

ENGINEERING EXHIBIT

Incentive Auction Channel Reassignment

Application for Digital Television Station Auxiliary Antenna Construction Permit

prepared for

WISN Hearst Television Inc.

WISN-TV Milwaukee, WI

Facility ID 65680

Ch. 28 1000 kW 264 m

WISN Hearst Television Inc. ("Hearst") is the licensee of digital television station WISN-TV, Facility ID 65680, Milwaukee WI. Reassignment of WISN-TV from Channel 34 to Channel 28 was specified in the *Incentive Auction Closing and Channel Reassignment Public Notice* (DA 17-317, released April 13, 2017). A Construction Permit ("CP", file# 0000034528) authorizes construction of the WISN-TV post-auction facility on Channel 28. *Hearst* herein seeks authorization for an auxiliary antenna for WISN-TV on its post-auction Channel 28.

The reassignment CP authorizes WISN-TV to operate with a directional antenna at 1000 kW effective radiated power (ERP) and 305 meters height above average terrain (HAAT). The proposed auxiliary antenna will be side-mounted on the same tower structure as the authorized main antenna, and will operate on Channel 28 at 1000 kW ERP (directional) and an antenna HAAT of 264 meters.

The WISN-TV tower structure is associated with FCC Antenna Structure Registration number 1035766. No change to the overall structure height will result from this proposal.

The proposed antenna is a horizontally polarized directional Dielectric model TFU-24WB C160H. The directional antenna's azimuthal pattern is supplied in Figure 1 and the elevation pattern is depicted in Figures 2 and 2A.

Pursuant to §73.625(b)(4) the calculated average terrain elevation and associated HAAT have been adjusted due to the proximity of the site to the shoreline of Lake Michigan (see Figure 3). The 45 and 90 degree radials have been omitted. The 135 degree radial has been truncated to include only the part of the radial extending from 3.2 kilometers to the water's edge. Considering the omitted and truncated radials, the proposed auxiliary antenna's resulting HAAT is 264.1 meters.

Figure 3 shows that the 41 dBμ noise limited service contour of the proposed auxiliary facility does not extend beyond that of the authorized main facility over land area. A minor contour extension over water (Lake Michigan) will exist and is customarily ignored for an auxiliary facility. Thus the proposal complies with §73.1675(a).

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 15 percent antenna relative field in downward elevations (pattern data shows less than 15 percent relative field at angles 25 to 90 degrees below the antenna), the calculated signal density near the tower at two meters above ground level attributable to the proposed facility is $9.2 \mu\text{W}/\text{cm}^2$, which is 2.7 percent of the general population/uncontrolled maximum permitted exposure limit. This is below the five percent threshold limit described in §1.1307(b) 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.

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 continue to 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. This exhibit is limited to the evaluation of exposure to RF electromagnetic field.

Engineering Exhibit
WISN Hearst Television Inc. (WISN-TV)
(page 3 of 3)



List of Attachments

Figure 1	Antenna Azimuthal Pattern
Figure 2, 2A	Antenna Elevation Pattern
Figure 3	Proposed Auxiliary Contours

Chesapeake RF Consultants, LLC

Joseph M. Davis, P.E.	July 19, 2019
207 Old Dominion Road	Yorktown, VA 23692

703-650-9600

AZIMUTH PATTERN

Gain
 Calculated / Measured

1.63 (2.12 dB)
Calculated

Frequency
 Drawing #

557 MHz
WB-C160H

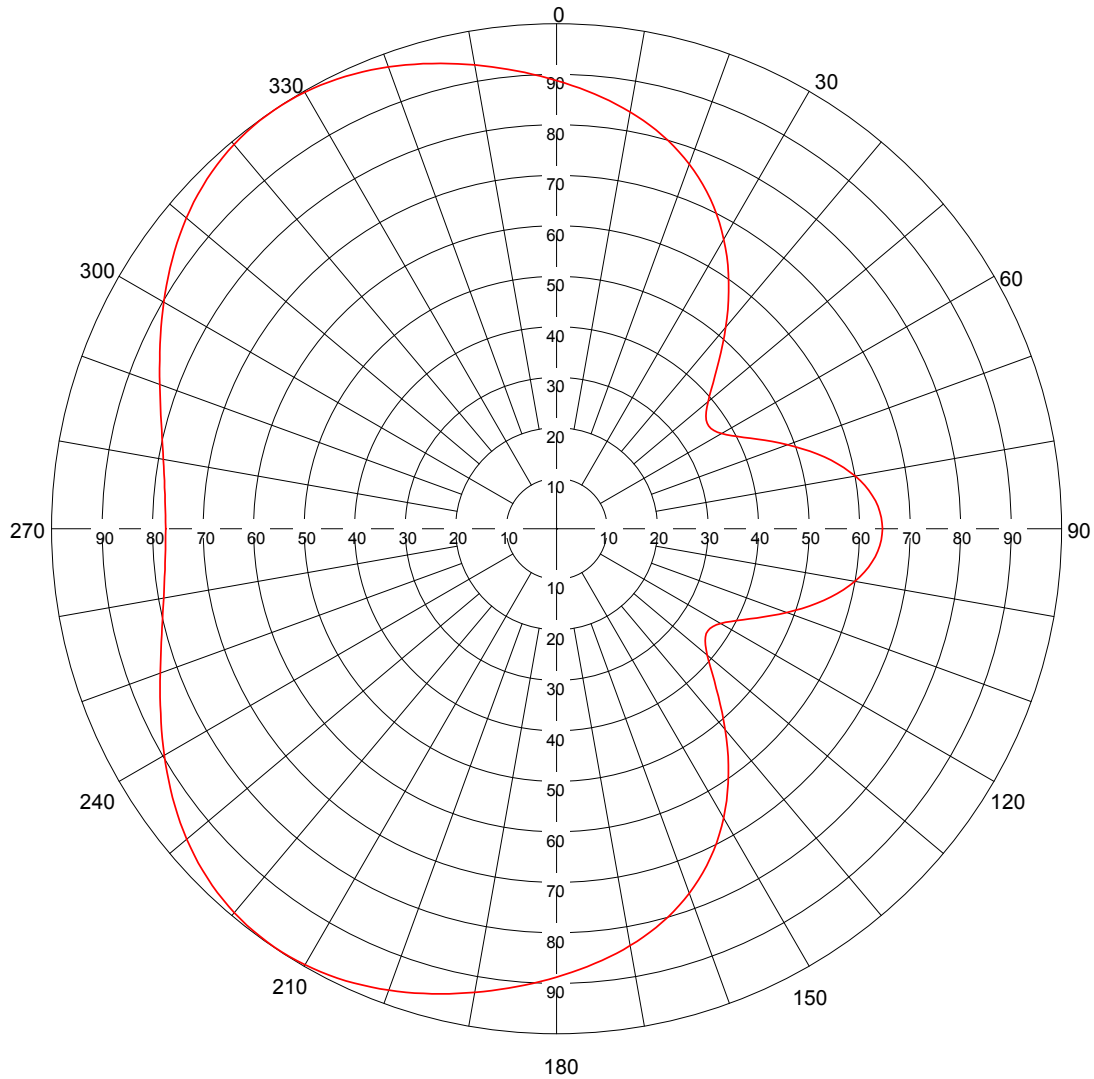


Figure 1
Auxiliary Antenna Azimuthal Pattern
WISN-TV Milwaukee, WI
Facility ID 65680
Ch. 28 1000 kW 264 m

prepared for
WISN Hearst Television Inc.

July, 2019



Date
Call Letters
Location
Customer
Antenna Type

18 Jul 2019

Channel

ELEVATION PATTERN

RMS Gain at Main Lobe	21.6 (13.34 dB)	Beam Tilt	0.50 Degrees
RMS Gain at Horizontal	18.1 (12.58 dB)	Frequency	557 MHz
Calculated / Measured	Calculated	Drawing #	24W216050-90

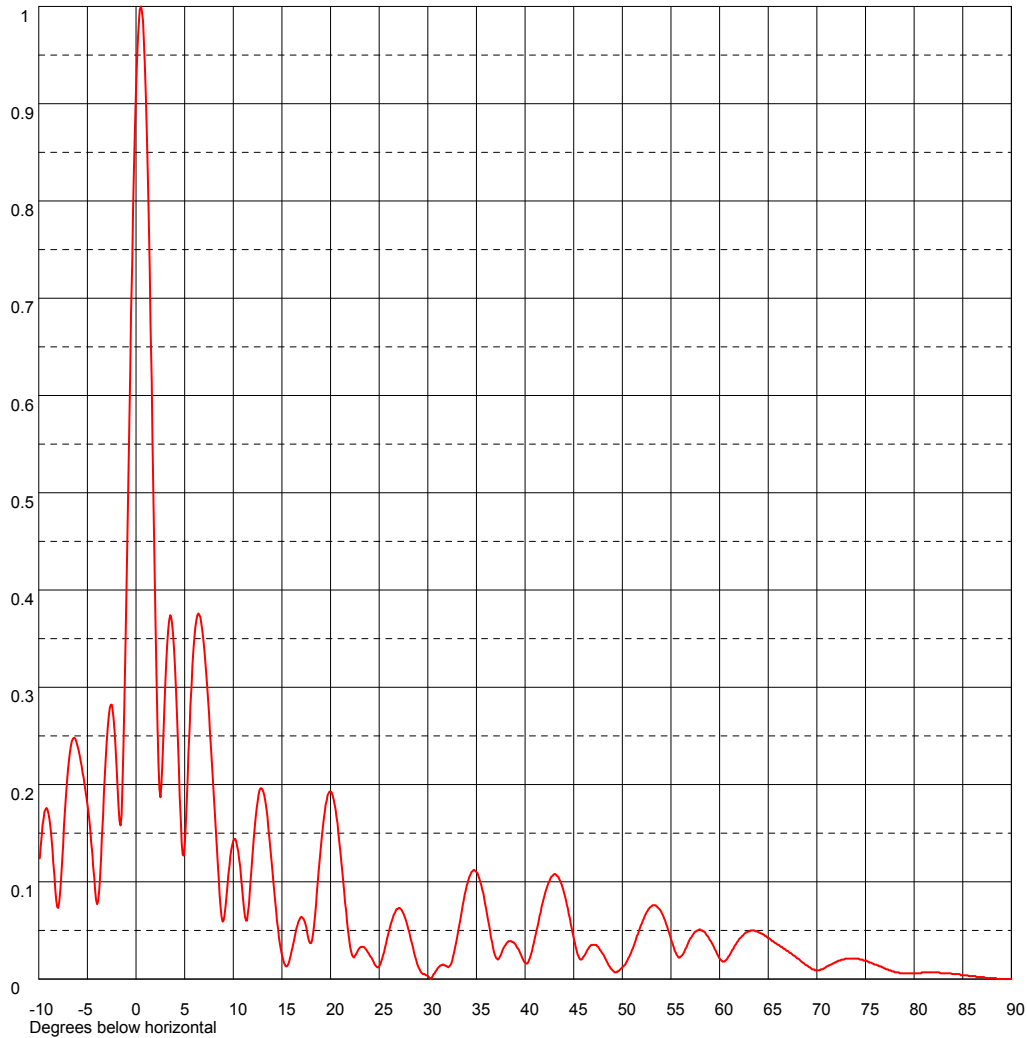


Figure 2
Auxiliary Antenna Elevation Pattern
WISN-TV Milwaukee, WI
Facility ID 65680
Ch. 28 1000 kW 264 m

prepared for
WISN Hearst Television Inc.

July, 2019



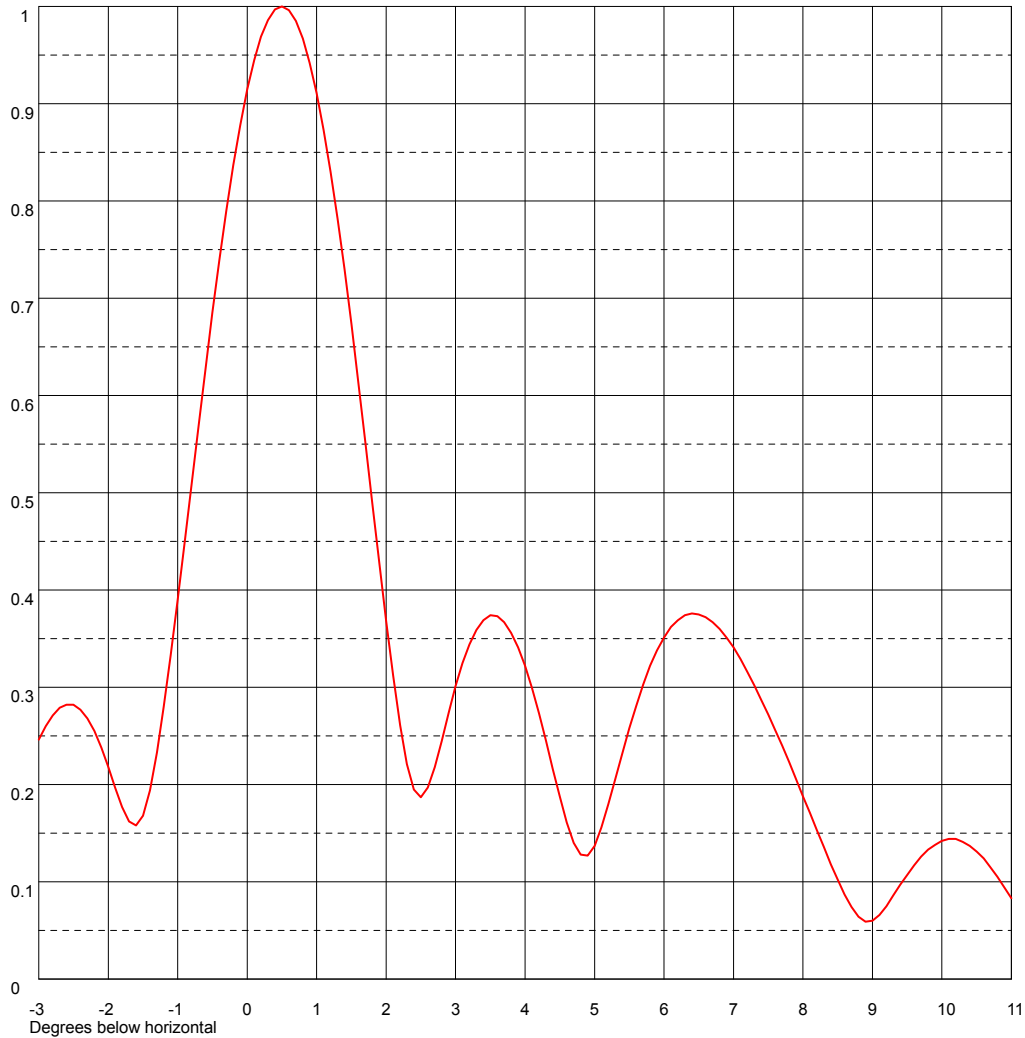
Date
Call Letters
Location
Customer
Antenna Type

18 Jul 2019

Channel

ELEVATION PATTERN

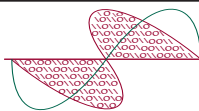
RMS Gain at Main Lobe	21.6 (13.34 dB)	Beam Tilt	0.50 Degrees
RMS Gain at Horizontal	18.1 (12.58 dB)	Frequency	557 MHz
Calculated / Measured	Calculated	Drawing #	24W216050



**Figure 2A - Detail
Auxiliary Antenna Elevation Pattern
WISN-TV Milwaukee, WI
Facility ID 65680
Ch. 28 1000 kW 264 m**

prepared for
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July, 2019



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

Figure 3
Proposed Auxiliary Contours
WISN-TV Milwaukee, WI
Facility ID 65680
Ch. 28 1000 kW 264 m

prepared for
WISN Hearst Television Inc.

July, 2019

Ch. 28 Construction Permit
File# 0000034528
1000 kW 305 m nondirectional
41 dBu Contour

Proposed Auxiliary Ch. 28
1000 kW 264 m directional
48 dBu
(Principal Community)
41 dBu
(Noise Limited Service Contour)

Minor contour extension over water
is ignored for auxiliary facility

