

ENGINEERING EXHIBIT

Digital Television Station Application for Minor Modification of Licensed Facility

prepared for

CBS Broadcasting Inc.
WBBM-TV Chicago, IL
Facility ID 9617
Ch. 12 30 kW 491 m

CBS Broadcasting Inc. ("CBS") is the licensee of digital television station WBBM-TV, Channel 12, Facility ID 9617, Chicago, IL. WBBM-TV is licensed (file# 0000187049) to operate with 10.9 kW effective radiated power ("ERP") with a nondirectional antenna at 500 meters height above average terrain ("HAAT"). *CBS* herein seeks a minor modification Construction Permit to authorize WBBM-TV to use a directional antenna at an increased ERP of 30 kW and a reduced antenna HAAT of 491 meters. No change to the site location is proposed.

WBBM-TV will continue to utilize a rooftop antenna supporting structure atop the Willis Tower office building in downtown Chicago, having FCC Antenna Structure Registration number 1032960. The proposed antenna will replace WBBM-TV's licensed antenna and will be centered 488.9 meters above ground level, a decrease of 9.7 meters from the licensed value. No change to the overall structure height will occur.

The proposed antenna is an elliptically polarized directional ERI model ETV3H4-ESP4O-12 (64.6 percent vertical polarization). *CBS* proposes to operate WBBM-TV with an ERP of 30 kW at 491 meters antenna HAAT. The maximum horizontally polarized ERP is 30 kW and the maximum vertically polarized ERP is 19.4 kW. The vertically polarized component will not exceed the horizontally polarized component at any azimuth. The directional antenna's azimuthal patterns are depicted in Figures 1 and 1A for horizontal and vertical polarization, respectively. The antenna's elevation patterns are supplied in Figures 2 and 2A for horizontal polarization and in Figures 2B and 2C for vertical polarization.

Figure 3 supplies a map that demonstrates compliance with §73.625(a)(1) regarding coverage of the entire principal community. The proposed facility's predicted population exceeds 95 percent of the Incentive Auction¹ baseline facility population.

The proposed facility expands the WBBM-TV noise limited service contour ("NLSC") beyond that established by the *CCRPN*. 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 except with respect to WINM (Ch. 12, Angola IN) and WREX (Ch. 13, Rockford, IL) which do not present a conflict for the proposal. FCC processing of this proposal is requested using a 0.5 km cell size and 0.1 km terrain profile increment. The interference study output report is provided as Table 1.

A minor modification application for WINM (file# 0000199518) was filed September 7, 2022, subsequent to the application and authorization underlying WBBM-TV's presently licensed facility. As shown in Table 2, the licensed WBBM-TV facility causes 1.03 percent existing interference to the WINM application facility. The modification proposed herein for WBBM-TV reduces the interference to WINM's application facility to 0.90 percent. WINM's licensed facility would receive 0.11 percent additional interference. Thus, the WBBM-TV proposal will not result in increased interference to WINM.

WREX would receive 1.90 percent additional interference to its licensed facility (file# 0000005114) and 3.15 percent additional interference to its construction permit facility ("CP", file# 0000035733) which exceeds the 0.5 percent limit towards full-service television stations. The licensee of WREX has consented to interference up to 6.17 percent from the proposed WBBM-TV (see interference consent agreement, attached separately).

¹*Incentive Auction Closing and Channel Reassignment Public Notice*, DA 17-317, released April 13, 2017.

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, 0.5 km cell size, and 0.1 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.

According to FCC TVStudy analysis and as depicted on Figures 4 and 5, the additional interference to the WREX licensed and CP facilities, respectively, would occur at locations that are near the edge of the WREX NLSC and beyond WREX's DMA (Rockford). Additionally, Figures 4 and 5 include overlapping NLSCs from relevant full power television stations in the region. As shown thereon, all locations of predicted additional interference to WREX from WBBM-TV are within the NLSC of another same-network station (NBC, WMAQ-TV Chicago IL) and are considered "well served" since at least five other licensed television facilities provide NLSC overlap. There are at least 14 other NLSC services available throughout all of the interference areas.

Accordingly, the proposal complies with §73.616 regarding interference protection to full power television and Class A television facilities.

The proposed WBBM-TV NLSC encompasses and expands beyond nearly all of the licensed facility's NLSC. Minor NLSC loss areas near South Bend, IN are created due to the directional pattern variations of the replacement antenna. The NLSC of nearby licensed television stations which overlap the loss areas are provided on Figure 6 to demonstrate the availability of other services. All of the NLSC loss areas are within the NLSC of another same-network station (CBS, WSBT-TV South Bend IN) and are considered "well served." There are at least seven other NLSC services available throughout all of the loss areas.

The proposed 30 kW ERP exceeds the maximum permitted by §73.622(f)(7) for the proposed antenna HAAT of 491 meters. Section 73.622(f)(5) permits the maximum ERP to be exceeded in order to provide the same geographic coverage area as the largest station within the same market. As demonstrated in Figure 7, the total area within the proposed WBBM-TV NLSC is 39,320 square kilometers, which does not exceed the NLSC area of WLS-TV (39,648 sq. km, post-auction Ch. 22, Chicago IL). Thus, the 30 kW ERP specified herein complies with §73.622(f)(5).

Human Exposure to Radiofrequency Electromagnetic Field (Environmental)

The proposed operation was evaluated for human exposure to RF energy using the procedures outlined in the FCC's OET Bulletin Number 65. Based on OET-65 equation (10), and considering 35 percent antenna relative field in downward elevations (pattern data shows less than 35 percent relative field at angles 10 to 90 degrees below the antenna), the calculated signal density near the Willis Tower building at two meters above ground level attributable to the proposed facility is $0.85 \mu\text{W}/\text{cm}^2$, which is 0.4 percent of the general population / uncontrolled maximum permitted exposure limit. This is well below the five percent threshold limit described in §1.1307(b)(3) regarding sites with multiple emitters, categorically excluding the applicant from responsibility for taking any corrective action in the areas where the proposal's contribution is less than five percent.

Access to the Willis Tower rooftop, antenna support structures, and any areas within the building that may exceed exposure limits is strictly controlled by the building owner. *CBS* participates in the building's RF exposure safety program along with the other broadcasters and FCC licensees that utilize the Willis Tower as a transmission site. As necessary, based on calculations or actual measurements considering all emitters, exposure abatement procedures will be confirmed and amended as necessary. The RF safety program will continue to be employed protecting maintenance and installation workers from excessive exposure when work must be performed in locations where high RF levels may be present. Such areas have been placed under strict restricted access and properly identified.

The general public will not be exposed to RF levels attributable to the proposal in excess of the FCC's guidelines. 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, mast, or antenna from RF electromagnetic field exposure in excess of FCC guidelines.

List of Attachments

Figure 1, 1A	Antenna Azimuthal Pattern
Figure 2, 2A, 2B, 2C	Antenna Elevation Pattern
Figure 3	Proposed Coverage Contours
Figure 4	Alternate Services to WREX (Lic) At Locations of Added Interference
Figure 5	Alternate Services to WREX (CP) At Locations of Added Interference
Figure 6	Coverage Contour Comparison – Alternate DTV Services
Figure 7	Coverage Contour Comparison - Maximum ERP per §73.622(f)
Table 1	TVStudy Analysis of Proposal
Table 2	Interference Study Details Regarding WINM
Form 2100	Saved Version of Engineering Sections from FCC Form at Time of Upload

Chesapeake RF Consultants, LLC

Joseph M. Davis, P.E.	January 17, 2023	
207 Old Dominion Road	Yorktown, VA 23692	703-650-9600

Azimuth Pattern

Type:	ETUP40-H	Polarization:	Horizontal
Directivity:	1.55 numeric (1.91 dB)	Frequency:	12 (ATSC)
Peak(s) at:		Location:	Chicago, IL
		NOTE: Pattern shape and directivity may vary with channel and mounting configuration.	

Relative Field

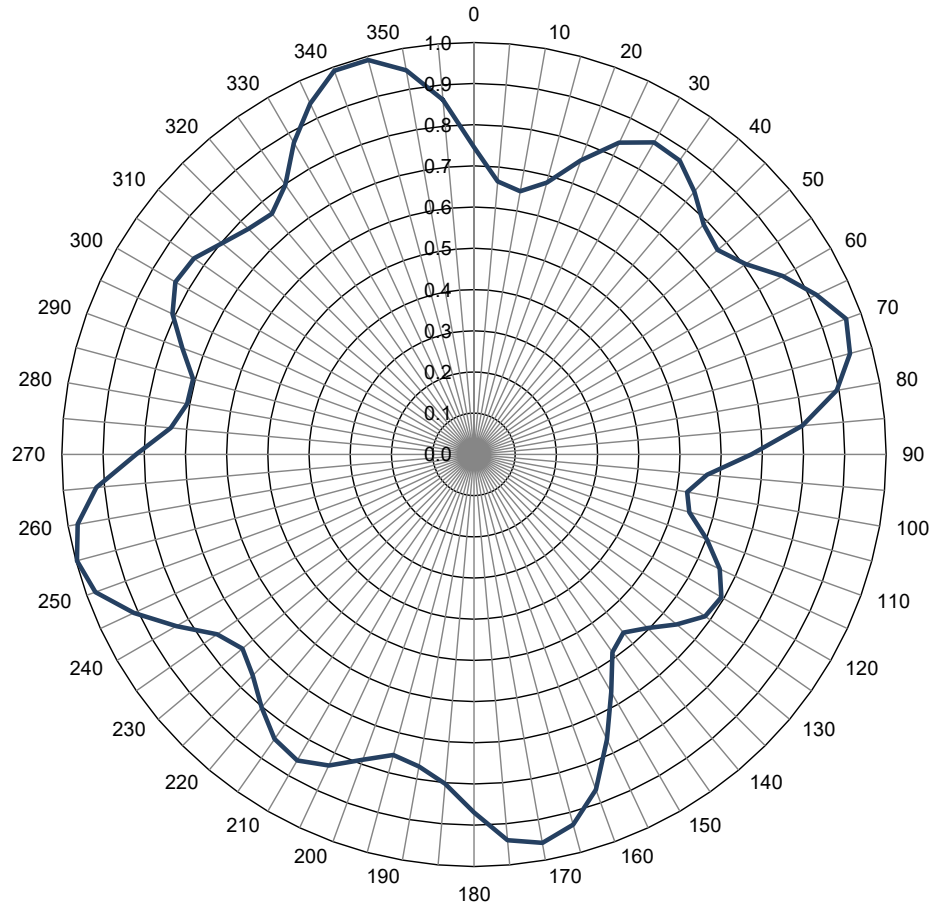


Figure 1
Antenna Azimuthal Pattern
Horizontal Polarization
WBBM-TV Chicago, IL
Facility ID 9617
Ch. 12 30 kW 491 m

prepared for
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January, 2023

Azimuth Pattern

Type:	ETUP40-V	Polarization:	Vertical
Directivity:	1.33 numeric (1.24 dB)	Frequency:	12 (ATSC)
Peak(s) at:		Location:	Chicago, IL
		NOTE: Pattern shape and directivity may vary with channel and mounting configuration.	

Relative Field

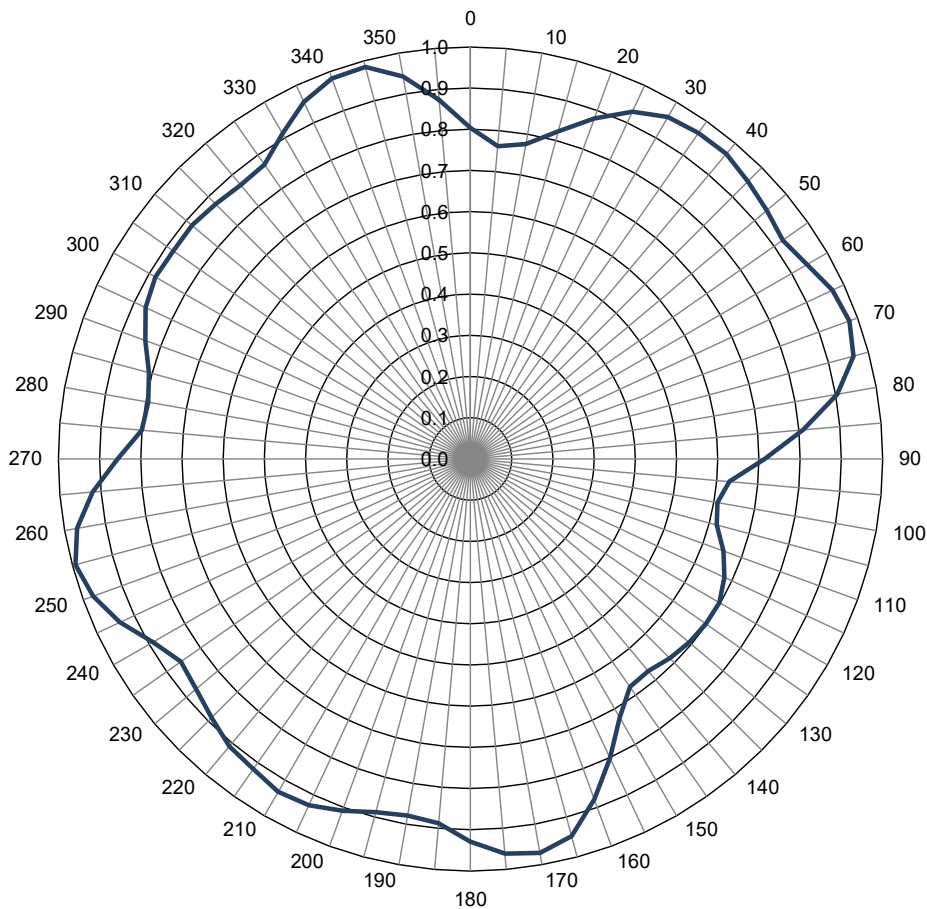


Figure 1A
Antenna Azimuthal Pattern
Vertical Polarization (Ref 64.6%)
WBBM-TV Chicago, IL
Facility ID 9617
Ch. 12 30 kW 491 m

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Elevation Pattern

Type:	ETU-3U?-H	Polarization:	Horizontal
Directivity:		Frequency:	12 (ATSC)
Main Lobe:	3.12 numeric (4.94 dB)	Location:	Chicago, IL
Horizontal:	3.07 numeric (4.86 dB)	Beam Tilt:	1.20 degrees

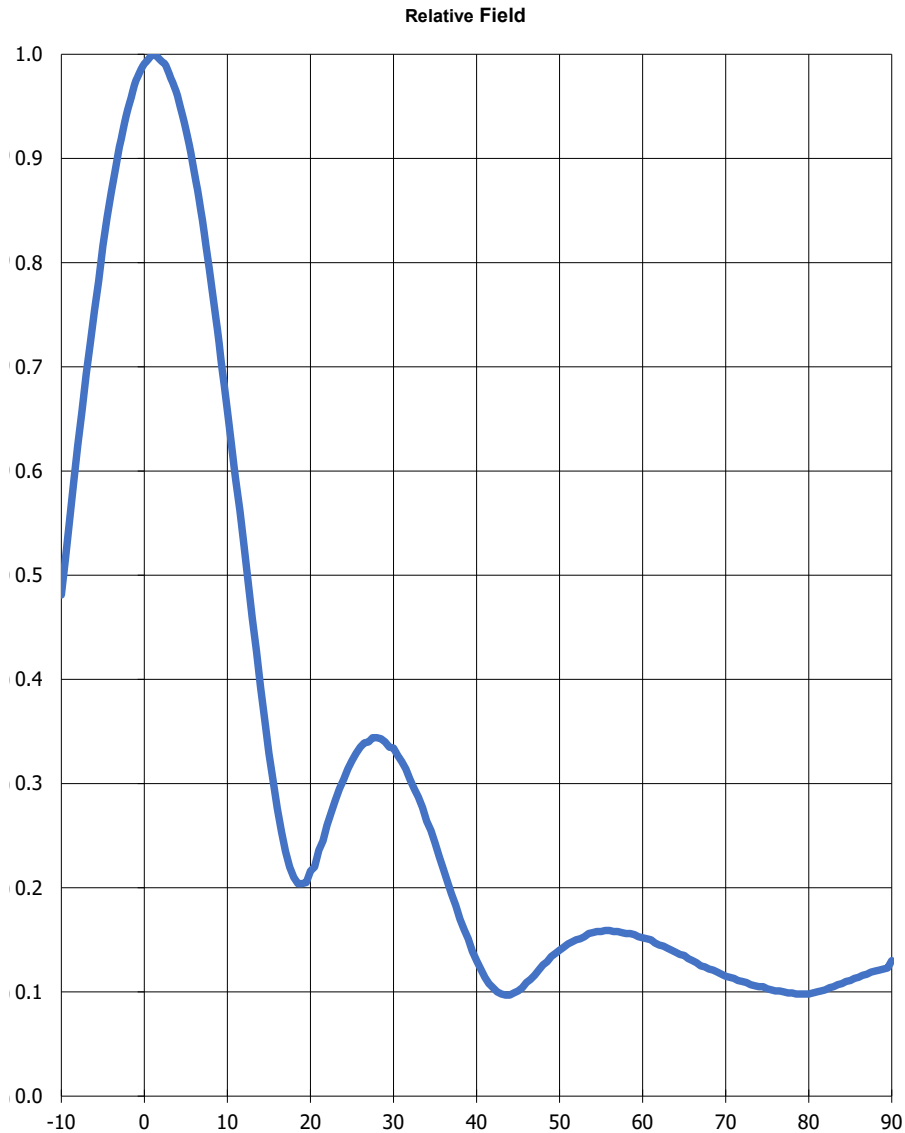


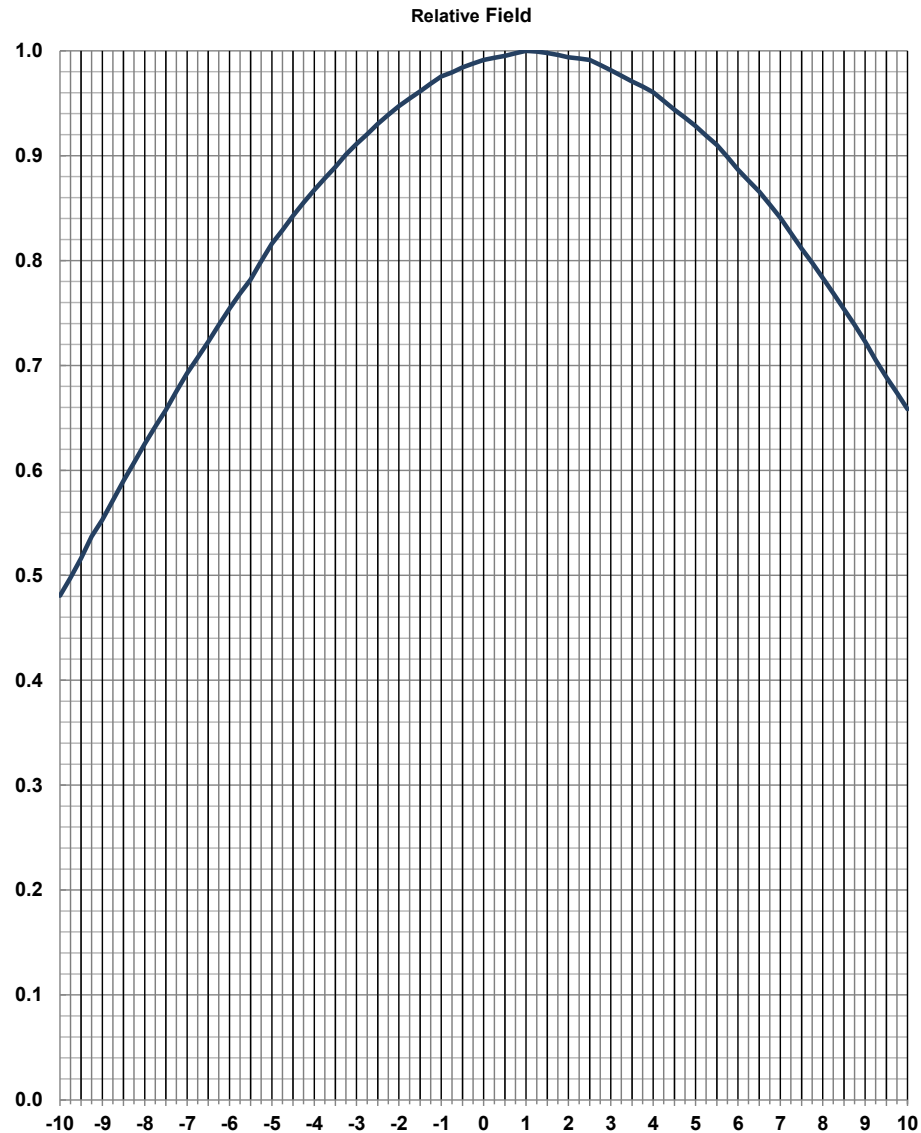
Figure 2
Antenna Elevation Pattern
Horizontal Polarization
WBBM-TV Chicago, IL
Facility ID 9617
Ch. 12 30 kW 491 m

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Elevation Pattern

Type:	ETU-3U?-H	Polarization:	Horizontal
Directivity:		Frequency:	12 (ATSC)
Main Lobe:	3.12 numeric (4.94 dB)	Location:	Chicago, IL
Horizontal:	3.07 numeric (4.86 dB)	Beam Tilt:	1.20 degrees



**Figure 2A - Detail
Antenna Elevation Pattern
Horizontal Polarization
WBBM-TV Chicago, IL
Facility ID 9617
Ch. 12 30 kW 491 m**

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Elevation Pattern

Type:	ETU-3U?-V	Polarization:	Vertical
Directivity:		Frequency:	12 (ATSC)
Main Lobe:	3.10 numeric (4.91 dB)	Location:	Chicago, IL
Horizontal:	3.04 numeric (4.83 dB)	Beam Tilt:	1.20 degrees

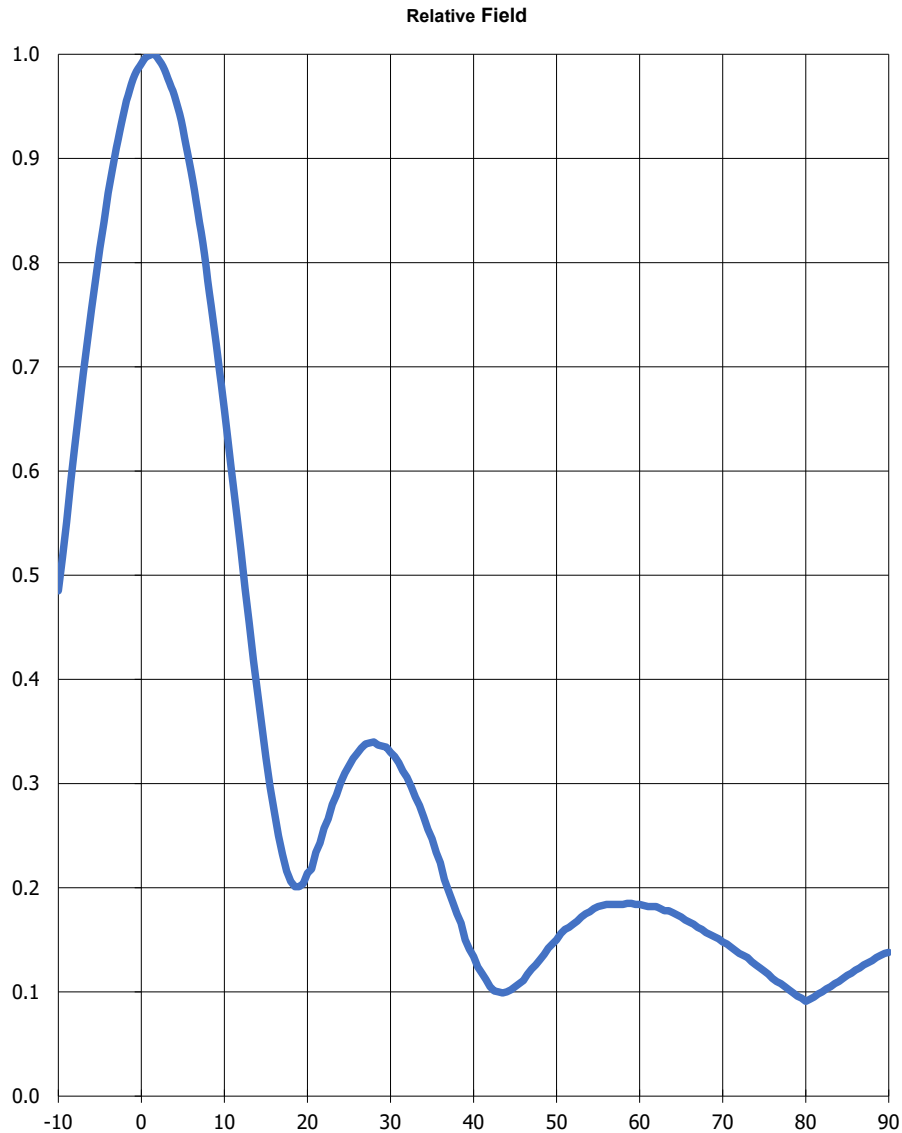


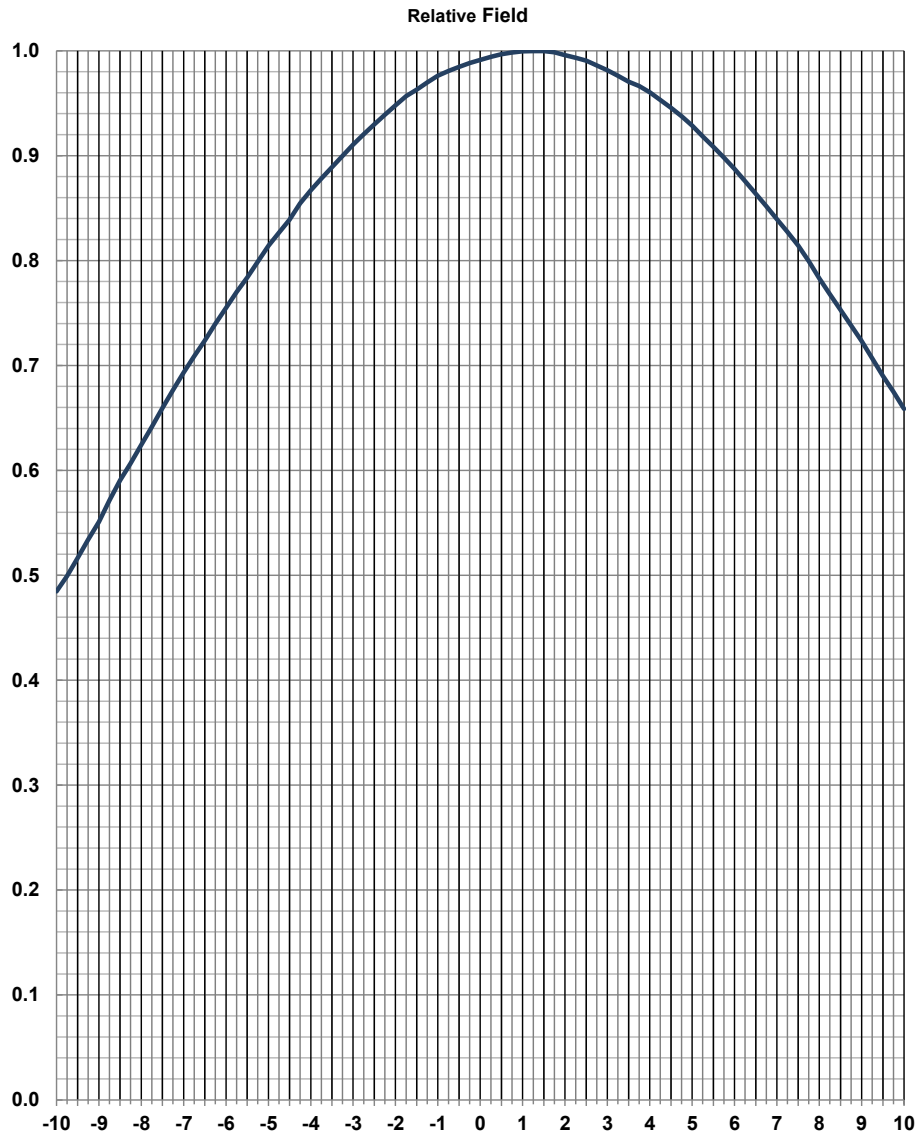
Figure 2B
Antenna Elevation Pattern
Vertical Polarization
WBBM-TV Chicago, IL
Facility ID 9617
Ch. 12 30 kW 491 m

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Elevation Pattern

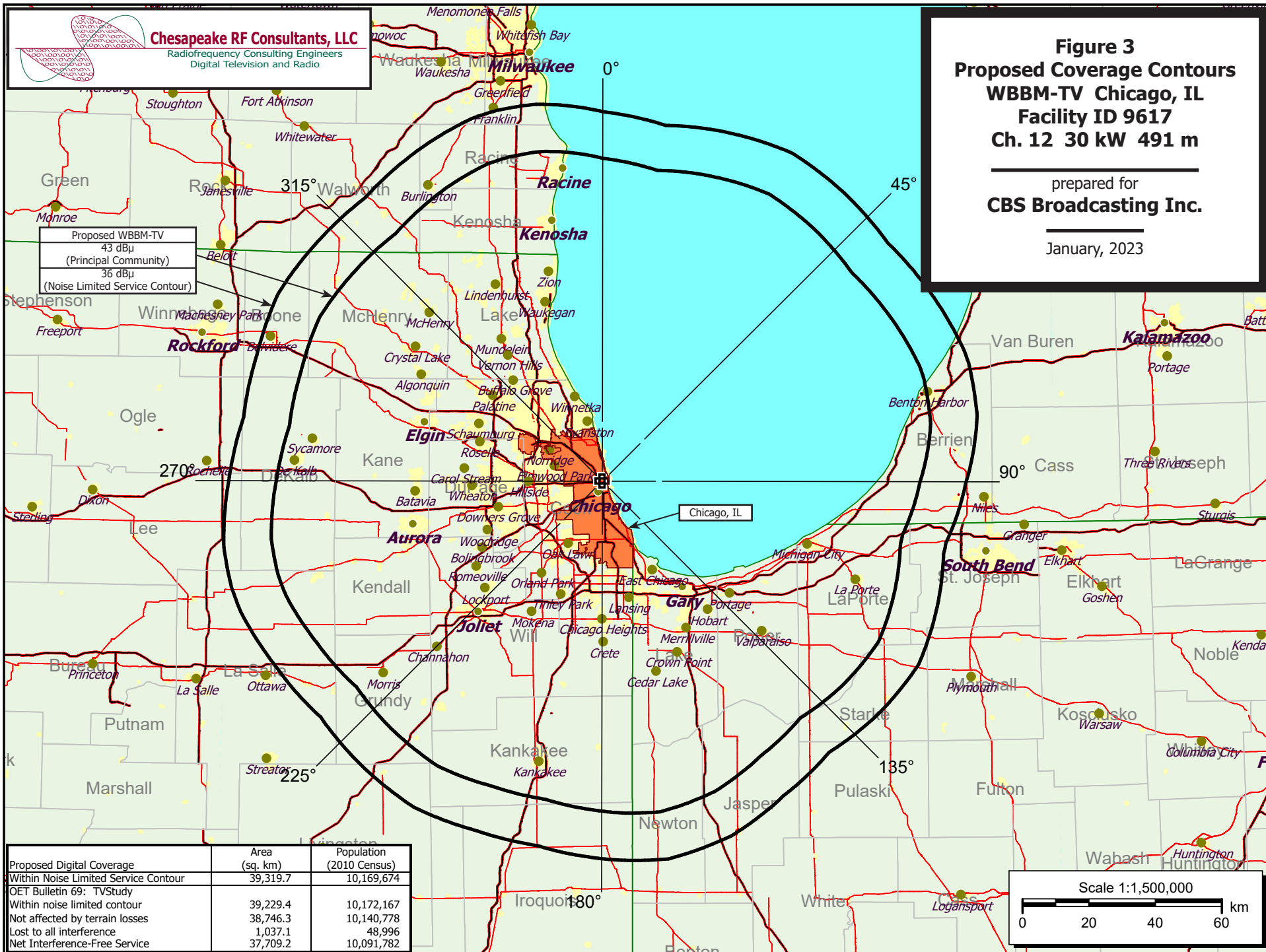
Type:	ETU-3U?-V	Polarization:	Vertical
Directivity:		Frequency:	12 (ATSC)
Main Lobe:	3.10 numeric (4.91 dB)	Location:	Chicago, IL
Horizontal:	3.04 numeric (4.83 dB)	Beam Tilt:	1.20 degrees

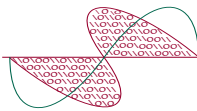


**Figure 2C - Detail
Antenna Elevation Pattern
Vertical Polarization
WBBM-TV Chicago, IL
Facility ID 9617
Ch. 12 30 kW 491 m**

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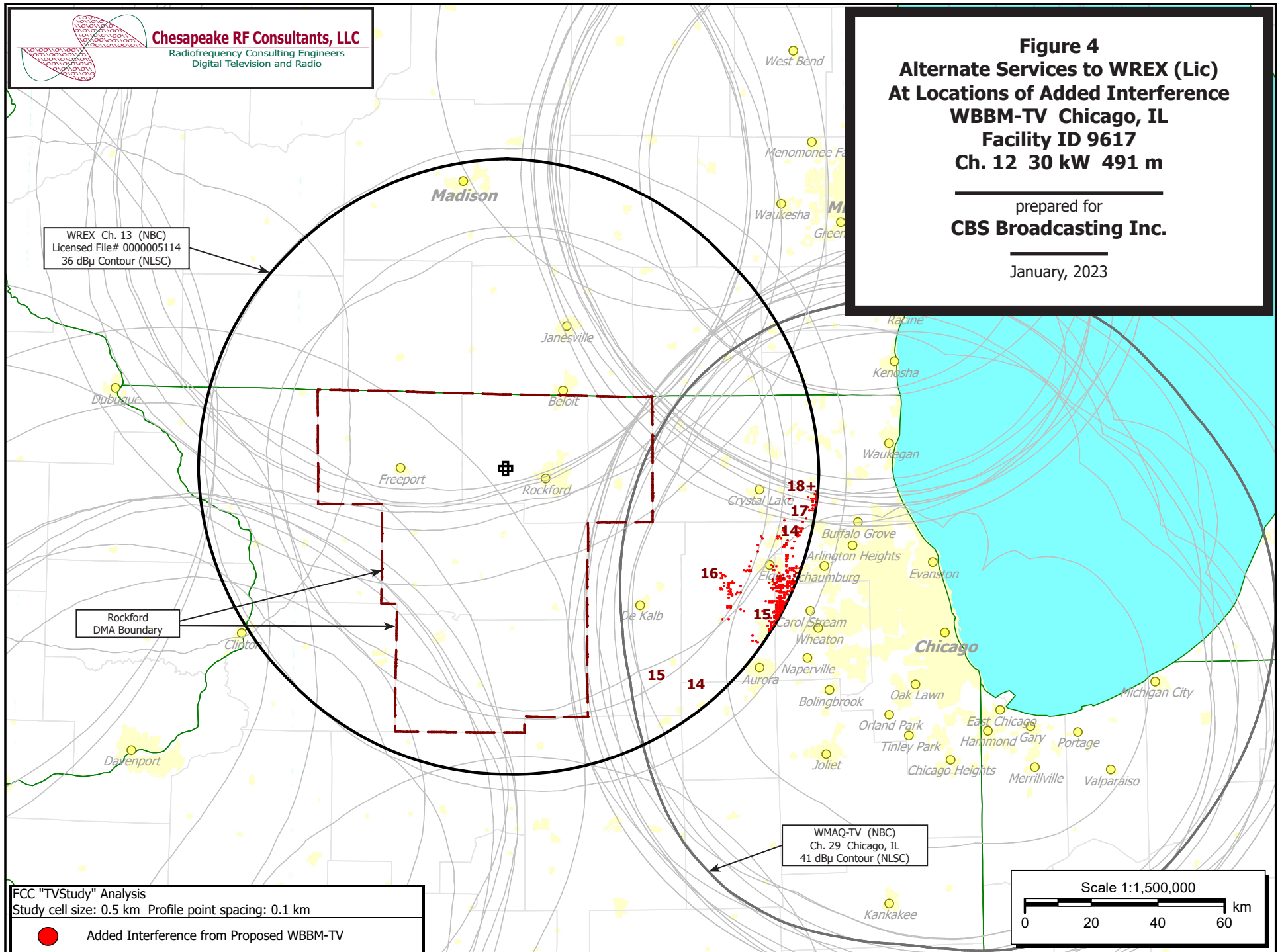


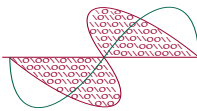
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Figure 4
Alternate Services to WREX (Lic)
At Locations of Added Interference
WBBM-TV Chicago, IL
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Ch. 12 30 kW 491 m

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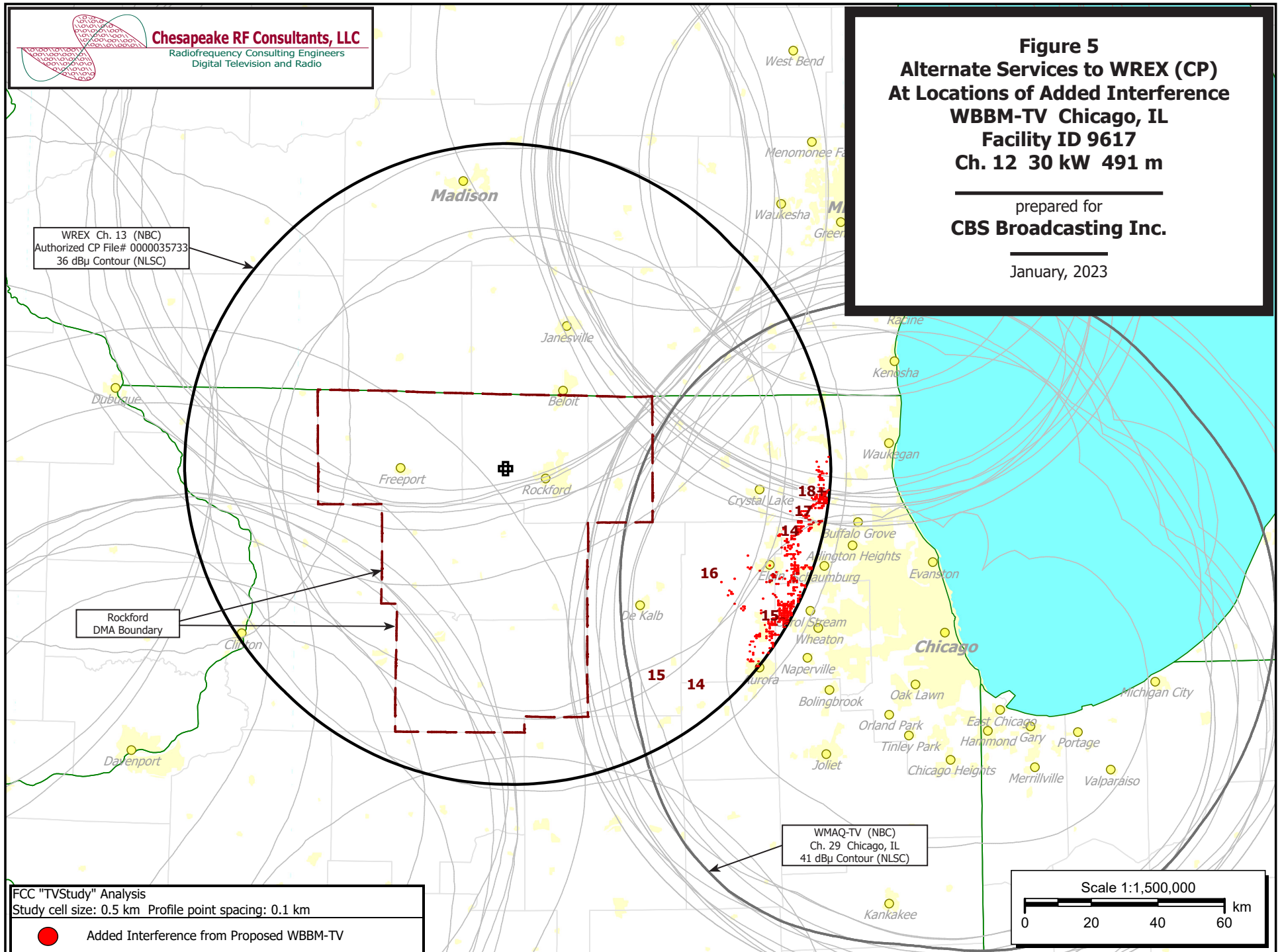


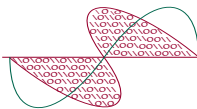
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Figure 5
Alternate Services to WREX (CP)
At Locations of Added Interference
WBBM-TV Chicago, IL
Facility ID 9617
Ch. 12 30 kW 491 m

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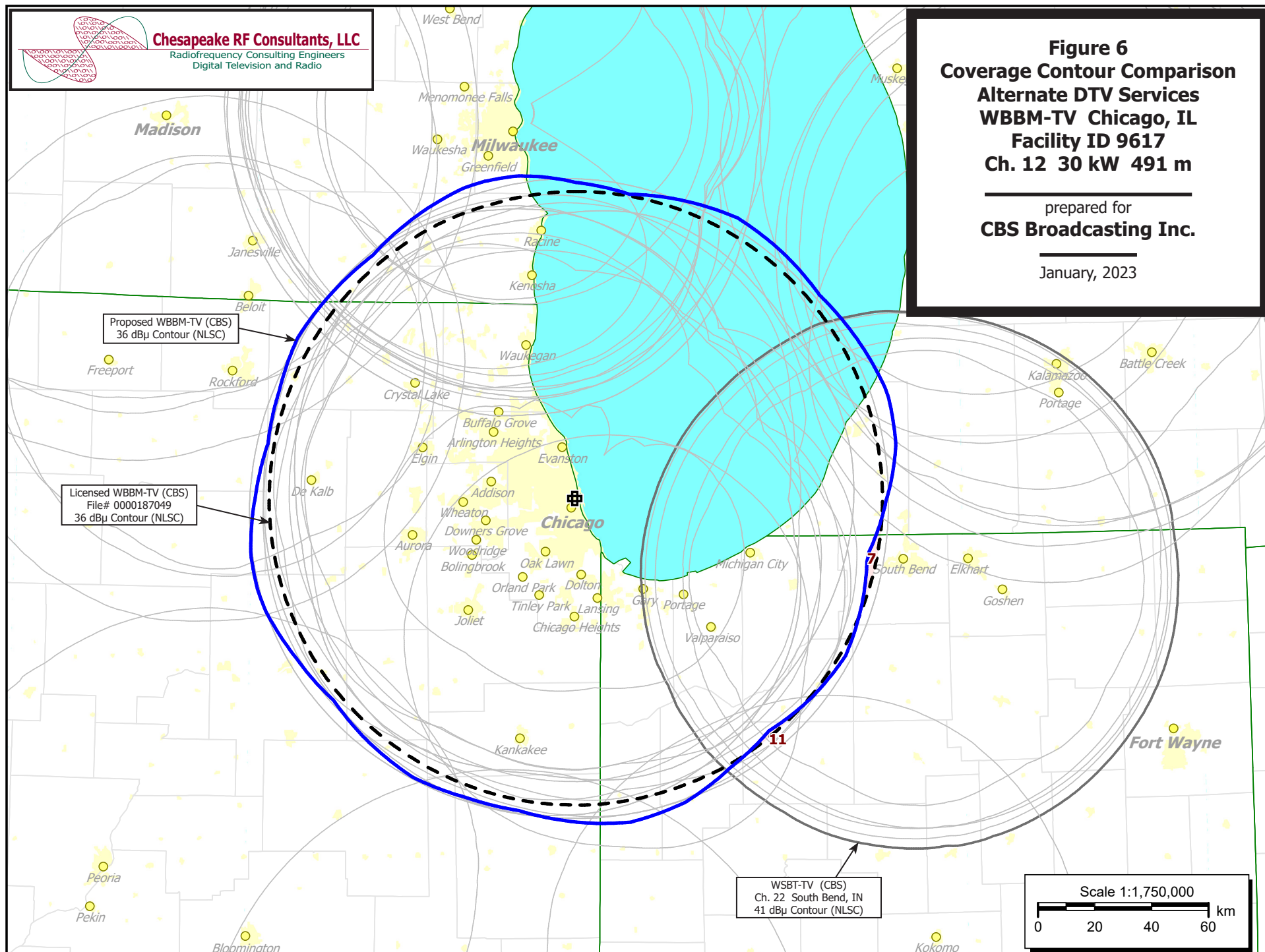


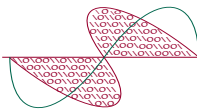
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Figure 6
Coverage Contour Comparison
Alternate DTV Services
WBBM-TV Chicago, IL
Facility ID 9617
Ch. 12 30 kW 491 m

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Figure 7
Coverage Contour Comparison
Maximum ERP per §73.622(f)
WBBM-TV Chicago, IL
Facility ID 9617
Ch. 12 30 kW 491 m

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January, 2023

WLS-TV Ch. 22 Chicago, IL
CP File# 0000086908
41 dBμ Contour (NLSC)
Area: 39,648.0 sq. km

Proposed WBBM-TV
36 dBμ Contour (NLSC)
Area: 39,319.7 sq. km

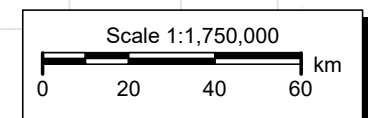


Table 1 WBBM-TV TVStudy Analysis of Proposal (page 1 of 6)



tvstudy v2.2.5 (4uoc83)
Database: localhost, Study: WBBM-TV 1604ft 13r1, Model: Longley-Rice
Start: 2023.01.16 11:41:44

Study created: 2023.01.16 11:41:44

Study build station data: LMS TV 2023-01-07

Proposal: WBBM-TV D12 DT APP CHICAGO, IL
File number: WBBM-TV 1604ft 13r1
Facility ID: 9617
Station data: User record
Record ID: 4812
Country: U.S.
Zone: I

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

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	WLFI-TV	D11	DT	LIC	LAFAYETTE, IN	BLCDT20040520AIX	186.4 km
No	WGVU-TV	D11	DT	LIC	GRAND RAPIDS, MI	BLEDT20100827ABE	186.6
No	WISC-TV	D11	DT	LIC	MADISON, WI	BLANK00000126605	203.4
Yes	KIIN	D12	DT	LIC	IOWA CITY, IA	BLEDT20091229ABP	307.6
Yes	WINM	D12	DT	APP	ANGOLA, IN	BLANK00000199518	221.0
Yes	WINM	D12	DT	LIC	ANGOLA, IN	BLCDT20130711ABN	239.9
No	WEHT	D12	DT	LIC	EVANSVILLE, IN	BLANK00000120480	446.1
Yes	WJRT-TV	D12	DT	LIC	FLINT, MI	BLANK00000185925	329.1
No	WKRC-TV	D12	DT	LIC	CINCINNATI, OH	BLANK00000157760	405.4
No	WMFD-TV	D12	DT	LIC	MANSFIELD, OH	BLCDT20081112ALJ	436.7
Yes	WREX	D13	DT	CP	ROCKFORD, IL	BLANK00000035733	140.2
Yes	WREX	D13	DT	LIC	ROCKFORD, IL	BLANK00000005114	140.2
No	WTHR	D13	DT	LIC	INDIANAPOLIS, IN	BLANK00000153712	248.8
No	WTHR	D13	DT	APP	INDIANAPOLIS, IN	BPCDT20130702ABM	248.8
No	WZZM	D13	DT	LIC	GRAND RAPIDS, MI	BLCDT20100726AKV	212.5

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D12
Latitude: 41 52 44.00 N (NAD83)
Longitude: 87 38 8.00 W
Height AMSL: 670.3 m
HAAT: 490.8 m
Peak ERP: 30.0 kW
Antenna: ERI ETV3H4-ESP40-12 Rev_13R1 0.0 deg
Elev Pattern: Generic
Elec Tilt: 1.20

36.0 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	16.7 kW	493.5 m	110.9 km
45.0	19.3	495.3	112.3
90.0	13.6	494.9	109.2
135.0	10.9	495.2	107.3
180.0	22.7	487.9	113.3
225.0	17.7	487.6	111.0
270.0	20.2	484.7	112.0
315.0	18.3	486.8	111.3

ERP exceeds maximum
ERP: 30.0 kW ERP maximum: 6.17 kW

Distance to Canadian border: 371.2 km

Table 1 WBBM-TV TVStudy Analysis of Proposal
(page 2 of 6)



Distance to Mexican border: 1825.6 km

Conditions at FCC monitoring station: Allegan MI
Bearing: 59.1 degrees Distance: 160.1 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:
Bearing: 268.4 degrees Distance: 1484.9 km

Study cell size: 0.50 km

Profile point spacing: 0.10 km

Maximum new IX to full-service and Class A: 0.50%
Maximum new IX to LPTV: 2.00%

Interference to BLEDT20091229ABP LIC scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	KIIN	D12	DT	LIC	IOWA CITY, IA	BLEDT20091229ABP	
Undesireds:	WBBM-TV	D12	DT	BL	CHICAGO, IL	DTVBL9617	307.6 km
	WBBM-TV	D12	DT	APP	CHICAGO, IL	WBBM-TV 1604ft 13r1	307.6
	KDIN-TV	D11	DT	LIC	DES MOINES, IA	BLEDT20090612AIB	188.7
	KEYC-TV	D12	DT	LIC	MANKATO, MN	BLCDT20120918AFE	351.0
	WHO-DT	D13	DT	LIC	DES MOINES, IA	BLCDT20090410ASQ	188.7
	WREX	D13	DT	CP	ROCKFORD, IL	BLANK0000035733	185.0
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX
44150.2 1,363,241		42925.1 1,344,192		42697.2 1,329,796		42515.5 1,326,693	0.43 0.23
Undesired		Total IX		Unique IX, before		Unique IX, after	
WBBM-TV D12 DT BL		69.6 2,093		69.6 2,093			
WBBM-TV D12 DT APP		251.3 5,196				251.3 5,196	
KDIN-TV D11 DT LIC		8.5 33		0.0 0		0.0 0	
KEYC-TV D12 DT LIC		107.5 8,594		105.2 8,586		105.2 8,586	
WHO-DT D13 DT LIC		53.1 3,717		42.9 3,676		42.9 3,676	

Interference to BLANK0000199518 APP scenario 1

****MX: 0.90% interference caused**

Interference to WINM APP is reduced, see text and Table 2

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WINM	D12	DT	APP	ANGOLA, IN	BLANK0000199518	
Undesireds:	WBBM-TV	D12	DT	BL	CHICAGO, IL	DTVBL9617	221.0 km
	WBBM-TV	D12	DT	APP	CHICAGO, IL	WBBM-TV 1604ft 13r1	221.0
	WJRT-TV	D12	DT	LIC	FLINT, MI	BLANK0000185925	254.1
	WKRC-TV	D12	DT	LIC	CINCINNATI, OH	BLANK0000157760	228.5
	WMFD-TV	D12	DT	LIC	MANSFIELD, OH	BLCDT20081112ALJ	219.3
	WTHR	D13	DT	LIC	INDIANAPOLIS, IN	BLANK0000153712	155.1
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX
23521.4 1,205,893		22926.7 1,173,367		20761.5 1,094,651		20633.6 1,084,767	0.62 0.90
Undesired		Total IX		Unique IX, before		Unique IX, after	
WBBM-TV D12 DT BL		778.1 41,785		248.3 16,859			
WBBM-TV D12 DT APP		1045.8 56,621				376.2 26,743	
WJRT-TV D12 DT LIC		1051.6 38,367		472.8 13,757		360.4 9,820	
WKRC-TV D12 DT LIC		353.8 16,492		194.3 7,801		178.3 7,348	
WMFD-TV D12 DT LIC		982.3 30,323		457.0 8,806		454.3 8,615	

Interference to BLCDT20130711ABN LIC scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WINM	D12	DT	LIC	ANGOLA, IN	BLCDT20130711ABN	
Undesireds:	WBBM-TV	D12	DT	BL	CHICAGO, IL	DTVBL9617	239.9 km



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[illegible]

Table 1 WBBM-TV TVStudy Analysis of Proposal
(page 4 of 6)



Interference to BLANK0000035733 CP scenario 1

****IX: 3.15% interference caused**

WREX is accepting up to 6.17 percent interference, see text

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WREX	D13	DT	CP	ROCKFORD, IL	BLANK0000035733	
Undesireds:	WBBM-TV	D12	DT	BL	CHICAGO, IL	DTVBL9617	140.2 km
	WBBM-TV	D12	DT	APP	CHICAGO, IL	WBBM-TV 1604ft 13r1	140.2
	WHO-DT	D13	DT	LIC	DES MOINES, IA	BLCDT20090410ASQ	365.1
	WTHR	D13	DT	LIC	INDIANAPOLIS, IN	BLANK0000153712	367.2
	WZZM	D13	DT	LIC	GRAND RAPIDS, MI	BLCDT20100726AKV	293.7
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX
28861.2 2,703,436		27019.4 2,487,608		26337.7 2,229,607		26221.5 2,159,392	0.44 3.15
Undesired		Total IX		Unique IX, before		Unique IX, after	
WBBM-TV D12 DT BL		124.3		99,927		66.7 57,090	
WBBM-TV D12 DT APP		271.1		193,238		182.9 127,305	
WHO-DT D13 DT LIC		57.1		256		57.1 256	
WTHR D13 DT LIC		121.2		44,970		56.2 11,546	
WZZM D13 DT LIC		498.8		186,422		376.3 111,900	

Interference to BLANK0000035733 CP scenario 2

****IX: 2.87% interference caused**

WREX is accepting up to 6.17 percent interference, see text

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WREX	D13	DT	CP	ROCKFORD, IL	BLANK0000035733	
Undesireds:	WBBM-TV	D12	DT	BL	CHICAGO, IL	DTVBL9617	140.2 km
	WBBM-TV	D12	DT	APP	CHICAGO, IL	WBBM-TV 1604ft 13r1	140.2
	WHO-DT	D13	DT	LIC	DES MOINES, IA	BLCDT20090410ASQ	365.1
	WTHR	D13	DT	APP	INDIANAPOLIS, IN	BPCDT20130702ABM	367.2
	WZZM	D13	DT	LIC	GRAND RAPIDS, MI	BLCDT20100726AKV	293.7
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX
28861.2 2,703,436		27019.4 2,487,608		26225.1 2,200,739		26116.4 2,137,614	0.41 2.87
Undesired		Total IX		Unique IX, before		Unique IX, after	
WBBM-TV D12 DT BL		124.3		99,927		65.2 56,680	
WBBM-TV D12 DT APP		271.1		193,238		173.9 119,805	
WHO-DT D13 DT LIC		57.1		256		57.1 256	
WTHR D13 DT APP		255.4		90,029		161.2 33,324	
WZZM D13 DT LIC		498.8		186,422		370.6 107,512	

Interference to BLANK000005114 LIC scenario 1

****IX: 1.90% interference caused**

WREX is accepting up to 6.17 percent interference, see text

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WREX	D13	DT	LIC	ROCKFORD, IL	BLANK000005114	
Undesireds:	WBBM-TV	D12	DT	BL	CHICAGO, IL	DTVBL9617	140.2 km
	WBBM-TV	D12	DT	APP	CHICAGO, IL	WBBM-TV 1604ft 13r1	140.2
	WHO-DT	D13	DT	LIC	DES MOINES, IA	BLCDT20090410ASQ	365.1
	WTHR	D13	DT	LIC	INDIANAPOLIS, IN	BLANK0000153712	367.2
	WZZM	D13	DT	LIC	GRAND RAPIDS, MI	BLCDT20100726AKV	293.7
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX
26599.4 2,302,999		24565.7 2,006,067		23884.8 1,837,897		23807.0 1,802,954	0.33 1.90
Undesired		Total IX		Unique IX, before		Unique IX, after	
WBBM-TV D12 DT BL		57.0		22,425		29.4 13,743	
WBBM-TV D12 DT APP		174.2		87,563		107.2 48,686	
WHO-DT D13 DT LIC		39.4		1,294		39.4 1,294	
WTHR D13 DT LIC		176.4		39,093		109.1 5,820	
WZZM D13 DT LIC		502.6		146,754		390.2 96,490	

Table 1 WBBM-TV TVStudy Analysis of Proposal
(page 5 of 6)



Interference to BLANK0000005114 LIC scenario 2

****IX: 1.68% interference caused**

WREX is accepting up to 6.17 percent interference, see text

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WREX	D13	DT	LIC	ROCKFORD, IL	BLANK0000005114	
Undesireds:	WBBM-TV	D12	DT	BL	CHICAGO, IL	DTVBL9617	140.2 km
	WBBM-TV	D12	DT	APP	CHICAGO, IL	WBBM-TV 1604ft 13r1	140.2
	WHO-DT	D13	DT	LIC	DES MOINES, IA	BLCDT20090410ASQ	365.1
	WTHR	D13	DT	APP	INDIANAPOLIS, IN	BPCDT20130702ABM	367.2
	WZZM	D13	DT	LIC	GRAND RAPIDS, MI	BLCDT20100726AKV	293.7
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX
26599.4		2,302,999		24565.7		1,824,985	0.32
				23742.1		1,794,252	1.68
Undesired		Total IX		Unique IX, before		Unique IX, after	
WBBM-TV D12 DT BL		57.0		22,425		28.1	
WBBM-TV D12 DT APP		174.2		87,563		103.2	
WHO-DT D13 DT LIC		39.4		1,294		39.4	
WTHR D13 DT APP		344.0		67,482		249.1	
WZZM D13 DT LIC		502.6		146,754		379.0	

Interference to proposal scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WBBM-TV	D12	DT	APP	CHICAGO, IL	WBBM-TV 1604ft 13r1	
Undesireds:	KIIN	D12	DT	LIC	IOWA CITY, IA	BLEDT20091229ABP	307.6 km
	WINM	D12	DT	APP	ANGOLA, IN	BLANK0000199518	221.0
	WJRT-TV	D12	DT	LIC	FLINT, MI	BLANK0000185925	329.1
	WREX	D13	DT	CP	ROCKFORD, IL	BLANK0000035733	140.2
Service area		Terrain-limited		IX-free		Percent IX	
39229.4		10,172,167		38746.3		10,140,778	
				37709.2		10,091,782	
Undesired		Total IX		Unique IX		Prcnt Unique IX	
KIIN D12 DT LIC		653.0		29,545		401.8	
WINM D12 DT APP		301.0		14,002		265.7	
WJRT-TV D12 DT LIC		38.8		2,951		3.5	
WREX D13 DT CP		330.8		16,468		79.6	

Interference to proposal scenario 2

0.51% interference received

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WBBM-TV	D12	DT	APP	CHICAGO, IL	WBBM-TV 1604ft 13r1	
Undesireds:	KIIN	D12	DT	LIC	IOWA CITY, IA	BLEDT20091229ABP	307.6 km
	WINM	D12	DT	LIC	ANGOLA, IN	BLCDDT20130711ABN	239.9
	WJRT-TV	D12	DT	LIC	FLINT, MI	BLANK0000185925	329.1
	WREX	D13	DT	CP	ROCKFORD, IL	BLANK0000035733	140.2
Service area		Terrain-limited		IX-free		Percent IX	
39229.4		10,172,167		38746.3		10,140,778	
				37704.5		10,089,386	
Undesired		Total IX		Unique IX		Prcnt Unique IX	
KIIN D12 DT LIC		653.0		29,545		401.8	
WINM D12 DT LIC		306.1		16,686		270.5	
WJRT-TV D12 DT LIC		38.8		2,951		3.2	
WREX D13 DT CP		330.8		16,468		79.6	

Interference to proposal scenario 3

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WBBM-TV	D12	DT	APP	CHICAGO, IL	WBBM-TV 1604ft 13r1	
Undesireds:	KIIN	D12	DT	LIC	IOWA CITY, IA	BLEDT20091229ABP	307.6 km
	WINM	D12	DT	APP	ANGOLA, IN	BLANK0000199518	221.0
	WJRT-TV	D12	DT	LIC	FLINT, MI	BLANK0000185925	329.1

Table 1 WBBM-TV TVStudy Analysis of Proposal
(page 6 of 6)



WREX	D13	DT	LIC	ROCKFORD, IL	BLANK0000005114	140.2
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Service area	Terrain-limited	IX-free	Percent IX
39229.4 10,172,167	38746.3 10,140,778	37748.3 10,092,728	2.58 0.47

Undesired		Total IX	Unique IX	Prcnt Unique IX
KIIN D12 DT LIC	653.0	29,545	475.4	19,098
WINM D12 DT APP	301.0	14,002	265.7	11,874
WJRT-TV D12 DT LIC	38.8	2,951	3.5	823
WREX D13 DT LIC	218.1	14,127	40.5	3,680

Interference to proposal scenario 4

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	WBBM-TV	D12	DT	APP	CHICAGO, IL	WBBM-TV 1604ft 13r1	
Undesireds:	KIIN	D12	DT	LIC	IOWA CITY, IA	BLEDT20091229ABP	307.6 km
	WINM	D12	DT	LIC	ANGOLA, IN	BLCDT20130711ABN	239.9
	WJRT-TV	D12	DT	LIC	FLINT, MI	BLANK0000185925	329.1
	WREX	D13	DT	LIC	ROCKFORD, IL	BLANK0000005114	140.2

Service area	Terrain-limited	IX-free	Percent IX
39229.4 10,172,167	38746.3 10,140,778	37743.5 10,090,332	2.59 0.50

Undesired		Total IX	Unique IX	Prcnt Unique IX
KIIN D12 DT LIC	653.0	29,545	475.4	19,098
WINM D12 DT LIC	306.1	16,686	270.5	14,270
WJRT-TV D12 DT LIC	38.8	2,951	3.2	535
WREX D13 DT LIC	218.1	14,127	40.5	3,680

Table 2 Interference Study Details Regarding WINM
(page 1 of 1)



Existing Condition
Licensed WBBM-TV Interference to WINM Application: 1.03 percent

Study cell size: 0.50 km
Profile point spacing: 0.10 km

Interference to BLANK0000199518 APP scenario 1

****MX: 1.03% interference caused**

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance	
	WINM	D12	DT	APP	ANGOLA, IN	BLANK0000199518		
Undesireds:	WBBM-TV	D12	DT	BL	CHICAGO, IL	DTVBL9617	221.0 km	
	WBBM-TV	D12	DT	LIC	CHICAGO, IL	BLANK0000187049	221.0	
	WJRT-TV	D12	DT	LIC	FLINT, MI	BLANK0000185925	254.1	
	WKRC-TV	D12	DT	LIC	CINCINNATI, OH	BLANK0000157760	228.5	
	WMFD-TV	D12	DT	LIC	MANSFIELD, OH	BLCDT20081112ALJ	219.3	
	WTHR	D13	DT	LIC	INDIANAPOLIS, IN	BLANK0000153712	155.1	
Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX
23521.4	1,205,893	22926.7	1,173,367	20761.5	1,094,651	20654.1	1,083,423	0.52 1.03
Undesired				Total IX	Unique IX, before	Unique IX, after		
WBBM-TV	D12	DT	BL	778.1	41,785	248.3	16,859	
WBBM-TV	D12	DT	LIC	991.8	57,245			
WJRT-TV	D12	DT	LIC	1051.6	38,367	472.8	13,757	389.9 10,520
WKRC-TV	D12	DT	LIC	353.8	16,492	194.3	7,801	180.9 7,302
WMFD-TV	D12	DT	LIC	982.3	30,323	457.0	8,806	454.6 8,612

Proposed Condition
Proposed WBBM-TV Interference to WINM Application: 0.90 percent

Study cell size: 0.50 km
Profile point spacing: 0.10 km

Interference to BLANK0000199518 APP scenario 1

****MX: 0.90% interference caused**

Desired:	Call WINM	Chan D12	Svc DT	Status APP	City, State ANGOLA, IN	File Number BLANK0000199518	Distance	
Undesireds:	WBBM-TV	D12	DT	BL	CHICAGO, IL	DTVBL9617	221.0 km	
	WBBM-TV	D12	DT	APP	CHICAGO, IL	WBBM-TV 1604ft 13r1	221.0	
	WJRT-TV	D12	DT	LIC	FLINT, MI	BLANK0000185925	254.1	
	WKRC-TV	D12	DT	LIC	CINCINNATI, OH	BLANK0000157760	228.5	
	WMFD-TV	D12	DT	LIC	MANSFIELD, OH	BLCDT20081112ALJ	219.3	
	WTHR	D13	DT	LIC	INDIANAPOLIS, IN	BLANK0000153712	155.1	
Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX
23521.4	1,205,893	22926.7	1,173,367	20761.5	1,094,651	20633.6	1,084,767	0.62 0.90
Undesired				Total IX	Unique IX, before	Unique IX, after		
WBBM-TV	D12	DT	BL	778.1	41,785	248.3	16,859	
WBBM-TV	D12	DT	APP	1045.8	56,621		376.2	26,743
WJRT-TV	D12	DT	LIC	1051.6	38,367	472.8	13,757	360.4 9,820
WKRC-TV	D12	DT	LIC	353.8	16,492	194.3	7,801	178.3 7,348
WMFD-TV	D12	DT	LIC	982.3	30,323	457.0	8,806	454.3 8,615

**Channel and
Facility
Information**

Section	Question	Response
Proposed Community of License	Facility ID	9617
	State	Illinois
	City	CHICAGO
	DTV Channel	12
	Designated Market Area	Chicago
Facility Type	Facility Type	Commercial
	Station Type	Main
Zone	Zone	1

Antenna Location
Data

Section	Question	Response
Antenna Structure Registration	Do you have an FCC Antenna Structure Registration (ASR) Number?	Yes
	ASR Number	1032960
Coordinates (NAD83)	Latitude	41° 52' 44.0" N+
	Longitude	087° 38' 08.0" W-
	Structure Type	BMAST-Building with MAST /ANTENNA on top
	Overall Structure Height	524.9 meters
	Support Structure Height	437.5 meters
	Ground Elevation (AMSL)	181.4 meters
Antenna Data	Height of Radiation Center Above Ground Level	488.9 meters
	Height of Radiation Center Above Average Terrain	490.8 meters
	Height of Radiation Center Above Mean Sea Level	670.3 meters
	Effective Radiated Power	30 kW

Antenna
Technical Data

Section	Question	Response
Antenna Type	Antenna Type	Directional Custom
	Do you have an Antenna ID?	No
	Antenna ID	
Antenna Manufacturer and Model	Manufacturer:	ERI
	Model	ETV3H4-ESP4O-12
	Rotation	0 degrees
	Electrical Beam Tilt	1.2
	Mechanical Beam Tilt	Not Applicable
	toward azimuth	
	Polarization	Elliptical
DTV and DTS: Elevation Pattern	Does the proposed antenna propose elevation radiation patterns that vary with azimuth for reasons other than the use of mechanical beam tilt?	No
	Uploaded file for elevation antenna (or radiation) pattern data	

Directional Antenna Relative Field Values (Pre-rotated Pattern)

Degree	Value	Degree	Value	Degree	Value	Degree	Value
0	0.746	90	0.673	180	0.869	270	0.820
10	0.648	100	0.526	190	0.769	280	0.707
20	0.759	110	0.602	200	0.789	290	0.753
30	0.874	120	0.694	210	0.858	300	0.837
40	0.833	130	0.643	220	0.802	310	0.798
50	0.772	140	0.565	230	0.733	320	0.762
60	0.865	150	0.666	240	0.834	330	0.874
70	0.961	160	0.866	250	0.978	340	0.991
80	0.895	170	0.957	260	0.977	350	0.947

Additional Azimuths

Degree	V _A
72	0.964
344	0.997
254	1.000
102	0.524