

ENGINEERING EXHIBIT

Application for Modification of Digital Television Station Construction Permit

prepared for

Sacramento Television Stations, Inc.

KMAX-TV Sacramento, CA

Facility ID 51499

Ch. 21 785 kW 543 m

Sacramento Television Stations, Inc. (“*STSI*”) is the licensee of television station KMAX-TV, pre-auction Channel 21, Sacramento CA, Facility ID 51499 (BLCDDT-20041018ABT). KMAX-TV is licensed to operate with 850 kW effective radiated power (“ERP”) at an antenna height above average terrain (“HAAT”) of 581 meters with a nondirectional antenna. A Construction Permit (“CP” file #0000019214) authorizes relocation of KMAX-TV to another site 2.9 km from the licensed site and to operate at 545 kW ERP and 606 meters HAAT on Channel 21. *STSI* proposes herein to modify the pre-auction Channel 21 CP to utilize decreased antenna height and increased ERP to maintain the same coverage contour as the CP. The proposal complies with the FCC’s April 5, 2013 freeze on contour extensions.

Reassignment of KMAX-TV from Channel 21 to Channel 24 was specified in the *Incentive Auction Closing and Channel Reassignment Public Notice* (“*CCRPN*”, DA 17-317, released April 13, 2017). This application concerns the pre-auction Channel 21 facility which *STSI* intends to relocate prior to the phase transition date when KMAX-TV will change to Channel 24. The FCC’s Licensing and Management System pre-fills the reassignment Channel 24 on the accompanying electronic application form and will not permit the applicant to set it to the intended pre-auction Channel 21. FCC staff advises that they will manually change the channel to the intended Channel 21 in the system after the application has been submitted.

The pre-auction Channel 21 CP specifies a top-mount antenna on the tower associated with FCC Antenna Structure Registration number 1011404. As proposed herein, KMAX-TV will employ a new side-mount antenna at a lower elevation on that same tower. The proposed ERP is 785 kW

ERP utilizing a horizontally polarized Dielectric model TFU-24DSC-R O3 nondirectional antenna at 543 meters HAAT. No change to the overall structure height will result from this proposal.

A map is supplied as Figure 1 which depicts the standard predicted coverage contours. This map includes the location of Sacramento, KMAX-TV’s principal community. As demonstrated thereon, the proposed facility complies with §73.625(a)(1) as the entire principal community will be encompassed by the 48 dBμ contour.

Interference study per FCC OET Bulletin 69¹ shows that the proposal complies with the 0.5 percent limit of new interference caused to pertinent nearby full service and Class A television stations as required by §73.616. The interference study output report is provided as Table 1.

The OET Bulletin 69 analysis (utilizing FCC legacy software implementation with 2000 Census data as customarily required for post-transition analysis) also shows that the proposed KMAX-TV facility’s predicted service population provides a 99.0 percent match of the MB Docket 87-268 Seventh Report and Order Appendix B facility, as detailed in the table below.

Digital Television Population Summary
Legacy OET Bulletin 69 Software, 2000 Census

Population Summary (2000 Census) OET Bulletin 69 method	Appendix B 850 kW 581 m	Proposed 785 kW 543 m
Within Noise Limited Contour	9,731,055	9,684,937
Not affected by terrain losses	6,385,375	6,319,098
Lost to all interference	383	5
Net DTV Service	6,384,992	6,319,093
Match of Appendix B	---	98.97%

The post-transition Appendix B KMAX-TV facility parameters are the same as the licensed KMAX-TV parameters (BLCDT-20041018ABT), and also match the KMAX-TV baseline parameters for the reverse auction.² Additional analysis pursuant to FCC OET Bulletin 69 using the

¹FCC Office of Engineering and Technology Bulletin number 69, *Longley-Rice Methodology for Evaluating TV Coverage and Interference*, February 6, 2004 (“OET-69”). The implementation of OET-69 for this study followed the guidelines of OET-69 as specified therein. A cell size of 2 km was employed. Comparisons of various results of this computer program (run on a Sun Sparc processor) to the FCCs implementation of OET-69 show excellent correlation.

² *Incentive Auction Task Force Releases Revised Baseline Data And Prices For Reverse Auction; Announces*

FCC’s “TVStudy” software³ and 2010 Census data shows that the proposed KMAX-TV facility will provide a 100.5 percent population match of the auction baseline facility (see table below).

Digital Television Population Summary
TVStudy Software, 2010 Census

Population Summary (2010 Census) OET Bulletin 69: TVStudy	Auction Baseline 850 kW 581 m	Proposed 785 kW 543 m
Within Noise Limited Contour	10,691,054	10,644,556
Not affected by terrain losses	6,944,437	6,963,166
Lost to all interference	30,316	17,114
Net DTV Service	6,914,121	6,946,052
Match of License	---	100.46%

The FCC’s “freeze” Public Notice⁴ of April 5, 2013 (DA 13-618) imposed limitations on the filing and processing of full power station applications that propose an increase in their authorized noise-limited service contour (“NLSC”). The proposed KMAX-TV facility complies with the freeze. As shown in Figure 2, the proposed 785 kW / 543 m HAAT facility’s NLSC (41 dBμ) does not extend beyond that of the licensed facility (850 kW / 581 m), and is essentially identical to the CP facility’s NLSC (545 kW / 606 m HAAT).

The proposed 785 kW ERP exceeds the maximum allowed for the proposed antenna HAAT of 543 meters currently permitted by §73.622(f)(8)(i). Section 73.622(f)(5) permits the maximum ERP to be exceeded in order to provide the same geographic coverage area as the largest station within the same market. Since the proposed KMAX-TV 41 dBμ contour is encompassed by the licensed KMAX-TV contour (see Figure 2), the proposal will result in a slightly smaller service area than that of the existing KMAX-TV. Additionally, the total area within the proposed KMAX-TV 41 dBμ contour is 41,658 square kilometers, which does not exceed the coverage contour area of

Revised Filing Window Dates, Public Notice, DA 15-1296, November 12, 2015.

³The FCC’s “TVStudy” program was employed with a standard cell size of 2 km and all default parameters. Comparisons of various results of this computer program (run on a Mac platform) to the FCC’s TVStudy implementation of OET-69 show excellent correlation.

⁴“*Media Bureau Announces Limitations on the Filing and Processing of Full Power and Class A Television Station Modification Applications, Effective Immediately, and Reminds Stations of Spectrum Act Preservation Mandate*,” DA 13-618, Public Notice, released April 5, 2013.

KXTV(DT) (47,583 sq. km, Ch. 10, Sacramento, CA, BLCDT-20120201AAM). Thus, the 785 kW ERP specified herein is in compliance with §73.622(f)(5) of the FCC's Rules.

The nearest FCC monitoring station is 61 km distant at Livermore, CA. Using the FCC propagation curves, the proposed F(50,90) signal level at the monitoring station is 3.7 mV/m, which is below the 10 mV/m threshold of §73.1030(c) for further analysis. The site is not located within the areas requiring coordination with "quiet" zones specified in §73.1030(a) and (b). There are no authorized AM stations within 3 kilometers of the site. The site location is beyond the border areas requiring international coordination.

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 10 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 $0.9 \mu\text{W}/\text{cm}^2$, which is 0.3 percent of the general population/uncontrolled maximum permitted exposure limit. This is well 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.

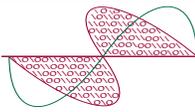
This exhibit is limited to the evaluation of exposure to RF electromagnetic field. The proposed transmitting antenna will be installed on an existing antenna support structure which was constructed prior to March 16, 2001. No increase in structure height is proposed.

List of Attachments

Figure 1	Proposed Coverage Contours
Figure 2	Coverage Contour Comparison
Table 1	OET Bulletin 69 Interference Study
Form 2100	Saved Version of Engineering Sections from FCC Form at Time of Upload

Chesapeake RF Consultants, LLC

Joseph M. Davis, P.E.	August 9, 2017	
207 Old Dominion Road	Yorktown, VA 23692	703-650-9600

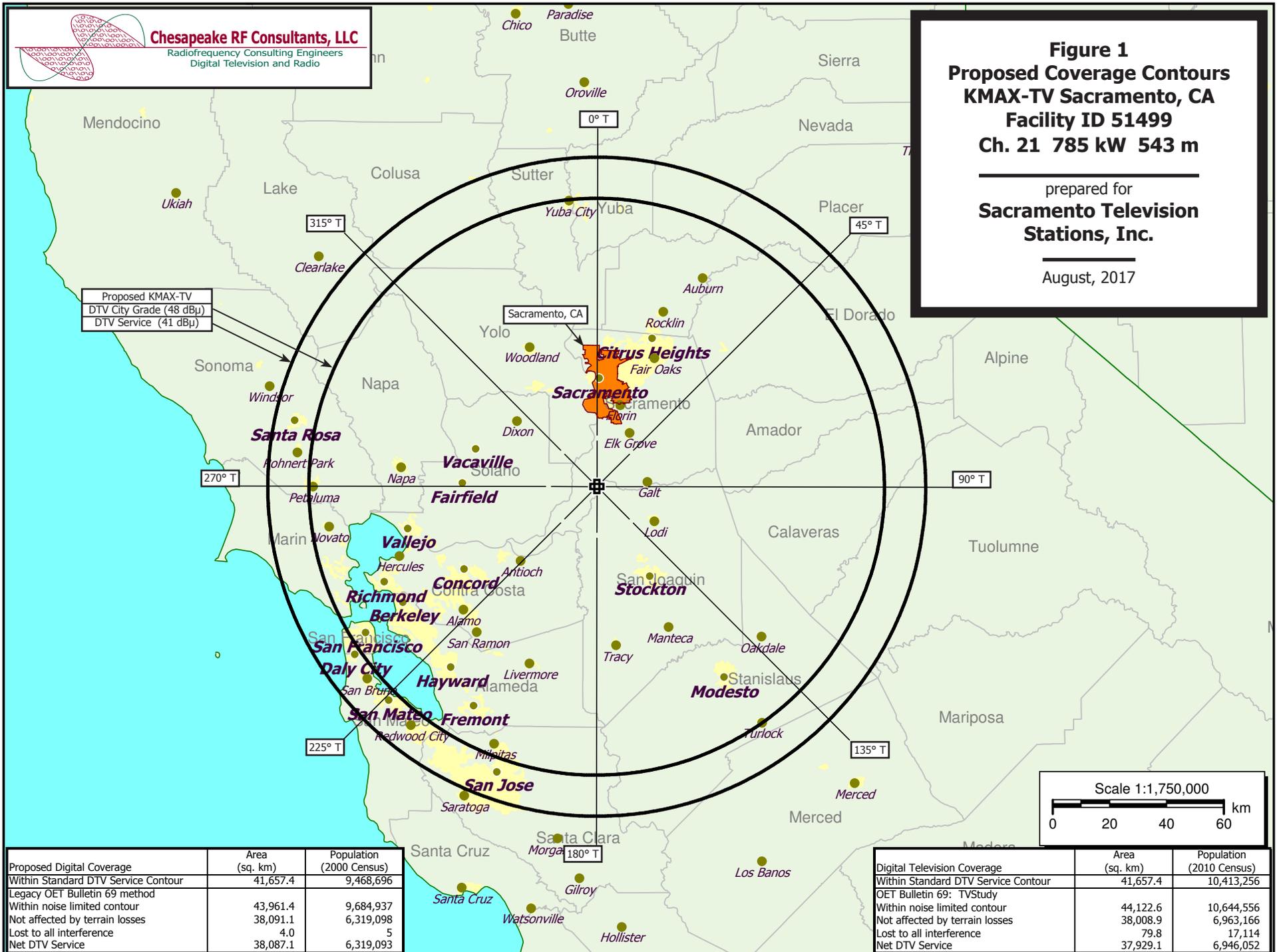


Chesapeake RF Consultants, LLC
 Radiofrequency Consulting Engineers
 Digital Television and Radio

Figure 1
Proposed Coverage Contours
KMAX-TV Sacramento, CA
Facility ID 51499
Ch. 21 785 kW 543 m

prepared for
Sacramento Television Stations, Inc.

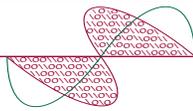
August, 2017



Proposed KMAX-TV
 DTV City Grade (48 dBμ)
 DTV Service (41 dBμ)

Proposed Digital Coverage	Area (sq. km)	Population (2000 Census)
Within Standard DTV Service Contour	41,657.4	9,468,696
Legacy OET Bulletin 69 method		
Within noise limited contour	43,961.4	9,684,937
Not affected by terrain losses	38,091.1	6,319,098
Lost to all interference	4.0	5
Net DTV Service	38,087.1	6,319,093

Digital Television Coverage	Area (sq. km)	Population (2010 Census)
Within Standard DTV Service Contour	41,657.4	10,413,256
OET Bulletin 69: TVStudy		
Within noise limited contour	44,122.6	10,644,556
Not affected by terrain losses	38,008.9	6,963,166
Lost to all interference	79.8	17,114
Net DTV Service	37,929.1	6,946,052



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

Figure 2
Coverage Contour Comparison
KMAX-TV Sacramento, CA
Facility ID 51499
Ch. 21 785 kW 543 m

prepared for
Sacramento Television
Stations, Inc.

August, 2017

Licensed KMAX-TV
850 kW 581 m
41 dBu Contour (NLSC)

Proposed KMAX-TV
785 kW 543 m
Identical to KMAX-TV CP
File# 0000019214
545 kW 606 m
41 dBu Contour (NLSC)

Licensed Site

CP Site

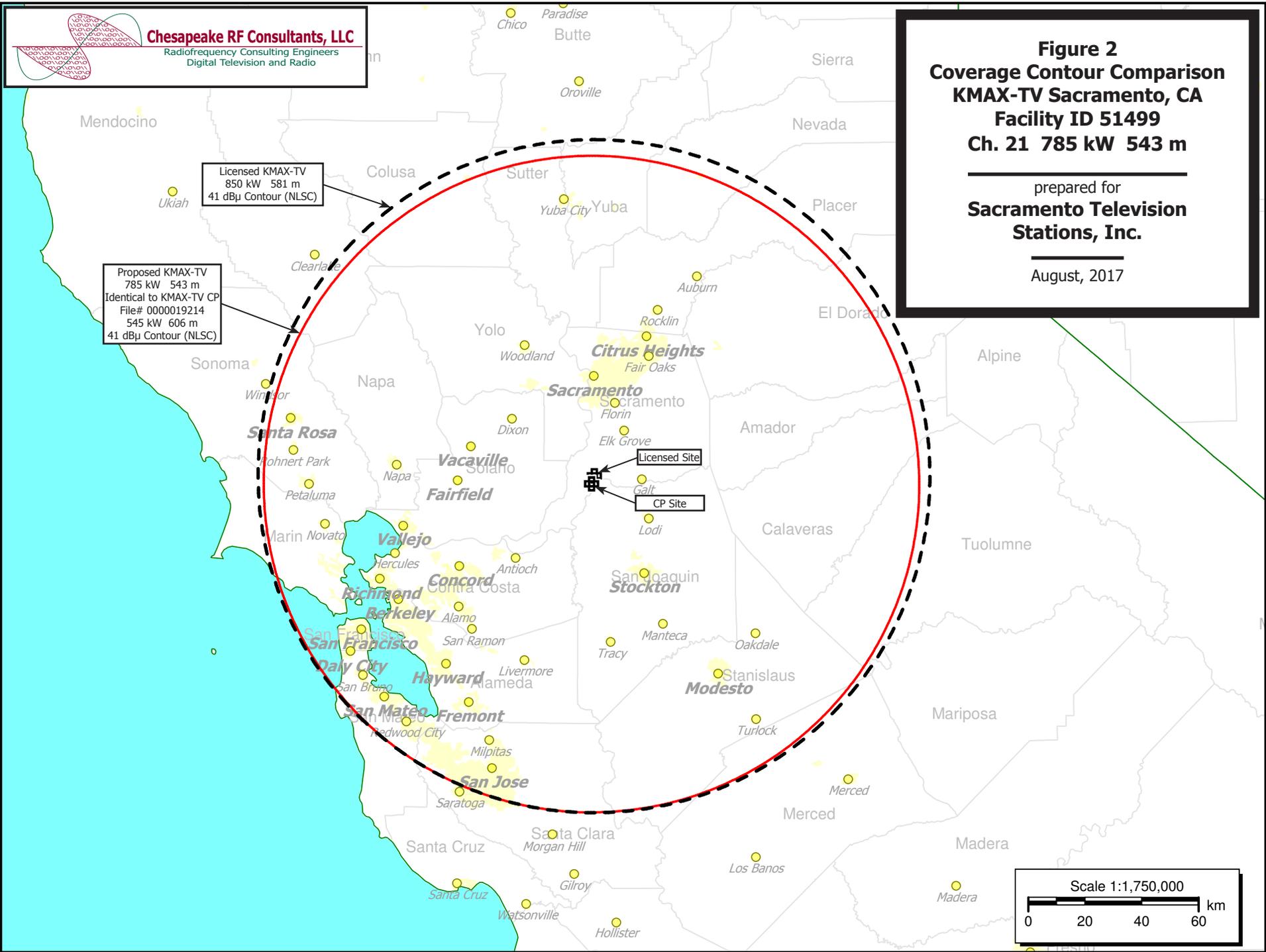
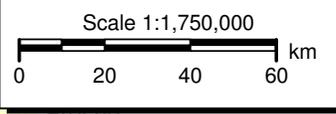


Table 1 KMAX-TV OET Bulletin 69 Interference Study
 (page 1 of 4)



TV INTERFERENCE and SPACING ANALYSIS PROGRAM

Date: 08-09-2017 Time: 15:16:02

Record Selected for Analysis

KMAX-TV USERRECORD-01 SACRAMENTO CA US
 Channel 21 ERP 785. kW HAAT 542. m RCAMSL 00543 m
 Latitude 038-14-24 Longitude 0121-30-03
 Status APP Zone 2 Border Site number: 01
 Last update Cutoff date Docket
 Comments
 Applicant

Cell Size for Service Analysis 2.0 km/side

Distance Increments for Longley-Rice Analysis 1.00 km

Facility (site # 01) does not meet maximum height/power limits
 Channel 21 ERP = 785.00 HAAT = 542.

Site number 1			
Azimuth (Deg)	ERP (kW)	HAAT (m)	41.0 dBu F(50,90) (km)
0.0	785.000	542.7	115.047
45.0	785.000	538.9	114.811
90.0	785.000	539.3	114.832
135.0	785.000	541.5	114.971
180.0	785.000	543.7	115.106
225.0	785.000	543.6	115.101
270.0	785.000	543.2	115.073
315.0	785.000	542.6	115.036

Evaluation toward Class A Stations from site # 01

No Spacing violations or contour overlap
 to Class A stations from site # 01

Class A Evaluation Complete

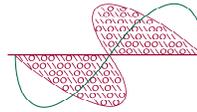
Checks to Site Number 01

- Proposed facility OK to FCC Monitoring Stations
- Proposed facility OK toward West Virginia quiet zone
- Proposed facility OK toward Table Mountain
- Proposed facility is beyond the Canadian coordination distance
- Proposed facility is beyond the Mexican coordination distance
- Proposed station is OK toward AM broadcast stations

 Start of Interference Analysis

Channel	Proposed Station Call	City/State	ARN
21	KMAX-TV	SACRAMENTO CA	USERRECORD01

Table 1 KMAX-TV OET Bulletin 69 Interference Study
 (page 2 of 4)



Stations Potentially Affected by Proposed Station

Chan	Call	City/State	Dist(km)	Status	Application	Ref. No.
20	KFTV-DT	HANFORD CA	223.6	LIC	BLCDT	20020906ABE
20	KCVU	PARADISE CA	192.4	LIC	BLCDT	20081222AAV
20	K20JX-D	SACRAMENTO CA	67.8	LIC	BLDTA	20101006AAS
20	KAME-TV	RENO NV	209.8	LIC	BLANK	0000001059
22	KZMM-CD	FRESNO CA	223.7	LIC	BLDTA	20110920ACZ

%%%

Analysis of Interference to Affected Station 1

Analysis of current record

Channel	Call	City/State	Application	Ref. No.
20	KFTV-DT	HANFORD CA	BLCDT	-20020906ABE

Stations Potentially Affecting This Station

Chan	Call	City/State	Dist(km)	Status	Application	Ref. No.
20	KVME-TV	BISHOP CA	116.5	LIC	BLANK	-0000001562
20	KCVU	PARADISE CA	377.5	LIC	BLCDT	-20081222AAV
20	KAME-TV	RENO NV	281.0	LIC	BLANK	-0000001059
21	KMAX-TV	SACRAMENTO CA	224.5	PLN	DTVPLN	-DTVP0738
21	KMAX-TV	SACRAMENTO CA	223.6	APP	USERRECORD-01	

Proposal causes no interference

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Analysis of Interference to Affected Station 2

Analysis of current record

Channel	Call	City/State	Application	Ref. No.
20	KCVU	PARADISE CA	BLCDT	-20081222AAV

Stations Potentially Affecting This Station

Chan	Call	City/State	Dist(km)	Status	Application	Ref. No.
20	KVME-TV	BISHOP CA	417.1	LIC	BLANK	-0000001562
20	KFTV-DT	HANFORD CA	377.5	LIC	BLCDT	-20020906ABE
20	KAME-TV	RENO NV	168.8	LIC	BLANK	-0000001059
21	KMAX-TV	SACRAMENTO CA	189.8	PLN	DTVPLN	-DTVP0738
21	KMAX-TV	SACRAMENTO CA	192.4	APP	USERRECORD-01	

Proposal causes no interference

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Analysis of Interference to Affected Station 3

Analysis of current record

Channel	Call	City/State	Application	Ref. No.
20	K20JX-D	SACRAMENTO CA	BLDTA	-20101006AAS

Stations Potentially Affecting This Station

Chan	Call	City/State	Dist(km)	Status	Application	Ref. No.
20	KVME-TV	BISHOP CA	316.2	LIC	BLANK	-0000001562
20	KSCZ-LD	GREENFIELD CA	184.3	LIC	BLDTL	-20120323AAC
20	KSCZ-LD	GREENFIELD CA	155.9	LIC	BLANK	-0000016657
20	KFTV-DT	HANFORD CA	256.2	LIC	BLCDT	-20020906ABE
20	KCVU	PARADISE CA	130.1	LIC	BLCDT	-20081222AAV
20	K20FR-D	HAWTHORNE NV	225.8	CP MOD	BMPDPT	-20090521ADK
20	K20FR-D	HAWTHORNE NV	225.8	LIC	BLDTT	-20090914ACI
20	KAME-TV	RENO NV	155.3	LIC	BLANK	-0000001059
21	KMAX-TV	SACRAMENTO CA	64.9	PLN	DTVPLN	-DTVP0738
21	KMAX-TV	SACRAMENTO CA	67.8	APP	USERRECORD-01	

Table 1 KMAX-TV OET Bulletin 69 Interference Study
 (page 3 of 4)



Total scenarios = 1

Result key: 1
 Scenario 1 Affected station 3
 Before Analysis

Results for: 20A CA SACRAMENTO BLDTA 20101006AAS LIC
 HAAT 114.0 m, ATV ERP 4.7 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	1008430	1669.2
not affected by terrain losses	1008430	1669.2
lost to NTSC IX	0	0.0
lost to additional IX by ATV	725883	967.0
lost to ATV IX only	725883	967.0
lost to all IX	725883	967.0

Potential Interfering Stations Included in above Scenario 1

20A CA PARADISE	BLCDT	20081222AAV	LIC
21A CA SACRAMENTO	DTVPLN	DTVP0738	PLN

After Analysis

Results for: 20A CA SACRAMENTO BLDTA 20101006AAS LIC
 HAAT 114.0 m, ATV ERP 4.7 kW

	POPULATION	AREA (sq km)
within Noise Limited Contour	1008430	1669.2
not affected by terrain losses	1008430	1669.2
lost to NTSC IX	0	0.0
lost to additional IX by ATV	725883	967.0
lost to ATV IX only	725883	967.0
lost to all IX	725883	967.0

Potential Interfering Stations Included in above Scenario 1

20A CA PARADISE	BLCDT	20081222AAV	LIC
21A CA SACRAMENTO	USERRECORD01		APP

Percent new IX = 0.0000%

Worst case new IX 0.0000% Scenario 1

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Analysis of Interference to Affected Station 4

Analysis of current record

Channel	Call	City/State	Application Ref. No.
20	KAME-TV	RENO NV	BLANK -0000001059

Stations Potentially Affecting This Station

Chan	Call	City/State	Dist(km)	Status	Application Ref. No.
20	KVME-TV	BISHOP CA	279.2	LIC	BLANK -0000001562
20	KFTV-DT	HANFORD CA	281.0	LIC	BLCDT -20020906ABE
20	KCVU	PARADISE CA	168.8	LIC	BLCDT -20081222AAV
21	KMAX-TV	SACRAMENTO CA	207.2	PLN	DTVPLN -DTVP0738
21	KMAX-TV	SACRAMENTO CA	209.8	APP	USERRECORD-01

Proposal causes no interference

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Analysis of Interference to Affected Station 5

Analysis of current record

Channel	Call	City/State	Application Ref. No.
22	KZMM-CD	FRESNO CA	BLDTA -20110920ACZ

Table 1 KMAX-TV OET Bulletin 69 Interference Study
 (page 4 of 4)



Stations Potentially Affecting This Station

Chan	Call	City/State	Dist(km)	Status	Application	Ref. No.
22	NEW	BAKERSFIELD CA	195.1	APP	BNPDTL	-20090825BUG
22	K22HB	MAMMOTH LAKES CA	75.7	LIC	BLTTL	-20071212ABV
22	K22LI-D	NEWMAN CA	147.0	CP	BNPDTL	-20100513ADU
22	KLFB-LD	SALINAS CA	203.9	CP	BPDTL	-20120425AAW
22	KLFB-LD	SALINAS CA	203.0	LIC	BLDTL	-20101005ABL
22	K22LM-D	SANTA MARIA CA	287.0	CP	BDCCDTT	-20120725AAE
22	K22FH-D	HAWTHORNE NV	164.8	LIC	BLDTT	-20100630BZY
22	K22JC-D	SILVER SPRINGS NV	268.8	LIC	BLDTT	-20121204ACN
21	KMAX-TV	SACRAMENTO CA	223.7	APP	USERRECORD-01	

Proposed station is beyond the site to nearest cell evaluation distance

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Analysis of Interference to Affected Station 6

Analysis of current record

Channel	Call	City/State	Application Ref. No.
21	KMAX-TV	SACRAMENTO CA	USERRECORD-01

Stations Potentially Affecting This Station

Chan	Call	City/State	Dist(km)	Status	Application	Ref. No.
20	KFTV-DT	HANFORD CA	223.6	LIC	BLCDDT	-20020906ABE
20	KCVU	PARADISE CA	192.4	LIC	BLCDDT	-20081222AAV
20	KAME-TV	RENO NV	209.8	LIC	BLANK	-0000001059

Total scenarios = 1

Result key: 2
 Scenario 1 Affected station 6
 Before Analysis

Results for: 21A CA SACRAMENTO USERRECORD01 APP

	POPULATION	AREA (sq km)
HAAT 542.0 m, ATV ERP 785.0 kW		
within Noise Limited Contour	9684937	43961.4
not affected by terrain losses	6319098	38091.1
lost to NTSC IX	0	0.0
lost to additional IX by ATV	5	4.0
lost to ATV IX only	5	4.0
lost to all IX	5	4.0

Potential Interfering Stations Included in above Scenario 1

20A CA PARADISE BLCDDT 20081222AAV LIC

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FINISHED FINISHED FINISHED FINISHED FINISHED FINISHED

Channel and Facility Information

Pre-filled and fixed to post-auction Ch-24 on electronic form. FCC Staff to change to intended, pre-auction Ch-21 after form is submitted.

Section	Question	Response
Proposed Community of License	Facility ID	51499
	State	California
	City	SACRAMENTO
	DTV Channel	24
Facility Type	Facility Type	Commercial
	Station Type	Main
Zone	Zone	2

Antenna Location Data

Section	Question	Response
Antenna Structure Registration	Do you have an FCC Antenna Structure Registration (ASR) Number?	Yes
	ASR Number	1011404
Coordinates (NAD83)	Latitude	38° 14' 24.0" N+
	Longitude	121° 30' 07.0" W-
	Structure Type	GTOWER-Guyed Structure Used for Communication Purposes
	Overall Structure Height	624.5 meters
	Support Structure Height	583.7 meters
	Ground Elevation (AMSL)	0.0 meters
Antenna Data	Height of Radiation Center Above Ground Level	545.3 meters
	Height of Radiation Center Above Average Terrain	543.3 meters
	Height of Radiation Center Above Mean Sea Level	545.3 meters
	Effective Radiated Power	785 kW

**Antenna
Technical Data**

Section	Question	Response
Antenna Type	Antenna Type	Non-Directional
	Do you have an Antenna ID?	
	Antenna ID	
Antenna Manufacturer and Model	Manufacturer:	DIE
	Model	TFU-24DSC-R O3
	Rotation	
	Electrical Beam Tilt	0.75
	Mechanical Beam Tilt	Not Applicable
	toward azimuth	
	Polarization	Horizontal
DTV and DTS: Elevation 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	

**Construction
Permit
Certifications**

Section	Question	Response
<p>Post-Incentive Auction Expedited Processing</p>	<p>It will operate on the DTV channel for this station as established in the post-incentive auction channel reassignment public notice.</p>	<p>No</p>
	<p>It will operate post-incentive auction facilities that do not expand the noise-limited service contour in any direction beyond that established by the post-incentive auction channel reassignment public notice.</p>	<p>Yes</p>
	<p>It will operate post-incentive auction facilities that match or reduce by no more than five percent with respect to predicted population from those defined in the post-incentive auction channel reassignment public notice.</p>	<p>Yes</p>
	<p>The antenna structure to be used by this facility has been registered by the Commission and will not require re-registration to support the proposed antenna, OR the FAA has previously determined that the proposed structure will not adversely affect safety in air navigation and this structure qualifies for later registration under the Commission's phased registration plan, OR the proposed installation on this structure does not require notification to the FAA pursuant to 47 C.F.R. Section 17.7.</p>	<p>Yes</p>
<p>Environmental Effect</p>	<p>Would a Commission grant of Authorization for this location be an action which may have a significant environmental effect? (See Section 1.1306 of 47 C.F.R.)</p>	<p>No</p>
<p>Broadcast Facility</p>	<p>The proposed facility complies with the applicable engineering standards and assignment requirements of 47 C.F.R. Sections 73.616, 73.622(i), 73.623(e), 73.625, 73.1030, and 73.1125.</p>	<p>Yes</p>