

ENGINEERING EXHIBIT

Digital Low Power Television Station Application for Minor Modification of Licensed Facility

prepared for

Jeff Chang

KPJC-LD San Francisco, CA

Facility ID 182962

Ch. 11 0.059 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. *Chang* herein seeks a minor modification Construction Permit to relocate KPJC-LD to an established mountaintop site, decrease ERP to 0.059 kW, and utilize a different directional antenna.

The proposed KPJC-LD facility will employ a new antenna 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 a Dielectric model THA-C2-2H/4H-1-VP having elliptical polarization. The horizontally ERP is 0.059 kW and the vertically polarized ERP is 0.047 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 dB μ coverage contour of the proposed facility as well as that of the licensed KPJC-LD, demonstrating compliance with §73.3572 for a minor change.

Interference study per OET Bulletin 69¹ shows that the proposal complies with the FCC’s interference protection requirements toward all digital television, television translator, LPTV, and

¹FCC 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 0.1 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 $4.4 \mu\text{W}/\text{cm}^2$, which is 2.2 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 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 0.1 km terrain increment. Comparisons of various results of this computer program (run on a Mac processor) to the FCC's 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. | September 30, 2021 | |
| 207 Old Dominion Road | Yorktown, VA 23692 | 703-650-9600 |

**Azimuth Pattern - Relative Field
(True North)**

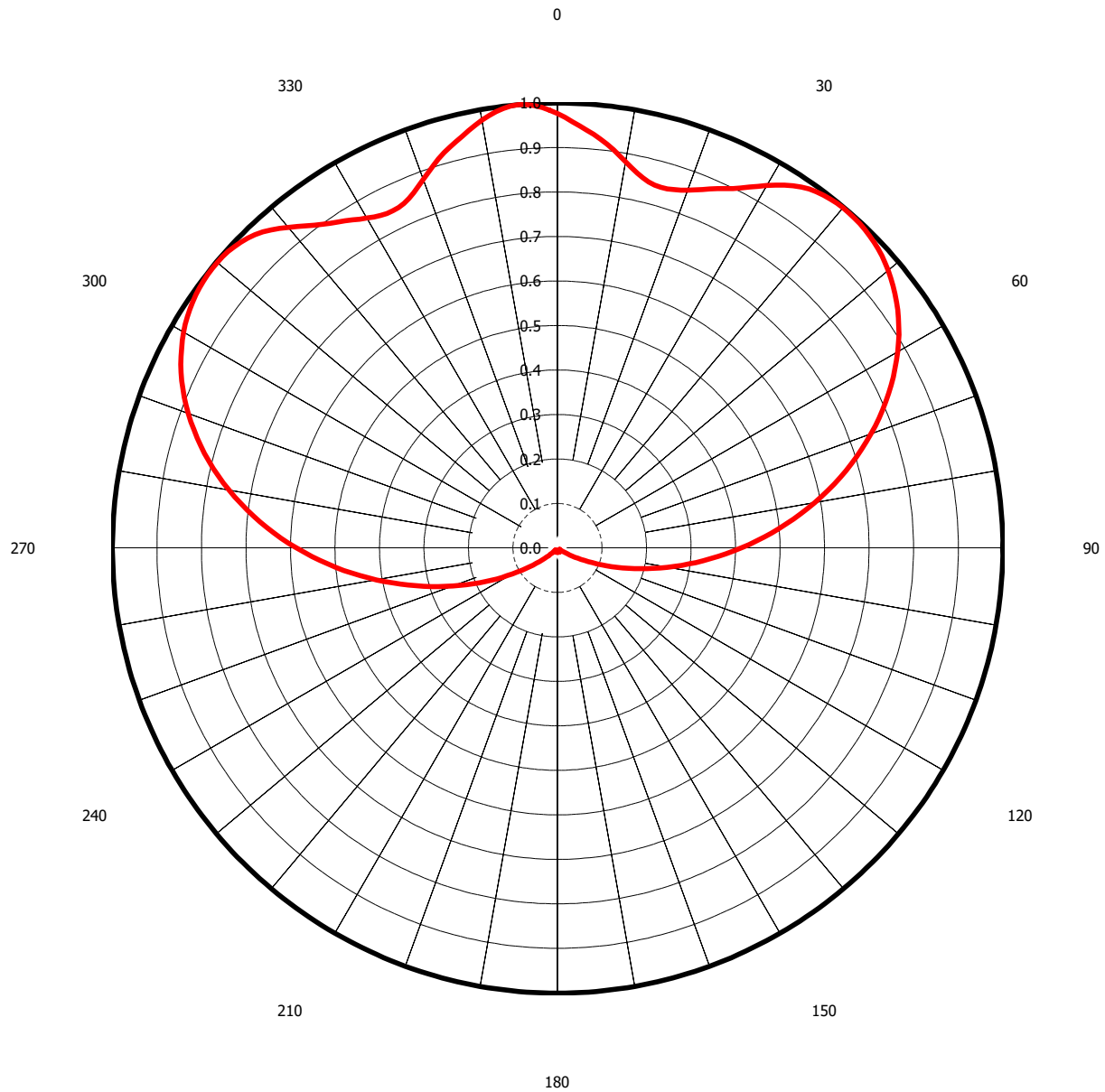


Figure 1
Antenna Azimuthal Pattern
KPJC-LD San Francisco, CA
Facility ID 182962
Ch. 11 0.059 kW Directional

prepared for
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September, 2021



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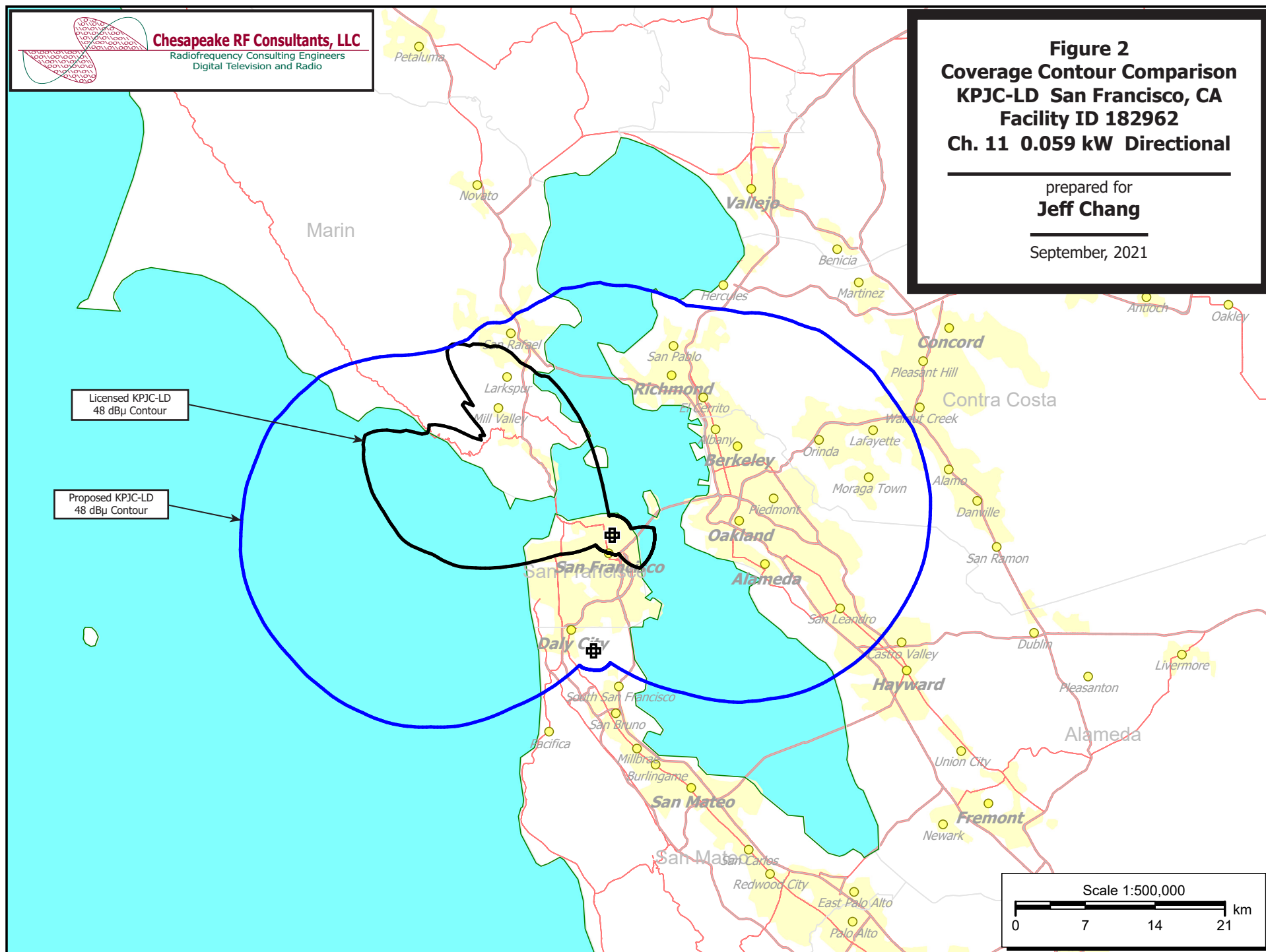


Table 1 KPJC-LD TVStudy Analysis of Proposal (page 1 of 3)



tvstudy v2.2.5 (4uoc83)
Database: localhost, Study: KPJC-LD Bruno_prop, Model: Longley-Rice
Start: 2021.09.30 11:27:03

Study created: 2021.09.30 11:27:03

Study build station data: LMS TV 2021-09-30

Proposal: KPJC-LD D11 LD APP San Francisco, CA
File number: KPJC-LD Bruno_prop
Facility ID: 182962
Station data: User record
Record ID: 3901
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 | CP | CHICO, CA | BLANK0000074670 | 260.1 |
| No | KKRM-LD | D11 | LD | LIC | CHICO, CA | BLDVL20080728AEJ | 260.0 |
| No | KEET | D11 | DT | LIC | EUREKA, CA | BLANK0000005864 | 363.1 |
| No | K27GZ | D11+ | LD | LIC | 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 | K49MP-D | D12 | LD | APP | LAKEPORT, CA | BLANK0000153740 | 169.9 |
| No | K12XJ-D | D12- | LD | LIC | MODESTO, CA | BLANK0000114101 | 124.2 |
| No | KRJR-LP | D12z | LD | CP | SACRAMENTO, CA | BLANK0000051701 | 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: 420.6 m
HAAT: 0.0 m
Peak ERP: 0.059 kW
Antenna: THA-C2-2H-4H-1-VP C-71784 20210930 355.0 deg
Elev Pattn: Generic

48.0 dBu contour:

| Azimuth | ERP | HAAT | Distance |
|---------|----------|---------|----------|
| 0.0 deg | 0.055 kW | 371.2 m | 36.8 km |
| 45.0 | 0.058 | 412.8 | 39.6 |
| 90.0 | 0.010 | 420.5 | 27.8 |
| 135.0 | 0.000 | 417.0 | 2.0 |
| 180.0 | 0.000 | 235.9 | 1.9 |
| 225.0 | 0.000 | 389.4 | 2.0 |
| 270.0 | 0.020 | 402.5 | 31.1 |
| 315.0 | 0.057 | 401.6 | 38.8 |

Database HAAT does not agree with computed HAAT
Database HAAT: 0 m Computed HAAT: 381 m

Distance to Canadian border: 1174.7 km

Distance to Mexican border: 724.4 km

Table 1 KPJC-LD TVStudy Analysis of Proposal
(page 2 of 3)



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: 0.10 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

| Desired: | Call | Chan | Svc | Status | City, State | File Number | Distance |
|--------------------|---------|-------------------|-----|-------------------|-------------------|--------------------|----------------|
| | KXTV | D10 | DT | LIC | SACRAMENTO, CA | BLANK0000146119 | |
| Undesireds: | KPJC-LD | D11 | LD | APP | San Francisco, CA | KPJC-LD Bruno_prop | 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 | | 42265.6 7,306,154 | | 41999.4 7,292,306 | | 41991.3 7,263,137 | 0.02 0.40 |
| Undesired | | Total IX | | Unique IX, before | | Unique IX, after | |
| KPJC-LD D11 LD APP | | 8.1 29,169 | | | | 8.1 29,169 | |
| KVIE D9 DT LIC | | 10.0 352 | | 10.0 352 | | 10.0 352 | |
| KERO-TV D10 DT LIC | | 256.2 13,496 | | 256.2 13,496 | | 256.2 13,496 | |

Interference to BLANK0000156689 LIC scenario 1

| Desired: | Call | Chan | Svc | Status | City, State | File Number | Distance |
|--------------------|---------|-------------------|-----|-------------------|-------------------|--------------------|----------------|
| | KGMC | D11 | DT | LIC | MERCED, CA | BLANK0000156689 | |
| Undesireds: | KPJC-LD | D11 | LD | APP | San Francisco, CA | KPJC-LD Bruno_prop | 273.8 km |
| | KXTV | D10 | DT | LIC | SACRAMENTO, CA | BLANK0000146119 | 223.5 |
| | KTTV | D11 | DT | LIC | LOS ANGELES, CA | BLCDT20100709AFD | 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 | | 39477.7 2,000,943 | | 39313.2 1,999,881 | | 39313.2 1,999,881 | 0.00 0.00 |
| Undesired | | Total IX | | Unique IX, before | | Unique IX, after | |
| KPJC-LD D11 LD APP | | 1.0 0 | | | | 0.0 0 | |
| KXTV D10 DT LIC | | 1.0 0 | | 1.0 0 | | 1.0 0 | |
| KTTV D11 DT LIC | | 9.1 216 | | 9.1 216 | | 9.1 216 | |
| KCBA D11 DT LIC | | 146.3 831 | | 142.3 727 | | 142.3 727 | |
| KTVN D11 DT LIC | | 12.1 119 | | 8.1 15 | | 8.1 15 | |

Interference to BLANK0000115967 LIC scenario 1

| Desired: | Call | Chan | Svc | Status | City, State | File Number | Distance |
|-------------------|---------|-------------------|-----|-------------------|-------------------|--------------------|----------------|
| | KCBA | D11 | DT | LIC | SALINAS, CA | BLANK0000115967 | |
| Undesireds: | KPJC-LD | D11 | LD | APP | San Francisco, CA | KPJC-LD Bruno_prop | 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 | | 25456.5 2,396,089 | | 24512.6 1,343,787 | | 24511.5 1,342,577 | 0.00 0.09 |
| Undesired | | Total IX | | Unique IX, before | | Unique IX, after | |

Table 1 KPJC-LD TVStudy Analysis of Proposal
(page 3 of 3)



| | | | | | | |
|--------------------|-------|-----------|-------|---------|-------|---------|
| KPJC-LD D11 LD APP | 63.0 | 101,391 | | | 1.0 | 1,210 |
| KXTV D10 DT LIC | 2.0 | 0 | 0.0 | 0 | 0.0 | 0 |
| KGMC D11 DT LIC | 393.0 | 110,082 | 308.7 | 6,845 | 308.7 | 6,845 |
| KTVN D11 DT LIC | 8.1 | 122 | 2.0 | 0 | 2.0 | 0 |
| KGO-TV D12 DT LIC | 629.2 | 1,045,335 | 548.9 | 942,220 | 492.1 | 842,039 |

Interference to BLANK0000063879 LIC scenario 1

| Desired: | Call | Chan | Svc | Status | City, State | File Number | Distance |
|--------------------|---------|-----------------|----------|-------------------|-------------------|--------------------|----------------|
| | KTVN | D11 | DT | LIC | RENO, NV | BLANK0000063879 | |
| Undesireds: | KPJC-LD | D11 | LD | APP | San Francisco, CA | KPJC-LD Bruno_prop | 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 | 43512.9 | 912,410 | 43442.8 | 907,921 | 43440.8 907,921 | 0.00 0.00 |
| Undesired | | | Total IX | Unique IX, before | | Unique IX, after | |
| KPJC-LD D11 LD APP | 7.0 | 1,130 | | | 2.0 | 0 | |
| KXTV D10 DT LIC | 37.0 | 4,420 | 24.0 | 2,646 | 23.0 | 2,252 | |
| KGMC D11 DT LIC | 13.0 | 308 | 3.0 | 69 | 3.0 | 69 | |
| KCBA D11 DT LIC | 37.1 | 1,535 | 26.1 | 0 | 25.1 | 0 | |

Interference to proposal scenario 1
50.64% interference received

| Desired: | Call | Chan | Svc | Status | City, State | File Number | Distance |
|-------------------|-----------|-----------------|-----------|-----------|-------------------|--------------------|----------|
| | KPJC-LD | D11 | LD | APP | San Francisco, CA | KPJC-LD Bruno_prop | |
| Undesireds: | KKRM-LD | D11 | LD | CP | CHICO, CA | BLANK0000074670 | 260.1 km |
| | KCBA | D11 | DT | LIC | SALINAS, CA | BLANK0000115967 | 132.3 |
| | KGO-TV | D12 | DT | LIC | SAN FRANCISCO, CA | BLANK0000113050 | 7.8 |
| Service area | | Terrain-limited | | IX-free | | Percent IX | |
| 2347.4 | 2,044,964 | 2212.9 | 1,956,025 | 920.1 | 965,475 | 58.42 50.64 | |
| Undesired | | | Total IX | Unique IX | | Prcnt Unique IX | |
| KCBA D11 DT LIC | 30.4 | 34,791 | 1.0 | 0 | 0.05 | 0.00 | |
| KGO-TV D12 DT LIC | 1291.8 | 990,550 | 1262.4 | 955,759 | 57.05 | 48.86 | |

**Channel and
Facility
Information**

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

Primary station proposed to be rebroadcast:

| Facility Id | Call Sign | City | State |
|-------------|-----------|------|-------|
|-------------|-----------|------|-------|

**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 | 30.5 meters |
| | Height of Radiation Center Above Mean Sea Level | 420.6 meters |
| | Effective Radiated Power | 0.059 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: | Dielectric |
| | Model | THA-C2-2H/4H-1-VP |
| | Rotation | 355 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: | Full Service |

Directional Antenna Relative Field Values (Pre-rotated Pattern)

| Degree | Value | Degree | Value | Degree | Value | Degree | Value |
|--------|-------|--------|-------|--------|-------|--------|-------|
| 0 | 1.000 | 90 | 0.500 | 180 | 0.010 | 270 | 0.500 |
| 10 | 0.933 | 100 | 0.329 | 190 | 0.010 | 280 | 0.671 |
| 20 | 0.844 | 110 | 0.179 | 200 | 0.010 | 290 | 0.821 |
| 30 | 0.891 | 120 | 0.067 | 210 | 0.010 | 300 | 0.933 |
| 40 | 0.985 | 130 | 0.010 | 220 | 0.010 | 310 | 0.992 |
| 50 | 0.992 | 140 | 0.010 | 230 | 0.010 | 320 | 0.985 |
| 60 | 0.933 | 150 | 0.010 | 240 | 0.067 | 330 | 0.891 |
| 70 | 0.821 | 160 | 0.010 | 250 | 0.179 | 340 | 0.844 |
| 80 | 0.671 | 170 | 0.010 | 260 | 0.329 | 350 | 0.933 |

Additional Azimuths

| Degree | V _A |
|--------|----------------|
|--------|----------------|