ENGINEERING EXHIBIT

Application for Minor Modification of Digital Television Translator Station

prepared for

Gray Television Licensee, LLC
K22HN-D Anchorage, AK
Facility ID 131081
Ch. 22 (digital) 15 kW

Gray Television Licensee, LLC ("Gray") is the licensee of digital television translator station K22HN-D, Channel 22, Anchorage AK, Facility ID 131081. K22HN-D is licensed (file# BLDTT-20080718AGR) to operate at 2.8 kW effective radiated power ("ERP") with a nondirectional antenna. *Gray* proposes herein a minor modification to relocate K22HN-D to a different transmitting location, increase ERP, and employ a directional antenna.

As proposed herein, K22HN-D will be relocated a distance of 11.6 km to the antenna supporting structure associated with FCC Antenna Structure Registration number 1288928. The proposed K22HN-D facility will employ a side-mounted antenna system and no change to the overall structure height is proposed.

The proposed antenna is an ERI model AL8OC-22-H having horizontal polarization. The ERP is 15 kW using a "full service" out of channel emission mask. A plot of the directional antenna's azimuthal pattern is supplied in Figure 1. Figure 2 depicts the 51 dBμ coverage contour of the licensed and proposed facilities, demonstrating compliance with §73.3572 for a minor change.

Interference study per OET Bulletin 69[1] shows that the proposal complies with the FCC's interference protection requirements toward all digital television, television translator, LPTV,

[1]FCC Office of Engineering and Technology Bulletin number 69, *Longley-Rice Methodology for Evaluating TV Coverage and Interference*, February 6, 2004 ("OET-69"). This analysis employed the FCC's current "TVStudy" software with the default application processing template settings, 1 km cell size, and 1 km terrain increment. Comparisons of various results of this computer program (run on a Mac processor) to the FCCs

and Class A stations (existing and post-auction). The results, summarized in Table 1, show that any new interference does not exceed the FCC's interference limits (0.5 percent to full power and Class A stations, and 2.0 percent to secondary stations) to any facility.

Human Exposure to Radiofrequency Electromagnetic Field (Environmental)

The proposed facility was evaluated for human exposure to RF energy using the procedures outlined in the FCC's OET Bulletin Number 65. Based on OET-65 equation (10) and 15 percent antenna relative field in downward elevations (pattern data shows less than 15 percent relative field at angles 25 to 90 degrees below the antenna), the calculated power density attributable to the proposed facility at locations near the transmitter site at a height of two meters above ground level is 11.4 $\mu W/cm^2$, which is 3.3 percent of the general population / uncontrolled maximum permissible exposure limit. This is below the five percent threshold limit described in §1.1307(b) regarding sites with multiple emitters, categorically excluding the applicant from responsibility for taking any corrective action in the areas where the proposal's contribution is less than five percent.

The general public will not be exposed to RF levels attributable to the proposal in excess of the FCC's guidelines. RF exposure warning signs will continue to be posted. With respect to worker safety, the applicant will coordinate exposure procedures with all pertinent stations and will reduce power or cease operation as necessary to protect persons having access to the site, tower, or antenna from RF electromagnetic field exposure in excess of FCC guidelines. This exhibit is limited to the evaluation of exposure to RF electromagnetic field. No increase in structure height is proposed.

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implementation of TVStudy show excellent correlation.

List of Attachments

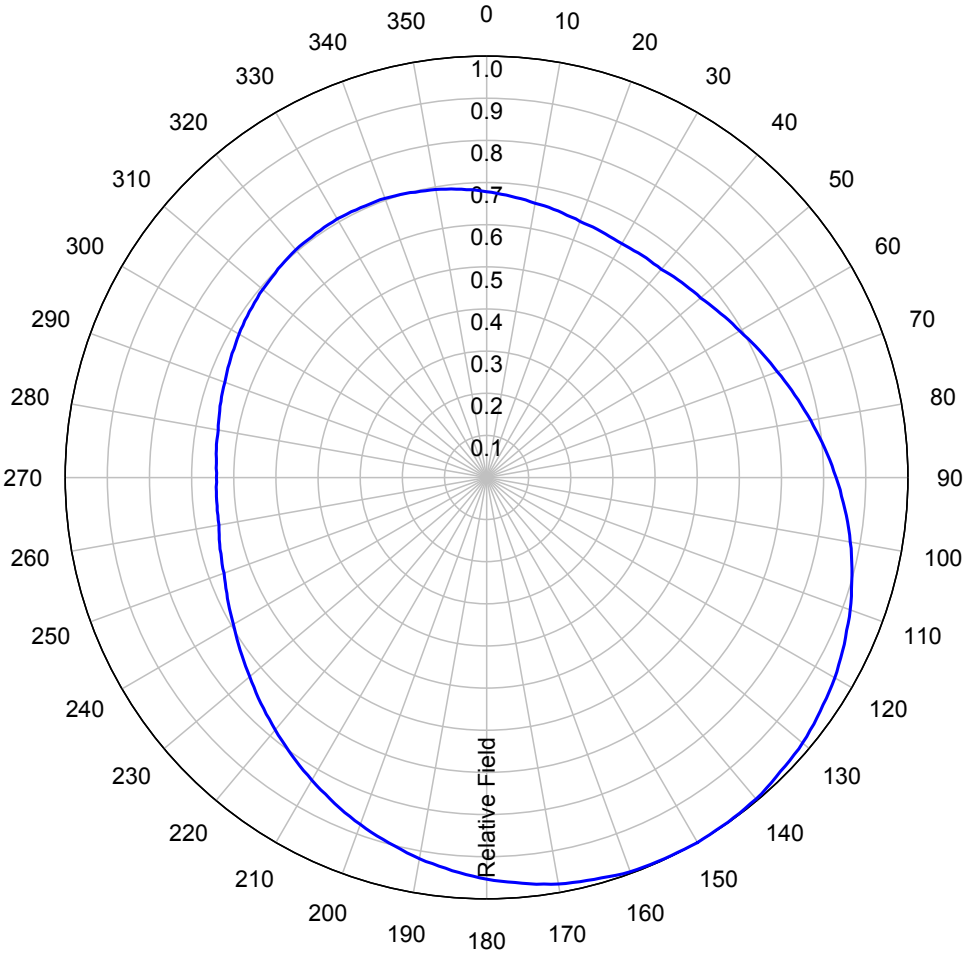
Figure 1	Antenna Azimuthal Pattern
Figure 2	Coverage Contour Comparison
Table 1	TVStudy Analysis of Proposal
Form 2100	Saved Version of Engineering Sections from FCC Form at Time of Upload

Chesapeake RF Consultants, LLC
Joseph M. Davis, P.E. April 8, 2019
207 Old Dominion Road Yorktown, VA 23692 703-650-9600

AZIMUTH PATTERN

Type:	**AL-OC**		**Channel:**	**22**
	Numeric	**dBd**	**Location:**	
Directivity:	**1.62**	**2.10**	**Polarization:**	**Horizontal**
Peak(s) at:				

Note: Pattern shape and directivity may vary with channel and mouting configuration.



Preliminary, subject to final design and review.

ELECTRONICS RESEARCH, INC. ERI

Chesapeake RF Consultants, LLC
Radiofrequency Consulting Engineers
Digital Television and Radio

Figure 1
Antenna Azimuthal Pattern
K22HN-D Anchorage, AK
Facility ID 131081
Ch. 22 (digital) 15 kW

prepared for
Gray Television Licensee, LLC

April, 2019

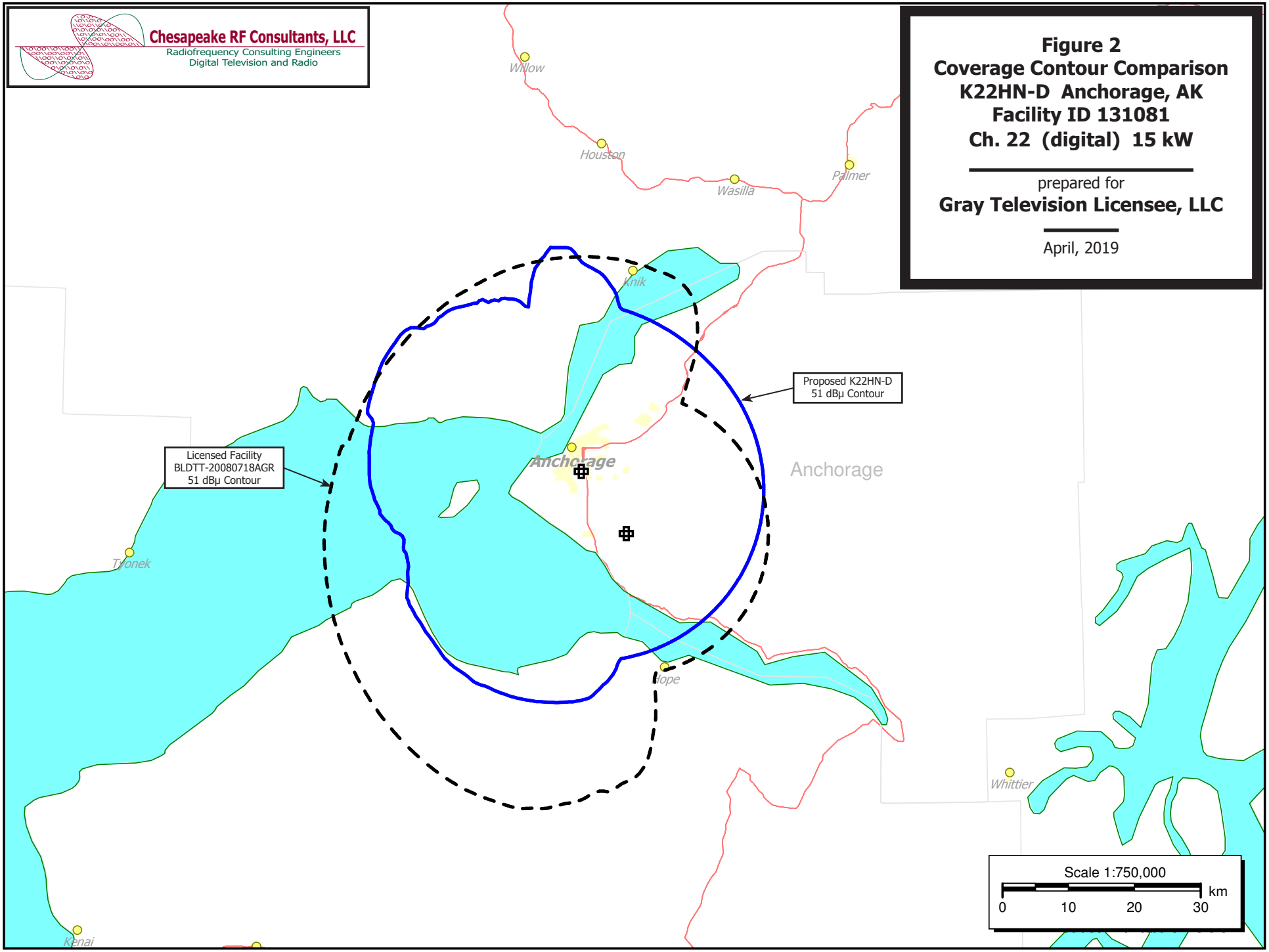

Chesapeake RF Consultants, LLC
Radiofrequency Consulting Engineers
Digital Television and Radio
Figure 2
Coverage Contour Comparison
K22HN-D Anchorage, AK
Facility ID 131081
Ch. 22 (digital) 15 kW
prepared for
Gray Television Licensee, LLC
April, 2019
Willow
Houston
Wasilla
Palmer
Knik
Anchorage
Anchorage
Proposed K22HN-D
51 dBµ Contour
Licensed Facility
BLDTT-20080718AGR
51 dBµ Contour
Tyonek
Hope
Whittier
Kenai
Scale 1:750,000
0
10
20
30
km

Table 1 K22HN-D TVStudy Analysis of Proposal


```
tvstudy v2.2.5 (4uoc83)
Database: localhost,  Study: K22HN-D_prop,  Model: Longley-Rice
Start: 2019.04.08 13:50:21

Study created: 2019.04.08 13:50:21

Study build station data: LMS TV 2019-04-06

    Proposal: K22HN-D D22 LD APP ANCHORAGE, AK
 File number: K22HN-D_prop
 Facility ID: 131081
Station data: User record
   Record ID: 2641
     Country: U.S.

Build options:
Protect pre-transition records not on baseline channel

Search options:
Baseline record excluded if station has CP

Stations potentially affected by proposal:

IX   Call      Chan       Svc Status  City, State              File Number             Distance
No   K15AP     N15        TX  LIC     MOOSE PASS, AK           BLTTL19850108ID          83.5 km
No   K21AM-D   D21        LD  LIC     NINILCHICK, ETC., AK     BLDTT20101220ABH        164.7
No   KFXF-LD   D22        LD  LIC     FAIRBANKS, AK            BLANK0000010639         417.6
Yes  K45HQ-D   D23        LD  CP      ANCHORAGE, AK            BLANK0000053984           2.9
No   K44LE-D   D23        LD  CP      KASILOF, AK              BLANK0000054793         127.7

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

    Channel: D22
       Mask: Full Service
   Latitude:  61 11  7.80 N (NAD83)
  Longitude: 149 52 23.30 W
Height AMSL: 67.3 m
       HAAT: 0.0 m
   Peak ERP: 15.0 kW
    Antenna: ERI AL-OC 150.0 deg
Elev Pattrn: Generic
  Elec Tilt: 1.75

49.6 dBu contour:
Azimuth      ERP       HAAT   Distance
  0.0 deg   6.90 kW    51.9 m   33.2 km
 45.0       6.42       -4.2     26.9
 90.0       10.3     -257.5     29.1
135.0       14.6     -278.7     30.6
180.0       13.6       50.3     36.0
225.0       8.61       55.8     35.1
270.0       6.16       56.6     33.7
315.0       7.34       50.6     33.2

Database HAAT does not agree with computed HAAT
Database HAAT: 0 m   Computed HAAT: -34 m

Distance to Canadian border: 473.8 km

Distance to Mexican border: 3938.7 km

Conditions at FCC monitoring station: Kenai AK
Bearing: 237.6 degrees   Distance: 94.2 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:
Bearing: 107.2 degrees   Distance: 3800.0 km
```

Table 1 K22HN-D TVStudy Analysis of Proposal

Chesapeake RF Consultants, LLC
Radiofrequency Consulting Engineers
Digital Television and Radio

Study cell size: 1.00 km
Profile point spacing: 1.00 km

Maximum new IX to full-service and Class A: 0.50%
Maximum new IX to LPTV: 2.00%

Interference to BLANK0000053984 CP scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	K45HQ-D	D23	LD	CP	ANCHORAGE, AK	BLANK0000053984	
Undesireds:	K22HN-D	D22	LD	APP	ANCHORAGE, AK	K22HN-D_prop	2.9 km
	K24JP-D	D24	LD	CP	ANCHORAGE, AK	BNPDTL20090826ACY	26.7

Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX	
1053.0	254,283	1022.1	254,260	978.1	254,260	961.1	254,171	1.74	0.04

Undesired	Total IX		Unique IX, before		Unique IX, after	
K22HN-D D22 LD APP	20.0	89			17.0	89
K24JP-D D24 LD CP	44.0	0	44.0	0	41.0	0

Interference to proposal scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	K22HN-D	D22	LD	APP	ANCHORAGE, AK	K22HN-D_prop	

Service area		Terrain-limited		IX-free		Percent IX	
3189.9	280,196	3056.5	280,048	3056.5	280,048	0.00	0.00

Channel and Facility Information

Section	Question	Response
Proposed Community of License	Facility ID	131081
	State	Alaska
	City	ANCHORAGE
	LPT Channel	22

Antenna Location Data

Section	Question	Response
Antenna Structure Registration	Do you have an FCC Antenna Structure Registration (ASR) Number?	Yes
	ASR Number	1288928
Coordinates (NAD83)	Latitude	61° 11' 07.8" N+
	Longitude	149° 52' 23.3" W-
	Structure Type	LTOWER-Lattice Tower
	Overall Structure Height	36.6 meters
	Support Structure Height	36.6 meters
	Ground Elevation (AMSL)	33.8 meters
Antenna Data	Height of Radiation Center Above Ground Level	33.5 meters
	Height of Radiation Center Above Mean Sea Level	67.3 meters
	Effective Radiated Power	15 kW

Antenna Technical Data

Section	Question	Response
Antenna Type	Antenna Type	Directional Custom
	Do you have an Antenna ID?	No
	Antenna ID	
Antenna Manufacturer and Model	Manufacturer:	ERI
	Model	AL8OC-22-H
	Rotation	150 degrees
	Electrical Beam Tilt	1.75
	Mechanical Beam Tilt	Not Applicable
	toward azimuth	
	Polarization	Horizontal
Elevation Radiation Pattern	Does the proposed antenna propose elevation radiation patterns that vary with azimuth for reasons other than the use of mechanical beam tilt?	No
	Uploaded file for elevation antenna (or radiation) pattern data	
	Out-of-Channel Emission Mask:	Full Service

Directional Antenna Relative Field Values (Pre-rotated Pattern)

Degree	V_A (Authorized Value)	Degree	V_A (Authorized Value)	Degree	V_A (Authorized Value)	Degree	V_A (Authorized Value)
0	1	**90**	0.694	**180**	0.709	**270**	0.694
10	0.995	**100**	0.663	**190**	0.705	**280**	0.734
20	0.979	**110**	0.645	**200**	0.694	**290**	0.781
30	0.953	**120**	0.641	**210**	0.678	**300**	0.829
40	0.918	**130**	0.647	**220**	0.661	**310**	0.876
50	0.876	**140**	0.661	**230**	0.647	**320**	0.918
60	0.829	**150**	0.679	**240**	0.641	**330**	0.953
70	0.781	**160**	0.694	**250**	0.645	**340**	0.979
80	0.734	**170**	0.705	**260**	0.663	**350**	0.995

Additional Azimuths

Degree	V_A