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

ENGINEERING EXHIBIT

Application for Modification of Digital Television Construction Permit

prepared for

CBS Television Stations Inc.
KCNC-DT Denver, CO
Facility ID 47903
Ch. 35 978 kW 373 m

CBS Television Stations Inc. ("CBS") is the licensee of television station KCNC-TV, analog Channel 4, Denver, CO. *CBS* is authorized by a Construction Permit ("CP", BMPCDT-20000501ADD) to operate the paired KCNC-DT digital Channel 35 facility at 1000 kW effective radiated power ("ERP") with a directional antenna having a height above average terrain ("HAAT") of 373 meters. KCNC-DT is currently operating under Special Temporary Authorization ("STA") with a reduced ERP of 11 kW and 177 meters antenna HAAT (BDSTA-20020412AAY, as extended).

CBS is nearing completion of the facility authorized by the CP. The CP involves use of a shared antenna and tower which will be utilized by several other digital television stations. The antenna specified in the CP, a Dielectric model TUV-24GTH/4MT-R S200/O4, is a "combo" antenna which was originally planned to be utilized by KCNC-DT Channel 35 (digital) and KCNC-TV Channel 4 (analog). Due to zoning litigation which delayed construction of the tower structure until very late in the transition, the analog KCNC-TV Channel 4 facility will not be relocated to the new site. The antenna to be utilized by the digital KCNC-DT Channel 35 was redesigned utilizing panel components to allow shared use by other UHF stations, in lieu of the originally intended "combo" antenna for VHF Channel 4 and UHF Channel 35. The substitute antenna design is a Dielectric model TUC-C4SP-12/48U-4-T and was specified to mimic the CP's directional pattern as closely as possible. Final review of directional antenna azimuthal relative field values shows that

there are minor variations from the CP pattern, including two azimuths where the CP's relative field would be exceeded by 0.1 dB.

Accordingly, the instant application proposes to modify the CP to specify operation of KCNC-DT with the substitute antenna's directional pattern. As proposed herein, the maximum ERP has been reduced to 978 kW to avoid exceeding the parameters specified in the current CP at any azimuth. The antenna HAAT is maintained at 373 meters as described in the CP, and no change in site location is proposed.

The proposed 978 kW facility will operate during the remainder of the transition. *CBS* also proposes herein to operate KCNC-DT with the 978 kW / 373 meter facility in the post-transition period. Appendix B of the Seventh Report and Order in MB Docket 87-278 specifies KCNC-DT's post-transition allotment on Channel 35 with the 1000 kW / 373 meter facilities authorized in the current CP. *CBS* requests that the Appendix B parameters for KCNC-DT be modified to indicate the parameters specified herein.

The proposed Dielectric model TUC-C4SP-12/48U-4-T's azimuthal pattern is depicted in **Figure 1**. **Figures 2** and **2A** provide the theoretical vertical plane (elevation) pattern[1].

The substitute antenna has been installed on the newly constructed KCNC-DT antenna supporting structure as authorized in the current CP. The tower structure corresponds to FCC Antenna Structure Registration ("ASR") number 1058328.

A map is supplied as **Figure 3,** which depicts the standard predicted coverage contours. This map includes the boundaries of Denver, KCNC-DT'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.

[1] These patterns are supplied in terms of relative field. In recent years, FCC Staff have not required pattern data in dBk format however such patterns are available upon request.

The map attached as **Figure 4** supplies a comparison of the 41 dBμ digital service contour corresponding to the proposed KCNC-DT facility (978 kW / 373 m) and the current CP (1000 kW / 373 m). No extension in contour location beyond that of the current CP will result, in compliance with the Commission's August 3, 2004 "freeze" concerning expansion in service area.[2] Further, the proposed coverage contour does not extend beyond that associated with the Appendix B parameters, which match the current CP (1000 kW / 373 m).

The proposed KCNC-DT facility's predicted service population provides a 100.7 percent match of the Appendix B facility, as detailed in the table below.

Post-Transition Population Summary

Population Summary (2000 Census) OET Bulletin 69 method	Appendix B	Proposed
Within Noise Limited Contour	3,118,272	3,089,741
Not affected by terrain losses	2,964,752	2,985,374
Lost to all interference	7,164	8,474
Net DTV Service	**2,957,588**	**2,976,900**
Match of Appendix B	---	**100.65%**

Under the instant proposal, KCNC-DT will operate at its presently authorized site with slightly reduced ERP. The instant proposal cannot be considered a "checklist" application for pre-transition operation, as the proposed ERP/HAAT combination (978 kW / 373 m) exceeds original allotment values (1000 kW / 451 m) at many azimuths. Under the instant proposal, KCNC-DT will operate at its presently authorized site at the authorized antenna height with a reduced ERP and directional antenna pattern. The reductions should serve to decrease any interference caused. The proposed coverage and interfering contour locations are wholly within those of the authorized facility, consequently, the instant proposal should not require detailed discussion of its allocation situation with respect to other stations. Nonetheless, for completeness and pursuant to §73.622(f)(5) of the Commission's Rules, a study in accordance with §73.623(c) was conducted to evaluate interference to analog and DTV stations that may be attributed to the proposed KCNC-DT facility.

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[2]Public Notice *"Freeze on the Filing of Certain TV and DTV Requests for Allotment or Service Area Changes,"* DA 04-2446, released August 3, 2004.

As expected, the detailed OET Bulletin 69[3] study shows that the proposal complies with the Commission's 2% / 10% de minimis interference limits to all DTV and NTSC television stations.

In addition, the instant proposal does not involve prohibited contour overlap to any authorized Class A station except for KDEV-LP (Ch. 39, Facility ID 29455, Aurora, CO), and OET Bulletin 69 analysis shows that no interference will be caused to KDEV-LP. Thus, this proposal complies with the provisions of §73.623(c)(2) of the Commission's rules.

Regarding impact to post-transition operations, since no extension in contour location beyond that of the 2007 Appendix B (Seventh R&O) allotment will result, interference analysis to other post-transition television facilities is not required.

The nearest FCC monitoring station is 593 km distant at Grand Island, NE. This exceeds by a large margin the threshold minimum distance specified in §73.1030(c)(3) that would suggest consideration of the monitoring station. The site is located 43 km from the Table Mountain Radio Receiving Zone in Boulder County, Colorado. Since the proposal does not involve an increase in ERP in any direction, no further consideration of protection to Table Mountain is necessary. There are no authorized AM stations within 3.2 kilometers of the site, based on information contained within the Commission's database. The site location is beyond the border areas that would require international coordination.

Human Exposure to Radiofrequency Electromagnetic Field (Environmental)

The various environmental topics listed in §1.1307(a) have been previously addressed by the applicant in obtaining grant of BMPCDT-20000501ADD. It is believed that this application for a substitute antenna may be categorically excluded from environmental processing pursuant to §1.1306 of the Commission's rules.

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[3]FCC 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 standard cell size of 2 km was employed. Comparisons of various results of this computer program (run on a Sun Sparc processor) to the Commission's implementation of OET-69 show excellent correlation.

The proposed operation was evaluated for human exposure to RF energy using the procedures outlined in the Commission's OET Bulletin Number 65. Based on OET-65 equation (10), and considering the antenna's elevation and azimuthal relative field pattern data in conjunction with the ground elevations near the site, the calculated signal density near the tower at two meters above ground level attributable to the proposed facility is less than five percent of the general population/uncontrolled maximum permitted exposure limit. Since the five percent threshold limit described in §1.1307(b) regarding sites with multiple emitters is not exceeded by the proposal, the applicant is categorically excluded from responsibility for taking any corrective action at ground level locations.

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, tower or antenna from RF electromagnetic field exposure in excess of FCC guidelines.

Certification

The undersigned hereby certifies that the foregoing statement and associated attachments were prepared by him or under his direction, and that they are true and correct to the best of his knowledge and belief.

Joseph M. Davis, P.E.
May 7, 2008

Chesapeake RF Consultants, LLC
11993 Kahns Road
Manassas, VA 20112
703-650-9600

List of Attachments

Figure 1	Antenna Horizontal Plane Pattern
Figure 2, 2A	Antenna Vertical Plane (Elevation) Pattern
Figure 3	Proposed Coverage Contours
Figure 4	Coverage Contour Comparison
Form 301	Saved Version of Engineering Sections from FCC Form at Time of Upload

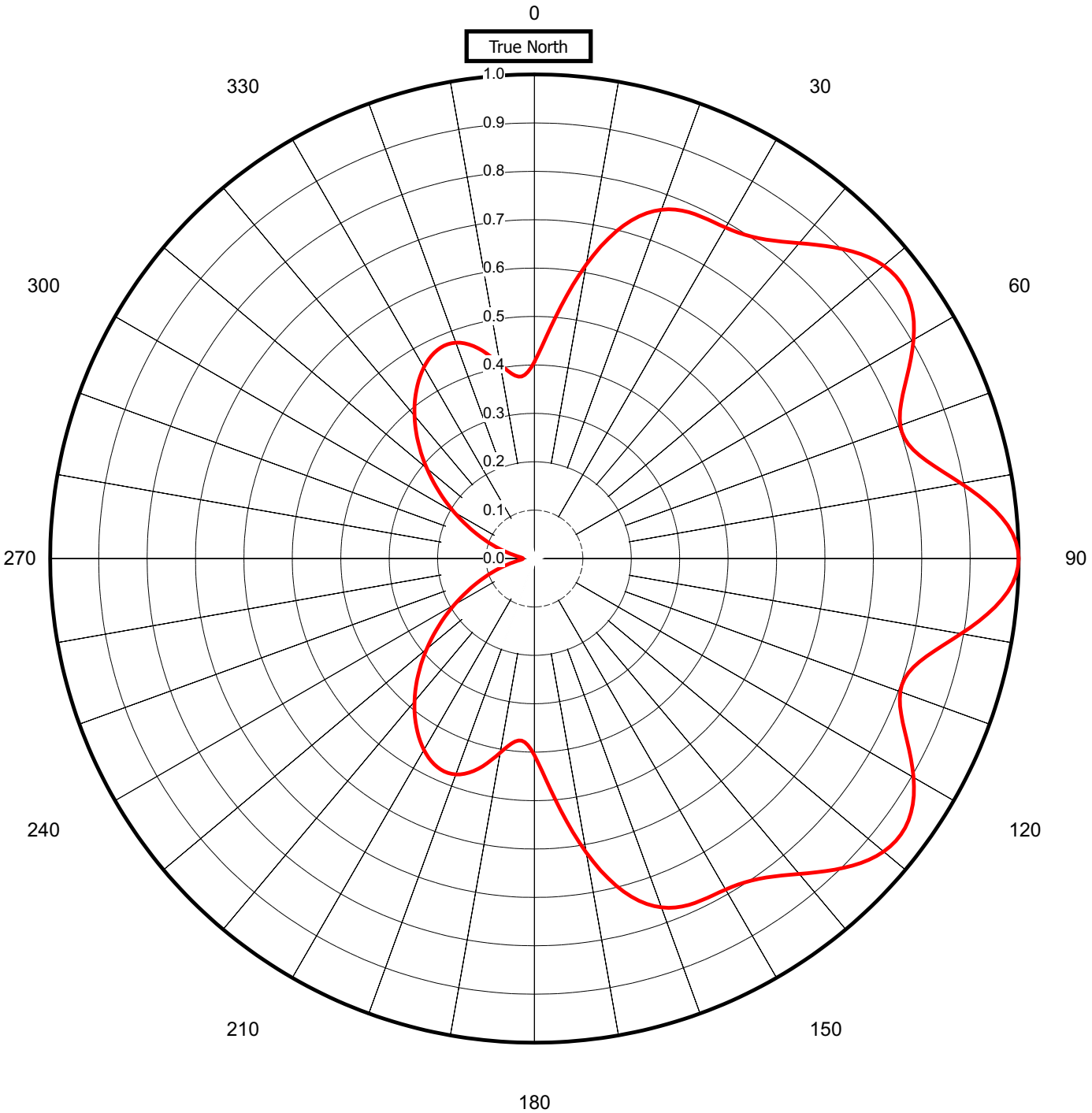
Dielectric

Proposal Number	**C-01268**		
Date	**16-Apr-07**		
Call Letters	**KCNC-DT**	Channel	**35**
Location	**Denver, CO**		
Customer			
Antenna Type	**TUC-C4SP-12/48U-4-T**		

Figure 1
Antenna Horizontal Plane Pattern

AZIMUTH PATTERN

Gain	**2.57**	**(4.11 dB)**	
Calculated / Measured	**Calculated**		
Frequency	**599.00 MHz**		
Drawing #	**TUC-C4SP-MOD-5990**		



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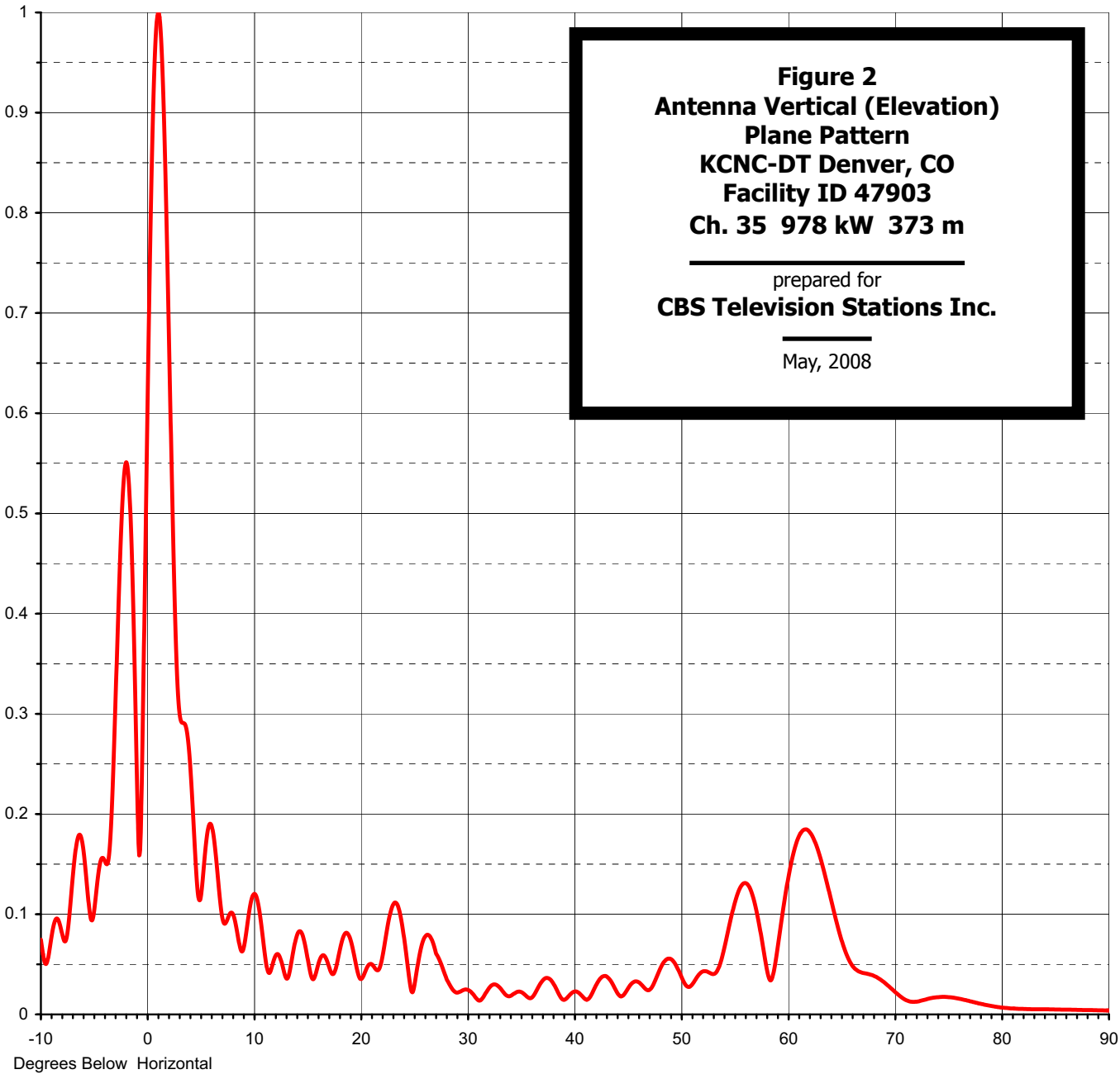
Antenna Type	**TUC-C4SP-12/48U-4-T**		

ELEVATION PATTERN

RMS Gain at Main Lobe	**21.30 (13.28 dB)**	Beam Tilt	**1.00 deg**
RMS Gain at Horizontal	**8.20 (9.14 dB)**	Frequency	**599.00 MHz**
Calculated / Measured	**Calculated**	Drawing #	**12U213100-90**



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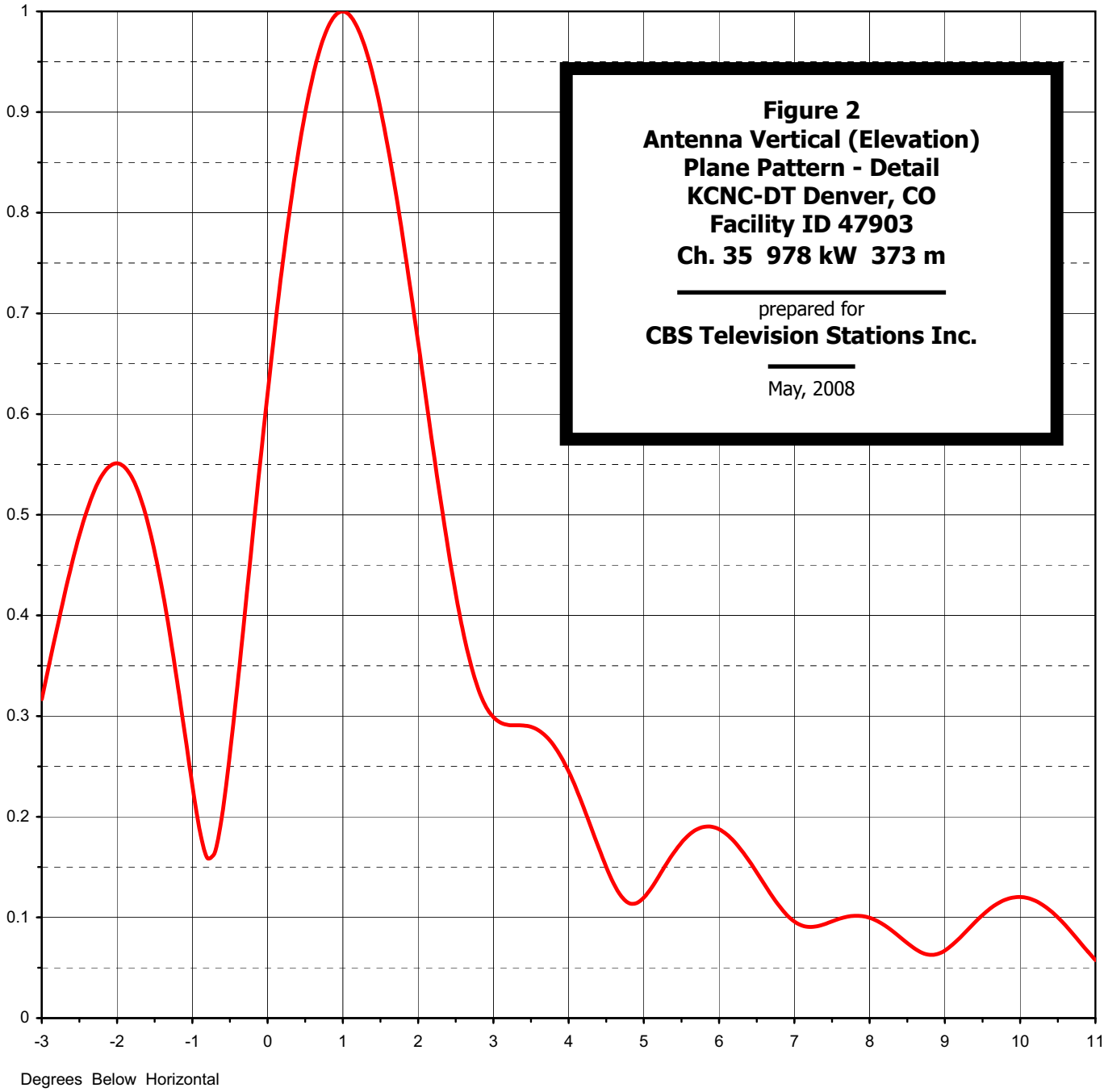
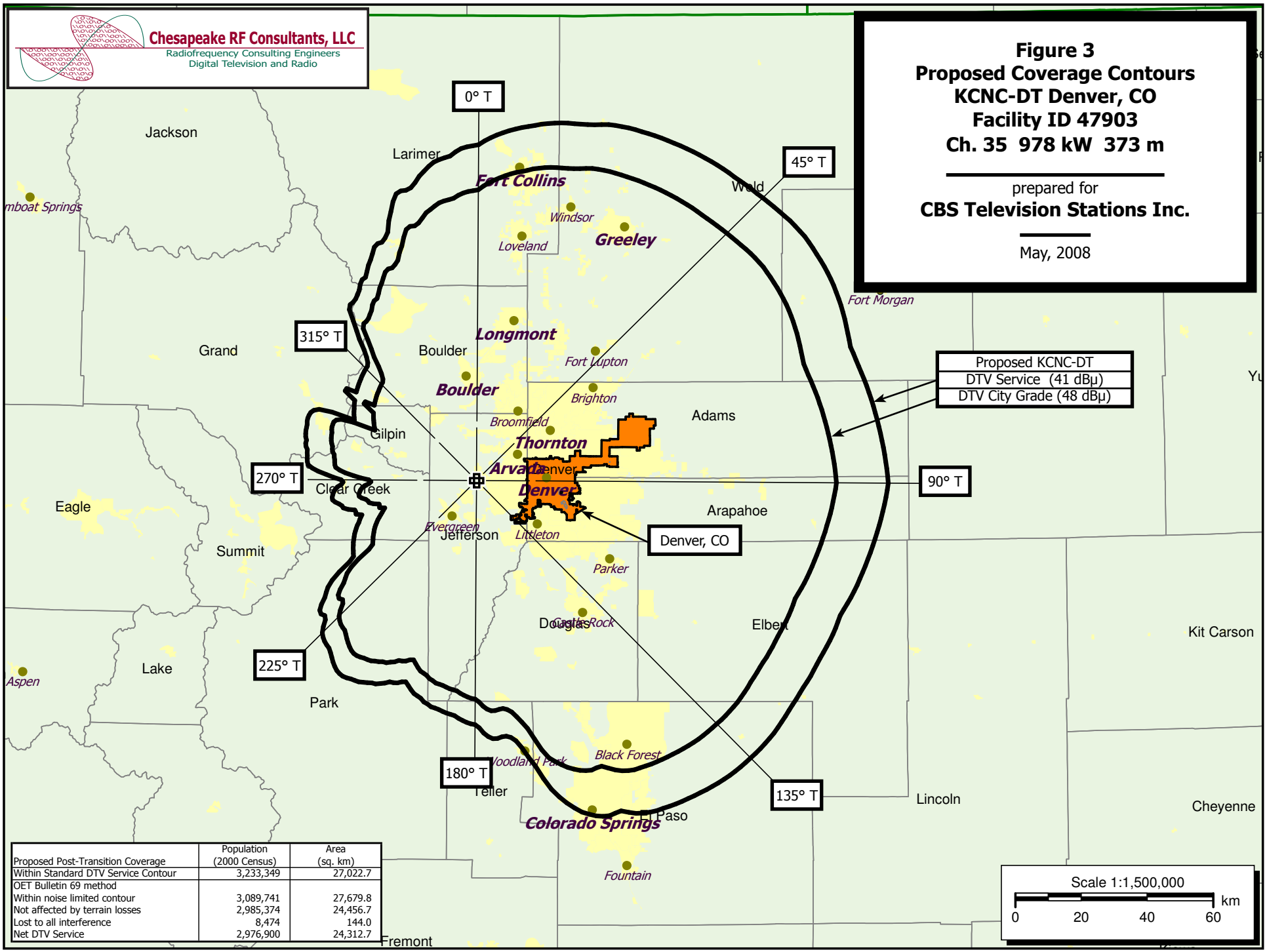
RMS Gain at Horizontal	**8.20 (9.14 dB)**	Frequency	**599.00 MHz**
Calculated / Measured	**Calculated**	Drawing #	**12U213100**





Proposed Post-Transition Coverage	Population (2000 Census)	Area (sq. km)
Within Standard DTV Service Contour	3,233,349	27,022.7
OET Bulletin 69 method		
Within noise limited contour	3,089,741	27,679.8
Not affected by terrain losses	2,985,374	24,456.7
Lost to all interference	8,474	144.0
Net DTV Service	2,976,900	24,312.7

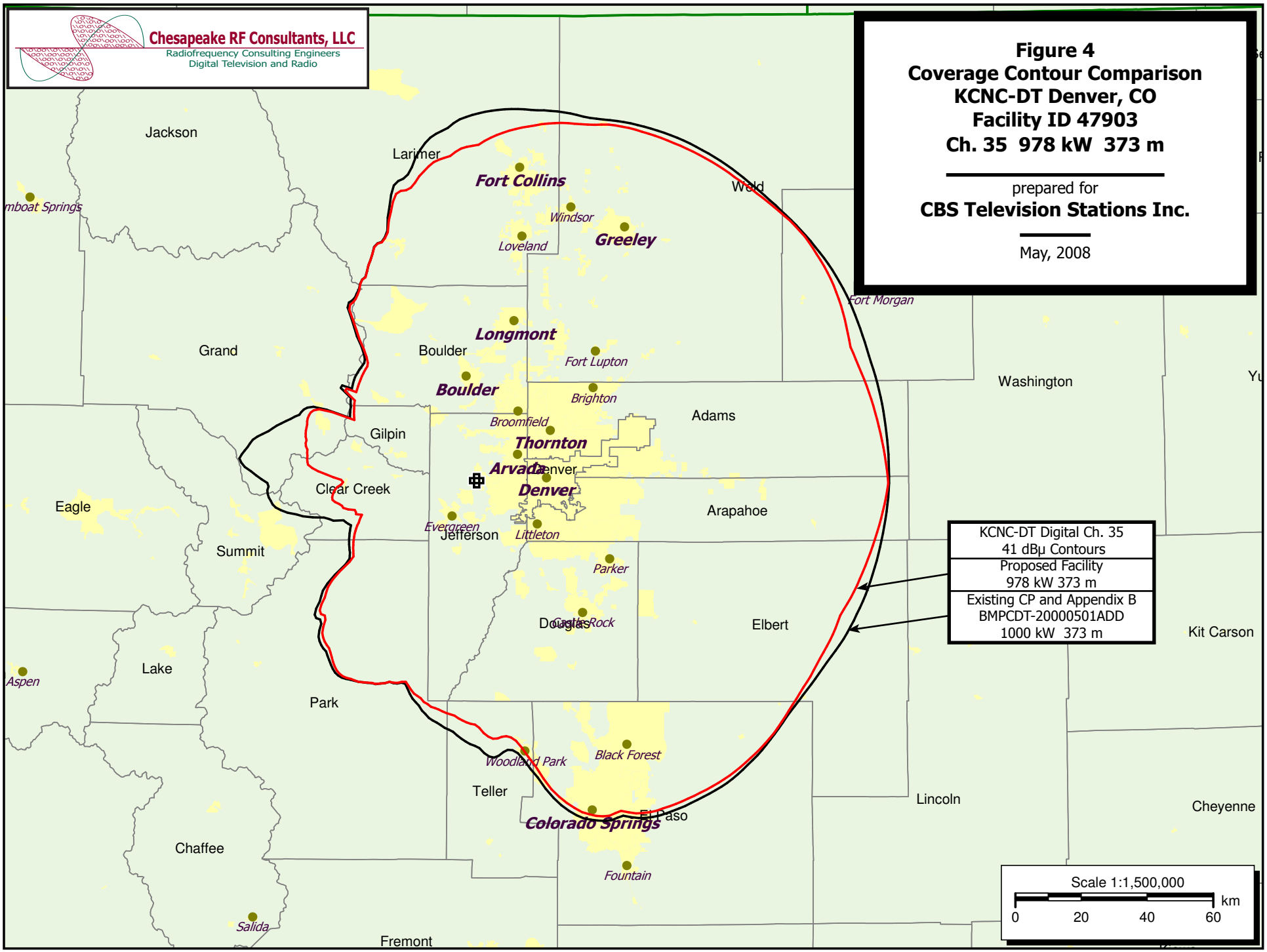

Chesapeake RF Consultants, LLC
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Figure 4
Coverage Contour Comparison
KCNC-DT Denver, CO
Facility ID 47903
Ch. 35 978 kW 373 m
prepared for
CBS Television Stations Inc.
May, 2008
KCNC-DT Digital Ch. 35
41 dBµ Contours
Proposed Facility
978 kW 373 m
Existing CP and Appendix B
BMPCDT-20000501ADD
1000 kW 373 m
Scale 1:1,500,000
0 20 40 60 km
Jackson
Larimer
Weld
Grand
Boulder
Gilpin
Clear Creek
Eagle
Summit
Lake
Park
Teller
Chaffee
Fremont
Adams
Washington
Arapahoe
Jefferson
Douglas
Elbert
Lincoln
El Paso
Kit Carson
Cheyenne
Fort Collins
Windsor
Loveland
Greeley
Fort Morgan
Longmont
Fort Lupton
Boulder
Brighton
Broomfield
Thornton
Arvada
Denver
Littleton
Evergreen
Parker
Castle Rock
Aspen
Woodland Park
Black Forest
Colorado Springs
Fountain
Salida

SECTION III-D - DTV Engineering

Complete Questions 1-5, and provide all data and information for the proposed facility, as requested in Technical Specifications, Items 1-13.

Pre-Transition Certification Checklist: An application concerning a pre-transition channel must complete questions 1(a)-(c), and 2-5. A correct answer of "Yes" to all of the questions will ensure an expeditious grant of a construction permit application to change pre-transition facilities. However, if the proposed facility is located within the Canadian or Mexican borders, coordination of the proposal under the appropriate treaties may be required prior to grant of the application. An answer of "No" will require additional evaluation of the applicable information in this form before a construction permit can be granted.

Post-Transition Expedited Processing. An application concerning a post-transition channel must complete questions 1(a), (d)-(e), and 2-5. A station applying for a construction permit to build its post-transition channel will receive expedited processing if its application (1) does not seek to expand the noise-limited service contour in any direction beyond that established by Appendix B of the Seventh Report and Order in MB Docket No. 87-268 establishing the new DTV Table of Allotments in 47 C.F.R. § 73.622(i) ("new DTV Table Appendix B"); (2) specifies facilities that match or closely approximate those defined in the new DTV Table Appendix B facilities; and (3) is filed within 45 days of the effective date of Section 73.616 of the rules adopted in the Report and Order in the Third DTV Periodic Review proceeding, MB Docket No. 07-91.

1.	The proposed DTV facility complies with 47 C.F.R. Section 73.622 in the following respects:		
	(a)	It will operate on the DTV channel for this station as established in 47 C.F.R. Section 73.622.	(•) Yes ( ) No
	(b)	It will operate a pre-transition facility from a transmitting antenna located within 5.0 km (3.1 miles) of the DTV reference site for this station as established in 47 C.F.R. Section 73.622.	(•) Yes ( ) No
	(c)	It will operate a pre-transition facility with an effective radiated power (ERP) and antenna height above average terrain (HAAT) that do not exceed the DTV reference ERP and HAAT for this station as established in 47 C.F.R. Section 73.622.	( ) Yes (•) No
	(d)	It will operate at post-transition facilities that do not expand the noise-limited service contour in any direction beyond that established by Appendix B of the Seventh Report and Order in MB Docket No. 87-268 establishing the new DTV Table of Allotments in 47 C.F.R. § 73.622(i) ("new DTV Table Appendix B").	(•) Yes ( ) No ( ) N/A
	(e)	It will operate at post-transition facilities that match or reduce by no more than five percent with respect to predicted population from those defined in the new DTV Table Appendix B.	(•) Yes ( ) No ( ) N/A
2.	The proposed facility will not have a significant environmental impact, including exposure of workers or the general public to levels of RF radiation exceeding the applicable health and safety guidelines, and therefore will not come within 47 C.F.R. Section 1.1307. Applicant must **submit the Exhibit** called for in Item 13.		(•) Yes ( ) No
3.	Pursuant to 47 C.F.R. Section 73.625, the DTV coverage contour of the proposed facility will encompass the allotted principal community.		(•) Yes ( ) No
4.	The requirements of 47 C.F.R. Section 73.1030 regarding notification to radio astronomy installations, radio receiving installations and FCC monitoring stations have either been satisfied or are not applicable.		(•) Yes ( ) No
5.	The antenna structure to be used by this facility has been registered by the Commission and will not require registration to support the proposed antenna, OR the FAA has previously determined that the proposed structure will not adversely effect 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.		(•) Yes ( ) No

SECTION III-D - DTV Engineering

TECHNICAL SPECIFICATIONS
Ensure that the specifications below are accurate. Contradicting data found elsewhere in this application will be disregarded. All items must be completed. The response "on file" is not acceptable.

TECH BOX

1.	Channel Number: DTV 35 Analog TV, if any 4	
2.	Zone: ( ) I (•) II ( ) III	
3.	Antenna Location Coordinates: (NAD 27) Latitude: Degrees 39 Minutes 43 Seconds 51 (•) North ( ) South Longitude: Degrees 105 Minutes 13 Seconds 54 (•) West ( ) East	
4.	Antenna Structure Registration Number: 1058328 ☐ Not Applicable ☐ Notification filed with FAA	
5.	Antenna Location Site Elevation Above Mean Sea Level:	2170 meters
6.	Overall Tower Height Above Ground Level:	223 meters
7.	Height of Radiation Center Above Ground Level:	213 meters
8.	Height of Radiation Center Above Average Terrain :	373 meters

9. Maximum Effective Radiated Power (average power): 978 kW

10. Antenna Specifications:

a. Manufacturer DIE Model TUC-C4SP-12/48U-4-T

b. Electrical Beam Tilt:
1 degrees ☐ Not Applicable

c. Mechanical Beam Tilt:
degrees toward azimuth
degrees True ☑ Not Applicable
Attach as an Exhibit all data specified in 47 C.F.R. Section 73.625(c). [Exhibit 42]

d. Polorization:
◉ Horizontal ○ Circular ○ Elliptical

e. Directional Antenna Relative Field Values: ☐ Not applicable (Nondirectional)

[For a composite directional (not off-the-shelf) antenna, press the following button to fill in the relative field values subform.]
[Relative Field Values]

10e. Directional Antenna Relative Field Values

[Fill in this subform for a composite directional (not off-the-shelf) antenna, only.]

e. Directional Antenna Relative Field Values:

Rotation (Degrees): ☑ No Rotation

Degrees	Value	Degrees	Value	Degrees	Value	Degrees	Value	Degrees	Value	Degrees	Value
0	0.406	10	0.617	20	0.767	30	0.789	40	0.85	50	0.941
60	0.904	70	0.804	80	0.894	90	1	100	0.894	110	0.804
120	0.904	130	0.941	140	0.85	150	0.789	160	0.767	170	0.617
180	0.406	190	0.407	200	0.475	210	0.456	220	0.385	230	0.29
240	0.191	250	0.105	260	0.044	270	0.024	280	0.044	290	0.105
300	0.191	310	0.29	320	0.385	330	0.456	340	0.475	350	0.407
Additional Azimuths		53	0.947	127	0.947	203	0.478	337	0.478		

Relative Field Polar Plot

If a directional antenna is proposed, the requirements of 47 C.F.R. Sections 73.625(c) must be satisfied. **Exhibit required.** [Exhibit 43]

11. Does the proposed facility satisfy the pre-transition interference protection provisions of 47 C.F.R. Section 73.623(a) (Applicable only if **Certification Checklist** Items 1(a), (b), or (c) are answered "No.") and/or the post-transition interference protection provisions of 47 C.F.R. Section 73.616? ◉ Yes ○ No [Exhibit 44]

If "No," attach as an Exhibit justification therefor, including a summary of any related previously granted waivers.

12. If the proposed facility will not satisfy the coverage requirement of 47 C.F.R. Section 73.625, attach as an Exhibit justification therefore. (Applicable only if **Certification Checklist** item 3 is answered "No.") [Exhibit 45]

13. **Environmental Protection Act. Submit in an Exhibit** the following: [Exhibit 46]

If **Certification Checklist** Item 2 is answered "Yes," a brief explanation of why an Environmental Assessment is not required. Also describe in the Exhibit the steps that will be taken to limit RF radiation exposure to the public and to persons authorized access to the tower site.

By checking "Yes" to **Certification Checklist** Item 2, the applicant also certifies that it, in coordination with other users of the site, will reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency electromagnetic exposure in excess of FCC guidelines.

If **Certification Checklist** Item 2 is answered "No," an Environmental Assessment as required by 47 C.F.R Section 1.1311.

PREPARERS CERTIFICATION ON SECTION III MUST BE COMPLETED AND SIGNED.

SECTION III - PREPARER'S CERTIFICATION

I certify that I have prepared Section III (Engineering Data) on behalf of the applicant, and that after such preparation, I have examined and found it to be accurate and true to the best of my knowledge and belief.

Name JOSEPH M. DAVIS, P.E.	Relationship to Applicant (e.g., Consulting Engineer) CONSULTING ENGINEER	
Signature	Date 5/7/2008	
Mailing Address CHESAPEAKE RF CONSULTANTS, LLC 11993 KAHNS ROAD		
City MANASSAS	State or Country (if foreign address) VA	Zip Code 20112 -
Telephone Number (include area code) 7036509600	E-Mail Address (if available) JOSEPH.DAVIS@RF-CONSULTANTS.COM	

WILLFUL FALSE STATEMENTS ON THIS FORM ARE PUNISHABLE BY FINE AND/OR IMPRISONMENT (U.S. CODE, TITLE 18, SECTION 1001), AND/OR REVOCATION OF ANY STATION LICENSE OR CONSTRUCTION PERMIT (U.S. CODE, TITLE 47, SECTION 312(a)(1)), AND/OR FORFEITURE (U.S. CODE, TITLE 47, SECTION 503).

Any specified rotation has already been applied to the plotted pattern.
Field strength values shown on a rotated pattern may differ from the listed values because intermediate azimuths are interpolated between entered azimuths.