
Percent Controlled Limit	6.68%

**Power Density Two Meters from Antenna** 0.0835 mW/cm<sup>2</sup>

OET Bulletin 65, Edition 97-01, Equation 7

Percent Uncontrolled Limit	8.35%
Percent Controlled Limit	1.67%

**Power Density Three Meters from Antenna** 0.0371 mW/cm<sup>2</sup>

OET Bulletin 65, Edition 97-01, Equation 7

Percent Uncontrolled Limit	3.71%
Percent Controlled Limit	0.74%