

Engineering Statement

prepared for

Gray Television Licensee, LLC

KKCO(DT) Grand Junction, CO

Facility ID 24766

Ch. 30 50 kW 452 m

This engineering statement has been prepared on behalf of *Gray Television Licensee, LLC* (“Gray”), licensee of KKCO(DT) (Facility ID 24766, Grand Junction CO) in support of a *Petition for Rulemaking* to amend §73.622(i)¹ by changing KKCO’s digital television channel assignment. KKCO is licensed to operate on Channel 12 (file#0000029050). As described herein, *Gray* requests substitution of Channel 30 in lieu of Channel 12 for KKCO.

The KKCO Channel 12 facility is in the VHF spectrum and has proven to be ineffective for satisfactory viewer reception as discussed herein and elsewhere in the petition. The use of Channel 30 would place KKCO in the UHF spectrum which is known to provide robust signal levels for home reception.

Gray has determined that many viewers experience significant difficulty in receiving KKCO’s signal. Problems with digital VHF reception by stations in many markets were widely publicized since the 2009 digital transition date. It has been established that indoor reception is difficult for digital VHF stations such as KKCO due to the longer wavelength signal’s inability to readily pass through buildings (the windows are smaller than the wavelength size), the ineffectiveness of many indoor antennas many of which were designed to emphasize the shorter wavelengths for UHF reception, and high levels of manmade and environmental noise.

¹The post-incentive auction transition period ended on July 13, 2020, pursuant to the *Incentive Auction Closing and Channel Reassignment Public Notice* (DA 17-317, released April 13, 2017). The FCC’s rules have not yet been amended to reflect all new full power channel assignments in a revised Table of Allotments. Because the Table has not yet been amended, it is understood that FCC’s Media Bureau will continue to refer to the Post-Transition Table of DTV Allotments, 47 CFR § 73.622(i) (2018), for the purpose of post-auction channel change rulemaking proceedings.

No change in transmitting location is proposed. The KKCO tower structure corresponds to FCC Antenna Structure Registration (“ASR”) number 1235966. *Gray* proposes to implement the Channel 30 substitution with a top-mounted transmitting antenna on the existing tower structure which would replace the existing top-mounted Channel 12 antenna.

The licensed Channel 12 facility operates with 5.3 kW effective radiated power (“ERP”) directional at 452 meters antenna height above average terrain (“HAAT”). *Gray* proposes herein to utilize 50 kW ERP directional on Channel 30 at 452 meters antenna HAAT.

A summary of the licensed Channel 12 and proposed Channel 30 technical parameters is provided in the following.

Licensed Channel 12 Parameters (file# 0000029050)

FacID	Call	Ch	City	St	Lat	Lon	RCAMSL	HAAT	ERP	DA
24766	KKCO	12	GRAND JUNCTION	CO	390359.9	1084447.4	2243.9	452	5.3	DA

Proposed Channel 30 Parameters

FacID	Call	Ch	City	St	Lat	Lon	RCAMSL	HAAT	ERP	DA
24766	KKCO	30	GRAND JUNCTION	CO	390359.9	1084447.4	2243.9	452	50	DA

The proposed directional antenna azimuthal pattern is plotted in Figure 1. The proposed directional antenna pattern is a wide cardioid oriented at 90°T, and is similar to the licensed Channel 12 directional pattern.

A map is supplied as Figure 2 which depicts the standard predicted coverage contours. As demonstrated thereon, the proposed facility complies with §73.625(a)(1) as the entire community of Grand Junction will be encompassed by the 48 dBμ contour.

Interference study per FCC OET Bulletin 69² 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.

A coverage contour comparison map is provided in Figure 3, showing that the proposed Channel 30 noise limited service contour (“NLSC”) will fall short of matching that of the licensed Channel 12 facility. The gap between the proposed Channel 30 NLSC and the licensed Channel 12 NLSC is approximately 10 kilometers. The licensed Channel 12 facility provides terrain-limited service to 176,577 persons within its NLSC. *Gray* has determined that constructing a Channel 30 facility having an ERP of 50 kW would be complementary to KKCO’s market size and fairly low population served.

The proposed KKCO Channel 30 NLSC loss areas are depicted in Figure 3. A population summary of the NLSC loss is provided on the map and in the following table.

Loss Area Analysis – Standard FCC Contours

KKCO Population Within NLSC	(2010 census)
Licensed Ch. 12 Total:	206,024
Proposed Ch. 30 Total:	187,481
Loss Area Population:	28,543
(percentage)	13.9%

The licensed Channel 12 facility’s NLSC encompasses 206,024 persons and the proposed Channel 30 facility’s NLSC would encompass 187,481 persons. The resulting NLSC loss population is 18,543 persons, representing 13.9 percent of the total population within the licensed KKCO Channel 12 NLSC.

The region of Grand Junction is within the Rocky Mountains. Grand Junction is located in a deep valley area along the Colorado River. Substantial terrain blockage surrounds Grand

²FCC 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, 2 km cell size, and 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.

Junction and throughout the region, such that the standard NLSC for Grand Junction television stations overstates the actual coverage area and population achieved.

The results of additional loss area analysis are also provided in Figure 3, now to consider terrain-limited coverage predictions of the KKCO licensed Channel 12 facility and the proposed Channel 30 operation. Here, the FCC's TVStudy computer program was used to determine terrain-limited coverage predictions at locations beyond the proposed Channel 30 NLSC. The study area was set using the "fixed geography" option to match the KKCO licensed Channel 12 NLSC. Default cell size and profile step settings were employed. The analysis included examination of each cell that is located beyond the Channel 30 NLSC and within the existing Channel 12 facility's NLSC. The results regarding the population within the NLSC loss area are provided on Figure 3 and in the following table.

Loss Area Analysis – Terrain-Limited	
KKCO Terrain-Limited Population	
TVStudy at Fixed Geography Area	(2010 census)
Licensed Ch. 12 Total	176,577
Loss beyond Licensed NLSC (percentage)	4 0.00%

The determination of terrain-limited service loss considers each cell that is located within the existing Channel 12 facility's NLSC and beyond the Channel 30 NLSC. Nearly all of the cells beyond the Channel 30 NLSC that would lose terrain-limited service are unpopulated. This analysis shows that the terrain-limited loss population is only 4 persons. The FCC has previously found that population loss of less than 500 persons is *de minimis*.³

Conclusion

The proposed channel substitution complies with the FCC's principal community coverage requirements of §73.625 and the interference protection requirements of §73.616. The area of service loss can be considered as *de minimis*.

³See *WSET, Inc.*, 80 FCC 2d 233, 246 (1980).

List of Attachments

Figure 1	Antenna Azimuthal Pattern
Figure 2	Proposed Coverage Contours
Figure 3	Loss Area Analysis – Terrain-Limited Method
Table 1	TVStudy Analysis of Proposal

Chesapeake RF Consultants, LLC

Joseph M. Davis, P.E.	August 13, 2021	
207 Old Dominion Road	Yorktown, VA 23692	703-650-9600



Spec Number: 20210813 jmd preliminary

Model Number: ATW10H8-ETC170-30H

Azimuth Pattern

Type:	ATW-C170	Polarization:	Horizontal
Directivity:	1.70 numeric (2.30 dB)	Frequency:	30 (ATSC)
Peak(s) at:		Location:	Grand Junction CO
		Note: Pattern shape and directivity may vary with channel and mounting configuration.	

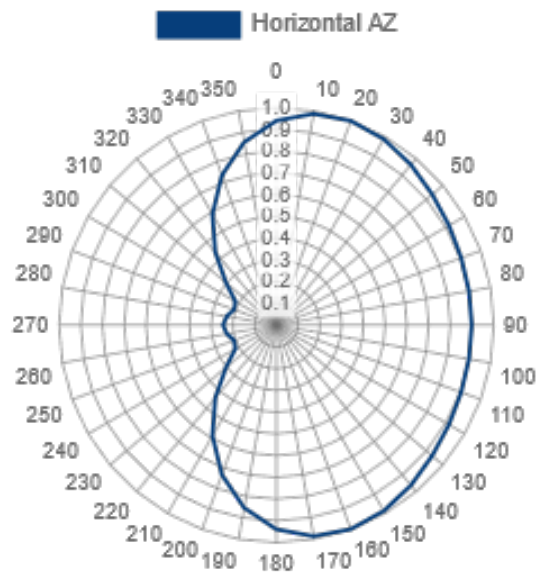
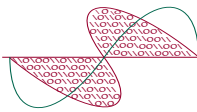


Figure 1
Antenna Azimuthal Pattern
KKCO(DT) Grand Junction, CO
Facility ID 24766
Ch. 30 50 kW 452 m

prepared for
Gray Television Licensee, LLC

August, 2021

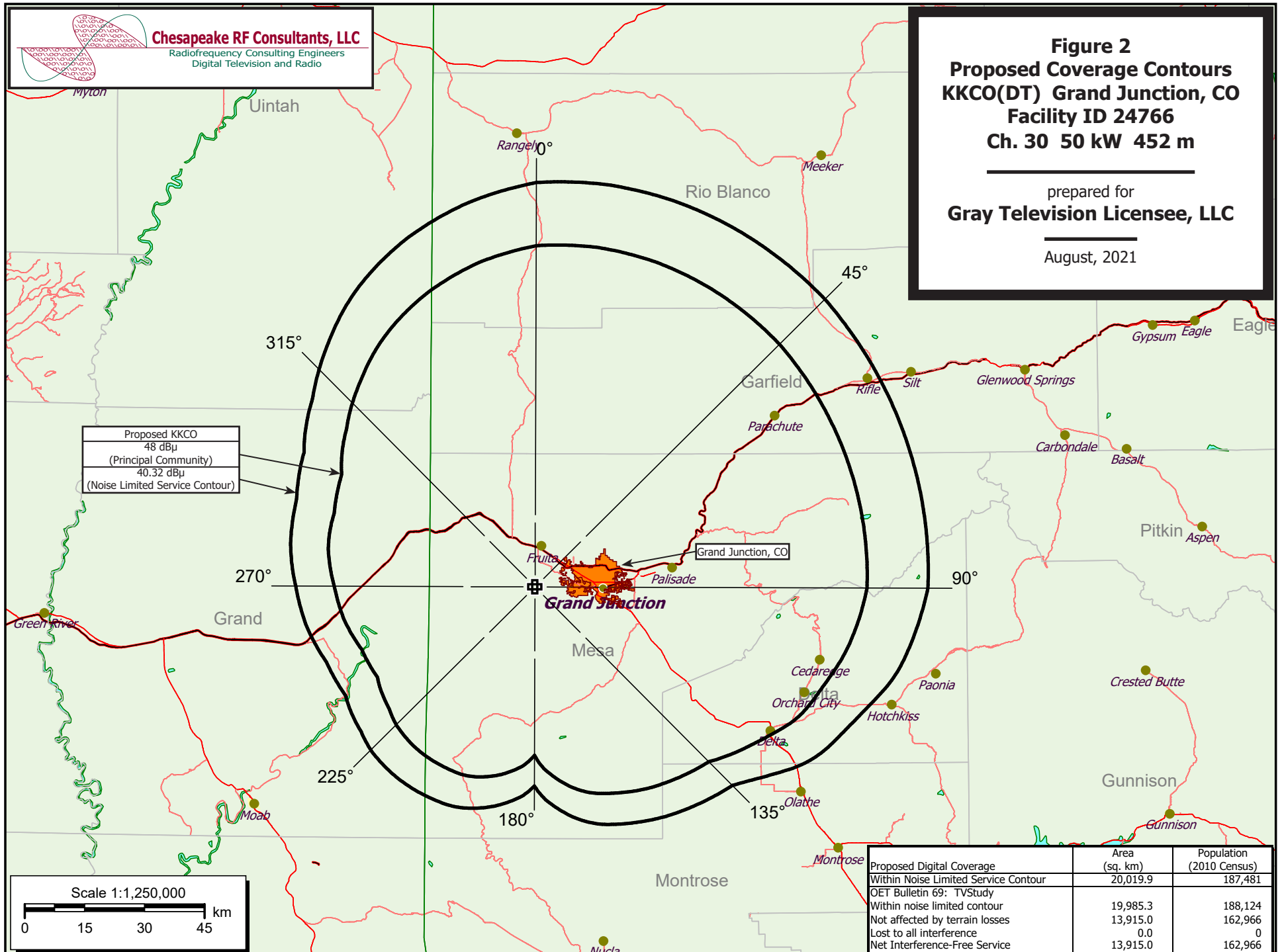


Chesapeake RF Consultants, LLC
Radiofrequency Consulting Engineers
Digital Television and Radio

Figure 2
Proposed Coverage Contours
KKCO(DT) Grand Junction, CO
Facility ID 24766
Ch. 30 50 kW 452 m

prepared for
Gray Television Licensee, LLC

August, 2021





Uintah

Proposed KKCO Ch. 30
40.32 dBμ Contour (NLSC)
Population: 187,481

NLSC Loss Area
Population: 18,543
(Yellow Tint)

KKCO Licensed Ch. 12
File# 0000029050
36 dBμ Contour (NLSC)
Population: 206,024

Grand

Moab

Scale 1:1,250,000

A horizontal number line is shown with tick marks at 0, 15, 30, and 45. The unit is labeled 'km' at the right end. The line is divided into segments by vertical bars: a segment from 0 to 10 km, a segment from 10 to 15 km, a segment from 15 to 30 km, and a segment from 30 to 45 km. The segments from 0 to 10 km and from 15 to 30 km are shaded with diagonal lines. The segment from 10 to 15 km is unshaded. The segment from 30 to 45 km is shaded with horizontal lines.

Montrose

Monte

Figure 3
Loss Area Analysis
Terrain-Limited Method
KKCO(DT) Grand Junction, CO
Facility ID 24766
Ch. 30 50 kW 452 m

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August, 2021

Gypsum Eagle Eagle

Glenwood Springs

Carbo

Basalt

Pitkin  Aspen

Crested Butte

KKCO Terrain-Limited Population TVStudy at Fixed Geography Area	(2010 census)
Licensed Ch. 12 Total	176,577
Loss beyond Licensed NLSC (percentage)	4 0.00%

FCC "TVStudy" Analysis (default settings)
Terrain-Limited Results

- | | | |
|---|---------|---|
|  | No Loss | Cells Having Terrain-Limited Service From Licensed Ch. 12
Terrain-Limited Service Is Provided for Prospective Ch. 30 |
|  | Loss | Cells Having Terrain-Limited Service From Licensed Ch. 12
Terrain-Limited Service Is Lost for Prospective Ch. 30 |

Table 1 KKCO TVStudy Analysis of Proposal
(page 1 of 2)



tvstudy v2.2.5 (4uoc83)
Database: localhost, Study: KKCO Ch-30 prop, Model: Longley-Rice
Start: 2021.08.13 14:10:05

Study created: 2021.08.13 14:10:05

Study build station data: LMS TV 2021-08-11

Proposal: KKCO D30 DT APP GRAND JUNCTION, CO
File number: KKCO Ch-30 prop
Facility ID: 24766
Station data: User record
Record ID: 3798
Country: U.S.
Zone: II

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	KTVX	D30	DT	LIC	SALT LAKE CITY, UT	BLANK0000114065	343.9 km
No	KGWN-TV	D30	DT	LIC	CHEYENNE, WY	BLCDT20070327AEQ	390.1

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D30
Latitude: 39 3 59.90 N (NAD83)
Longitude: 108 44 47.40 W
Height AMSL: 2243.9 m
HAAT: 452.0 m
Peak ERP: 50.0 kW
Antenna: ERI ATW-C170 90.0 deg
Elev Pattern: Generic
Elec Tilt: 2.00

40.3 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	44.2 kW	782.9 m	100.9 km
45.0	45.1	806.9	101.9
90.0	40.4	720.3	98.0
135.0	45.1	242.9	70.5
180.0	44.2	46.0	49.9
225.0	6.83	192.8	57.6
270.0	3.00	293.9	59.6
315.0	6.83	535.0	76.6

Database HAAT does not agree with computed HAAT
Database HAAT: 452 m Computed HAAT: 453 m

Distance to Canadian border: 1104.0 km

Distance to Mexican border: 811.0 km

Conditions at FCC monitoring station: Douglas AZ
Bearing: 185.9 degrees Distance: 845.0 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:
Bearing: 67.6 degrees Distance: 321.2 km

Study cell size: 2.00 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%

Table 1 KKCO TVStudy Analysis of Proposal
(page 2 of 2)



Interference to proposal scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	KKCO	D30	DT	APP	GRAND JUNCTION, CO	KKCO Ch-30 prop	
	Service area			Terrain-limited		IX-free	Percent IX
19985.3	188,124	13915.0		162,966	13915.0	162,966	0.00 0.00