

ENGINEERING STATEMENT
RE FCC FORM 312
NEW SATELLITE UPLINK TRUCK
ON BEHALF OF
NEXSTAR BROADCASTING, INC.
WCIA-DT, CHAMPAIGN, ILLINOIS

NOVEMBER 2012

COHEN, DIPPELL AND EVERIST, P.C.
CONSULTING ENGINEERS
RADIO AND TELEVISION
WASHINGTON, D.C.

City of Washington)
) ss
District of Columbia)

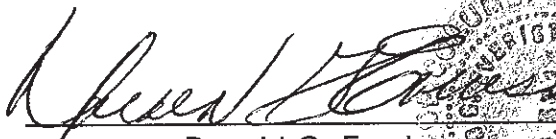
Donald G. Everist, being duly sworn upon his oath, deposes and states that:

He is a graduate electrical engineer, a Registered Professional Engineer in the District of Columbia, and is President, Secretary and Treasurer of Cohen, Dippell and Everist, P.C., Consulting Engineers, Radio - Television, with offices at 1420 N Street, N.W., Suite One, Washington, D.C. 20005;

That his qualifications are a matter of record in the Federal Communications Commission;

That the attached engineering report was prepared by him or under his supervision and direction and

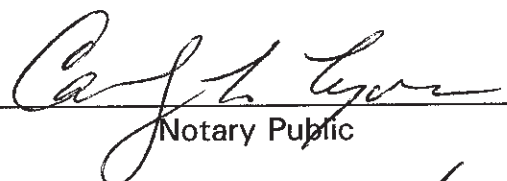
That the facts stated herein are true of his own knowledge, except such facts as are stated to be on information and belief, and as to such facts he believes them to be true.



Donald G. Everist
District of Columbia
Professional Engineer
Registration No. 5714

Subscribed and sworn to before me this 1st day of November, 2012.





Notary Public

My Commission Expires: 2/18/2013

Introduction

This engineering statement has been prepared on behalf of Nexstar Broadcasting, Inc., and proposes to construct a transportable transmit Ku-band satellite uplink truck for its DTV operations.

The accompanying FCC Form 312 and provides the technical information requested.

The details requested in accordance with Attachment 3 of FCC Public Notice, DA 87-732, are provided below.

- 1) Applicant:
Nexstar Broadcasting, Inc.
- 2) Site Location:
N/A - Transportable
- 3) Type of Domestic Service:
 - a) Class of Station - Vehicle-mounted earth station
 - b) Regulatory Class - Private
 - c) Type of Facility - Transmit-Only
- 4) Geographic Coordinates:
Within 500 miles of 40° 06' 46" N, 88° 15 40" W
- 5) Frequency Bands: Transmit 14.0-14.5 GHz
- 6) Points of Communications: ALSAT
- 7) Site Elevation Above Mean Sea Level: N/A - Transportable
- 8) Frequency Coordination Limits:
 - a) Range of Satellite Arc:
 - 1) Western Limit - 129°
 - 2) Eastern Limit - 70°

Based on typical operation

- b) Antenna Elevation Angle at:
 - 1) Western Limit - 21.4° min
 - 2) Eastern Limit - 32.7° min
 - c) Earth Station Azimuth:
 - 1) Western Limit 152° (true)
 - 2) Eastern Limit 233° (true)
 - d) Maximum EIRP Density Towards Horizon: -4.03 dBu/4 KHz
- 9) Transmitting Equipment:
- a) Number of high power amplifiers 1
 - b) Manufacturer and Model No.: Advantech Wireless, Model SSPB-KS125-CREIF
 - c) Maximum Power Output (watts) each: 125 watts
- 10) Antenna Facilities:
- a) Antenna conforms to Section 25.209 of FCC Rules
 - b) Use of antenna: Communications
 - c) Antenna size: 1.25 meters
 - d) Type of feed: Single Offset [Prime Focus Offset]
 - e) Manufacturer and Model No.: GD Satcom C125M
 - f) Antenna gain in dBi and the frequency at which it is measured:
43.40 dBi, measured at 14.25 GHz
 - g) Maximum antenna height above ground: 11 feet, 9 inches
(3.58 meters)
- 11) Remote Control Operation: No
- 12) Receiving System Noise Temperature: N/A (Transmit-only being applied)

13) Specifics of Operation

- a) Frequency Limits: 14.0 - 14.5 GHz
- b) Earth Station Antenna Polarization: linear
- c) Emission Designator: 9M0067F

- d) Maximum EIRP for each RF carrier in the main-beam:
62.15 dBw
- e) Maximum EIRP density for each carrier in main-beam:
22.6 dBw/4 KHz
- f) Description of each RF carrier: Phase modulated digital video with digital audio/data

Environmental Assessment

Based on the off-axis radiation characteristics of the 1.25 meter truck-mounted GD Satcom parabolic uplink antenna, the proposed operation complies with Section 1.1307 of the FCC Rules as it meets the provisions of the limits adopted by the Commission for Maximum Permissible Exposure (MPE)¹ at all locations surrounding the truck at two meters above ground level.

For an antenna input power of 108.87 Watts, the radio frequency power density outside of the 1.25 meter diameter project cylinder in front of the antenna will be less than 5 $\mu\text{W}/\text{m}^2$.

The antenna is attached atop a van as shown in Exhibit E-1 of this engineering statement. As such, the center of radiation for the antenna is located 3.58 meters (11 feet, 9 inches) above ground level. The radio frequency power density levels behind the antenna system, and at 2 meters

¹See Appendix A of OET Bulletin No. 65, Edition 97-01, August 1997.

above ground level around the van, will be less than $5 \mu\text{W}/\text{m}^2$. The transmitting system will be placed in the non-operative mode when authorized personnel are working on the top of the van.

Nexstar Broadcasting, Inc. will ensure that its portable uplink system will be operated in such a way as to contribute less than 1% of the allowable MPE limit to site areas containing non-categorically excluded stations. In order to obtain proper illumination of the satellite, the proposed uplink will be operated such that the major on-axis 1.25 meter cylinder, plus its accompanying 5° cone, will be located well away from buildings or towers. The minimum vertical operating angle to any domestic satellite will be at least 15° above the horizon.

For a 1.25 meter diameter parabolic antenna at 14.25 GHz, an antenna input power of 108.87 watts (50.369 dBm) and antenna gain of 43.4 dBi, the results of the five equations follows:

1.	<u>Extent of Near Field</u>	<u>(Equation)</u>	<u>Page</u>
	$R(\text{nf}) = D^2 / 4 \text{ Lambda}$ = 18.6 m (61 feet)	(12)	27
2.	<u>Maximum Near Field On-Axis Power Density</u>		
	$S(\text{nf}) = 16\eta P / \text{Pi } D^2$ = 23.066 mW/cm ² , for $\eta = 0.65$	(13)	28
3.	<u>Distance to Beginning of Far Field Region</u>		
	$R(\text{ff}) = 0.6 D^2 / \text{Lambda}$ = 44.64 m (146.5 feet)	(16)	29
4.	<u>Transition Region</u>		
	$S = [S(\text{nf}) R(\text{nf})] / R$ = 23.066 mW/cm ² @ 18.6 m to 9.62 mW/cm ² @ 44.6 m	(17)	29
5.	<u>Far Field</u>		
	$S = PG / 4 \text{ Pi } R^2$ = 9.511 mW/cm ²		

Radiation Hazard Study

Antenna Diameter (D) =	1.25 meters
Antenna Surface Area (A _S) =	1.227 m ²

Wavelength at 14.25 GHz (λ) =	0.02103806709 m
Power at Flange =	125 Watts (20.969 dBm)
Antenna Gain at 14.25 GHz =	43.4 dBi
Antenna Aperture Efficiency (η) =	0.65

<u>Region</u>	<u>Distance</u> meters	<u>Radiation</u> <u>Level</u> mW/cm ²	<u>Hazard</u> <u>Assessment</u>
Far Field	44.64	9.511	Potential Hazard
Far Field off-axis	--	0.09511	Complies with MPE
Transition Field (R_T)	18.6 < (R_T) < 44.64	< 23.066	Potential Hazard
Near Field	1.857	23.066	Potential Hazard
Near Field off-axis	--	0.231	Meets ANSI requirements
Between Main Reflector and Subreflector	--	N/A	--
Main Reflector Region (W_m)		17.743	Potential Hazard
Between Reflector and Ground (W_G)	--	8.872	Potential Hazard
Between Reflector and Ground at 2 meters	--	_____	Complies with MPE

An environmental assessment (“EA”) is, therefore, categorically excluded under Section 1.1307 of the FCC Rules and Regulations since the applicant indicates:

- (a)(1) to (a)(8) The proposed operation is truck-mounted portable unit and not subject to these subsections.
- (b) Workers and the general public will not be subjected to RF radiation levels in excess of the FCC adopted limits for Maximum Permissible Exposure (MPE) as set forth in Table 1, Limits for MPE of Appendix A of OET Bulletin No. 65, Edition 97-01, August 1997. Authorized personnel will be alerted to areas of the truck where potential radiation levels are in excess of the MPE standard. The transmitting equipment will be placed in the non-operative mode when authorized personnel are on the truck bed. Workers will ensure that uplink operations will contribute less than 1% of the

applicable RF exposure limit to the site areas of any non-categorically excluded facilities including AM and FM radio stations, TV stations, LPTV and TV translator stations, FM booster stations with ERP > 100 watts, ITFS, MDS, and MMDS stations with ERP > 200 watts, experimental stations, and other satellite earth stations. The operation will be in full accordance with FCC Public Notice, Report No. DS-1202 entitled, Guidelines for Filing Domestic Satellite Earth Station Applications, Released June 10, 1992.

Environmental Considerations

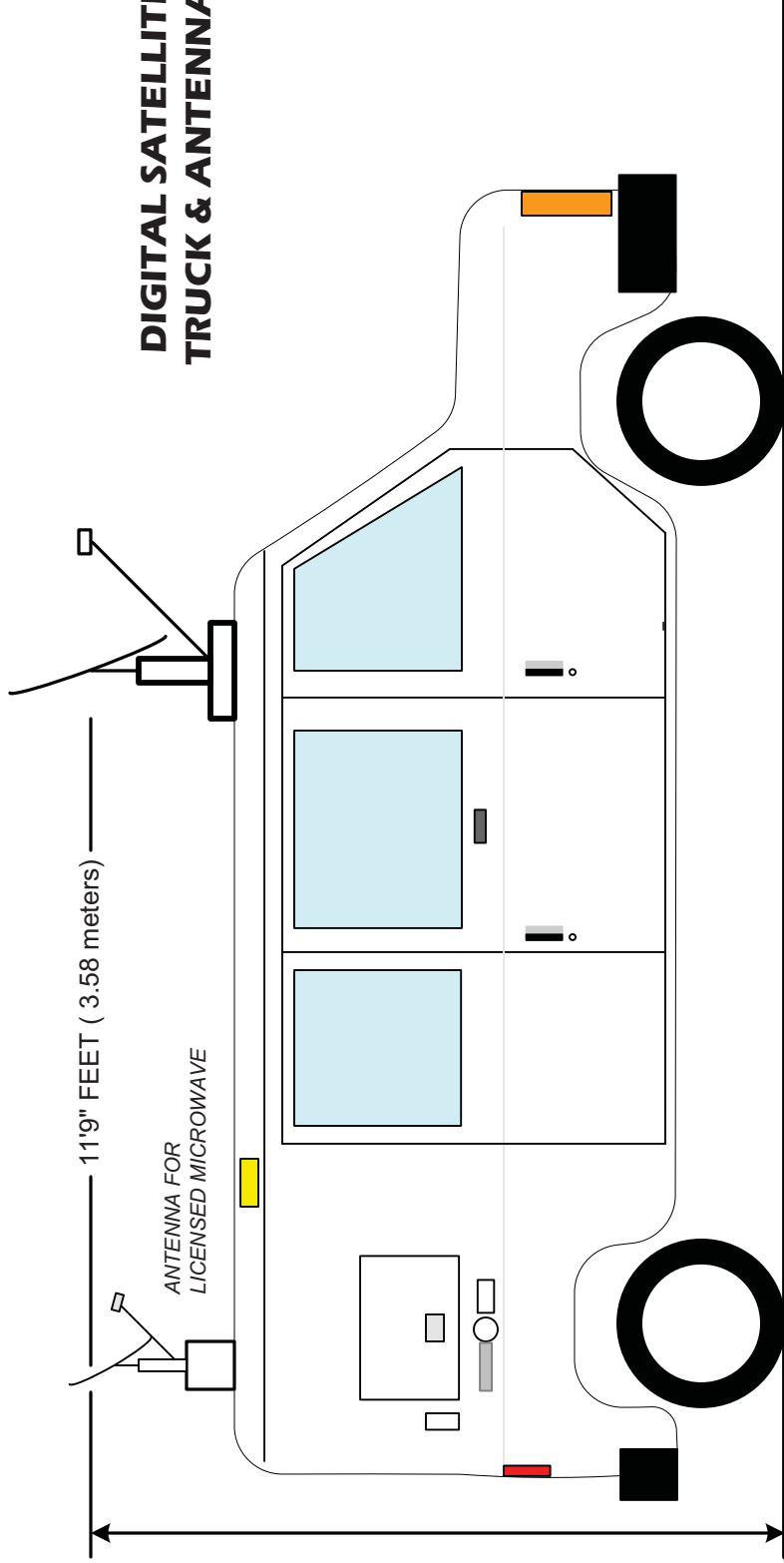
The facility will not be located in any officially designated wilderness area or wildlife preserve. The facility does not protect, shelter, or affect any threatened or endangered species nor will it result in the destruction or adverse modification of proposed or existing critical habitats. The facility will not affect districts, sites, buildings, structures or objects significant in American history, architecture, archaeology, engineering or culture.

The facility will not affect Indian religious sites and is not located in a flood plain. Construction of the facility will not involve significant change in surface features, nor be equipped with high intensity white or located in a residential neighborhood.

The station will not cause exposure to workers or the general public to levels of radio frequency radiation in excess of Maximum Permissible Exposure limits.

The applicant anticipates that the facility will meet or exceed MPE objectives of the OET Bulletin No. 65, Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields, Edition 97-01, August 1997. Even so, during operation, all personnel will be restricted from areas where hazardous radiation will be encountered. Equipment shielding and warning signs will be employed as needed.

EXHIBIT E-1
DIGITAL SATELLITE
VAN AND ANTENNA PROFILE
WCIA-DT, CHAMPAIGN, ILLINOIS
OCTOBER 2012



**DIGITAL SATELLITE UPLINK
TRUCK & ANTENNA PROFILE**