COMPREHENSIVE TECHNICAL EXHIBIT
APPLICATION FOR CONSTRUCTION PERMIT

KTUO-LD – TULSA, OKLAHOMA
FACILITY ID: 190113

DIGITAL NETWORKS–MIDWEST, LLC

JANUARY 2021

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APPLICATION FOR CONSTRUCTION PERMIT

The following engineering statement and attached exhibits have been prepared for **Digital Networks-Midwest, LLC** ("Midwest"), licensee of digital low power television station KTUO-LD at Tulsa, Oklahoma, and are in support of their application for construction permit.[1] This application proposes a relocation of the licensed facility.

KTUO is licensed to operate on television channel 23 as a digital low-power television facility. The station is authorized to operate with a maximum effective radiated power of 1.35 kW at a center of radiation of 229.5 meters above mean sea level, 30.5 meters above ground, using a composite directional antenna. The proposed facility would continue to operate on television channel 23, but with a maximum effective radiated power of 15 kW at a center of radiation of 352 meters AMSL. A directional antenna is proposed for use by the facility. The proposed antenna is a Propagation Systems, Inc. ("PSI") model PSILP16AE oriented at an azimuth of 135 degrees true.

The proposed relocation of the facility would be consistent with the provisions of Section 73.3572 of the Commission's Rules. Exhibit E-1 illustrates the predicted 51 dBu F(50,90) service contour from the licensed KTUO-LD facility, as well as the corresponding contour from the proposed facility. As this map demonstrates, overlap exists between the service contours. Additionally, the proposed site is located within 30 miles of the licensed site.

The proposed technical parameters would not result in interference to other proposed, authorized, or licensed facilities in excess of that permitted under the Commission's Rules. Exhibit E-2 provides tabular output from *TVStudy*. This study demonstrates that the proposed technical

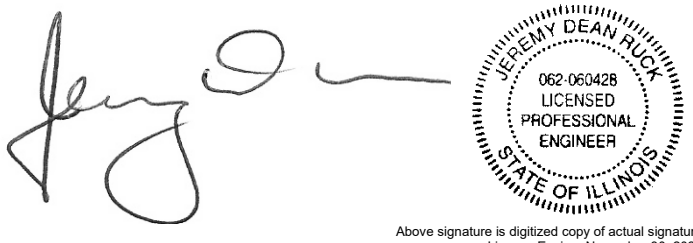
[1] The Facility ID for KTUO-LD at Tulsa, Oklahoma is 190113

parameters would not result in impermissible interference, and that no outgoing interference check failures exists.

The proposed facility would not constitute a significant environmental impact, and is exempt from environmental processing. The proposed antenna would be mounted to an existing tower that is registered with the Commission. The addition of the antenna to this tower would not increase the existing environmental impact already present from the tower.

Using the equations in Supplement A of *OET Bulletin 65*, the calculated worst-case power density at ground level assuming a downward radiation relative field of 0.3 is 2.66 $\mu W/cm^2$. This value is less than the upper limit of the uncontrolled environment condition. Midwest certifies it will coordinate with all other users of the site to ensure that workers and other personnel are not exposed to levels of radiofrequency radiation in excess of the applicable safety standards. Coordination activities will include, but are not necessarily limited to, a reduction in transmitter power or cessation of operation.

The preceding statement and attached exhibits have been prepared by me, or under my direction, and are true and accurate to the best of my belief and knowledge.



Above signature is digitized copy of actual signature
License Expires November 30, 2021

Jeremy D. Ruck, PE
January 2, 2021

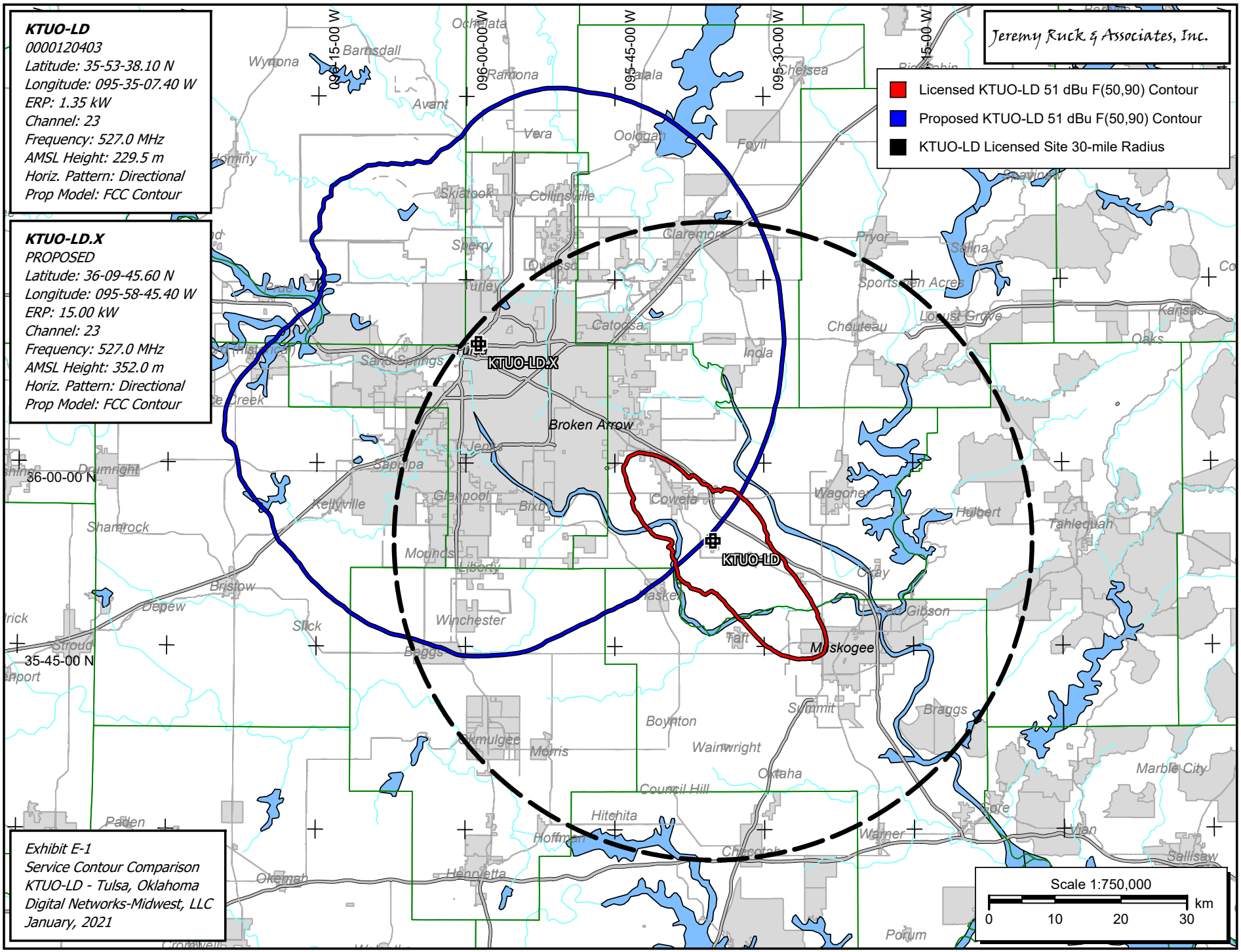

KTUO-LD
0000120403
Latitude: 35-53-38.10 N
Longitude: 095-35-07.40 W
ERP: 1.35 kW
Channel: 23
Frequency: 527.0 MHz
AMSL Height: 229.5 m
Horiz. Pattern: Directional
Prop Model: FCC Contour
KTUO-LD.X
PROPOSED
Latitude: 36-09-45.60 N
Longitude: 095-58-45.40 W
ERP: 15.00 kW
Channel: 23
Frequency: 527.0 MHz
AMSL Height: 352.0 m
Horiz. Pattern: Directional
Prop Model: FCC Contour
Exhibit E-1
Service Contour Comparison
KTUO-LD - Tulsa, Oklahoma
Digital Networks-Midwest, LLC
January, 2021
Jeremy Ruck & Associates, Inc.
Licensed KTUO-LD 51 dBu F(50,90) Contour
Proposed KTUO-LD 51 dBu F(50,90) Contour
KTUO-LD Licensed Site 30-mile Radius
KTUO-LD.X
KTUO-LD
096-15-00 W
096-00-00 W
095-45-00 W
095-30-00 W
36-00-00 N
35-45-00 N
Wynona
Barnsdall
Ochelata
Ramona
Avant
Vera
Oologah
Foyil
Chelsea
Skiatook
Collinsville
Sperry
Claremore
Pryor
Salina
Turley
Catoosa
Chouteau
Locust Grove
Sand Springs
India
Broken Arrow
Jenks
Sapulpa
Drumright
Kellyville
Glenpool
Bixby
Coweta
Wagoner
Hulbert
Tahlequah
Shamrock
Mounds
Liberty
Bristow
Depew
Stroud
Slick
Winchester
Taft
Muskogee
Gibson
Braggs
Boynton
Summit
Wainwright
Oktaha
Marble City
Morris
Okmulgee
Council Hill
Hitchita
Hoffman
Warner
Checotah
Sallisaw
Porum
Paden
Okemah
Henryetta
Scale 1:750,000
0
10
20
30
km

Exhibit E-2 - TVStudy Interference Study

```
tvstudy v2.2.5 (4uoc83)
Database: 127.0.0.1,  Study: KTUO-LD CH  23 Final ASRN 1201785 15 kW ERP 352 m AMSL PSILP16AE @135,  Model:
Longley-Rice
Start: 2021.01.02 15:37:24

Study created: 2021.01.02 15:37:24

Study build station data: LMS TV 2021-01-01

    Proposal: KTUO-LD D23 LD LIC TULSA, OK
 File number: BLANK0000120403
 Facility ID: 190113
Station data: User record
   Record ID: 273
     Country: U.S.

Build options:
Protect pre-transition records not on baseline channel

Stations potentially affected by proposal:
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IX	Call	Chan	Svc	Status	City, State	File Number	Distance
No	K22OC-D	D22	LD	CP	FORT SMITH, AR	BLANK0000071940	173.0 km
No	KTOU-LD	D22	LD	CP	OKLAHOMA CITY, OK	BLANK0000051682	161.9
No	K22OD-D	D22	LD	CP	PONCA CITY, OK	BLANK0000071812	150.9
No	KOKI-TV	D22	DT	LIC	TULSA, OK	BLCDT20021127AGL	30.9
No	K23OW-D	D23	LD	LIC	HOT SPRINGS, AR	BLANK0000087667	334.0
No	KJEP-LP	N23-	TX	LIC	NASHVILLE, AR	BLTTL19960111AE	312.9
No	K23LY-D	D23	LD	CP	EMPORIA, KS	BNPDTL20100930ARP	254.4
No	KSNL-LD	D23	LD	LIC	SALINA, KS	BLANK0000059950	332.9
No	KCTU-LD	D23	LD	CP	WICHITA, KS	BLANK0000031023	208.1
No	KSLA	D23	DT	LIC	SHREVEPORT, LA	BLANK0000120697	430.7
Yes	KODE-TV	D23	DT	LIC	JOPLIN, MO	BLANK0000071606	162.6
No	K23MS-D	D23	LD	LIC	Kansas city, MO	BLANK0000058560	344.4
No	K23MS-D	D23	LD	CP	Kansas city, MO	BLANK0000059054	328.1
No	KCDN-LD	D23	LD	LIC	KANSAS CITY, MO	BLANK0000112964	343.0
No	K23MS-D	D23	LD	LIC	Kansas city, MO	BLANK0000120926	328.1
No	K22KA-D	D23	LD	CP	ROLLA, MO	BLANK0000071816	422.5
No	K23LE-D	D23	LD	CP	SEDALIA, MO	BNPDTL20100319AEZ	360.0
Yes	KSBI	D23	DT	LIC	OKLAHOMA CITY, OK	BLANK0000055374	149.8
Yes	KSBI	D23	DT	LIC	OKLAHOMA CITY, OK	BLCDT20140530AFS	149.8
No	K40JP-D	D23	LD	LIC	SAYRE, OK	BLANK0000058433	355.5
No	K23NH-D	D23	LD	LIC	SEILING, OK	BLANK0000058916	267.2
No	K23IZ-D	D23	LD	LIC	STRONG CITY, OK	BLDTT20100521AEH	327.3
No	KQDA-LD	D23	LD	CP	DENISON, TX	BLANK0000001210	291.3
No	KTXD-TV	D23	DT	LIC	GREENVILLE, TX	BLANK0000080284	407.4
No	K40HZ	D23-	LD	CP	WICHITA FALLS, TX	BLANK0000052116	343.2
No	KFSM-TV	D24	LD	LIC	FORT SMITH, AR	BLCDT20110517AEQ	165.3
No	KEGW-CD	D24	DC	LIC	SILOAM SPRINGS, AR	BLANK0000052722	160.5
No	KGPT-CD	D24	DC	LIC	WICHITA, KS	BLDTA20130404ABI	228.0
No	KGPT-CD	D24	DC	CP	WICHITA, KS	BDCCDTL20111228ACD	228.0
Yes	KZLL-LD	D24	LD	CP	JOPLIN, MO	BLANK0000051609	8.9
No	KRLJ-LD	D24	LD	LIC	JOPLIN, MO	BLANK0000079995	162.2
No	KOKH-TV	D24	DT	LIC	OKLAHOMA CITY, OK	BLANK0000121771	152.1
No	KTUL	D24	LD	LIC	TULSA, OK	BLCDT20140421ADF	133.0
No	KTUL	D24	LD	APP	TULSA, OK	BDRTCDT20110817AAG	90.3
No	K25GJ	N25+	TX	LIC	MUSKOGEE, OK	BLTT20051206ADA	79.6
No	KCLJ-LP	N30z	TX	LIC	JOPLIN/CARTHAGE, MO	BLTTA20050506ACG	172.9

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No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

    Channel: D23
       Mask: Full Service
   Latitude:  36  9 45.60 N (NAD83)
  Longitude:  95 58 45.40 W
Height AMSL: 352.0 m
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       HAAT: 136.9 m
   Peak ERP: 15.0 kW
    Antenna: PSILP16AE 135.0 deg
Elev Pattrn: Generic
  Elec Tilt: 1.00

49.7 dBu contour:
Azimuth      ERP       HAAT   Distance
  0.0 deg   1.21 kW   158.1 m   35.9 km
 45.0       8.62      164.1     46.4
 90.0       14.6      144.8     47.8
135.0       15.0      126.2     46.6
180.0       14.6      160.0     48.8
225.0       8.62      127.7     43.9
270.0       1.21      116.4     33.2
315.0       1.56      102.8     33.2

Database HAAT does not agree with computed HAAT
Database HAAT: 137 m   Computed HAAT: 138 m

Distance to Canadian border: 1280.4 km

Distance to Mexican border: 871.6 km

Conditions at FCC monitoring station: Grand Island NE
Bearing: 338.8 degrees   Distance: 570.2 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:
Bearing: 301.3 degrees   Distance: 919.4 km


Study cell size: 1.00 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%


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Interference to BLANK0000071606 LIC scenario 1

             Call      Chan  Svc Status  City, State              File Number             Distance
Desired:     KODE-TV   D23   DT  LIC     JOPLIN, MO               BLANK0000071606

Undesireds:  KTUO-LD   D23   LD  LIC     TULSA, OK                BLANK0000120403         162.6 km
             KRBK      D22   DT  LIC     OSAGE BEACH, MO          BLANK0000063419         143.1
             KOKI-TV   D22   DT  LIC     TULSA, OK                BLCDT20021127AGL        153.9
             KSBI      D23   DT  LIC     OKLAHOMA CITY, OK        BLANK0000055374         309.9
             KEGW-CD   D24   DC  LIC     SILOAM SPRINGS, AR       BLANK0000052722         108.2

        Service area       Terrain-limited       IX-free, before       IX-free, after    Percent New IX
 30587.0     737,982   30024.2     732,465   29440.1     714,077   29199.2     712,641     0.82     0.20

Undesired                          Total IX     Unique IX, before     Unique IX, after
KTUO-LD D23 LD LIC       428.7       5,078                            240.9       1,436
KRBK D22 DT LIC          203.2       4,312     203.2       4,312      196.2       4,048
KOKI-TV D22 DT LIC       123.7       3,212      79.5       1,454       47.3         698
KSBI D23 DT LIC          238.9       3,253     191.6       1,488       86.3         550
KEGW-CD D24 DC LIC        65.5       9,376      62.5       9,369       60.5       9,369

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Interference to BLANK0000071606 LIC scenario 2

             Call      Chan  Svc Status  City, State              File Number             Distance
Desired:     KODE-TV   D23   DT  LIC     JOPLIN, MO               BLANK0000071606

Undesireds:  KTUO-LD   D23   LD  LIC     TULSA, OK                BLANK0000120403         162.6 km
             KRBK      D22   DT  LIC     OSAGE BEACH, MO          BLANK0000063419         143.1
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            KOKI-TV   D22   DT  LIC     TULSA, OK                BLCDT20021127AGL        153.9
            KSBI      D23   DT  LIC     OKLAHOMA CITY, OK        BLCDT20140530AFS        309.9
            KEGW-CD   D24   DC  LIC     SILOAM SPRINGS, AR       BLANK0000052722         108.2

        Service area       Terrain-limited       IX-free, before       IX-free, after    Percent New IX
 30587.0     737,982   30024.2     732,465   29413.9     713,887   29186.1     712,541     0.77     0.19

Undesired                          Total IX     Unique IX, before      Unique IX, after
KTUO-LD D23 LD LIC        428.7       5,078                          227.9       1,346
KRBK D22 DT LIC           203.2       4,312      203.2       4,312   196.2       4,048
KOKI-TV D22 DT LIC        123.7       3,212       77.5       1,454    47.3         698
KSBI D23 DT LIC           267.0       3,443      217.7       1,678    99.4         650
KEGW-CD D24 DC LIC         65.5       9,376       62.5       9,369    60.5       9,369

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Interference to BLANK0000055374 LIC scenario 1

             Call      Chan  Svc Status  City, State              File Number             Distance
Desired:     KSBI      D23   DT  LIC     OKLAHOMA CITY, OK        BLANK0000055374

Undesireds:  KTUO-LD   D23   LD  LIC     TULSA, OK                BLANK0000120403         149.8 km
             KOKI-TV   D22   DT  LIC     TULSA, OK                BLCDT20021127AGL        170.0
             KODE-TV   D23   DT  LIC     JOPLIN, MO               BLANK0000071606         309.9
             KTXD-TV   D23   DT  LIC     GREENVILLE, TX           BLANK0000080284         337.8
             KOKH-TV   D24   DT  LIC     OKLAHOMA CITY, OK        BLANK0000121771           5.4

        Service area       Terrain-limited       IX-free, before       IX-free, after    Percent New IX
 33128.9   1,577,792   32826.1   1,576,278   31207.2   1,559,095   31053.2   1,555,622     0.49     0.22

Undesired                          Total IX     Unique IX, before      Unique IX, after
KTUO-LD D23 LD LIC        302.7       4,658                          154.0       3,473
KOKI-TV D22 DT LIC         33.3         442        9.1          94     0.0           0
KODE-TV D23 DT LIC        239.3       2,352      197.1       1,838   109.6       1,356
KTXD-TV D23 DT LIC        126.2         484       91.2         253    88.2         241
KOKH-TV D24 DT LIC       1290.3      14,602     1253.3      14,320  1243.3      14,258

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Interference to BLCDT20140530AFS LIC scenario 1

             Call      Chan  Svc Status  City, State              File Number             Distance
Desired:     KSBI      D23   DT  LIC     OKLAHOMA CITY, OK        BLCDT20140530AFS

Undesireds:  KTUO-LD   D23   LD  LIC     TULSA, OK                BLANK0000120403         149.8 km
             KOKI-TV   D22   DT  LIC     TULSA, OK                BLCDT20021127AGL        170.0
             KODE-TV   D23   DT  LIC     JOPLIN, MO               BLANK0000071606         309.9
             KTXD-TV   D23   DT  LIC     GREENVILLE, TX           BLANK0000080284         337.8
             KOKH-TV   D24   DT  LIC     OKLAHOMA CITY, OK        BLANK0000121771           5.4

        Service area       Terrain-limited       IX-free, before       IX-free, after    Percent New IX
 33128.9   1,577,792   32826.1   1,576,278   31207.2   1,559,095   31053.2   1,555,622     0.49     0.22

Undesired                          Total IX     Unique IX, before      Unique IX, after
KTUO-LD D23 LD LIC        302.7       4,658                          154.0       3,473
KOKI-TV D22 DT LIC         33.3         442        9.1          94     0.0           0
KODE-TV D23 DT LIC        239.3       2,352      197.1       1,838   109.6       1,356
KTXD-TV D23 DT LIC        126.2         484       91.2         253    88.2         241
KOKH-TV D24 DT LIC       1290.3      14,602     1253.3      14,320  1243.3      14,258

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Interference to BLANK0000051609 CP scenario 1

             Call      Chan  Svc Status  City, State              File Number             Distance
Desired:     KZLL-LD   D24   LD  CP      JOPLIN, MO               BLANK0000051609

Undesireds:  KTUO-LD   D23   LD  LIC     TULSA, OK                BLANK0000120403           8.9 km
             KEGW-CD   D24   DC  LIC     SILOAM SPRINGS, AR       BLANK0000052722         168.8
             KGPT-CD   D24   DC  LIC     WICHITA, KS              BLDTA20130404ABI        226.0
             KOKH-TV   D24   DT  LIC     OKLAHOMA CITY, OK        BLANK0000121771         143.2
             KTUL      D24   LD  LIC     TULSA, OK                BLCDT20140421ADF        131.5
             KTUL      D24   LD  APP     TULSA, OK                BDRTCDT20110817AAG       94.7
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Exhibit E-2 - TVStudy Interference Study

Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX	
4769.4	778,099	4678.9	776,564	4443.3	767,725	4436.2	766,689	0.16	0.13

Undesired	Total IX		Unique IX, before		Unique IX, after	
KTUO-LD D23 LD LIC	10.1	1,051			7.1	1,036
KEGW-CD D24 DC LIC	1.0	27	0.0	0	0.0	0
KOKH-TV D24 DT LIC	234.6	8,839	232.6	8,794	229.5	8,779
KTUL D24 LD LIC	1.0	27	0.0	0	0.0	0
KTUL D24 LD APP	2.0	18	1.0	0	1.0	0

Interference to proposal scenario 1
6.94% interference received

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	KTUO-LD	D23	LD	LIC	TULSA, OK	BLANK0000120403	
Undesireds:	KOKI-TV	D22	DT	LIC	TULSA, OK	BLCDT20021127AGL	30.9 km
	KODE-TV	D23	DT	LIC	JOPLIN, MO	BLANK0000071606	162.6
	KSBI	D23	DT	LIC	OKLAHOMA CITY, OK	BLANK0000055374	149.8
	KZLL-LD	D24	LD	CP	JOPLIN, MO	BLANK0000051609	8.9

Service area		Terrain-limited		IX-free		Percent IX	
5632.2	817,290	5509.1	816,326	4108.6	759,706	25.42	6.94

Undesired	Total IX		Unique IX		Prcnt Unique IX	
KOKI-TV D22 DT LIC	1137.0	49,733	733.9	40,095	13.32	4.91
KODE-TV D23 DT LIC	388.3	9,191	88.9	2,584	1.61	0.32
KSBI D23 DT LIC	464.0	12,149	85.8	1,833	1.56	0.22
KZLL-LD D24 LD CP	31.3	919	6.1	30	0.11	0.00

Interference to proposal scenario 2
6.94% interference received

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	KTUO-LD	D23	LD	LIC	TULSA, OK	BLANK0000120403	
Undesireds:	KOKI-TV	D22	DT	LIC	TULSA, OK	BLCDT20021127AGL	30.9 km
	KODE-TV	D23	DT	LIC	JOPLIN, MO	BLANK0000071606	162.6
	KSBI	D23	DT	LIC	OKLAHOMA CITY, OK	BLCDT20140530AFS	149.8
	KZLL-LD	D24	LD	CP	JOPLIN, MO	BLANK0000051609	8.9

Service area		Terrain-limited		IX-free		Percent IX	
5632.2	817,290	5509.1	816,326	4108.6	759,706	25.42	6.94

Undesired	Total IX		Unique IX		Prcnt Unique IX	
KOKI-TV D22 DT LIC	1137.0	49,733	723.8	38,445	13.14	4.71
KODE-TV D23 DT LIC	388.3	9,191	88.9	2,584	1.61	0.32
KSBI D23 DT LIC	475.1	13,799	85.8	1,833	1.56	0.22
KZLL-LD D24 LD CP	31.3	919	5.0	30	0.09	0.00