

TECHNICAL SUMMARY
APPLICATION FOR CONSTRUCTION PERMIT
LOW POWER DIGITAL STATION K22NK-D
LAKE HAVASU CITY, ARIZONA
CHANNEL 22 15 KW (DA)

1. Application Purpose: The instant application proposes to change the licensed K22NK-D directional antenna system from a Scala model 4DR-16S to a Kathrein model 4x1 750 0000049 E-pol panel array, increase the ERP from 2.34 kW (horizontal polarization) to 15 kW (elliptical polarization) and change the emission mask from stringent to full service. No other changes are proposed.

2. Interference Compliance: As indicated in the attached *TVStudy* analysis summary, K22NK-D's proposed 15 kW operation meets the FCC's interference protection requirements with respect to all protected facilities. A cell size of 1.0 km and a profile resolution of 1.0 km points/km were utilized for the *TVStudy* analysis.

3. RFR Compliance: The proposed facilities were evaluated in terms of potential radiofrequency radiation (RFR) exposure at ground level to workers and the general public. The radiation center for the proposed DTV antenna will be located 16 meters above ground level. The total DTV ERP is 21.43 kW (15 kW H-pol, 6.43 kW V-pol). A greater than expected vertical plane relative field value of 0.1 is presumed for the antenna's downward radiation (-60° to -90° elevation, see attached vertical plane relative field pattern). The calculated power density at a point 2 meters above ground level is 36.5 uW/cm^2 which is 10.5% of the FCC's recommended limit of 347.3 uW/cm^2 for channel 22 for an uncontrolled environment. Thus, it is believed that the proposed K22NK-D facility is in compliance with the FCC's requirements with regard to RF radiation exposure. However, if necessary, measurements will be made to substantiate compliance with the FCC's RF radiation exposure requirements.

Access to the transmitting site will be restricted and appropriately marked with RFR warning signs. Furthermore, as this is a multi-user site, a protocol shall be in effect in the event that workers or other authorized personnel enter the restricted area or climb the supporting structure to ensure that appropriate measures will be taken to assure worker safety with respect to RF energy exposure.

K22NK-D TVSTUDY INTERFERENCE ANALYSIS

tvstudy v2.2.5 (4uoc83)
Database: localhost, Study: k22nk030, Model: Longley-Rice
Start: 2023.07.06 12:21:14

Study created: 2023.07.06 12:21:14

Study build station data: LMS TV 2023-07-03

Proposal: K22NK030 D22 LD APP LAKE HAVASU CITY, AZ
File number: k22nk030
Facility ID: 43371
Station data: User record
Record ID: 453
Country: U.S.

Search options:
Non-U.S. records included

Stations potentially affected by proposal:

IX	Call	Chan	Svc	Status	City, State	File Number	Distance
No	K21EG-D	D21	LD	LIC	GOLDEN VALLEY, AZ	BLDTT20130308ABB	70.9 km
No	K21NQ-D	D21	LD	LIC	MEADVIEW, AZ	BLANK0000071717	142.3
No	K21PB-D	D21	LD	CP	PARKER, AZ	BNPDTL20100514ADI	100.9
No	KRPO-LD	D21	LD	LIC	QUARTZSITE, AZ	BLDTL20110926AEA	119.5
No	K21FU-D	D21	LD	LIC	TOPOCK, AZ	BLDTT20130308ACK	48.2
No	K21DO-D	D21	DC	LIC	PALM SPRINGS, CA	BLANK0000191501	206.5
No	KLSV-LD	D21	LD	LIC	LAS VEGAS, NV	BLANK0000064058	166.6
No	KHSV	D21	DT	APP	LAS VEGAS, NV	BLANK0000127675	166.5
No	KNAZ-TV	D22	DT	LIC	FLAGSTAFF, AZ	BLCDT20091210AAC	264.4
No	DK22JD-D	D22	LD	LIC	MADERA PEAK, AZ	BLANK0000033767	351.8
No	KPSN-LD	D22	LD	LIC	PAYSON, AZ	BLDTL20120430AAZ	293.5
No	KPDF-CD	D22	DC	LIC	PHOENIX, AZ	BLANK0000063133	255.3
No	KPDF-CD	D22	DC	CP	PHOENIX, AZ	BLANK0000127530	255.3
Yes	KVYE	D22	DT	LIC	EL CENTRO, CA	BLCDT20070604ABN	177.6
No	K22NA-D	D22	LD	LIC	INYOKERN, ETC, CA	BLANK0000068893	316.8
No	KHTV-CD	D22	DC	LIC	LOS ANGELES, CA	BLANK0000068679	341.2
No	KJHP-LD	D22	LD	LIC	MORONGO VALLEY, CA	BLANK0000125585	206.5
No	KIFR	D22	DT	LIC	VISALIA, CA	BLANK0000093296	445.7
Yes	KSNV	D22	DT	LIC	LAS VEGAS, NV	BLANK0000112809	166.5
Yes	K22DR-D	D22	LD	LIC	LAUGHLIN, NV	BLANK0000062881	79.5
Yes	K22DR-D	N22	TX	LIC	LAUGHLIN, NV	BLTT19911118JJ	79.5
No	KUWB-LD	D22	LD	CP	BLOOMINGTON, UT	BLANK0000054910	282.8
No	KUWB-LD	D22	LD	LIC	BLOOMINGTON, UT	BLDTT20100714AAQ	282.8
No	K22NB-D	D22	LD	LIC	KANARRAVILLE ETC., UT	BLANK0000091242	337.4
No	K49KX-D	D22	LD	LIC	ORDERVILLE, UT	BLANK0000059978	335.8
No	K22IP-D	D22	LD	LIC	VIRGIN, UT	BLDTT20081202AHJ	310.4
No	K23FV-D	D23	LD	LIC	KINGMAN, AZ	BLDTT20130308ABD	68.1
No	K23BJ-D	D23	LD	LIC	LAKE HAVASU CITY, AZ	BLANK0000177714	0.0
Yes	K23BJ-D	N23	TX	LIC	LAKE HAVASU CITY, AZ	BLTTL19891127JR	0.1
No	K23DK-D	D23	LD	LIC	MEADVIEW, AZ	BLDTT20130308ABX	142.3
No	K23NJ-D	D23	LD	LIC	PRESCOTT, ETC., AZ	BLANK0000058780	168.7
No	KVMD	D23	DD	LIC	TWENTYNINE PALMS, CA	BLANK0000145096	251.1
No	KLVD-LD	D23	LD	CP	LAS VEGAS, NV	BLANK0000216405	166.7
No	KLVD-LD	D23	LD	LIC	LAS VEGAS, NV	BLDTL20110728ADN	166.7
No	K29GK-D	N29-	TX	LIC	TWENTYNINE PALMS,ETC, CA	BLTT20060119ADC	156.8
No	XHSFE	D22	DT	LIC	SAN FELIPE, BN	BLANKBPFS20160302ACU	400.3
No	XHUAA	D22	DT	LIC	TIJUANA, BN	BLANKBPFS20100517ADE	340.0
No	XHPDT	D22	DT	LIC	PUERTO PENASCO, SO	BLANKBPFS20160315ABI	374.9

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: 34 36 9.00 N (NAD83)
Longitude: 114 22 16.00 W
Height AMSL: 408.0 m
HAAT: 54.0 m
Peak ERP: 15.0 kW
Antenna: Kat_4x1_750_0000049_E 350.0 deg
Elev Pattnr: Generic

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49.6 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	0.049 kW	35.8 m	9.3 km
45.0	0.042	-7.4	8.3
90.0	0.394	-298.1	14.4
135.0	8.80	-5.2	28.4
180.0	10.7	255.9	52.9
225.0	0.633	173.6	33.6
270.0	0.033	113.4	15.1
315.0	0.052	167.8	20.7

Distance to Canadian border: 1600.3 km

**Proposal is within coordination distance of Mexican border
Distance to Mexican border: 211.8 km

Conditions at FCC monitoring station: Douglas AZ
Bearing: 126.8 degrees Distance: 558.4 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:
Bearing: 50.0 degrees Distance: 1011.3 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%

----- Interference to BLCDT20070604ABN LIC scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance		
	KVYE	D22	DT	LIC	EL CENTRO, CA	BLCDT20070604ABN			
Undesireds:	K22NK030	D22	LD	APP	LAKE HAVASU CITY, AZ	k22nk030	177.6 km		
	KNAZ-TV	D22	DT	LIC	FLAGSTAFF, AZ	BLCDT20091210AAC	372.8		
	KPDF-CD	D22	DC	LIC	PHOENIX, AZ	BLANK0000063133	259.1		
	KSNV	D22	DT	LIC	LAS VEGAS, NV	BLANK0000112809	329.1		
	XHSFE	D22	DT	LIC	SAN FELIPE, BN	BLANKBPFS20160302ACU	225.4		
	XHUAA	D22	DT	LIC	TIJUANA, BN	BLANKBPFS20100517ADE	215.5		
	XHPDT	D22	DT	LIC	PUERTO PENASCO, SO	BLANKBPFS20160315ABI	228.8		
	Service area	Terrain-limited		IX-free, before		IX-free, after		Percent New IX	
	27664.0	396,684	25268.5	392,740	25142.7	392,737	25139.7	392,737	0.01 0.00
	8802.6	1,093,129	8014.3	1,093,124	8007.3	1,093,124	8007.3	1,093,124	0.00 0.00 (in
	Mexico)								

Undesired	Total IX	Unique IX, before	Unique IX, after
K22NK030 D22 LD APP	5.0	0	3.0 0
KNAZ-TV D22 DT LIC	11.9	0	7.0 0
KPDF-CD D22 DC LIC	11.9	0	8.9 0
KSNV D22 DT LIC	3.0	0	2.0 0
XHSFE D22 DT LIC	4.0	0	3.0 0
XHSFE D22 DT LIC	3.0	0	2.0 0 (in Mexico)
XHUAA D22 DT LIC	2.0	0	0.0 0
XHPDT D22 DT LIC	102.0	3	98.0 3
XHPDT D22 DT LIC	5.0	0	4.0 0 (in Mexico)

----- Interference to BLCDT20070604ABN LIC scenario 2

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	KVYE	D22	DT	LIC	EL CENTRO, CA	BLCDT20070604ABN	
Undesireds:	K22NK030	D22	LD	APP	LAKE HAVASU CITY, AZ	k22nk030	177.6 km
	KNAZ-TV	D22	DT	LIC	FLAGSTAFF, AZ	BLCDT20091210AAC	372.8
	KPDF-CD	D22	DC	CP	PHOENIX, AZ	BLANK0000127530	259.2
	KSNV	D22	DT	LIC	LAS VEGAS, NV	BLANK0000112809	329.1
	XHSFE	D22	DT	LIC	SAN FELIPE, BN	BLANKBPFS20160302ACU	225.4
	XHUAA	D22	DT	LIC	TIJUANA, BN	BLANKBPFS20100517ADE	215.5

K22NK-D TVSTUDY INTERFERENCE ANALYSIS

XHPDT	D22	DT	LIC	PUERTO PENASCO, SO	BLANKBPFS20160315ABI	228.8	
Service area	Terrain-limited		IX-free, before		IX-free, after		Percent New IX
27664.0	396,684	25268.5	392,740	25119.7	392,737	25116.8	392,737
8802.6	1,093,129	8014.3	1,093,124	8007.3	1,093,124	8007.3	1,093,124
Mexico)							0.00 0.00 (in

Undesired	Total IX	Unique IX, before	Unique IX, after
K22NK030 D22 LD APP	5.0	0	3.0
KNAZ-TV D22 DT LIC	11.9	0	7.0
KPDF-CD D22 DC CP	37.8	0	31.9
KSNV D22 DT LIC	3.0	0	2.0
XHSFE D22 DT LIC	4.0	0	3.0
XHSFE D22 DT LIC	3.0	0	2.0
XHUAA D22 DT LIC	2.0	0	0.0
XHPDT D22 DT LIC	102.0	3	95.0
XHPDT D22 DT LIC	5.0	0	4.0

(in Mexico)

Interference to BLANK0000112809 LIC scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	KSNV	D22	DT	LIC	LAS VEGAS, NV	BLANK0000112809	
Undesireds:	K22NK030	D22	LD	APP	LAKE HAVASU CITY, AZ	k22nk030	166.5 km
	KHSV	D21	DT	APP	LAS VEGAS, NV	BLANK0000127675	0.2
	KMYU	D21	DT	CP	ST. GEORGE, UT	BLANK0000129216	173.7
	KNAZ-TV	D22	DT	LIC	FLAGSTAFF, AZ	BLCDT20091210AAC	337.0
	KVYE	D22	DT	LIC	EL CENTRO, CA	BLCDT20070604ABN	329.1
Service area	Terrain-limited		IX-free, before		IX-free, after		Percent New IX
32499.9	1,967,775	21083.5	1,918,909	20922.2	1,918,889	20916.3	1,918,889

Undesired	Total IX	Unique IX, before	Unique IX, after
K22NK030 D22 LD APP	7.0	0	6.0
KHSV D21 DT APP	100.6	20	100.6
KNAZ-TV D22 DT LIC	2.0	0	2.0
KVYE D22 DT LIC	58.7	0	57.7

Interference to BLANK0000062881 LIC scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	K22DR-D	D22	LD	LIC	LAUGHLIN, NV	BLANK0000062881	
Undesireds:	K22NK030	D22	LD	APP	LAKE HAVASU CITY, AZ	k22nk030	79.5 km
	K21FU-D	D21	LD	LIC	TOPOCK, AZ	BLDTT20130308ACK	41.3
	KPDF-CD	D22	DC	LIC	PHOENIX, AZ	BLANK0000063133	325.4
	KSNV	D22	DT	LIC	LAS VEGAS, NV	BLANK0000112809	87.6
	KUWB-LD	D22	LD	CP	BLOOMINGTON, UT	BLANK0000054910	227.3
	K23BJ-D	D23	LD	LIC	LAKE HAVASU CITY, AZ	BLANK0000177714	79.5
	KLVD-LD	D23	LD	CP	LAS VEGAS, NV	BLANK0000216405	87.8
Service area	Terrain-limited		IX-free, before		IX-free, after		Percent New IX
4400.1	86,228	3182.3	71,745	3096.6	71,743	3094.6	71,743

Undesired	Total IX	Unique IX, before	Unique IX, after
K22NK030 D22 LD APP	2.0	0	2.0
K21FU-D D21 LD LIC	1.0	0	1.0
KSNV D22 DT LIC	84.7	2	84.7

Interference to BLTT19911118JJ LIC scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	K22DR-D	N22	TX	LIC	LAUGHLIN, NV	BLTT19911118JJ	
Undesireds:	K22NK030	D22	LD	APP	LAKE HAVASU CITY, AZ	k22nk030	79.5 km
	KPDF-CD	D22	DC	LIC	PHOENIX, AZ	BLANK0000063133	325.5
	KSNV	D22	DT	LIC	LAS VEGAS, NV	BLANK0000112809	87.6
	KUWB-LD	D22	LD	CP	BLOOMINGTON, UT	BLANK0000054910	227.3
	K23BJ-D	D23	LD	LIC	LAKE HAVASU CITY, AZ	BLANK0000177714	79.5
	KLVD-LD	D23	LD	CP	LAS VEGAS, NV	BLANK0000216405	87.8
Service area	Terrain-limited		IX-free, before		IX-free, after		Percent New IX

K22NK-D TVSTUDY INTERFERENCE ANALYSIS

807.9	47,479	644.3	35,448	517.7	33,313	513.7	33,313	0.77	0.00
Undesired			Total IX	Unique IX, before		Unique IX, after			
K22NK030 D22 LD APP	4.0		0			4.0	0		
KSNV D22 DT LIC	126.6		2,135	126.6	2,135	126.6	2,135		

Interference to BLTTL19891127JR LIC scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	K23BJ-D	N23	TX	LIC	LAKE HAVASU CITY, AZ	BLTTL19891127JR	
Undesireds:	K22NK030	D22	LD	APP	LAKE HAVASU CITY, AZ	k22nk030	0.1 km
	K22DR-D	D22	LD	LIC	LAUGHLIN, NV	BLANK0000062881	79.4
	K23FZ-D	D23	LD	LIC	CAMP VERDE, AZ	BLANK0000179591	229.2
	K23FV-D	D23	LD	LIC	KINGMAN, AZ	BLDTT20130308ABD	68.1
	KLVD-LD	D23	LD	CP	LAS VEGAS, NV	BLANK0000216405	166.7
	K24NG-D	D24	LD	LIC	LAKE HAVASU CITY, AZ	BLANK0000071720	0.1
	Service area		Terrain-limited		IX-free, before	IX-free, after	Percent New IX
	474.5	32,420	470.5	32,420	302.6	31,560	0.00 0.00

Undesired		Total IX	Unique IX, before		Unique IX, after	
K22NK030 D22 LD APP	1.0	53			0.0	0
K23FV-D D23 LD LIC	164.9	343	163.9	343	163.9	343
K24NG-D D24 LD LIC	4.0	517	3.0	517	2.0	464

Interference to proposal scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	K22NK030	D22	LD	APP	LAKE HAVASU CITY, AZ	k22nk030	
Undesireds:	KNAZ-TV	D22	DT	LIC	FLAGSTAFF, AZ	BLCDT20091210AAC	264.4 km
	KPDF-CD	D22	DC	LIC	PHOENIX, AZ	BLANK0000063133	255.3
	KVYE	D22	DT	LIC	EL CENTRO, CA	BLCDT20070604ABN	177.6
	KSNV	D22	DT	LIC	LAS VEGAS, NV	BLANK0000112809	166.5
	K22DR-D	D22	LD	LIC	LAUGHLIN, NV	BLANK0000062881	79.5
	KUWB-LD	D22	LD	CP	BLOOMINGTON, UT	BLANK0000054910	282.8
	K23BJ-D	D23	LD	LIC	LAKE HAVASU CITY, AZ	BLANK0000177714	0.0
	Service area		Terrain-limited		IX-free	Percent IX	
	2290.2	64,047	1630.0	56,350	1560.6	56,345	4.26 0.01

Undesired		Total IX	Unique IX		Prct Unique IX	
KNAZ-TV D22 DT LIC	1.0	0	1.0	0	0.06	0.00
KVYE D22 DT LIC	20.1	0	18.1	0	1.11	0.00
KSNV D22 DT LIC	2.0	0	0.0	0	0.00	0.00
K22DR-D D22 LD LIC	50.3	5	47.3	5	2.90	0.01

Interference to proposal scenario 2

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	K22NK030	D22	LD	APP	LAKE HAVASU CITY, AZ	k22nk030	
Undesireds:	KNAZ-TV	D22	DT	LIC	FLAGSTAFF, AZ	BLCDT20091210AAC	264.4 km
	KPDF-CD	D22	DC	LIC	PHOENIX, AZ	BLANK0000063133	255.3
	KVYE	D22	DT	LIC	EL CENTRO, CA	BLCDT20070604ABN	177.6
	KSNV	D22	DT	LIC	LAS VEGAS, NV	BLANK0000112809	166.5
	K22DR-D	N22	TX	LIC	LAUGHLIN, NV	BLTT19911118J5	79.5
	KUWB-LD	D22	LD	CP	BLOOMINGTON, UT	BLANK0000054910	282.8
	K23BJ-D	D23	LD	LIC	LAKE HAVASU CITY, AZ	BLANK0000177714	0.0
	Service area		Terrain-limited		IX-free	Percent IX	
	2290.2	64,047	1630.0	56,350	1600.8	56,350	1.79 0.00

Undesired		Total IX	Unique IX		Prct Unique IX	
KNAZ-TV D22 DT LIC	1.0	0	1.0	0	0.06	0.00
KVYE D22 DT LIC	20.1	0	19.1	0	1.17	0.00
KSNV D22 DT LIC	2.0	0	0.0	0	0.00	0.00
K22DR-D N22 TX LIC	8.1	0	7.0	0	0.43	0.00

Subject to alternation

