

ENGINEERING STATEMENT  
RE DTV BROADCAST ENGINEERING DATA  
APPLICATION FOR CONSTRUCTION PERMIT  
ON BEHALF OF  
NVT TOPEKA LICENSEE, LLC  
**KSNT-DT, TOPEKA, KANSAS**  
CHANNEL 27 50 KW ERP 320 METERS

MARCH 2008

COHEN, DIPPELL AND EVERIST, P.C.  
CONSULTING ENGINEERS  
RADIO AND TELEVISION  
WASHINGTON, D.C.

COHEN, DIPPELL AND EVERIST, P. C.

City of Washington            )  
  ) ss  
District of Columbia         )

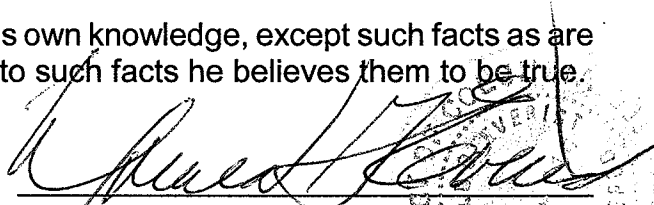
Donald G. Everist, being duly sworn upon his oath, deposes and states that:

He is a graduate electrical engineer, a Registered Professional Engineer in the District of Columbia, and is President, Secretary and Treasurer of Cohen, Dippell and Everist, P.C., Consulting Engineers, Radio - Television, with offices at 1300 L Street, N.W., Suite 1100, Washington, D.C. 20005;

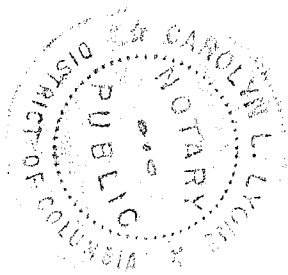
That his qualifications are a matter of record in the Federal Communications Commission;


That the attached engineering report was prepared by him or under his supervision and direction and

That the facts stated herein are true of his own knowledge, except such facts as are stated to be on information and belief, and as to such facts he believes them to be true.

  
Donald G. Everist  
District of Columbia  
Professional Engineer  
Registration No. 5714

Subscribed and sworn to before me this 17<sup>th</sup> day of March, 2008.



  
Notary Public

My Commission Expires: 2/28/2013

This engineering statement has been prepared on behalf of NVT Topeka Licensee, LLC, (“NVT”), licensee of KSNT(TV), Topeka, Kansas, in support of its request to construct DTV facilities for post-transition operation.

KSNT(TV) is licensed to operate on NTSC television Channel 27 with a maximum visual ERP of 1100 kW and an antenna height above average terrain (“HAAT”) of 320 meters (1049.9 feet). In Appendix B of the revised DTV Table of Allotments<sup>1</sup>, NVT has been allocated a post-transition DTV operation on Channel 27 of 50 kW directional ERP and HAAT of 320 meters.

Filing Freeze Waiver Request

The proposed KSNT-DT post-transition facilities will expand the noise-limited service contour beyond that established by Appendix B of the *Memorandum Opinion and Order*<sup>2</sup>. In accordance with Paragraph 151 of the Third Periodic Review Report and Order<sup>3</sup>, NVT proposes a minor expansion of its post-transition DTV allotment which will accommodate the use of the existing top-mounted analog antenna and also avoid a significant reduction in post-transition service from its current analog service area. Further, the proposed minor expansion does not extend more than 5 miles in any direction beyond the KSNT-DT facility as defined by the post-transition DTV Table Appendix B and does not exceed the 0.5 percent new interference criteria to any other

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1 “In the Matter of Advanced Television Systems and Their Impact Upon the Existing Television Broadcast Service”, MM Docket 87-268, Memorandum Opinion and Order on Reconsideration of the Seventh Report and Order and Eighth Report and Order (FCC 08-72) Released March 6, 2008.

2 Ibid .

3 “In the Matter of Third Periodic Review of the Commission’s Rules and Policies Affecting the Conversion to Digital Television”, MB Docket No. 07-91, Report & Order (FCC 07-228), Released December 31, 2007.

potentially affected station in Appendix B of the DTV Table. Therefore, NVT hereby requests a waiver of the Filing Freeze<sup>4</sup> and proposes to construct DTV facilities of 50 kW non-directional ERP at a height above average terrain of 320 meters.

Proposed Parameters

The KSNT-DT post-transition DTV antenna will be top-mounted on an existing tower. The existing tower has a total overall structure height above ground of 350 meters (1148.3 feet). The existing transmitter is located 6835 NW Highway 24 in Topeka, Kansas.

There is no proposed change in overall height and therefore an FAA aeronautical study is not required. The FCC antenna structure registration number of the existing tower is 1032989. Exhibit E-1 is a vertical sketch of the existing tower and top-mounted transmitting antenna.

The geographic coordinates of the proposed site are as follows:

North Latitude: 39° 05' 34"

West Longitude: 95° 47' 04"

NAD-27

Equipment Data

Antenna: Dielectric Type TFU-26GTH-H 04 DC antenna (or equivalent). The antenna elevation pattern and the associated tabulated data are included as Exhibits E-2.

Transmission Line: 365.8 meters (1200 ft) of Dielectric Rigid, Type DC-677-004, 6-1/8", 75 ohm or equivalent, Attenuation 0.114 dB/100 ft

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<sup>4</sup>Public Notice entitled, "Freeze on the Filing of Certain TV and DTV Requests for Allotment or Service Area Changes", (DA 04-2466) Released August 3, 2004.

Power Data

Transmitter Output	3.05 kW	4.84 dBk
Transmission Line Efficiency/Loss	72.8%	1.37 dB
Input Power to the Antenna	2.22 kW	3.47 dBk
Antenna Gain	22.5	13.52 dB
Effective Radiated Power	50.0 kW	16.99 dBk

Elevation Data

Vertical dimension of top-mounted Channel 27 antenna (including appurtenances)	16.25 meters 53.3 feet
Overall height above ground of new antenna structure (including appurtenances)	350 meters 1148.3 feet
Center of radiation of Channel 27 antenna above ground	342 meters 1122.0 feet
Elevation of site above mean sea level	274 meters 899.0 feet
Center of radiation of Channel 27 antenna above mean sea level	616 meters 2021.0 feet
Overall height above mean sea level of new tower (including beacon)	624 meters 2047.2 feet
Antenna height above average terrain	320 meters

Note: Slight height differences may result due to conversion to metric.

Interference Analysis

A study of predicted interference (Table I) caused by the proposed KSNT-DT post-transition has been performed using a version of the Longley-Rice program as described in OET Bulletin No. 69 (February 6, 2004) and the Public Notice, "Additional Application Processing Guidelines for Digital Television (DTV)" (August 1998). The FCC's FORTRAN-77 code was modified only to the extent necessary (primarily input/output handling) for the program to run on a Windows XP platform. Comparison of service/interference areas and populations indicates that this model closely matches the FCC's evaluation program. Best efforts have been made to use data and calculations identical to the FCC's program. Any slight differences are attributable to compiler, operating system and/or processor characteristics. The effect of any variance in calculated population values versus the FCC's program is minimized when differencing a given model's results, such as calculating new interference as total interference less baseline interference. Any variance effect is further reduced when using ratios of calculated population values such as measuring the incremental population affected as a percent of the total population served. The model employs the Longley-Rice propagation methodology and evaluates in grid cells of approximately 4 km<sup>2</sup> using 3-second terrain data sampled approximately every 1.0 km at one degree azimuth intervals with 2000 census centroids. The Longley-Rice analysis considers all post-transition DTV allotments as listed in Appendix B of the 7<sup>th</sup> Report & Order. The results of the analysis predict that the proposed nondirectional post-transition operation of KSNT-DT will not cause any new interference to other potentially affected stations as listed in Appendix B of the 7<sup>th</sup> Report & Order.

### Coverage

The average elevation data for 3.2 to 16.1 km along each radial has been determined from the NGDC 3-second computerized terrain database. The F(50,90) DTV coverage contours have been computed from reference to the propagation data for Channels 14-69, as published by the FCC in Figure 10b and Figure 10c, Section 73.699 of the FCC Rules and Regulations. Utilizing the formula in Section 73.625(b)(2) of the Rules for the effective heights, it is found that the depression angle,  $A_n$ , varies from 0.480 to 0.515 degrees.

Table II includes the distances to the F(50,90) 48 and 41 dBu coverage contours, the average elevation 3 to 16 km, and the antenna height above average terrain for the each radial spaced 45 degrees in azimuth. Exhibit E-3 provides a map of the computed coverage contours relative to the Appendix B DTV Allotment and the 5 mile radius.

### Additional Broadcast Facilities

There is one AM station located within 3.22 km of the existing tower site. However, the electrical height of the KSNT-DT tower will remain unchanged and no adverse technical effect is predicted. There are no FM, NTSC or DTV television stations, other than the pre-transition KSNT(TV) and DTV facilities, located within 0.5 km of the transmitting site.

### FCC Rule, Section 1.1307

The proposed operation based upon the current OET Bulletin No. 65, Edition No. 97-01, dated August 1997 and Supplement A meets the provisions of the FCC radio frequency field ("RFF") guidelines, and thus, complies with Section 1.1307 of the FCC Rules. Provisions will be

made to reduce power or to terminate the transmitter emissions, as appropriate, when it is necessary for authorized personnel to be on the tower.

The following equations from OET Bulletin No. 65 have been used to calculate the predicted radiofrequency fields at 2 meters above ground at the base of the tower:

**Digital Television Broadcast Stations**

$$S = [(33.4)(F^2)(ERP^2)]/R^2$$

S = Power Density in Microwatts/sq. cm ( $\mu\text{W}/\text{cm}^2$ )

F = Relative Field Factor in the downward direction of interest ( $-60^\circ$  to  $-90^\circ$  elevation)

$ERP_V$  = Total Peak Visual ERP in Watts

$ERP_A$  = Total Aural ERP in Watts

ERP = Power in Watts

R = Distance from 2 meters above ground to center of radiation in meters

<u>Station</u>	<u>Statuts</u>	<u>ERP</u> (kW)	<u>Frequency</u> (MHz)	<u>Ch</u>	<u>RCAGL</u> (m)	<u>Relative</u> <u>Field</u>	<u>S</u> ( $\mu\text{W}/\text{cm}^2$ )	<u>RFF</u> (%)
KSNT-DT	<b>Proposed</b>	50	548-554	27	342	0.3	0.2	0.1

For the post-transition operation, KSNT-DT proposes to use the existing top-mounted Dielectric Type TFU-26GTH-R 04 DC antenna (or equivalent). Using a relative field factor of 0.1 based on the antenna elevation pattern and the procedures outlined in OET Bulletin 65, the maximum RFF resulting from the proposed operation is less than  $0.2 \mu\text{W}/\text{cm}^2$ . This is less than 0.1% of the  $367.3 \mu\text{W}/\text{cm}^2$  maximum human exposure to RFF recommended by the current FCC guidelines for the general population.

The total contribution by all post-transition broadcast facilities and the addition of the proposed post-transition operation of KSNT-DT at 2 meters above ground level is less than 0.1%



of the current FCC guidelines for maximum permissible exposure (“MPE”) for the general population/uncontrolled exposure.

Authorized personnel and rigging contractors will be alerted to the potential zone of high field levels on the tower, and if necessary, the station will operate with reduced power or terminate the operation of the transmitter as appropriate when it is necessary for authorized personnel or contractors to perform work on the tower. Workers and the general public, therefore, will not be subjected to RFF levels in excess of the current FCC guidelines.

Environmental Assessment

An environmental assessment (“EA”) is categorically excluded under Section 1.1306 of the FCC Rules and Regulations as the tower was constructed prior to the requirements specified in WT Docket No. 03-128 and the licensee indicates:

- (a)(1) The existing tower is not located in an officially designated wilderness area.
- (a)(2) The existing tower is not located in an officially designated wildlife preserve.
- (a)(3) The proposed facilities will not affect any listed threatened or endangered species or habitats.
- (a)(3)(ii) The proposed facilities will not jeopardize the continued existence of any proposed endangered or threatened species or likely to result in the destruction or adverse modification of proposed critical habitats.
- (a)(4) The proposed facilities are located on a tower which was built prior to the adoption of WT Docket No. 03-128 and therefore grandfathered, and have not affected any known districts, sites, buildings, structures, or objects significant in American history, architecture, archaeology, engineering, or culture.
- (a)(5) The existing tower is not located near any known Indian religious sites.

- (a)(6) The existing tower is not located in a flood plain.
- (a)(7) The installation of the DTV facilities on an existing guyed tower will not involve a significant change in surface features of the ground in the vicinity of the tower.
- (a)(8) It is not proposed to equip the tower with high intensity white lights unless required by the FAA.
- (b) Workers and the general public will not be subjected to RFF levels in excess of the current FCC guidelines contained in OET Bulletin No. 65, Edition 97-01, dated August 1997 and Supplement A.

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TABLE I  
LONGLEY-RICE ANALYSIS  
FOR THE POST-TRANSITION OPERATION OF  
KSNT-DT, TOPEKA, KANSAS  
CH 27 50 KW ND ERP 320 METERS HAAT  
MARCH 2008

<u>Station</u>	<u>City</u>	<u>State</u>	<u>Channel</u>	<u>Distance</u>	<u>Status</u>	<u>FCC File No.</u>	<u>Interference From KSNT-DT Appendix B Allotment</u>	<b>Additional</b> <u>Interference From KSNT-DT Proposed Operation</u>
				km				
KSAS-TV	WICHITA	KS	26	209.6	7th R&O	BPCDT-19991018ABE	No Interference	No Interference
KFTA-TV	FORT SMITH	AR	27	403.1	7th R&O	BPCDT-19991028AEE	No Interference	No Interference
KFOR-TV	OKLAHOMA CITY	OK	27	416.6	7th R&O	BLCDT-19991207AAL	No Interference	No Interference

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TABLE II  
COMPUTED COVERAGE DATA  
FOR THE PROPOSED DTV OPERATION OF  
KSNT-DT, TOPEKA, KANSAS  
CHANNEL 27 50 KW ERP 320 METERS HAAT  
MARCH 2008

Radial Bearing N ° E, T	Average* Elevation 3.2 to 16.1 km meters	Effective Height meters	Depression Angle	ERP At Radio Horizon kW	Distance to Contour F(50,90)	
					48 dBu City Grade km	41 dBu Noise-Limited km
0	303.6	312.4	0.490	50.0	66.2	75.2
45	304.4	311.6	0.489	50.0	66.2	75.1
90	269.9	346.1	0.515	50.0	68.2	78.4
135	303.4	322.3	0.497	50.0	66.8	76.1
180	293.7	300.6	0.480	50.0	65.5	74.1
225	294.4	321.6	0.497	50.0	66.7	76.0
270	279.3	336.7	0.508	50.0	67.6	77.5
315	304.2	311.8	0.489	50.0	66.2	75.1
Average	296	320				

\*Based on data from FCC 3-second data base

DTV Channel 27 (548-554 MHz)  
Average Elevation 3.2 to 16.1 km 296 meters AMSL  
Center of Radiation 616 meters AMSL  
Antenna Height Above Average Terrain 320 meters  
Effective Radiated Power 50 kW (16.99 dBk)

North Latitude: 39° 05' 34"  
West Longitude: 95° 47' 04"

(NAD-27)

ABOVE GROUND

ABOVE MEAN SEA LEVEL

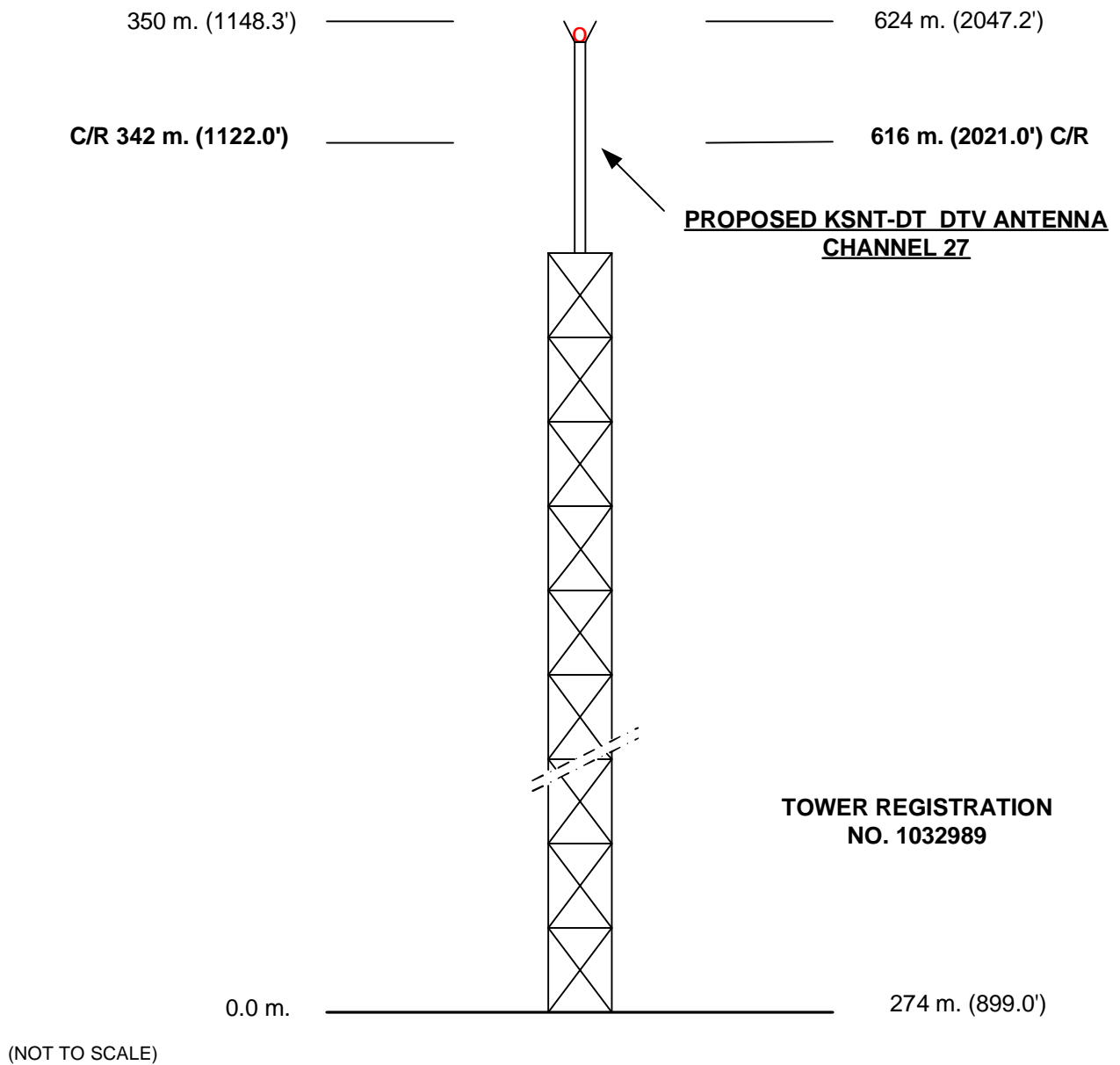


EXHIBIT E - 1  
VERTICAL SKETCH  
FOR THE PROPOSED DTV OPERATION OF  
**KSNT-DT, TOPEKA, KANSAS**  
MARCH 2008

EXHIBIT E-2  
ANTENNA DATA

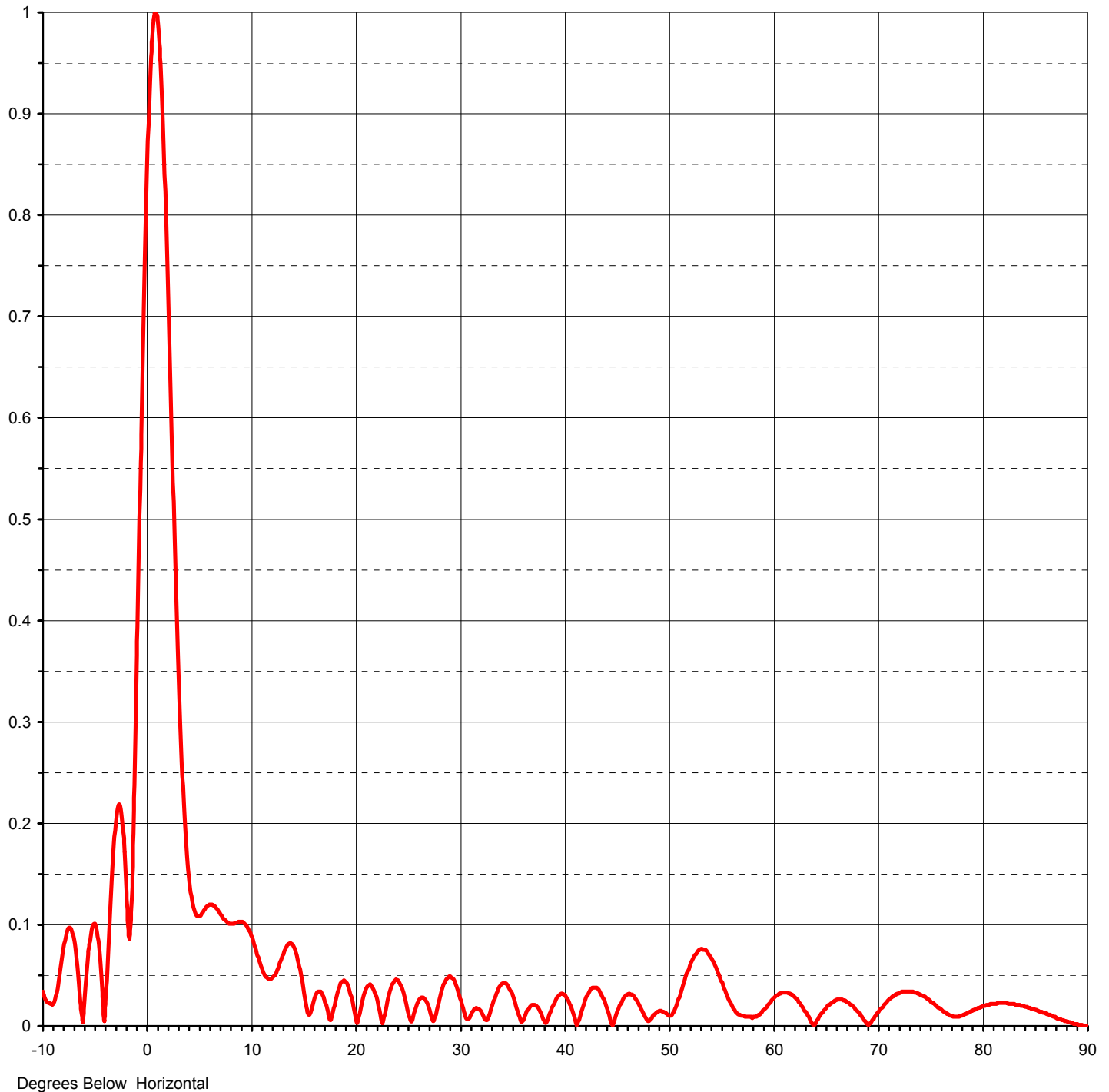


Proposal Number	<b>DCA-11057</b>	Revision:	<b>2</b>
Date	<b>28-Jul-05</b>		
Call Letters	<b>KSNT</b>	Channel	<b>27</b>
Location	<b>Topeka, KS</b>		
Customer			
Antenna Type	<b>TFU-26GTH-H O4 DC</b>		

## ELEVATION PATTERN

RMS Gain at Main Lobe	<b>22.50 ( 13.52 dB )</b>
RMS Gain at Horizontal	<b>16.50 ( 12.17 dB )</b>
Calculated / Measured	<b>Calculated</b>

Beam Tilt	<b>0.75 deg</b>
Frequency	<b>551.00 MHz</b>
Drawing #	<b>26G225075N-90</b>





Proposal Number **DCA-11057**      Revision: **2**  
 Date **28-Jul-05**  
 Call Letters **KSNT**      Channel **27**  
 Location **Topeka, KS**  
 Customer  
 Antenna Type **TFU-26GTH-H O4 DC**

## TABULATION OF ELEVATION PATTERN

Elevation Pattern Drawing #: **26G225075N-90**

Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10.0	0.034	2.4	0.556	10.6	0.071	30.5	0.011	51.0	0.028	71.5	0.030
-9.5	0.023	2.6	0.479	10.8	0.064	31.0	0.010	51.5	0.044	72.0	0.033
-9.0	0.022	2.8	0.407	11.0	0.058	31.5	0.017	52.0	0.059	72.5	0.034
-8.5	0.044	3.0	0.342	11.5	0.048	32.0	0.015	52.5	0.070	73.0	0.034
-8.0	0.078	3.2	0.285	12.0	0.047	32.5	0.006	53.0	0.075	73.5	0.033
-7.5	0.097	3.4	0.237	12.5	0.055	33.0	0.017	53.5	0.075	74.0	0.031
-7.0	0.084	3.6	0.198	13.0	0.068	33.5	0.032	54.0	0.068	74.5	0.028
-6.5	0.036	3.8	0.167	13.5	0.080	34.0	0.041	54.5	0.058	75.0	0.024
-6.0	0.029	4.0	0.145	14.0	0.080	34.5	0.041	55.0	0.045	75.5	0.020
-5.5	0.084	4.2	0.128	14.5	0.065	35.0	0.032	55.5	0.032	76.0	0.016
-5.0	0.101	4.4	0.117	15.0	0.039	35.5	0.016	56.0	0.021	76.5	0.012
-4.5	0.062	4.6	0.111	15.5	0.012	36.0	0.005	56.5	0.013	77.0	0.010
-4.0	0.024	4.8	0.108	16.0	0.024	36.5	0.016	57.0	0.010	77.5	0.009
-3.5	0.127	5.0	0.108	16.5	0.034	37.0	0.021	57.5	0.009	78.0	0.010
-3.0	0.204	5.2	0.111	17.0	0.028	37.5	0.018	58.0	0.008	78.5	0.013
-2.8	0.217	5.4	0.114	17.5	0.008	38.0	0.007	58.5	0.010	79.0	0.015
-2.6	0.217	5.6	0.117	18.0	0.020	38.5	0.009	59.0	0.015	79.5	0.018
-2.4	0.202	5.8	0.119	18.5	0.039	39.0	0.022	59.5	0.021	80.0	0.020
-2.2	0.172	6.0	0.120	19.0	0.044	39.5	0.030	60.0	0.027	80.5	0.021
-2.0	0.131	6.2	0.120	19.5	0.033	40.0	0.031	60.5	0.031	81.0	0.022
-1.8	0.091	6.4	0.119	20.0	0.010	40.5	0.023	61.0	0.033	81.5	0.023
-1.6	0.099	6.6	0.116	20.5	0.017	41.0	0.008	61.5	0.032	82.0	0.023
-1.4	0.168	6.8	0.113	21.0	0.036	41.5	0.009	62.0	0.029	82.5	0.022
-1.2	0.262	7.0	0.110	21.5	0.040	42.0	0.025	62.5	0.023	83.0	0.022
-1.0	0.366	7.2	0.107	22.0	0.029	42.5	0.036	63.0	0.015	83.5	0.021
-0.8	0.475	7.4	0.105	22.5	0.006	43.0	0.038	63.5	0.007	84.0	0.019
-0.6	0.583	7.6	0.103	23.0	0.021	43.5	0.032	64.0	0.002	84.5	0.018
-0.4	0.684	7.8	0.101	23.5	0.040	44.0	0.020	64.5	0.012	85.0	0.016
-0.2	0.777	8.0	0.101	24.0	0.045	44.5	0.004	65.0	0.018	85.5	0.014
0.0	0.856	8.2	0.101	24.5	0.036	45.0	0.012	65.5	0.023	86.0	0.012
0.2	0.920	8.4	0.102	25.0	0.016	45.5	0.024	66.0	0.026	86.5	0.010
0.4	0.966	8.6	0.102	25.5	0.008	46.0	0.031	66.5	0.026	87.0	0.008
0.6	0.992	8.8	0.103	26.0	0.024	46.5	0.031	67.0	0.024	87.5	0.006
0.8	1.000	9.0	0.103	26.5	0.028	47.0	0.024	67.5	0.020	88.0	0.005
1.0	0.989	9.2	0.102	27.0	0.019	47.5	0.014	68.0	0.014	88.5	0.003
1.2	0.960	9.4	0.100	27.5	0.005	48.0	0.005	68.5	0.007	89.0	0.002
1.4	0.915	9.6	0.097	28.0	0.024	48.5	0.010	69.0	0.001	89.5	0.001
1.6	0.857	9.8	0.095	28.5	0.042	49.0	0.014	69.5	0.007	90.0	0.000
1.8	0.789	10.0	0.090	29.0	0.049	49.5	0.014	70.0	0.014		
2.0	0.714	10.2	0.085	29.5	0.044	50.0	0.010	70.5	0.021		
2.2	0.636	10.4	0.078	30.0	0.029	50.5	0.014	71.0	0.026		



