

## **TECHNICAL REPORT**

This technical report has been developed for a minor modification to KWOX(FM).AP 266C0 at Woodward, OK, FCC file no. BPH-20150424ABI. A correction of the site elevation and coordinates are submitted. The following exhibits are provided for the form 301:

- E-1 KWOX(FM) Spacing Study
- E-2 KWOX(FM) Overlap Study
- E-3 Interference Contour Plot to KVRO(FM) 266A
- E-4 FMOver Tabulation to KVRO(FM)
- E-5 HAAT Calculation
- E-6 70 dBu Contour Coverage of Woodward, OK

### **KWOX(FM) Modification Analysis:**

KWOX(FM) will continue to be designated as a 73.215 short-spaced facility with respect to KVRO(FM) 266A at Stillwater, OK (Exhibit E-1). An overlap study (exhibit E-2), interference plot (Exhibit E-3) and FMOver tabulation (Exhibit E-4), show the KBRI(FM) modification will not produce any interference overlap to KVRO(FM).

### **KWOX(FM) Antenna System:**

The facility is located on the existing tower, ASR 1010654, at corrected coordinates:

**36-16-23N 99-26-45W NAD27.**

An ERI G5CPS-10AC3 ten bay, full-wavelength, nondirectional antenna is mounted at a COR AGL of 352 meters, 1041 meters AMSL, 365 meter HAAT (exhibit E-5) and operates at an ERP of 82.0 kW with beam tilt (80.0 kW w/o). The 70 dBu contour

## Anderson Associates

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Broadcast Consultants  
1519 Euclid Avenue  
Bowling Green, KY 42103

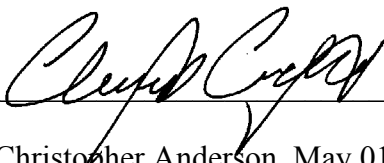
provides coverage entirely over the Woodward, OK community of license city boundary, shown in exhibit E-6.

### **RF Exposure Calculation:**

The RF production of the 82.0 kW facility was calculated using the Commission's FMMODEL program. The maximum RF at a height of 2 meters above ground was calculated to be  $2.30 \mu\text{Watts/cm}^2$  at a distance of 85 meters from the tower, which is below 5% of the  $200 \mu\text{Watts/cm}^2$  permissible for general public/uncontrolled exposure, allowing exclusion from consideration.

### **Conclusion:**

It is concluded that the minor modification of KWOX(FM) is in full compliance with the Commission rules and policies.



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Christopher Anderson May 01, 2015  
andersce@bham.rr.com

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# E-1 KWOX(FM) Spacing Study

REFERENCE		CLASS = C0	DISPLAY DATES
36 16 23.0 N.			DATA 05-01-15
99 26 45.0 W.	Current Spacings to 3rd Adj.		SEARCH 05-01-15
----- Channel 266 - 101.1 MHz -----			

Call	Channel	Location		Azi	Dist	FCC	Margin
KWOX	LIC-N 266C0	Woodward	OK	207.6	0.59	269.5	-268.9
KVRO	LIC 266A	Stillwater	OK	91.0	205.37	214.5	-9.1 <b>(1)</b>
KOCD	CP -Z 268C2	Okeene	OK	105.2	88.76	88.5	0.26
KLAW	LIC-N 267C1	Lawton	OK	156.5	208.17	195.5	12.7
KKZU	LIC 269C2	Sayre	OK	189.3	101.50	88.5	13.0
KFDI-FM	LIC 267C	Wichita	KS	44.5	239.87	219.5	20.4
NEW	CP -Z 266A	Wayne	OK	128.1	244.00	214.5	29.5
KXGL	LIC-N 265C0	Amarillo	TX	244.5	241.65	206.5	35.2
KGBL	LIC 265C1	Lakin	KS	326.4	231.28	195.5	35.8
KREJ	LIC 269C2	Medicine Lodge	KS	32.9	127.48	88.5	39.0

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All separation margins include rounding

(1) KWOX(FM) is designated as a 73.215 facility.

# E-2 KWOX(FM).AP Mod. Overlap Study

REFERENCE		CH# 266C0 - 101.1 MHz, Pwr= 82 kW, HAAT= 365.0 M, COR= 1041 M								DISPLAY DATES	
36 16 23.0 N.		Average Protected F(50-50)= 75.15 km								DATA 05-01-15	
99 26 45.0 W.		73.215 Omni-directional								SEARCH 05-01-15	
CH CITY	CALL	TYPE STATE	ANT STATE	AZI <--	DIST FILE #	LAT LNG	PWR(kW) HAAT(M)	INT(km) COR(M)	PRO(km) LICENSEE	*IN* (Overlap in km)	*OUT*
266C0 KWOX Woodward		APP NCY OK		0.0 0.0	0.00 BPH20150424ABI	36 16 23.0 99 26 45.0	82.000 369	176.6 1045	76.2 Omni Communications, Inc.	-252.5*	-252.4*
266C0 KWOX Woodward		LIC NC_ OK		207.6 27.6	0.59 BLH20071003AAM	36 16 06.0 99 26 56.0	84.000 366	178.9 1044	78.1 Omni Communications, Inc.	-251.6*	-249.5*
268C2 KOCD« Okeene		CP ZCX OK		105.2 285.7	88.76 BNPH20130717AAA	36 03 38.0 98 29 41.0	46.000 149	2.7 604	27.6 Fmi Media, Inc.	88.5R	0.26M
266A KVR0^ Stillwater		LIC _CX OK		91.0 272.4	204.87 BLH20090922ABW	36 13 06.0 97 09 43.0	6.000 100	80.2 413	23.2 Stillwater Broadcasting, L	46.0	0.4
267C1 KLAW« Lawton		LIC NCX OK		156.5 337.1	208.17 BMLH20100624AMR	34 32 59.0 98 32 21.0	100.000 178	87.3 531	56.5 Townsquare Media Lawton Li	195.5R	12.7M
269C2 KKZU« Sayre		LIC _CX OK		189.3 9.2	101.50 BLH20100517AAK	35 22 13.0 99 37 40.0	50.000 150	5.7 758	49.9 Wright Broadcasting System	88.5R	13.0M
267C KFDI -FM« Wichita		LIC _CN KS		44.5 225.6	239.87 BLH19830114AC	37 47 47.0 97 31 59.0	100.000 347	107.9 771	74.3 Journal Broadcast Corporat	219.5R	20.4M
266A NEW« Wayne		CP ZCX OK		128.1 309.3	244.00 BNPH20130625ADA	34 54 02.0 97 20 32.0	6.000 100	83.1 414	25.5 Kxo, Inc.	214.5R	29.5M
265C0 KXGL« Amarillo		LIC NCX TX		244.5 63.1	241.65 BLH20041116ABF	35 18 53.0 101 50 47.0	100.000 398	118.1 1441	79.5 Jmj Broadcasting Company I	206.5R	35.2M
265C1 KGBL« Lakin		LIC _CX KS		326.4 145.5	231.28 BLH20140917AAK	37 59 52.0 100 54 25.0	100.000 121	85.9 1002	56.4 Steckline Communications,	195.5R	35.8M
269C2 KREJ« Medicine Lodge		LIC _C_ KS		32.9 213.4	127.48 BLED20010112AAI	37 14 00.0 98 39 44.0	50.000 145	5.4 630	47.1 Florida Public Radio, Inc.	88.5R	39.0M

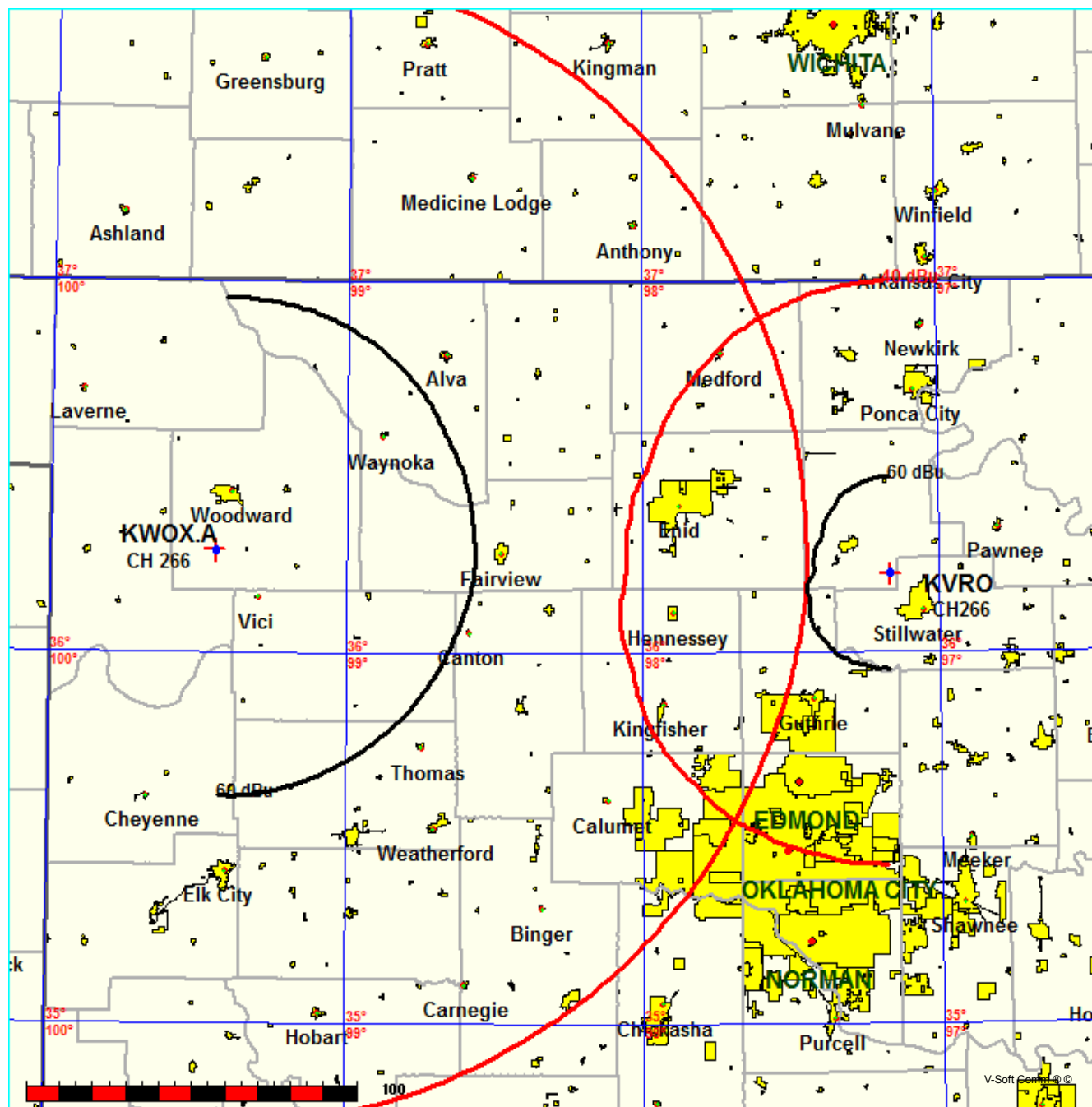
Terrain database is USGS 03 SEC , R= 73.215 qualifying spacings or FCC minimum Spacings in KM, M= Margin in KM  
In & Out distances between contours are shown at closest points. Reference zone= - Zone 2, Co to 3rd adjacent.  
All separation margins (if shown) include rounding. Call signs with strikeout need not be protected.  
Ant Column: (D= DA Standard, Z= DA 73.215, N= Not DA 73.215, \_= Omni), Polarization (C,H,V,E), Beamtilt(Y,N,X)  
"\*\*\*"affixed to 'IN' or 'OUT' values = site inside restricted contour.  
« = Station meets FCC minimum distance spacing for its class.  
^ = Power and antenna height 'Max classed' as per Sec 73.215 protection requirements

# E-3 KWOX(FM).AP Mod. Interference Plot to KVRO(FM) 266A

FMCommander Single Allocation Study - 05-01-2015 - USGS 03 SEC  
KWOX.A's Overlaps (In= 45.97 km, Out= 0.37 km)

KWOX.A CH 266 C0 73.215 N  
Lat= 36 16 23.0, Lng= 99 26 45.0  
82.0 kW 365 M HAAT, 1041 M COR  
Prot.= 60 dBu, Intef.= 40 dBu

KVRO CH 266 A BLH20090922ABW  
Lat= 36 13 06.0, Lng= 97 09 43.0  
6.0 kW 100 M HAAT, 413.2 M COR  
Prot.= 60 dBu, Intef.= 40 dBu



## E-4 KWOX(FM).AP Mod. FMOver Calculation to KVRO(FM)

05-01-2015

Terrain Data: USGS 03 SEC

FMOver Analysis

KVRO BLH20090922ABW

KWOX.AP Mod.

Channel = 266A

Max ERP = 6 kW

RCAMSL = 413.2 M

N. Lat. 36 13 06.0

W. Lng. 97 09 43.0

Protected

60 dBu

Channel = 266C0

Max ERP = 82 kW

RCAMSL = 1041 M

N. Lat. 36 16 23.0

W. Lng. 99 26 45.0

Interfering

40 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
212.0	006.0000	0111.9	029.8	098.8	082.0000	0410.3	191.9	37.67	
213.0	006.0000	0112.0	029.8	098.7	082.0000	0410.3	191.4	37.76	
214.0	006.0000	0111.4	029.7	098.6	082.0000	0410.5	191.0	37.84	
215.0	006.0000	0110.2	029.6	098.5	082.0000	0410.6	190.6	37.92	
216.0	006.0000	0109.0	029.5	098.4	082.0000	0410.7	190.1	38.00	
217.0	006.0000	0108.8	029.4	098.4	082.0000	0410.8	189.7	38.08	
218.0	006.0000	0108.7	029.4	098.3	082.0000	0410.9	189.3	38.16	
219.0	006.0000	0108.3	029.4	098.2	082.0000	0411.0	188.8	38.24	
220.0	006.0000	0107.7	029.3	098.1	082.0000	0411.1	188.4	38.31	
221.0	006.0000	0107.3	029.2	098.0	082.0000	0411.2	188.0	38.38	
222.0	006.0000	0105.2	029.0	097.9	082.0000	0411.4	187.7	38.44	
223.0	006.0000	0103.6	028.8	097.7	082.0000	0411.6	187.4	38.49	
224.0	006.0000	0103.6	028.8	097.6	082.0000	0411.7	187.0	38.57	
225.0	006.0000	0104.5	028.9	097.6	082.0000	0411.7	186.5	38.65	
226.0	006.0000	0104.8	028.9	097.5	082.0000	0411.8	186.1	38.73	
227.0	006.0000	0104.9	028.9	097.4	082.0000	0411.9	185.7	38.81	
228.0	006.0000	0104.6	028.9	097.3	082.0000	0412.1	185.3	38.87	
229.0	006.0000	0104.1	028.8	097.2	082.0000	0412.2	185.0	38.94	
230.0	006.0000	0104.0	028.8	097.1	082.0000	0412.3	184.6	39.00	
231.0	006.0000	0104.8	028.9	097.0	082.0000	0412.4	184.2	39.08	
232.0	006.0000	0104.6	028.9	096.9	082.0000	0412.5	183.8	39.15	
233.0	006.0000	0103.9	028.8	096.7	082.0000	0412.7	183.5	39.20	
234.0	006.0000	0103.6	028.8	096.6	082.0000	0412.9	183.2	39.27	
235.0	006.0000	0103.3	028.7	096.5	082.0000	0413.0	182.9	39.33	
236.0	006.0000	0102.6	028.6	096.4	082.0000	0413.2	182.6	39.38	
237.0	006.0000	0101.7	028.5	096.2	082.0000	0413.3	182.4	39.42	
238.0	006.0000	0100.6	028.4	096.1	082.0000	0413.5	182.2	39.46	
239.0	006.0000	0099.5	028.2	095.9	082.0000	0413.7	182.0	39.50	
240.0	006.0000	0098.4	028.1	095.8	082.0000	0413.9	181.8	39.54	
241.0	006.0000	0096.8	027.9	095.6	082.0000	0414.0	181.7	39.56	
242.0	006.0000	0095.4	027.7	095.4	082.0000	0414.2	181.5	39.59	
243.0	006.0000	0093.9	027.5	095.3	082.0000	0414.4	181.4	39.61	
244.0	006.0000	0092.5	027.3	095.1	082.0000	0414.5	181.3	39.63	

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)
245.0	006.0000	0091.4	027.1	095.0	082.0000	0414.7	181.2	39.65
246.0	006.0000	0089.9	026.9	094.8	082.0000	0414.8	181.2	39.67
247.0	006.0000	0088.5	026.7	094.6	082.0000	0414.9	181.1	39.68
248.0	006.0000	0086.6	026.4	094.5	082.0000	0415.0	181.1	39.68
249.0	006.0000	0085.1	026.2	094.3	082.0000	0415.0	181.1	39.68
250.0	006.0000	0083.6	026.0	094.2	082.0000	0415.1	181.1	39.68
251.0	006.0000	0082.5	025.8	094.0	082.0000	0415.2	181.0	39.69
252.0	006.0000	0081.9	025.8	093.9	082.0000	0415.2	180.9	39.71
253.0	006.0000	0082.2	025.8	093.7	082.0000	0415.3	180.7	39.75
254.0	006.0000	0082.9	025.9	093.6	082.0000	0415.3	180.5	39.80
255.0	006.0000	0083.8	026.0	093.5	082.0000	0415.4	180.2	39.86
256.0	006.0000	0084.1	026.1	093.4	082.0000	0415.4	180.0	39.89
257.0	006.0000	0083.8	026.0	093.2	082.0000	0415.4	179.9	39.91
258.0	006.0000	0083.2	025.9	093.1	082.0000	0415.4	179.9	39.92
259.0	006.0000	0082.5	025.8	092.9	082.0000	0415.4	179.8	39.93
260.0	006.0000	0081.8	025.7	092.8	082.0000	0415.4	179.8	39.93
261.0	006.0000	0081.0	025.6	092.6	082.0000	0415.4	179.8	39.93
262.0	006.0000	0079.9	025.5	092.5	082.0000	0415.3	179.9	39.91
263.0	006.0000	0078.3	025.2	092.3	082.0000	0415.3	180.0	39.89
264.0	006.0000	0076.3	024.9	092.2	082.0000	0415.2	180.2	39.84
265.0	006.0000	0073.8	024.5	092.0	082.0000	0415.1	180.6	39.79
266.0	006.0000	0071.7	024.2	091.9	082.0000	0415.1	180.8	39.74
267.0	006.0000	0069.8	024.0	091.7	082.0000	0415.0	181.0	39.69
268.0	006.0000	0068.1	023.7	091.6	082.0000	0414.9	181.3	39.65
269.0	006.0000	0066.6	023.5	091.5	082.0000	0414.8	181.5	39.61
270.0	006.0000	0065.4	023.3	091.3	082.0000	0414.7	181.6	39.58
271.0	006.0000	0064.8	023.2	091.2	082.0000	0414.6	181.7	39.57
272.0	006.0000	0064.8	023.2	091.1	082.0000	0414.5	181.7	39.57
273.0	006.0000	0065.5	023.3	090.9	082.0000	0414.4	181.6	39.58
274.0	006.0000	0066.0	023.4	090.8	082.0000	0414.3	181.5	39.60
275.0	006.0000	0066.7	023.5	090.7	082.0000	0414.2	181.4	39.61
276.0	006.0000	0067.4	023.6	090.6	082.0000	0414.1	181.3	39.62
277.0	006.0000	0068.2	023.7	090.4	082.0000	0414.0	181.2	39.64
278.0	006.0000	0068.5	023.7	090.3	082.0000	0413.9	181.3	39.64
279.0	006.0000	0068.4	023.7	090.2	082.0000	0413.9	181.3	39.63
280.0	006.0000	0067.9	023.7	090.0	082.0000	0413.8	181.4	39.60
281.0	006.0000	0067.1	023.5	089.9	082.0000	0413.7	181.6	39.56
282.0	006.0000	0066.8	023.5	089.8	082.0000	0413.6	181.8	39.54
283.0	006.0000	0067.3	023.6	089.7	082.0000	0413.5	181.8	39.54
284.0	006.0000	0068.3	023.7	089.5	082.0000	0413.4	181.7	39.55
285.0	006.0000	0069.7	023.9	089.4	082.0000	0413.3	181.6	39.56
286.0	006.0000	0069.8	023.9	089.2	082.0000	0413.2	181.7	39.55
287.0	006.0000	0069.3	023.9	089.1	082.0000	0413.1	181.9	39.51
288.0	006.0000	0068.6	023.8	089.0	082.0000	0413.0	182.1	39.47
289.0	006.0000	0067.7	023.6	088.9	082.0000	0412.9	182.3	39.42
290.0	006.0000	0066.6	023.5	088.8	082.0000	0412.8	182.6	39.36
291.0	006.0000	0065.4	023.3	088.7	082.0000	0412.8	183.0	39.31
292.0	006.0000	0064.3	023.1	088.6	082.0000	0412.7	183.3	39.25
293.0	006.0000	0063.7	023.0	088.5	082.0000	0412.7	183.5	39.21
294.0	006.0000	0063.9	023.0	088.4	082.0000	0412.6	183.6	39.18
295.0	006.0000	0064.5	023.2	088.2	082.0000	0412.5	183.7	39.17

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)
296.0	006.0000	0065.3	023.3	088.1	082.0000	0412.4	183.8	39.15
297.0	006.0000	0066.1	023.4	088.0	082.0000	0412.3	183.9	39.13
298.0	006.0000	0067.2	023.6	087.9	082.0000	0412.2	183.9	39.13
299.0	006.0000	0068.5	023.7	087.7	082.0000	0412.1	184.0	39.12
300.0	006.0000	0069.3	023.9	087.6	082.0000	0412.0	184.1	39.10
301.0	006.0000	0070.0	024.0	087.5	082.0000	0411.9	184.2	39.07
302.0	006.0000	0070.8	024.1	087.3	082.0000	0411.9	184.3	39.05
303.0	006.0000	0071.9	024.3	087.2	082.0000	0411.8	184.4	39.03
304.0	006.0000	0073.0	024.4	087.0	082.0000	0411.7	184.5	39.01
305.0	006.0000	0074.1	024.6	086.9	082.0000	0411.6	184.6	38.99
306.0	006.0000	0075.3	024.8	086.8	082.0000	0411.5	184.7	38.97
307.0	006.0000	0076.1	024.9	086.6	082.0000	0411.4	184.9	38.93
308.0	006.0000	0076.7	025.0	086.5	082.0000	0411.3	185.1	38.89
309.0	006.0000	0077.2	025.1	086.4	082.0000	0411.3	185.4	38.85
310.0	006.0000	0077.6	025.1	086.3	082.0000	0411.2	185.6	38.81
311.0	006.0000	0077.7	025.1	086.2	082.0000	0411.1	185.9	38.76
312.0	006.0000	0078.0	025.2	086.1	082.0000	0411.1	186.2	38.71
313.0	006.0000	0078.4	025.2	086.0	082.0000	0411.0	186.4	38.66
314.0	006.0000	0078.9	025.3	085.9	082.0000	0410.9	186.7	38.61
315.0	006.0000	0079.4	025.4	085.8	082.0000	0410.9	187.0	38.56
316.0	006.0000	0080.0	025.5	085.6	082.0000	0410.8	187.3	38.51
317.0	006.0000	0080.7	025.6	085.5	082.0000	0410.8	187.5	38.46
318.0	006.0000	0081.6	025.7	085.4	082.0000	0410.8	187.8	38.42
319.0	006.0000	0082.6	025.9	085.3	082.0000	0410.7	188.1	38.37
320.0	006.0000	0083.4	026.0	085.2	082.0000	0410.7	188.3	38.32
321.0	006.0000	0084.5	026.1	085.1	082.0000	0410.7	188.6	38.27
322.0	006.0000	0085.9	026.3	084.9	082.0000	0410.6	188.9	38.22
323.0	006.0000	0087.3	026.5	084.8	082.0000	0410.6	189.2	38.17
324.0	006.0000	0088.7	026.7	084.7	082.0000	0410.6	189.4	38.12
325.0	006.0000	0090.0	026.9	084.6	082.0000	0410.6	189.7	38.07
326.0	006.0000	0091.1	027.1	084.4	082.0000	0410.6	190.1	38.01
327.0	006.0000	0091.5	027.1	084.4	082.0000	0410.6	190.5	37.94
328.0	006.0000	0091.6	027.1	084.3	082.0000	0410.6	190.9	37.86
329.0	006.0000	0091.7	027.2	084.2	082.0000	0410.6	191.3	37.79
330.0	006.0000	0092.0	027.2	084.1	082.0000	0410.6	191.7	37.71
331.0	006.0000	0092.3	027.2	084.1	082.0000	0410.6	192.1	37.64



# E-5 KWOX(FM).AP Mod. HAAT Calculation

N. Lat. = 361623.0    W. Lng. = 992645.0  
HAAT and Distance to Contour,  
FCC, FM 2-10 Mi, 51 pts Method - USGS 03 SEC

Azi.	AV EL	HAAT	ERP kW	60-F(50-50)
000	665.4	375.6	82.0000	75.92
045	629.7	411.3	82.0000	78.55
090	627.3	413.7	82.0000	78.73
135	671.8	369.2	82.0000	75.46
180	701.2	339.8	82.0000	73.32
225	718.6	322.4	82.0000	72.05
270	703.3	337.7	82.0000	73.17
315	689.0	352.0	82.0000	74.21

Ave El= 675.77 M    HAAT= 365.23 M    AMSL= 1041

E-6 KWOX(FM).CP Mod. 70 dBu Contour Plot

