

## **ENGINEERING EXHIBIT**

### **Application for Minor Modification of Digital Low Power Television Station Construction Permit**

prepared for

#### **Gray Television Licensee, LLC**

K36NB-D Incline Village, NV

Facility ID 187605

Ch. 36 0.32 kW Directional

*Gray Television Licensee, LLC* (“Gray”) is the permittee of unbuilt digital Low Power Television station K36NB-D, Channel 36, Incline Village NV, Facility ID 187605. K36NB-D is authorized to operate pursuant to a Construction Permit (“CP”, file# 0000178471) with 15 kW effective radiated power (“ERP”), directional. *Gray* herein seeks a modification of the CP to specify a different directional antenna and reductions in ERP and antenna height.

As with the current authorization, the proposed facility will employ a new antenna system to be side-mounted on the existing tower structure associated with FCC Antenna Structure Registration number 1009893. No change to the overall structure height is proposed.

The proposed antenna is a Kathrein model 75010325 (single panel) having elliptical polarization. The proposed ERP is 0.32 kW horizontally polarized and 0.14 kW vertically polarized using a “simple” out of channel emission mask. A plot of the directional antenna’s azimuthal pattern is supplied in Figure 1. Figure 2 depicts the 51 dB $\mu$  coverage contour of the proposed facility as well as that of the original CP facility (BNPDTL-20100611AHQ), demonstrating compliance with §73.3572 for a minor change.

Interference study per OET Bulletin 69<sup>1</sup> shows that the proposal complies with the FCC’s interference protection requirements toward all digital television, television translator, LPTV, and

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<sup>1</sup>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 1.0 km terrain increment. Comparisons of various results of this computer program (run on a Mac processor) to the FCC’s implementation of

Class A stations. 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 25 percent antenna relative field in downward elevations (pattern data shows 25 percent or less relative field at angles 30 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  $19.0 \mu\text{W}/\text{cm}^2$ , which is 4.7 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.

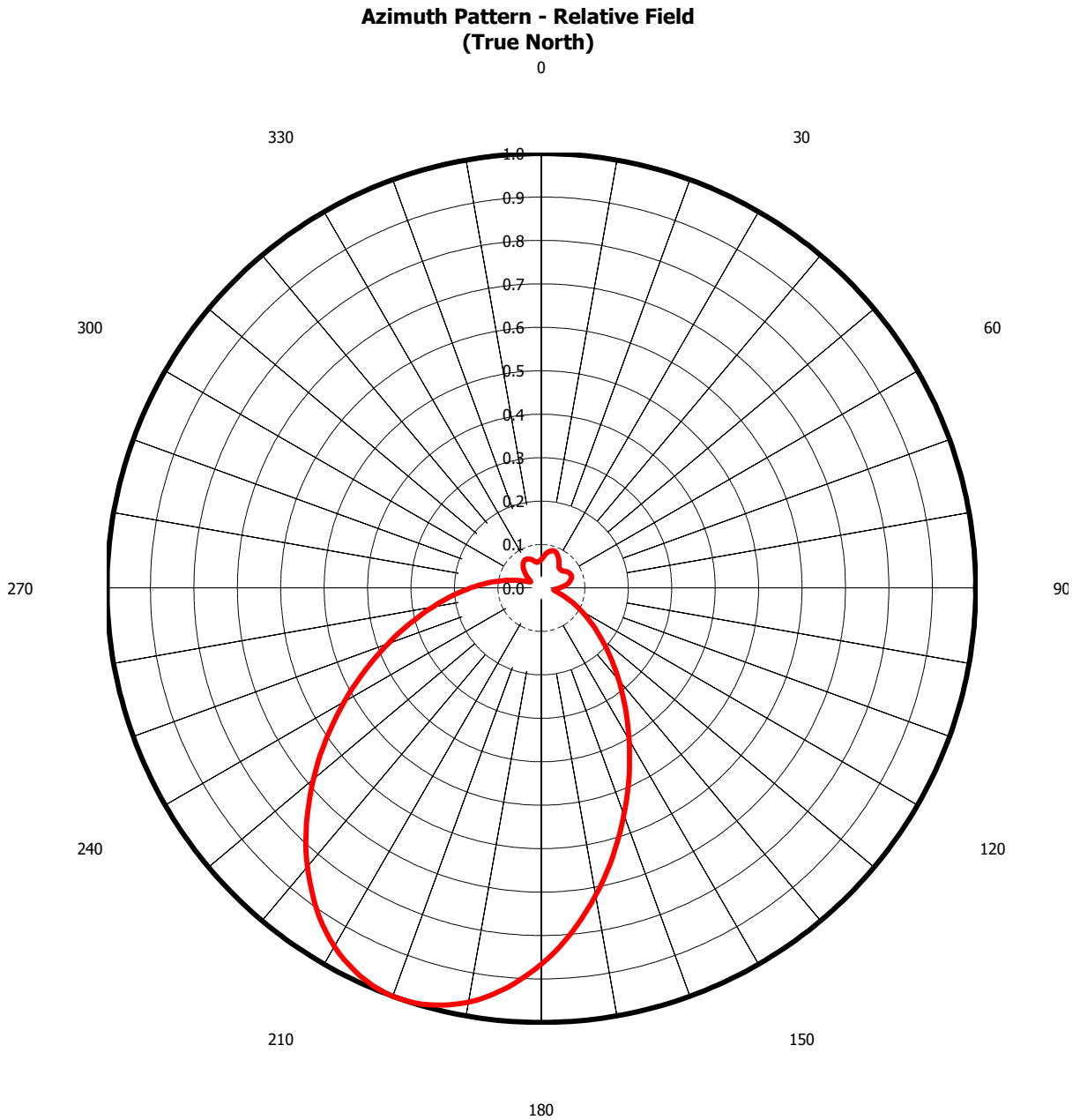
The general public will not be exposed to RF levels attributable to the proposal in excess of the FCC's guidelines. RF exposure warning signs will be posted. With respect to worker safety, the applicant will coordinate exposure procedures with all pertinent stations and will reduce power or cease operation 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.

#### 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 of FCC Form at Time of Upload

### **Chesapeake RF Consultants, LLC**

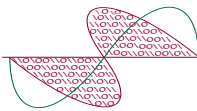
Joseph M. Davis, P.E.	June 9, 2022	
207 Old Dominion Road	Yorktown, VA 23692	703-650-9600



**Figure 1**  
**Antenna Azimuthal Pattern**  
**K36NB-D Incline Village, NV**  
**Facility ID 187605**  
**Ch. 36 0.32 kW Directional**

prepared for  
**Gray Television Licensee, LLC**

June, 2022

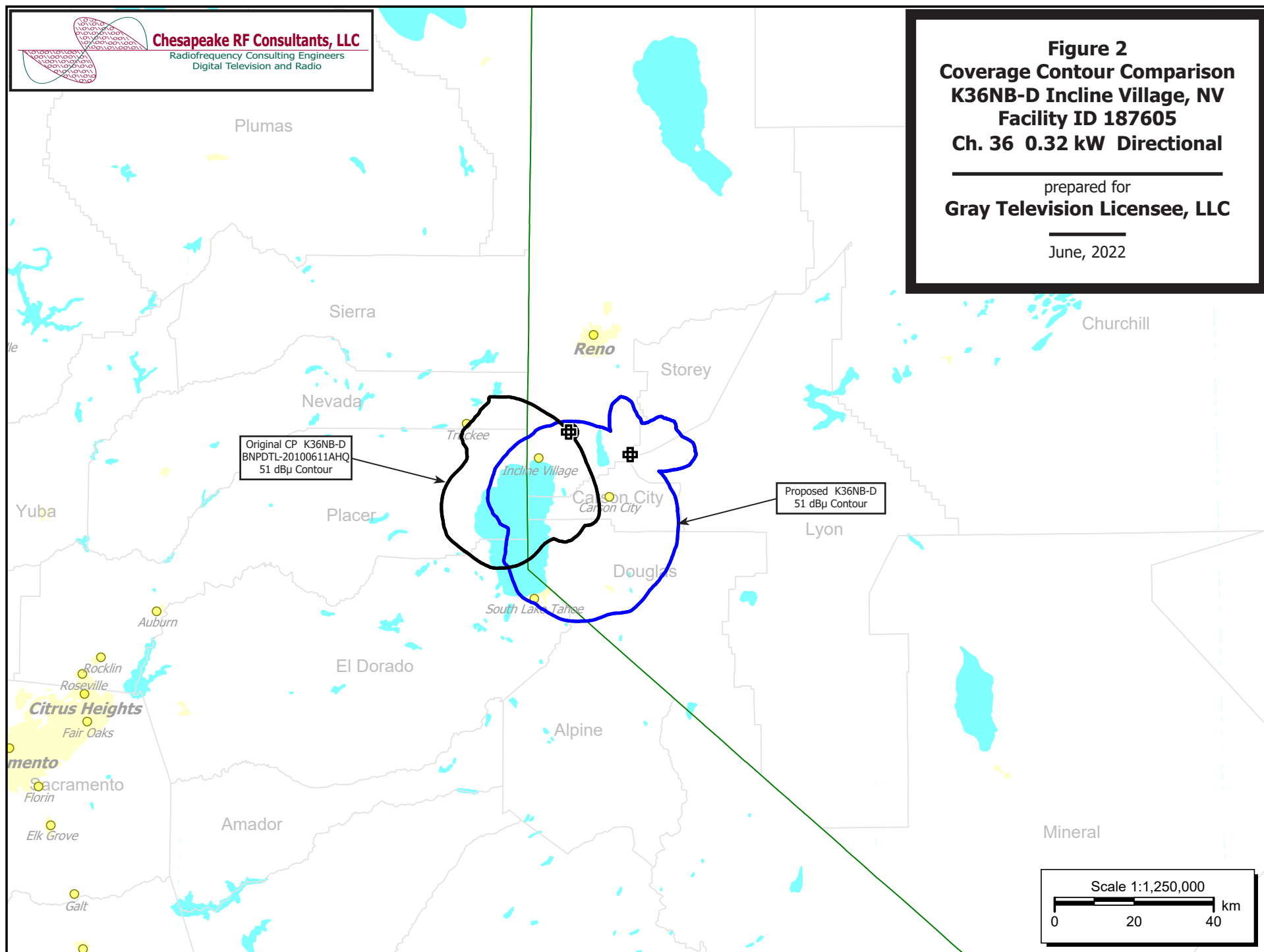


**Chesapeake RF Consultants, LLC**  
Radiofrequency Consulting Engineers  
Digital Television and Radio

**Figure 2**  
**Coverage Contour Comparison**  
**K36NB-D Incline Village, NV**  
**Facility ID 187605**  
**Ch. 36 0.32 kW Directional**

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June, 2022



# **Table 1 K36NB-D TVStudy Analysis of Proposal** (page 1 of 3)



tvstudy v2.2.5 (4uoc83)  
Database: localhost, Study: K36NB-D MOD 1009893, Model: Longley-Rice  
Start: 2022.06.09 13:32:50

Study created: 2022.06.09 13:32:50

Study build station data: LMS TV 2022-06-09

Proposal: K36NB-D D36 LD APP INCLINE VILLAGE, NV  
File number: K36NB-D MOD 1009893  
Facility ID: 187605  
Station data: User record  
Record ID: 4474  
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	K35OZ-D	D35	LD	CP	CHICO, CA	BLANK0000170817	203.5 km
No	KCRA-TV	D35	DT	LIC	SACRAMENTO, CA	BLANK0000143770	190.2
No	K35JX-D	D35	LD	LIC	WESTWOOD, CA	BLDTT20100722HYE	157.2
No	K35AX-D	D35	LD	LIC	HAWTHORNE, NV	BLDTT20100706HQD	120.7
No	K35FL-D	D35	LD	LIC	SILVER SPRINGS, NV	BLDTT20100729AAP	42.7
Yes	KGLR-LD	D35	LD	LIC	SPARKS, NV	BLANK0000184471	36.9
Yes	KGLR-LD	D35	LD	CP	SPARKS, NV	BLANK0000189584	36.9
No	KHSL-TV	D36	DT	LIC	CHICO, CA	BLANK0000063624	188.7
No	KXTV	D36	LD	LIC	SACRAMENTO, CA	BLANK0000063113	174.0
No	KICU-TV	D36	DT	CP	SAN JOSE, CA	BLANK0000035729	272.5
No	KICU-TV	D36	DT	LIC	SAN JOSE, CA	BLCDT20090709ALH	272.5
No	KFRE-TV	D36	DT	LIC	SANGER, CA	BLANK0000190922	243.7
No	K36HH-D	D36	LD	LIC	SUSANVILLE, ETC, CA	BLDTT20101207AFN	143.2
No	K49IG-D	D36	LD	LIC	YREKA, CA	BLANK0000063168	375.0
No	K36PN-D	D36	LD	LIC	BEOWAWE, NV	BLANK0000152684	298.0
No	K36KN-D	D36	LD	LIC	EUREKA, NV	BLDTT20120423AAZ	319.3
No	K36GL-D	D36	LD	LIC	LOVELOCK, NV	BLDTT20110721AAT	126.9
No	K36FF-D	D36	LD	LIC	SHURZ, NV	BLDTT20110609AAR	77.5
Yes	K36OB-D	D36	LD	LIC	Verdi, NV	BLANK0000117788	41.3
No	K36PO-D	D36	LD	LIC	WINNEMUCCA, NV	BLANK0000145196	254.9
No	K36IB-D	D36	LD	LIC	MIDLAND, ETC., OR	BLDTT20090921ACY	367.0
No	K24NS-D	N38+	TX	LIC	STATELINE, NV	BLTTL20030205AAP	39.0

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D36  
Mask: Simple  
Latitude: 39 15 34.00 N (NAD83)  
Longitude: 119 42 20.00 W  
Height AMSL: 2279.5 m (Adjusted based on actual ground elevation calculation)  
HAAT: 0.0 m  
Peak ERP: 0.320 kW  
Antenna: Kathrein-750 10325 1x (ID 1009080) 200.0 deg  
Elev Pattn: Generic

50.9 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	0.001 kW	546.3 m	13.2 km
45.0	0.001	398.9	10.9
90.0	0.000	824.0	11.3
135.0	0.017	712.9	27.4
180.0	0.240	807.3	44.8
225.0	0.186	574.4	39.5
270.0	0.009	604.8	22.3
315.0	0.001	622.6	12.4

**Table 1 K36NB-D TVStudy Analysis of Proposal**  
(page 2 of 3)



Database HAAT does not agree with computed HAAT  
Database HAAT: 0 m    Computed HAAT: 636 m

Distance to Canadian border: 1042.3 km

Distance to Mexican border: 768.2 km

Conditions at FCC monitoring station: Livermore CA  
Bearing: 226.9 degrees    Distance: 246.7 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:  
Bearing: 80.8 degrees    Distance: 1238.4 km

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%

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Interference to BLANK0000184471 LIC scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	KGLR-LD	D35	LD	LIC	SPARKS, NV	BLANK0000184471	
Undesireds:	K36NB-D	D36	LD	APP	INCLINE VILLAGE, NV	K36NB-D MOD 1009893	36.9 km
	K23DT-D	D34	LD	CP	TAHOE CITY, CA	BLANK0000092818	31.2
	K35OZ-D	D35	LD	CP	CHICO, CA	BLANK0000170817	186.5
	K35FL-D	D35	LD	LIC	SILVER SPRINGS, NV	BLDTT20100729AAP	44.0
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX
1057.6    276,475		793.9    261,393		788.0    260,592		787.0    260,592	0.13    0.00
Undesired			Total IX		Unique IX, before		Unique IX, after
K36NB-D D36 LD APP			1.0	0			1.0    0
K23DT-D D34 LD CP			2.0	801	2.0	801	2.0    801
K35FL-D D35 LD LIC			4.0	0	4.0	0	4.0    0

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Interference to BLANK0000189584 CP scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	KGLR-LD	D35	LD	CP	SPARKS, NV	BLANK0000189584	
Undesireds:	K36NB-D	D36	LD	APP	INCLINE VILLAGE, NV	K36NB-D MOD 1009893	36.9 km
	K23DT-D	D34	LD	CP	TAHOE CITY, CA	BLANK0000092818	31.3
	K35OZ-D	D35	LD	CP	CHICO, CA	BLANK0000170817	186.5
	K35AX-D	D35	LD	LIC	HAWTHORNE, NV	BLDTT20100706HQD	153.8
	K35FL-D	D35	LD	LIC	SILVER SPRINGS, NV	BLDTT20100729AAP	44.0
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX
4187.7    510,946		2615.0    415,170		2581.1    415,167		2580.1    415,167	0.04    0.00
Undesired			Total IX		Unique IX, before		Unique IX, after
K36NB-D D36 LD APP			5.0	0			1.0    0
K23DT-D D34 LD CP			19.1	3	17.1	3	17.1    3
K35AX-D D35 LD LIC			2.0	0	2.0	0	2.0    0
K35FL-D D35 LD LIC			14.9	0	12.9	0	9.9    0

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Interference to BLANK0000117788 LIC scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	K36OB-D	D36	LD	LIC	Verdi, NV	BLANK0000117788	
Undesireds:	K36NB-D	D36	LD	APP	INCLINE VILLAGE, NV	K36NB-D MOD 1009893	41.3 km
	KGLR-LD	D35	LD	LIC	SPARKS, NV	BLANK0000184471	11.4
	KICU-TV	D36	DT	CP	SAN JOSE, CA	BLANK0000035729	287.6

**Table 1 K36NB-D TVStudy Analysis of Proposal**  
(page 3 of 3)

K36HH-D				D36	LD	LIC	SUSANVILLE, ETC, CA		BLDTT20101207AFN		102.2								
Service area				Terrain-limited		IX-free, before		IX-free, after		Percent New IX									
7566.1		521,367		4872.0		425,355		4869.0		425,355		4852.1		424,662		0.35		0.16	
Undesired				Total IX		Unique IX, before		Unique IX, after											
K36NB-D D36 LD APP				16.9		693		16.9		693									
K36HH-D D36 LD LIC				3.0		0		3.0		0									
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Interference to BLANK0000117788 LIC scenario 2																			
Desired:		Call		Chan	Svc	Status	City, State		File Number		Distance								
		K36OB-D		D36	LD	LIC	Verdi, NV		BLANK0000117788										
Undesireds:		K36NB-D		D36	LD	APP	INCLINE VILLAGE, NV		K36NB-D MOD 1009893		41.3 km								
		KGLR-LD		D35	LD	CP	SPARKS, NV		BLANK0000189584		11.4								
		KICU-TV		D36	DT	CP	SAN JOSE, CA		BLANK0000035729		287.6								
		K36HH-D		D36	LD	LIC	SUSANVILLE, ETC, CA		BLDTT20101207AFN		102.2								
Service area				Terrain-limited		IX-free, before		IX-free, after		Percent New IX									
7566.1		521,367		4872.0		425,355		4867.0		425,310		4852.1		424,662		0.31		0.15	
Undesired				Total IX		Unique IX, before		Unique IX, after											
K36NB-D D36 LD APP				16.9		693		14.9		648									
KGLR-LD D35 LD CP				2.0		45		2.0		45		0.0		0					
K36HH-D D36 LD LIC				3.0		0		3.0		0		3.0		0					
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Interference to proposal scenario 1																			
Desired:		Call		Chan	Svc	Status	City, State		File Number		Distance								
		K36NB-D		D36	LD	APP	INCLINE VILLAGE, NV		K36NB-D MOD 1009893										
Undesireds:		KGLR-LD		D35	LD	LIC	SPARKS, NV		BLANK0000184471		36.9 km								
		KICU-TV		D36	DT	CP	SAN JOSE, CA		BLANK0000035729		272.5								
		K36GL-D		D36	LD	LIC	LOVELOCK, NV		BLDTT20110721AAT		126.9								
		K36OB-D		D36	LD	LIC	Verdi, NV		BLANK0000117788		41.3								
Service area				Terrain-limited		IX-free		Percent IX											
2074.1		132,311		1566.9		109,106		1430.8		108,204		8.69		0.83					
Undesired				Total IX		Unique IX		Prcnt Unique IX											
K36GL-D D36 LD LIC				1.0		0		0.0		0		0.00		0.00					
K36OB-D D36 LD LIC				136.2		902		135.2		902		8.63		0.83					

**Channel and  
Facility  
Information**

Section	Question	Response
Facility ID	187605	
State	Nevada	
City	INCLINE VILLAGE	
LPD Channel	36	

**Primary station proposed to be rebroadcast:**

Facility Id	Call Sign	City	State
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**Antenna Location  
Data**

Section	Question	Response
<b>Antenna Structure Registration</b>	Do you have an FCC Antenna Structure Registration (ASR) Number?	Yes
	ASR Number	1009893
<b>Coordinates (NAD83)</b>	Latitude	39° 15' 34.0" N+
	Longitude	119° 42' 20.0" W-
	Structure Type	TOWER-A free standing or guyed struct
	Overall Structure Height	80.7 meters
	Support Structure Height	79.2 meters
	Ground Elevation (AMSL)	2267.7 meters
<b>Antenna Data</b>	Height of Radiation Center Above Ground Level	9.1 meters
	Height of Radiation Center Above Mean Sea Level	2276.8 meters
	Effective Radiated Power	0.32 kW

**Antenna  
Technical Data**

Section	Question	Response
Antenna Type	Antenna Type	Directional Custom
	Do you have an Antenna ID?	Yes
	Antenna ID	1009080
Antenna Manufacturer and Model	Manufacturer:	Kathrein
	Model	750 10325 1x
	Rotation	200 degrees
	Electrical Beam Tilt	Not Applicable
	Mechanical Beam Tilt	Not Applicable
	toward azimuth	
	Polarization	Elliptical
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:	Simple

**Directional Antenna Relative Field Values (Pre-rotated Pattern)**

Degree	Value	Degree	Value	Degree	Value	Degree	Value
0	1.000	90	0.048	180	0.090	270	0.056
10	0.953	100	0.029	190	0.079	280	0.107
20	0.838	110	0.046	200	0.063	290	0.179
30	0.685	120	0.066	210	0.062	300	0.277
40	0.524	130	0.075	220	0.072	310	0.404
50	0.376	140	0.070	230	0.074	320	0.556
60	0.255	150	0.060	240	0.063	330	0.719
70	0.163	160	0.066	250	0.042	340	0.866
80	0.095	170	0.083	260	0.029	350	0.968

**Additional Azimuths**

Degree	V <sub>A</sub>
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