

ENGINEERING EXHIBIT  
AMENDMENT OF APPLICATION FOR  
CONSTRUCTION PERMIT  
WEIGEL BROADCASTING CO.  
STATION WFBT-CA  
CHICAGO, ILLINOIS

March 19, 2003

CH 23      47.5 KW (MAX-DA)

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Engineering Statement

This Engineering Exhibit was prepared on behalf of Weigel Broadcasting Co. in support of an amendment to the pending application for construction permit for WFBT-CA. The instant amendment provides supplemental information supporting the allocation study for WFBT-CA. It is demonstrated herein that the WFBT-CA proposal will not result in any intermodulation interference to taboo related stations, WYCC(TV) (Channel 20), Chicago, Illinois; and, WCIU-TV (Channel 26), Chicago, Illinois.

Allocation Considerations (Supplement)

The proposed WFBT-CA Channel 23 facility is located within 32 km of the following analog television facilities that are the subject of this amendment:

Call Sign	Location	Channel	Channel Relationship to WFBT-CA
WYCC(TV)	Chicago-IL	20	N+3
WCIU-TV	Chicago-IL	26	N-3

If required, a waiver of the FCC Rules is requested concerning each of these proposed short-spacings.

The above short-spacings are UHF "taboos" related to the receiver induced third-order intermodulation interference mechanism that can occur in UHF television reception.\* These interference relationships were studied to determine if there would be any interference caused due to the instant proposal. This is discussed in further detail below.

The intermodulation interference effect is a receiver-induced problem resulting from the combination of strong input channel signals that produce a spurious signal within the tuned channel. The spurious signals,  $f_x$ , can be computed from  $f_x = 2f_a - f_b$  where  $f_a$  is the frequency of one station and  $f_b$  is the frequency of the second station.† In the present case, the affected channels are as follows:

Channel Combination	Third-Order Intermodulation Affected Channels
N+3, Channels 23 and 20	16, 17, 18, 25, 26, 27
N-3, Channels 23 and 26	19, 20, 21, 28, 29, 30

The only full service broadcast television stations with Grade B contours falling closer than 35 km of WFBT-CA on these channels are as follows:

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\* There is a detailed discussion of the UHF taboos in the *Notice of Inquiry* in MM Docket No. 87-268, Released: August 20, 1987.

† See FCC TV *Sixth Report and Order*, Released: April 14, 1952, paragraphs 175-179.

Call Sign	Location	Channel	Distance (km)
WYCC (TV)	Chicago-IL	20	2.5
WCIU-TV	Chicago-IL	26	0.0

In order to evaluate the interference potential to each of these stations, an analysis of the predicted intermodulation interference was conducted for each of the two channel combination scenarios. The analyses were conducted over a 10,000 point grid cell area within approximately 40-km of the WFBT-CA proposed transmitter site. The analysis was based on the assumption of a 0 dBi gain omni-directional receiving antenna. The procedure of the analysis was as follows:

1. The Longley-Rice predicted desired and undesired field strength for each of the subject stations was calculated at the subject point.
2. The threshold desired-to-undesired (D/U) ratio to interference was determined at each point using data from the appropriate graphs in the 1974 FCC report, *A Study of the Characteristics of Typical Television Receivers Relative to the UHF Taboos*. The Figures #15 and #16 from the 1974 FCC report were employed in the analysis for the N+3 and N-3 analyses, respectively.

3. Using the formulations outlined in the FCC Report, *Report and Recommendations in the Low Power Television Inquiry*, BC Docket No. 78-253, the combined threshold undesired signal level was determined at each grid cell point.<sup>‡</sup>
4. The predicted combined undesired signal level was compared to the threshold to determine if interference is predicted at the grid cell point.

The FCC default vertical elevation pattern taken from Table 8 of FCC OET-69 for UHF Analog stations was employed in the calculations for WYCC(TV) and WCIU-TV. Since the FCC pattern does not extend beyond 10-degrees below the horizon, additional data for elevation angles greater than 10-degrees below the horizon were employed. A relative field factor of 0.11 was employed for these angles consistent with the FCC procedure in FCC OET-69. For WFBT-CA the actual vertical elevation pattern data was employed taking into account the electrical and mechanical beam tilt proposed for WFBT-CA.<sup>§</sup>

The following table provides a calculation example for an intermodulation interference analysis with respect to desired station WYCC(20) from the combination of undesired stations WFBT(23) and WCIU(26) at a grid point located approximately 10 km directly west of the WYCC(TV) transmitter site:

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‡ See Technical Appendix B to Part IV dealing with intermodulation interference, pp. 230-242.

§ The proposed maximum peak visual ERP of 363 kW was employed for the main beam maximum effective radiated power.

WYCC(TV) Longley-Rice calculated desired signal level	112.3 dBu
WFBT-CA Longley-Rice calculated undesired signal level	100.4 dBu
WCIU-TV Longley-Rice calculated undesired signal level	113.6 dBu
WYCC(TV) Calculated level of desired signal assuming 0 dB gain receiving antenna	-19.7 dBm
D/U level from Figure #15 of FCC 1974 Report (mean level)	-16.0 dB
Combined undesired threshold interference level	-11.1 dBm
WFBT-CA Calculated level of undesired signal assuming 0 dB gain receiving antenna	-31.6 dBm
WCIU-TV Calculated level of undesired signal assuming 0 dB gain receiving antenna	-18.4 dBm
Calculated combined level of undesired signal	-81.6 dBm
Interference calculation result	No interference

Similar results as above would be found for the remaining 9,999 grid points analyzed.

The results of the intermodulation interference analyses with respect to both of the stations under consideration are summarized below:

Station	Interference Analysis Result
WYCC (TV)**	Proposal causes no interference.
WCIU-TV††	Proposal causes no interference.

Based on the above it is concluded that the proposal will result in no predicted intermodulation interference population with respect to WYCC (TV) and WCIU-TV.

Louis Robert du Treil, Jr.

March 19, 2003

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\*\* WYCC (TV) has an application pending (FCC File No. BPET-20020326ABD) to replace its transmitting antenna with no other significant changes. The application facility is essentially identical to the licensed WYCC (TV) facility. Therefore, these results are equally applicable to both the WYCC (TV) licensed and application facilities.

†† Based on the WCIU-TV construction permit facility, which is identical to the licensed facility with the exception of a higher effective radiated power of 5000 kW for the construction permit facility.

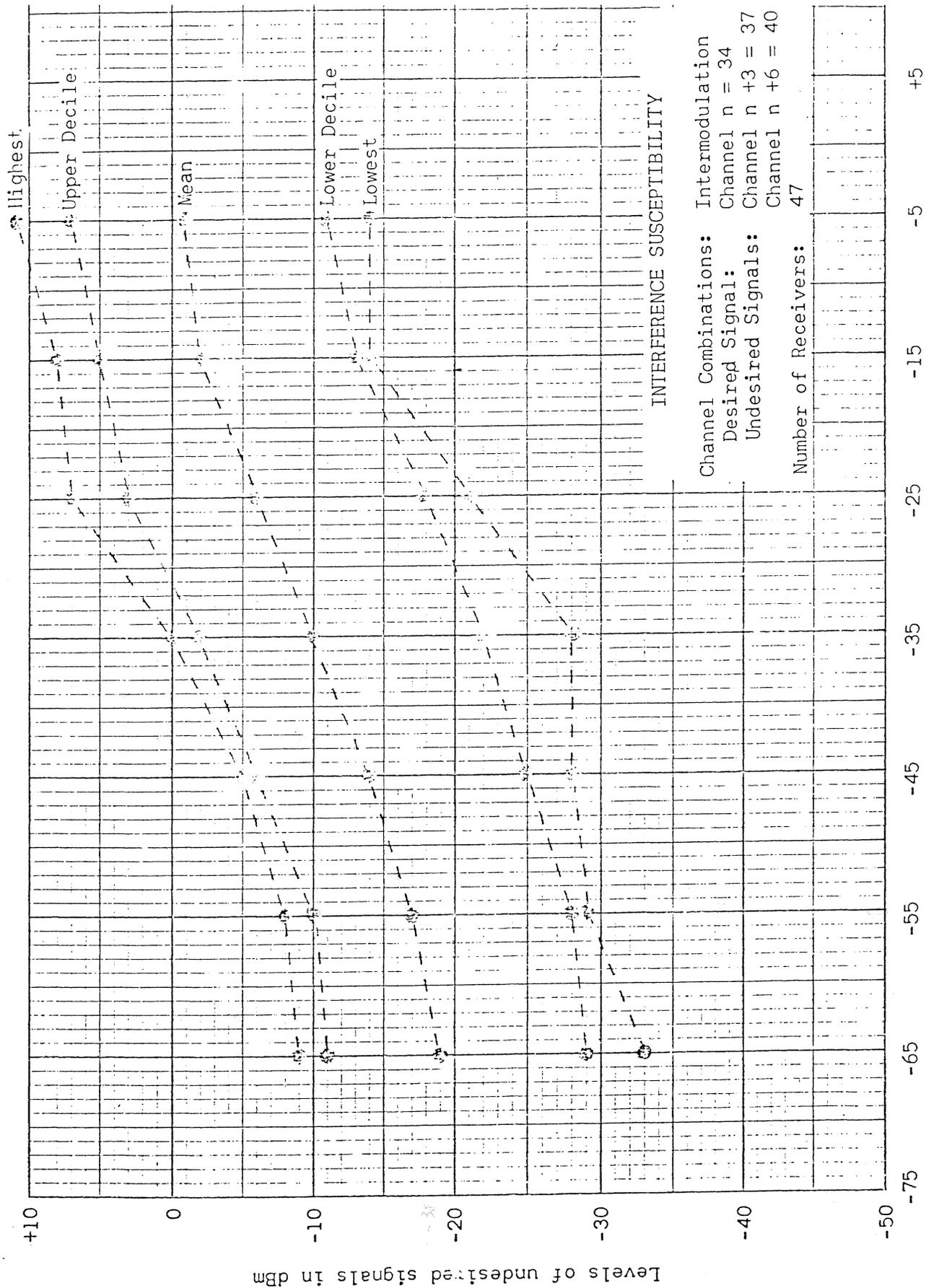
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Interference Susceptibility Graphs  
from FCC 1974 UHF Taboo Study Report

(two sheets follow)

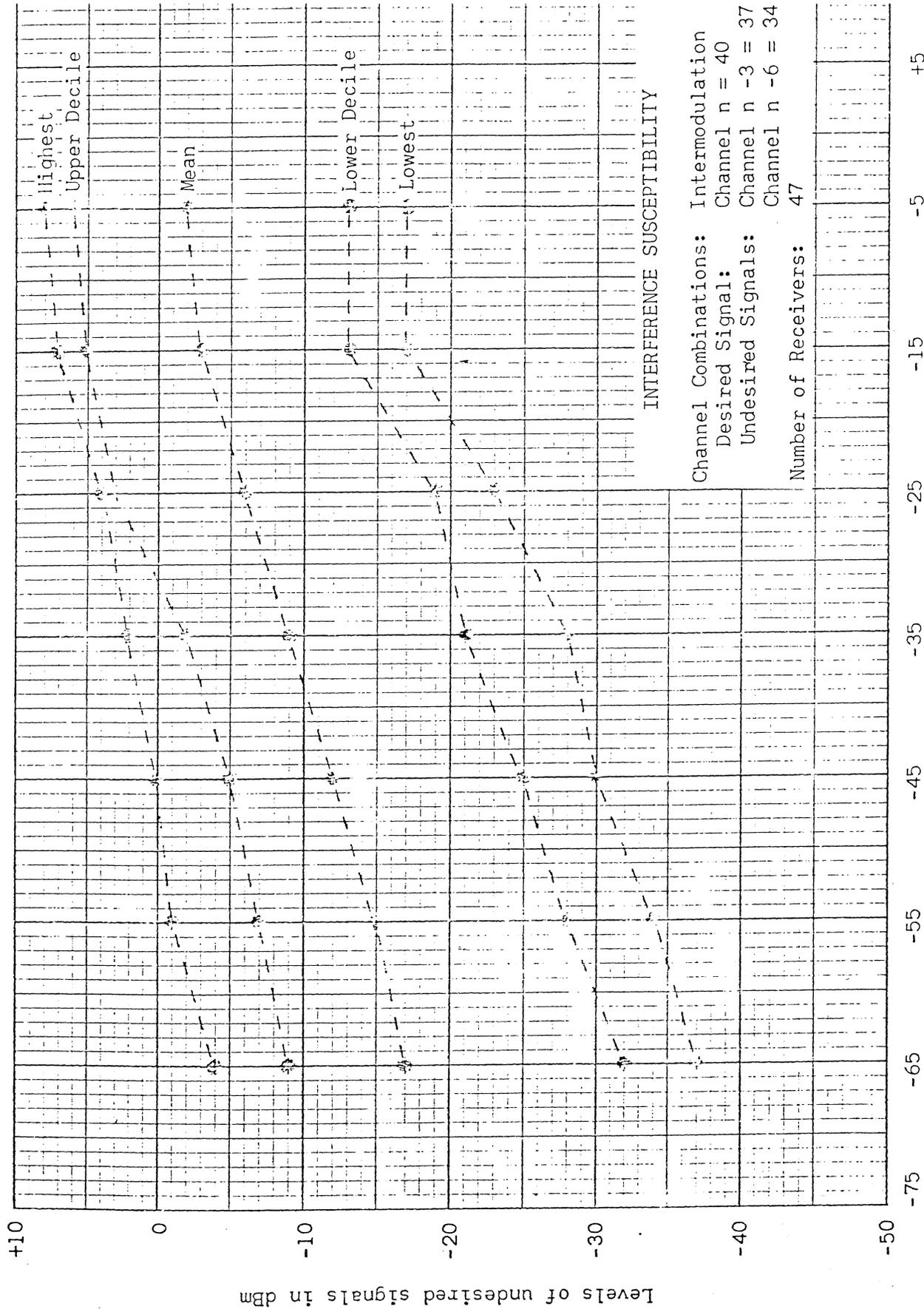
Sheet 1 - Figure #15

Sheet 2 - Figure #16



Level of desired signal in dBm

Figure #15



Level of desired signal in dBm  
 Figure #16