ENGINEERING EXHIBIT

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

prepared for

Jeff Chang
KPJC-LD San Francisco, CA
Facility ID 182962
Ch. 11 0.075 kW Directional

Jeff Chang ("Chang") is the licensee of digital Low Power Television station KPJC-LD, Channel 11, Facility ID 182962, San Francisco CA. KPJC-LD is licensed to operate (file# 0000117056) from a rooftop transmitting location with 0.07 kW effective radiated power ("ERP"), directional. A minor modification Construction Permit ("CP" file# 0000162102) authorizes KPJC-LD to relocate to a different site and operate at 0.059 kW ERP, directional. *Chang* herein seeks a modification of the CP to specify increased ERP, decreased antenna height, and use of a different directional antenna at the authorized site location.

As with the current CP, the proposed KPJC-LD facility will employ a new antenna system to be side-mounted on the existing tower structure associated with FCC Antenna Structure Registration number 1010566, located at San Bruno Mountain 11.8 km (7.3 miles) from the licensed site. No change to the overall structure height is proposed.

The proposed antenna is an array of two Scala model CL-713 antennas having horizontal polarization. The proposed ERP is 0.075 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 48 dBµ coverage contour of the proposed facility as well as those of the licensed and currently authorized KPJC-LD 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, and

[1]FCC Office of Engineering and Technology Bulletin number 69, *Longley-Rice Methodology for Evaluating*

Class A stations. FCC processing of this proposal is requested using a 1.0 km cell size and 0.2 km terrain profile increment. 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

The proposed operation 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 considering the worst-case of 100 percent antenna relative field in downward elevations, the calculated signal density near the tower at two meters above ground level attributable to the proposed facility is 6.7 $\mu W/cm^2$, which is 3.4 percent of the general population/uncontrolled maximum permitted 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. When the antenna's elevation pattern is considered, the calculated signal density will be even lower.

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, structure, or antenna from RF electromagnetic field exposure in excess of FCC guidelines. Environmental matters covered by this exhibit are limited to the evaluation of exposure to RF electromagnetic field.

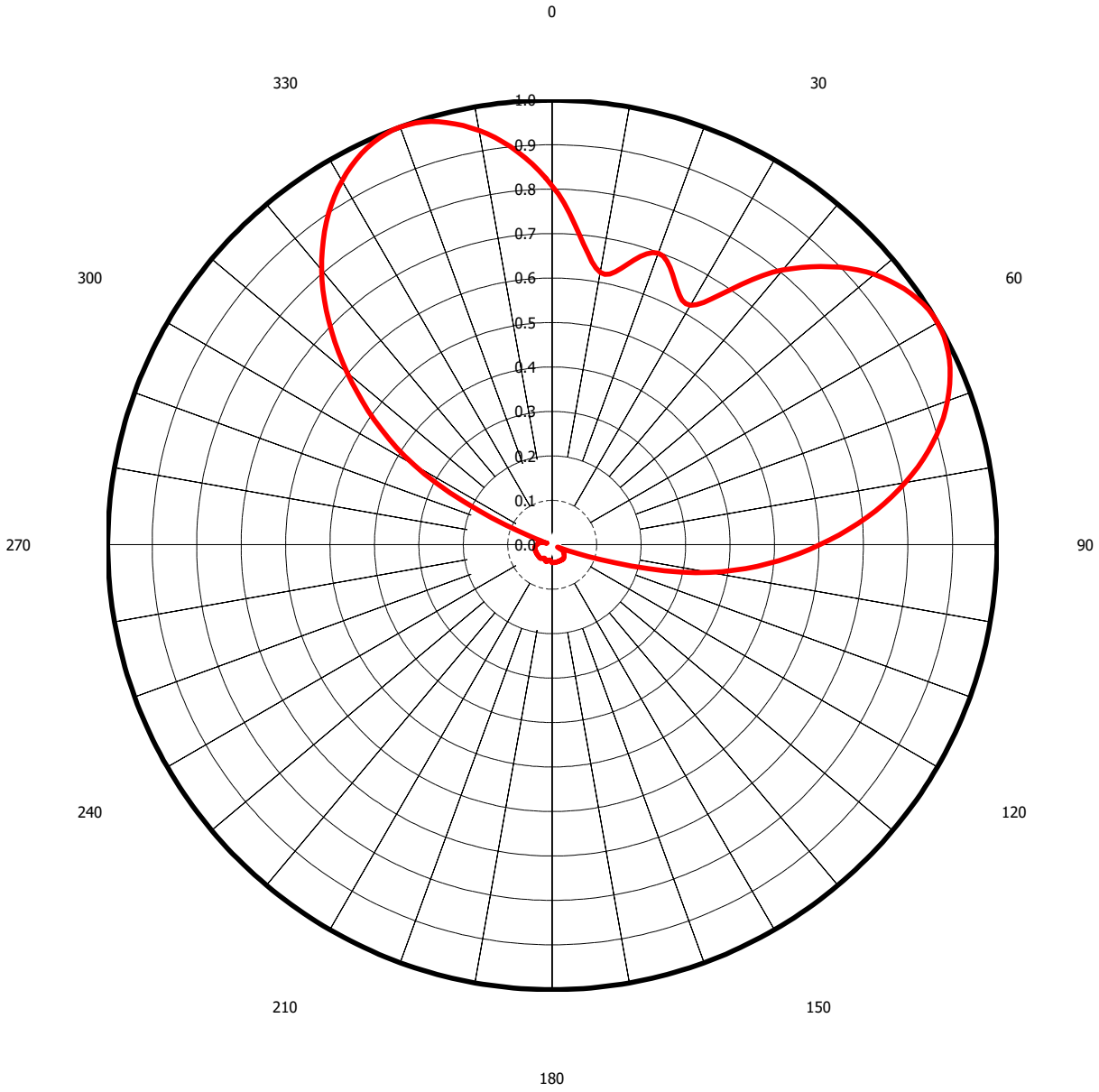
TV Coverage and Interference, February 6, 2004 ("OET-69"). This analysis employed the FCC's current "TVStudy" software with the default application processing template settings, 1 km cell size, and 0.2 km terrain increment. Comparisons of various results of this computer program (run on a Mac processor) to the FCCs 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. January 13, 2023
207 Old Dominion Road Yorktown, VA 23692 703-650-9600

Azimuth Pattern - Relative Field
(True North)



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

Figure 1
Antenna Azimuthal Pattern
KPJC-LD San Francisco, CA
Facility ID 182962
Ch. 11 0.075 kW Directional

prepared for
Jeff Chang

January, 2023

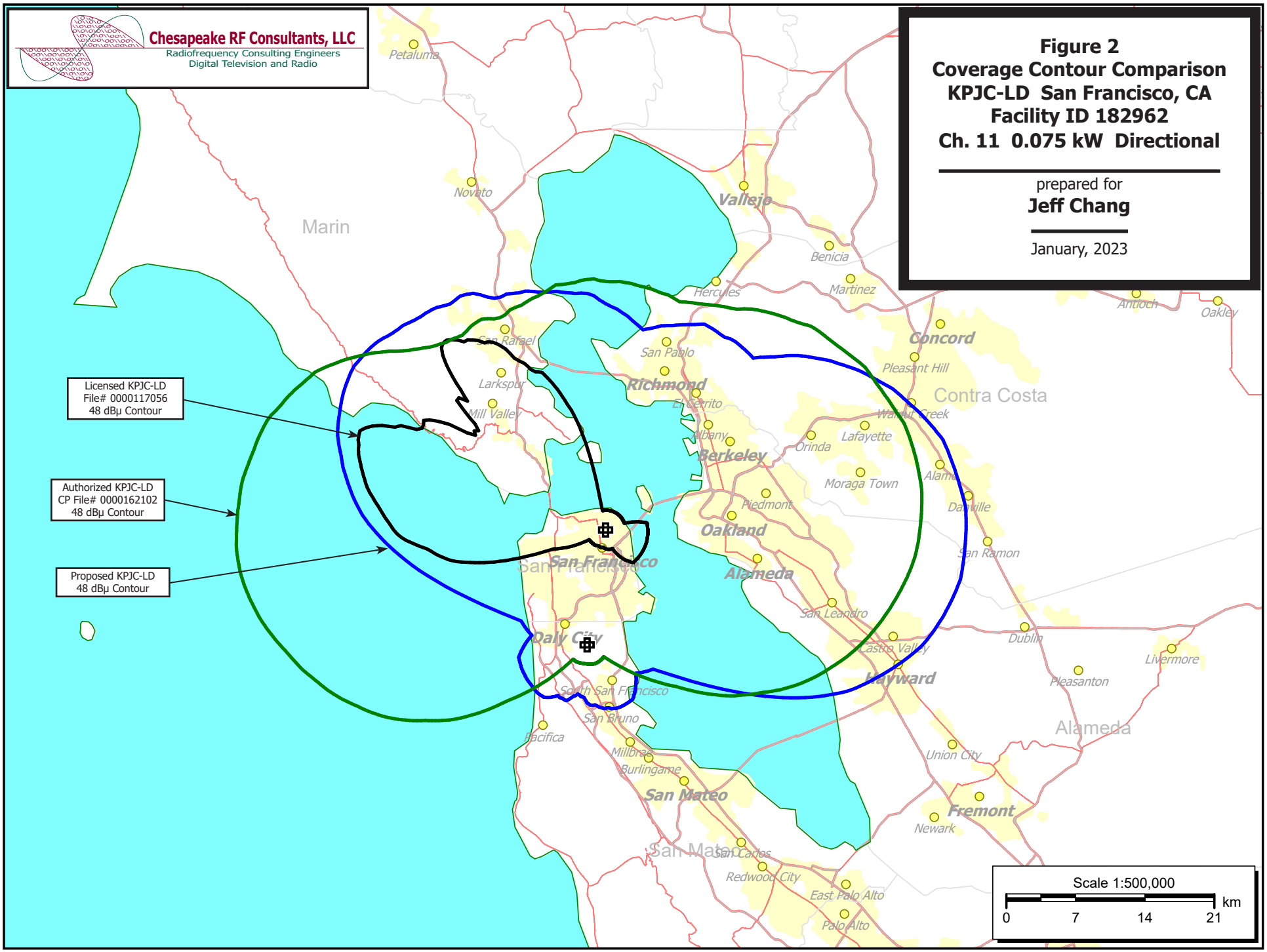

Chesapeake RF Consultants, LLC
Radiofrequency Consulting Engineers
Digital Television and Radio
Figure 2
Coverage Contour Comparison
KPJC-LD San Francisco, CA
Facility ID 182962
Ch. 11 0.075 kW Directional
prepared for
Jeff Chang
January, 2023
Licensed KPJC-LD
File# 0000117056
48 dBµ Contour
Authorized KPJC-LD
CP File# 0000162102
48 dBµ Contour
Proposed KPJC-LD
48 dBµ Contour
Petaluma
Novato
Marin
Vallejo
Benicia
Martinez
Hercules
Antioch
Oakley
Concord
Pleasant Hill
Contra Costa
Walnut Creek
Lafayette
Orinda
Moraga Town
Alamo
Danville
San Ramon
San Rafael
San Pablo
Richmond
El Cerrito
Albany
Berkeley
Piedmont
Oakland
Alameda
San Francisco
Larkspur
Mill Valley
San Leandro
Castro Valley
Dublin
Livermore
Pleasanton
Hayward
Daly City
South San Francisco
San Bruno
Pacifica
Millbrae
Burlingame
San Mateo
Union City
Fremont
Newark
Alameda
San Mateo
San Carlos
Redwood City
East Palo Alto
Palo Alto
Scale 1:500,000
0
7
14
21
km

Table 1 KPJC-LD TVStudy Analysis of Proposal


```
tvstudy v2.2.5 (4uoc83)
Database: localhost,  Study: KPJC-LD 1010566 70-ft prop,  Model: Longley-Rice
Start: 2023.01.13 14:43:20

Study created: 2023.01.13 14:43:19

Study build station data: LMS TV 2023-01-07

    Proposal: KPJC-LD D11 LD APP SAN FRANCISCO, CA
 File number: KPJC-LD 1010566 70-ft prop
 Facility ID: 182962
Station data: User record
   Record ID: 4811
     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
Yes  KXTV      D10        DT  LIC     SACRAMENTO, CA           BLANK0000146119         102.3 km
No   K10RU-D   D10        LD  CP      SALINAS, CA              BNPDTL20090825AEI       147.0
No   KKRM-LD   D11        LD  LIC     Chico, CA                BLANK0000199842         260.1
No   KKRM-LD   D11        LD  CP      Chico, CA                BLANK0000202240         260.1
No   KEET      D11        DT  LIC     EUREKA, CA               BLANK0000005864         363.1
No   DK27GZ    D11+       LD  APP     MARIPOSA, CA             BLANK0000121605         208.2
Yes  KGMC      D11        DT  LIC     MERCED, CA               BLANK0000156689         273.8
No   K11XS-D   D11        LD  CP      MODESTO, CA              BNPDTL20090825ALO       118.8
Yes  KCBA      D11        DT  LIC     SALINAS, CA              BLANK0000115967         132.3
Yes  KTVN      D11        DT  LIC     RENO, NV                 BLANK0000063879         286.3
No   K12XJ-D   D12-       LD  LIC     MODESTO, CA              BLANK0000114101         124.2
No   KRJR-LD   D12z       LD  LIC     SACRAMENTO, CA           BLANK0000203475         135.7
No   K12XN-D   D12        LD  CP      SALINAS, CA              BNPDTL20090825AFN       147.0
No   KGO-TV    D12        DT  LIC     SAN FRANCISCO, CA        BLANK0000113050           7.8

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

    Channel: D11
       Mask: Full Service
   Latitude:  37 41 12.30 N (NAD83)
  Longitude: 122 26  7.30 W
Height AMSL: 411.4 m
       HAAT: 0.0 m
   Peak ERP: 0.075 kW
    Antenna: 2x CL-713 array 0.0 deg
Elev Pattrn: Generic

48.0 dBu contour:
Azimuth      ERP       HAAT   Distance
  0.0 deg  0.049 kW   362.0 m   35.4 km
 45.0      0.058      403.6     39.0
 90.0      0.027      411.3     33.8
135.0      0.000      407.8      6.8
180.0      0.000      226.7      5.8
225.0      0.000      380.2      6.9
270.0      0.000      393.3      6.3
315.0      0.037      392.4     34.9

Database HAAT does not agree with computed HAAT
Database HAAT: 0 m   Computed HAAT: 372 m

Distance to Canadian border: 1174.7 km

Distance to Mexican border: 724.4 km
```

Table 1 KPJC-LD TVStudy Analysis of Proposal

Conditions at FCC monitoring station: Livermore CA
Bearing: 85.7 degrees Distance: 60.0 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:
Bearing: 74.3 degrees Distance: 1508.1 km

Study cell size: 1.00 km
Profile point spacing: 0.20 km

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

Interference to BLANK0000146119 LIC scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	KXTV	D10	DT	LIC	SACRAMENTO, CA	BLANK0000146119	
Undesireds:	KPJC-LD	D11	LD	APP	SAN FRANCISCO, CA	KPJC-LD 1010566 70-ft	102.3 km
	KVIE	D9	DT	LIC	SACRAMENTO, CA	BLANK0000160094	3.5
	KERO-TV	D10	DT	LIC	BAKERSFIELD, CA	BLCDT20100929AEF	403.4

Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX	
47357.6	10,765,017	41998.1	7,319,746	41718.9	7,305,561	41693.5	7,269,060	0.06	0.50

Undesired	Total IX		Unique IX, before		Unique IX, after	
KPJC-LD D11 LD APP	25.3	36,501			25.3	36,501
KVIE D9 DT LIC	16.0	868	16.0	868	16.0	868
KERO-TV D10 DT LIC	263.2	13,317	263.2	13,317	263.2	13,317

Interference to BLANK0000156689 LIC scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	KGMC	D11	DT	LIC	MERCED, CA	BLANK0000156689	
Undesireds:	KPJC-LD	D11	LD	APP	SAN FRANCISCO, CA	KPJC-LD 1010566 70-ft	273.8 km
	KTTV	D11	DT	LIC	LOS ANGELES, CA	BLANK0000196952	340.0
	KCBA	D11	DT	LIC	SALINAS, CA	BLANK0000115967	187.3
	KTVN	D11	DT	LIC	RENO, NV	BLANK0000063879	252.3

Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX	
41959.2	2,051,210	39255.9	1,999,246	39074.3	1,998,414	39073.3	1,998,414	0.00	0.00

Undesired	Total IX		Unique IX, before		Unique IX, after	
KPJC-LD D11 LD APP	7.1	0			1.0	0
KTTV D11 DT LIC	11.1	181	11.1	181	11.1	181
KCBA D11 DT LIC	164.4	640	160.4	536	155.3	536
KTVN D11 DT LIC	10.1	115	6.1	11	5.1	11

Interference to BLANK0000115967 LIC scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	KCBA	D11	DT	LIC	SALINAS, CA	BLANK0000115967	
Undesireds:	KPJC-LD	D11	LD	APP	SAN FRANCISCO, CA	KPJC-LD 1010566 70-ft	132.3 km
	KXTV	D10	DT	LIC	SACRAMENTO, CA	BLANK0000146119	164.9
	KGMC	D11	DT	LIC	MERCED, CA	BLANK0000156689	187.3
	KTVN	D11	DT	LIC	RENO, NV	BLANK0000063879	317.8
	KGO-TV	D12	DT	LIC	SAN FRANCISCO, CA	BLANK0000113050	139.3

Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX	
32121.8	3,090,470	25246.4	2,384,593	24245.1	1,328,369	24244.1	1,327,159	0.00	0.09

Undesired	Total IX		Unique IX, before		Unique IX, after	
KPJC-LD D11 LD APP	132.5	194,739			1.0	1,210
KXTV D10 DT LIC	3.0	0	0.0	0	0.0	0
KGMC D11 DT LIC	452.1	134,684	355.7	3,501	353.7	917

Table 1 KPJC-LD TVStudy Analysis of Proposal

KTVN D11 DT LIC	8.1	5,390	1.0	201	0.0	0	
KGO-TV D12 DT LIC	640.5	1,052,408	548.1	921,339	476.1	839,927	

Interference to BLANK0000063879 LIC scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	KTVN	D11	DT	LIC	RENO, NV	BLANK0000063879	
Undesireds:	KPJC-LD	D11	LD	APP	SAN FRANCISCO, CA	KPJC-LD 1010566 70-ft	286.3 km
	KXTV	D10	DT	LIC	SACRAMENTO, CA	BLANK0000146119	184.2
	KGMC	D11	DT	LIC	MERCED, CA	BLANK0000156689	252.3
	KCBA	D11	DT	LIC	SALINAS, CA	BLANK0000115967	317.8

Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX	
50085.9	998,326	43059.6	897,963	42974.5	893,192	42970.5	893,192	0.01	0.00

Undesired	Total IX		Unique IX, before		Unique IX, after	
KPJC-LD D11 LD APP	20.0	1,347			4.0	0
KXTV D10 DT LIC	43.0	4,237	26.0	2,292	22.0	1,846
KGMC D11 DT LIC	20.0	743	3.0	386	3.0	386
KCBA D11 DT LIC	46.1	1,736	33.1	148	29.1	53

Interference to proposal scenario 1
50.54% interference received

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	KPJC-LD	D11	LD	APP	SAN FRANCISCO, CA	KPJC-LD 1010566 70-ft	
Undesireds:	KKRM-LD	D11	LD	LIC	Chico, CA	BLANK0000199842	260.1 km
	KCBA	D11	DT	LIC	SALINAS, CA	BLANK0000115967	132.3
	KTVN	D11	DT	LIC	RENO, NV	BLANK0000063879	286.3
	KGO-TV	D12	DT	LIC	SAN FRANCISCO, CA	BLANK0000113050	7.8

Service area		Terrain-limited		IX-free		Percent IX	
1948.3	2,262,974	1798.7	2,163,786	875.6	1,070,125	51.32	50.54

Undesired	Total IX		Unique IX		Prcnt Unique IX	
KCBA D11 DT LIC	38.5	71,910	3.0	1,605	0.17	0.07
KTVN D11 DT LIC	1.0	0	0.0	0	0.00	0.00
KGO-TV D12 DT LIC	920.1	1,092,056	884.7	1,021,751	49.18	47.22

Channel and Facility Information

Section	Question	Response
Facility ID	182962	
State	California	
City	San Francisco	
LPD Channel	11	

Antenna Location Data

Section	Question	Response
Antenna Structure Registration	Do you have an FCC Antenna Structure Registration (ASR) Number?	Yes
	ASR Number	1010566
Coordinates (NAD83)	Latitude	37° 41' 12.3" N+
	Longitude	122° 26' 07.3" W-
	Structure Type	LTOWER-Lattice Tower
	Overall Structure Height	78.3 meters
	Support Structure Height	61.3 meters
	Ground Elevation (AMSL)	390.1 meters
Antenna Data	Height of Radiation Center Above Ground Level	21.3 meters
	Height of Radiation Center Above Mean Sea Level	411.4 meters
	Effective Radiated Power	0.075 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:	Scala
	Model	2x CL-713 Array
	Rotation	0 degrees
	Electrical Beam Tilt	Not Applicable
	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	Value	Degree	Value	Degree	Value	Degree	Value
0	0.807	**90**	0.602	**180**	0.040	**270**	0.035
10	0.622	**100**	0.359	**190**	0.035	**280**	0.030
20	0.698	**110**	0.040	**200**	0.040	**290**	0.040
30	0.622	**120**	0.030	**210**	0.035	**300**	0.359
40	0.807	**130**	0.035	**220**	0.040	**310**	0.602
50	0.946	**140**	0.040	**230**	0.040	**320**	0.807
60	1.000	**150**	0.040	**240**	0.040	**330**	0.946
70	0.946	**160**	0.040	**250**	0.040	**340**	1.000
80	0.807	**170**	0.040	**260**	0.040	**350**	0.946

Additional Azimuths

Degree	V_A