APPENDIX A

ENGINEERING STATEMENT OF CARL E. GLUCK

Salem Communications Corporation

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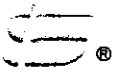
COMMENTS OF CARL E. GLUCK CONCERNING FCC MM DOCKET 99-25 ABOUT LOW POWER FM RADIO



I am Vice President of Technical Research for Salem Communications Corporation (Salem), with offices located in Camarillo, California. I am a Certified Professional Broadcast Engineer (#50261) with the Society of Broadcast Engineers. Salem Communications Corporation, through subsidiaries, is licensee of 46 broadcast radio stations, both AM and FM, throughout the United States. This statement provides comments requested by the Notice of Proposed Rulemaking (proposal) in FCC MM Docket 99-25 concerning Low Power FM (LPFM).

In an attempt to understand one of the impacts of the proposed LPFM service on Salem's FM radio stations I carefully studied the listening areas of KKHT 106.9 FM, Conroe, Texas (a Class C station); and WYLL 106.7 FM, Des Plaines, Illinois (a Class B station). My study specifically focused on the possibility of interference to presently receivable KKHT and WYLL signals beyond the stations' protected service contours as defined by the FCC. It is my opinion, based upon years of broadcast engineering experience, that completely useable FM broadcast signals are present beyond defined protected service contours, in the absence of interference, down to signal levels as low as 36 dBu.

The study revealed that at both KKHT and WYLL there are large audiences where the general public receives interference free service outside of the protected class contour of these stations. Under the instant proposal, the general public in these areas will receive large new areas of interference from potential LPFM stations where neither Salem's station nor the LPFM will have interference free service. A very small number of people will receive interference

free service from the potential LPFM stations compared to a very large number of people who will receive the new interference.

In the case of KKHT 106.9 FM Conroe, Texas, there is an area of interference free reception on the FM channel at Nederland, Texas. Under the provisions of the LPFM rulemaking[1] a fully spaced 100 watt LPFM co-channel station could be placed in Nederland, Texas[2]. All other sources of potential interference, existing and potential drop-ins under existing FCC allotment standards[3], were identified. The f(50,50) 48 dBu contour of KKHT fully encompasses the area where new interference will occur. 113,098 people (based on 1990 Census Data) who now receive an interference free signal from KKHT would no longer be able to hear KKHT based upon the Nederland LPFM interfering f(50,10) 40 dBu contour area. Of these 113,098 people, only 40,936 would receive interference free service from the new LPFM based on its f(50,50) 60 dBu contour area. 72,162 people who previously had interference free reception on 106.9 MHz near Nederland would no longer be able to receive any radio service on that frequency. Exhibit 1 fully depicts this information.

In the case of WYLL 106.7 FM in Des Plaines, Illinois, there is an area of interference free reception on this FM channel near Portage, Indiana. Under the provisions of the LPFM rulemaking[1] a fully spaced 100 watt LPFM co-channel

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[1] – based upon the tables provided with the LPFM rulemaking and ignoring 2nd and 3rd channel protection criteria, as suggested in the rulemaking.

[2] – The 100 watt LPFM station could be placed at North Latitude 29-58-19 and West Longitude 93-59-41 as shown on the accompanying exhibit. The LPFM was modeled as prescribed in the rulemaking: 100 watts at 30 meters height above average terrain.

[3] – A new Class C3 drop-in on FM channel 296 which would create the worst case interference to KKHT's signal could be placed at New Cameron, Louisiana at North Latitude 29-49-14 and West Longitude 87-06-04. The drop-in was modeled with 25 kW at 100 meters height above average terrain. The potential interfering 40 dBu contour from this drop-in was considered in defining the new interference from a LPFM station at Nederland, Texas.

station could be placed at Portage, Indiana[4]. All other sources of interference both existing and potential drop-ins[5] were identified. The area of new interference is within the WYLL f(50,50) 36 dBu contour and inside of the Portage LPFM interfering f(50,10) 34 dBu contour area, but outside of the WYBA f(50,10) 80 dBu contour. 467,256 people (based on the 1990 Census Data) who now receive an interference free signal from WYLL would no longer be able to hear WYLL based upon interference received from the Portage LPFM. Of these 467,256 people only 32,057 would receive interference free service from the new LPFM based upon its f(50,50) 60 dBu contour area. 435,199 people who previously had interference free reception from WYLL on 106.7 MHz near Portage, Gary, Michigan City, Valparaiso, Hobart, and Merrillville, Indiana, would no longer be able to receive any radio service on that frequency. Exhibit 2 fully depicts this information.

This Engineering Statement and the attached exhibits were prepared by me and are correct to the best of my knowledge, information, and belief.

Date: July 29, 1999

Carl E. Gluck

Carl E. Gluck

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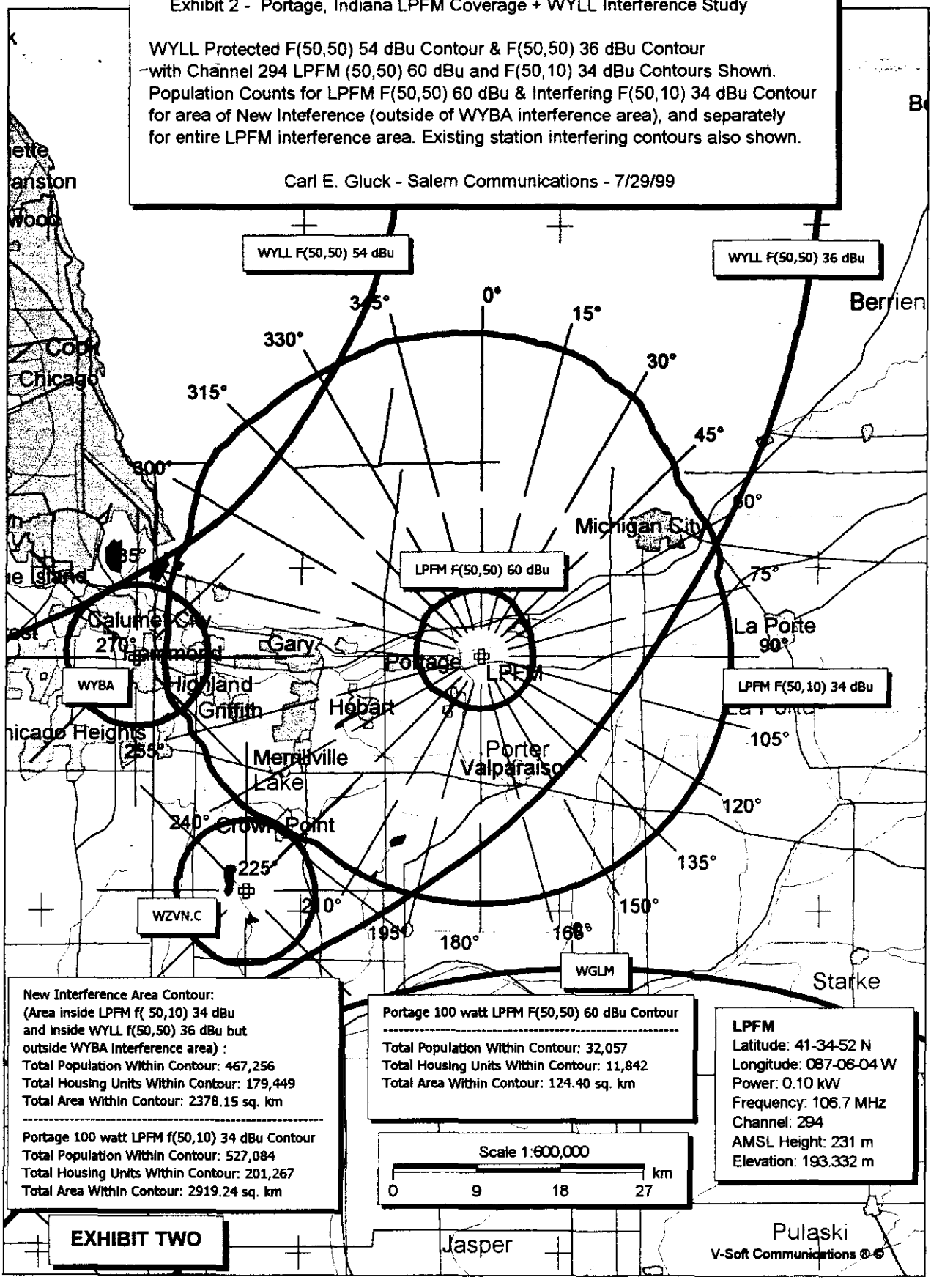
[4] – The 100 watt LPFM station could be placed at North Latitude 41-34-52 and West Longitude 87-06-04 as shown on the accompanying exhibit. The LPFM was modeled as prescribed in the rulemaking: 100 watts at 30 meters height above average terrain.

[5] – No new drop-ins could be placed near Portage, Indiana, on an interfering channel.

Exhibit 2 - Portage, Indiana LPFM Coverage + WYLL Interference Study

WYLL Protected F(50,50) 54 dBu Contour & F(50,50) 36 dBu Contour with Channel 294 LPFM (50,50) 60 dBu and F(50,10) 34 dBu Contours Shown. Population Counts for LPFM F(50,50) 60 dBu & Interfering F(50,10) 34 dBu Contour for area of New Inteference (outside of WYBA interference area), and separately for entire LPFM interference area. Existing station interfering contours also shown.

Carl E. Gluck - Salem Communications - 7/29/99



New Interference Area Contour:
(Area inside LPFM f(50,10) 34 dBu and inside WYLL f(50,50) 36 dBu but outside WYBA interference area) :
Total Population Within Contour: 467,256
Total Housing Units Within Contour: 179,449
Total Area Within Contour: 2378.15 sq. km

Portage 100 watt LPFM f(50,10) 34 dBu Contour
Total Population Within Contour: 527,084
Total Housing Units Within Contour: 201,267
Total Area Within Contour: 2919.24 sq. km

Portage 100 watt LPFM F(50,50) 60 dBu Contour
Total Population Within Contour: 32,057
Total Housing Units Within Contour: 11,842
Total Area Within Contour: 124.40 sq. km

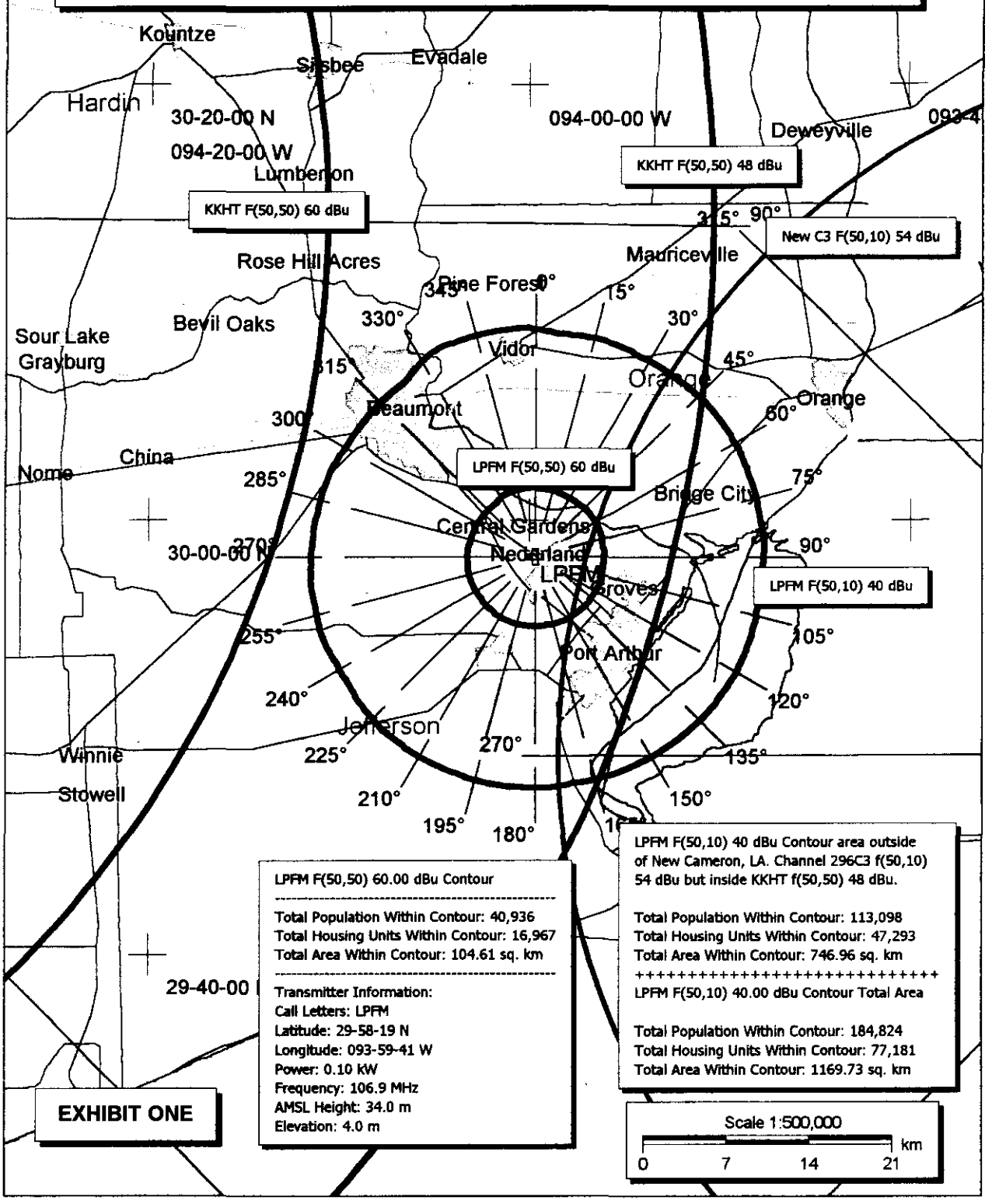
LPFM
Latitude: 41-34-52 N
Longitude: 087-06-04 W
Power: 0.10 kW
Frequency: 106.7 MHz
Channel: 294
AMSL Height: 231 m
Elevation: 193.332 m

EXHIBIT TWO

Exhibit 1 - Nederland, Texas LPFM Coverage + KKHT Interference Study

KKHT Protected F(50,50) 60 dBu Contour and Drop-In C3 Cameron, LA F(50,10) 54 dBu Contour with Channel 295 LPFM F(50,50) 60 dBu and F(50,10) 40 dBu Contours Shown. KKHT F(50,50) 48 dBu contour also shown. Pop Counts for LPFM F(50,50) 60 dBu & Interfering F(50,10) 40 dBu Contour for area outside of New CH296 C3, and separately for entire interference area.

Carl E. Gluck - Salem Communications - 7/29/99



LPFM F(50,50) 60.00 dBu Contour

Total Population Within Contour: 40,936
Total Housing Units Within Contour: 16,967
Total Area Within Contour: 104.61 sq. km

Transmitter Information:
Call Letters: LPFM
Latitude: 29-58-19 N
Longitude: 093-59-41 W
Power: 0.10 kW
Frequency: 106.9 MHz
AMSL Height: 34.0 m
Elevation: 4.0 m

LPFM F(50,10) 40 dBu Contour area outside of New Cameron, LA. Channel 296C3 f(50,10) 54 dBu but inside KKHT f(50,50) 48 dBu.

Total Population Within Contour: 113,098
Total Housing Units Within Contour: 47,293
Total Area Within Contour: 746.96 sq. km

LPFM F(50,10) 40.00 dBu Contour Total Area

Total Population Within Contour: 184,824
Total Housing Units Within Contour: 77,181
Total Area Within Contour: 1169.73 sq. km

EXHIBIT ONE

APPENDIX B

ENGINEERING STATEMENT OF HERMAN E. HURST, JR.

Appendix B

STATEMENT OF HERMAN E. HURST, JR.
IN SUPPORT OF COMMENTS
SUBMITTED IN MM DOCKET NO. 99-25 (RM-9208 & RM-9242)
CREATION OF A LOW POWER RADIO SERVICE

Prepared on Behalf of: Salem Communications Corporation

Introduction.

I am a Radio Engineer, an employee of Carl T. Jones Corporation with offices in Springfield, Virginia. My education and experience are a matter of record with the Federal Communications Commission. This statement has been prepared for Salem Communications Corporation in support of its Comments in MM Docket No. 99-25, Creation of a Low Power Radio Service.

A. Proposal for a new low power FM service.

On January 28, 1999, the Commission adopted a Notice of Proposed Rulemaking looking toward establishing rules for the authorization of a new low power radio service (LPFM). The NPRM provides for establishing two classes of LPFM facilities; a 1000 W primary low power FM facility limited in height above average terrain to 60 meters and a secondary low power FM, 100 W at 30 meter facility. Both classes of LPFM's would be assigned in a manner similar to current full service assignment procedures, but without the

requirement of a pre-assigned allotment rulemaking. The NPRM contains a table of required spacing between the various classes of full service FM stations and LPFM facilities operating on co-channel, first adjacent channel, and second/third adjacent channels. As proposed, the LP100 facilities would be considered secondary in nature. Though not clearly defined, presumably these facilities would be required to vacate their assigned channel should it be found that the station causes interference to full service facilities and protected LP1000 assignments.

B. Stations provide service beyond the field strength contour the Commission has designated as "protected field strength". This service in many instances will be lost.

It is important to recognize in considering assigning additional facilities, even if they are low power facilities, that while station separations for full service facilities are based on a presumption of interference-free service to a specified contour level, most stations experience spacing constraints in only two or possibly three directions. These constraints, whether minimum spacing under section 73.207 or short spaced relationships, result in a predicted interference at approximately the value of service defined as primary for the class, but provide for interference-free service in other directions well beyond the defined primary service contour. In the absence of an interfering signal, the minimum usable field strength level is 36 dBu for satisfactory stereophonic reception in the presence of noise

only.[1] Consequently, stations today provide service well beyond the protected contour in many directions. The additional assignment of low power facilities providing limited service will result in a substantial loss of interference-free service enjoyed today.

C. Protection for full service FM stations from low power facilities operating on second and third adjacent channels should be maintained.

In the initial development of the FM broadcast service, the FCC's laboratory quantified the sensitivity and selectivity of FM broadcast receivers. This effort determined that stations operating up to 600 kHz removed from one another could not operate in the same area. When the current table of allotments was developed in 1964, it was again confirmed that maintaining protection for frequencies separated by up to 600 kHz was required and the existing separations were established. It is submitted that the basic performance of receivers today is essentially unchanged from that found in 1947[2] and as again found in 1961[3]; and that it is mandatory that any assignment plan for low power facilities must maintain protection to full service stations from interfering signals on second and third adjacent channels. While one may argue that, due to the relatively low power

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[1] FCC/OCE RS 75-08 FM Broadband Channel Frequency Spacing, December 1975, page 3.

[2] Project No. 22231, FCC Laboratory Division, Characteristics of Commercial FM Broadcast Receivers, parts I, II & III, 1947.

[3] Project No. 2223-7, FCC Laboratory Division, Characteristics of FM Broadcast Receivers (1961), parts I & II, 1961-1962.

contemplated for LPFM stations, the resulting interference from operation within the protected service area on adjacencies, in particular the third adjacent channel, results in a predicted interference area which is small in comparison to the total service area of the full service station. This argument is without merit when the full service station's signal level is relatively low but still exceeds the protected service contour value. For example, an LP1000 assigned just inside a 6 kW, Class A, 60 dBu service contour could cause interference to more than 2% of the station's protected service area.

The NPRM notes that in 1997 the Commission eliminated the 3rd adjacent channel protection for full power "grandfathered short spaced stations" with the support of nearly all parties filing comments.[4] This action by the Commission was only legitimizing an existing situation between possibly a couple hundred stations which were authorized before the adoption of a Table of Assignments. Even in the most congested (spectrum wise) areas of the country, stations may have "short-spaced" relationships with two or three other stations, which usually have transmitter sites located in rather remote areas of a community resulting in small populations actually suffering interference. This action by the Commission in fact re-established Rules which were in effect from 1967 until 1987.[5]

Should the need for second/third adjacent channel protection to full service stations be ignored, the resulting interference will be severe in many instances. For example, while

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[4] See NPRM, paragraphs 42 through 46.

[5] See Second Report and Order in MM Docket 86-144, 2 FCC Rcd 5693 (1987).

maintaining the proposed co-channel spacing of 24 km, it is mathematically possible to assign 26 LP100 stations on one adjacent channel within the 54 dBu contour of a Class B station.

Certainly after a review of the entire record in this proceeding, one must conclude that maintaining second adjacent channel protection to full service stations is essential to the technical integrity of today's FM broadcast service. Should the Commission elect to eliminate the third adjacent channel separations illustrated in Appendix B of the NPRM, to minimize the potential impact to full service stations, the LPFM assignment (both LP1000 and LP100) should be required to be located within the distance from the protected station's transmitter site specified in the following table or beyond the protected contour of the protected station as shown.

	LPFM site must be located:	
LPFM is 3rd Adjacent to Station Class	Beyond (Distance to Protected Contour) (km)	Or Within (Distance to 86 dBu Contour) (km)
A	28.3	6.5
B1	44.7	9.2
B	65.1	13.3
C3	39.1	9.2
C2	52.2	13.3
C1	72.4	22.5
C	91.8	32.3

D. Low power FM stations should be authorized to use horizontal polarized transmitting antennas only.

Since consideration for interference caused by the proposed LPFM facility assumes nondirectional transmitting antennas, and no provision is being considered for use of directional transmitting antennas for the purpose of providing protection to full service facilities, it is recommended that the Commission consider requiring LPFM facilities to utilize transmitting antennas which are horizontally polarized only. Current Commission technical standards for full service facilities governs power permitted based on horizontal polarization. The Rules provide that a station may also add vertical polarization (or utilize a circular antenna) provided the vertical component RMS does not exceed the RMS value of the horizontal polarized signal.

The proposed LPFM assignment criteria assumes a nondirectional transmitting antenna. An antenna with vertical polarization is far more subject to pattern distortion caused by the structure on which the antenna is mounted. Because circularity of the radiating antenna is critical, the Commission should permit only horizontally polarized antennas to be installed by LPFM stations. The attached exhibits of pole mounted nondirectional circularly polarized antennas depict a variation in the horizontal polarization pattern of ±1 dB or less while the vertically polarized component varies between 4.7 dB and 5.6 dB. Such variation can result in substantial interference to full service stations even though the low power FM facility is assigned at a distance complying with the proposed separation based on nondirectional transmitting antennas.

E. Power for a particular height should be selected to insure that interfering contours do not exceed referenced distance in all directions.

The table of separations proposed in the NPRM is simply the sum of a full service station's normally protected contour, assuming specified maximum facility and the LPFM interfering contour, determined using the appropriate interference ratio and F(50,10) curves contained in the Rules. This assumption assumes uniform terrain in determining the separation to be required. Since terrain throughout the United States varies widely, it is recommended that the spacings be increased to provide some safety margin for terrain anomalies. It is recommended that the proposed separations be increased 20% and that the power assigned an LPFM be selected to insure that the appropriate interfering contour does not extend in any direction beyond the distances calculated based on that of the reference facilities for the LP1000 and LP100 plus the 20% margin. With the computerized tools available today, this calculation can be made at one degree intervals and a power can be selected appropriately to insure an LPFM's interfering contour is within the required separation, expanded to include a safety margin.

Since signal propagation from transmitting antennas mounted at very high sites is known to approach a "free-space" attenuation model rather than the Commission's F(50,10) model, overall height above average terrain should be further restricted to avoid excessive influence. Consequently, antenna heights above average terrain should be restricted to twice the reference height (i.e. 120 meters for LP1000 and 60 meters for LP100).

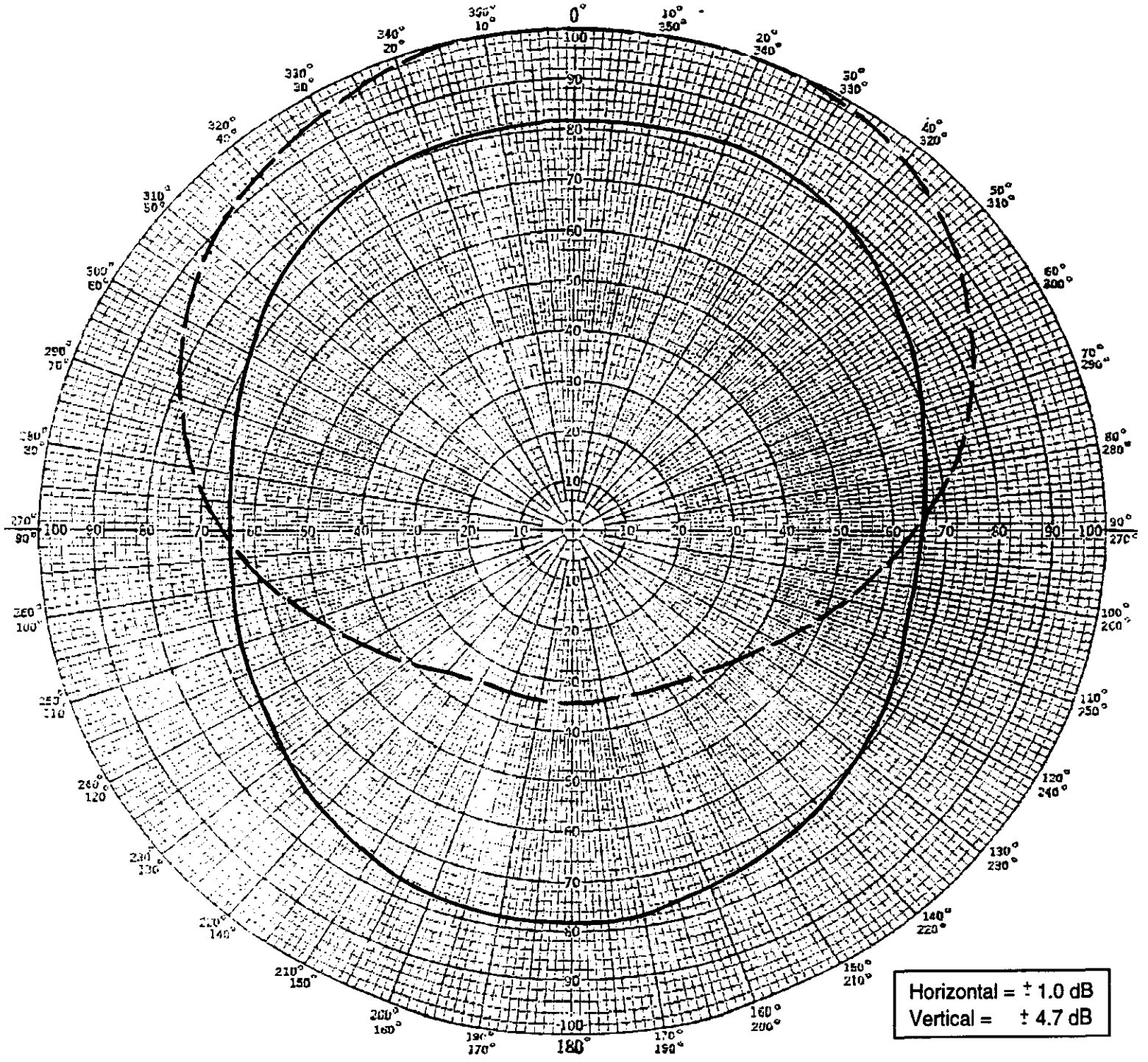
Dated: July 30, 1999

Herman E. Hurst, Jr.

SHIVELY LABORATORIES

PROJECT NAME _____ ANTENNA TYPE 6812

PROJECT NUMBER 601 DATE 5-21-83 PATTERN TYPE AZIMUTH



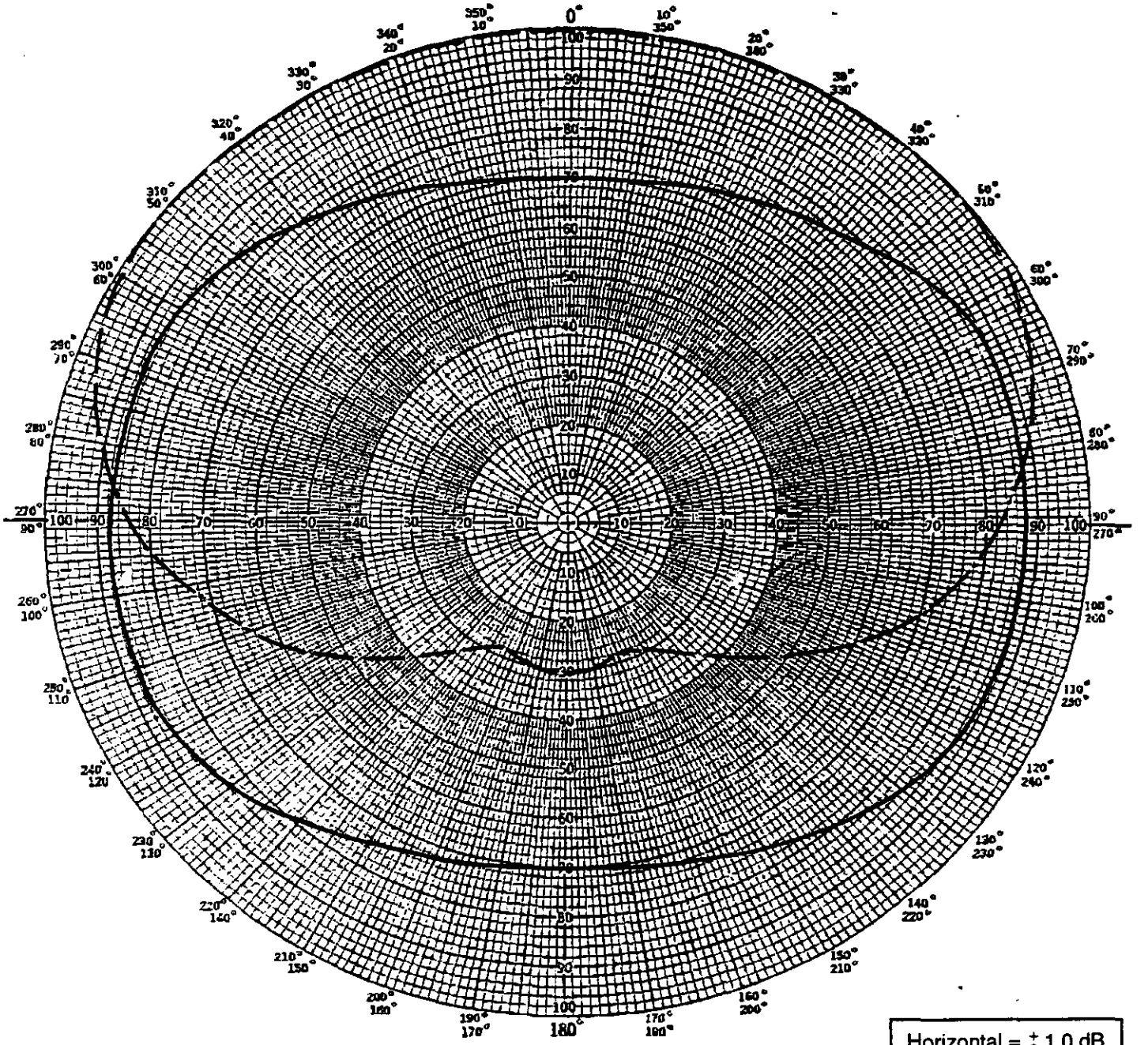
MODEL (X) FULL SCALE ( ) FREQUENCY 405.45

POLARIZATION HORIZ (——); VERT (----)

CURVE PLOTTED IN: VOLTAGE (X) POWER( ) DB( )

OBSERVER DRS

REMARKS: Mounted on a pole



Horizontal = ± 1.0 dB
Vertical = ± 5.5 dB

Shively Labs

PROJECT NAME Sample Pole Mount

PROJECT NUMBER SAMPLE DATE 8/29/96

MODEL (X) FULL SCALE ( ) FREQUENCY 98.0 MHz (441 range)

POLARIZATION HORIZ. (——): VERT. (---)

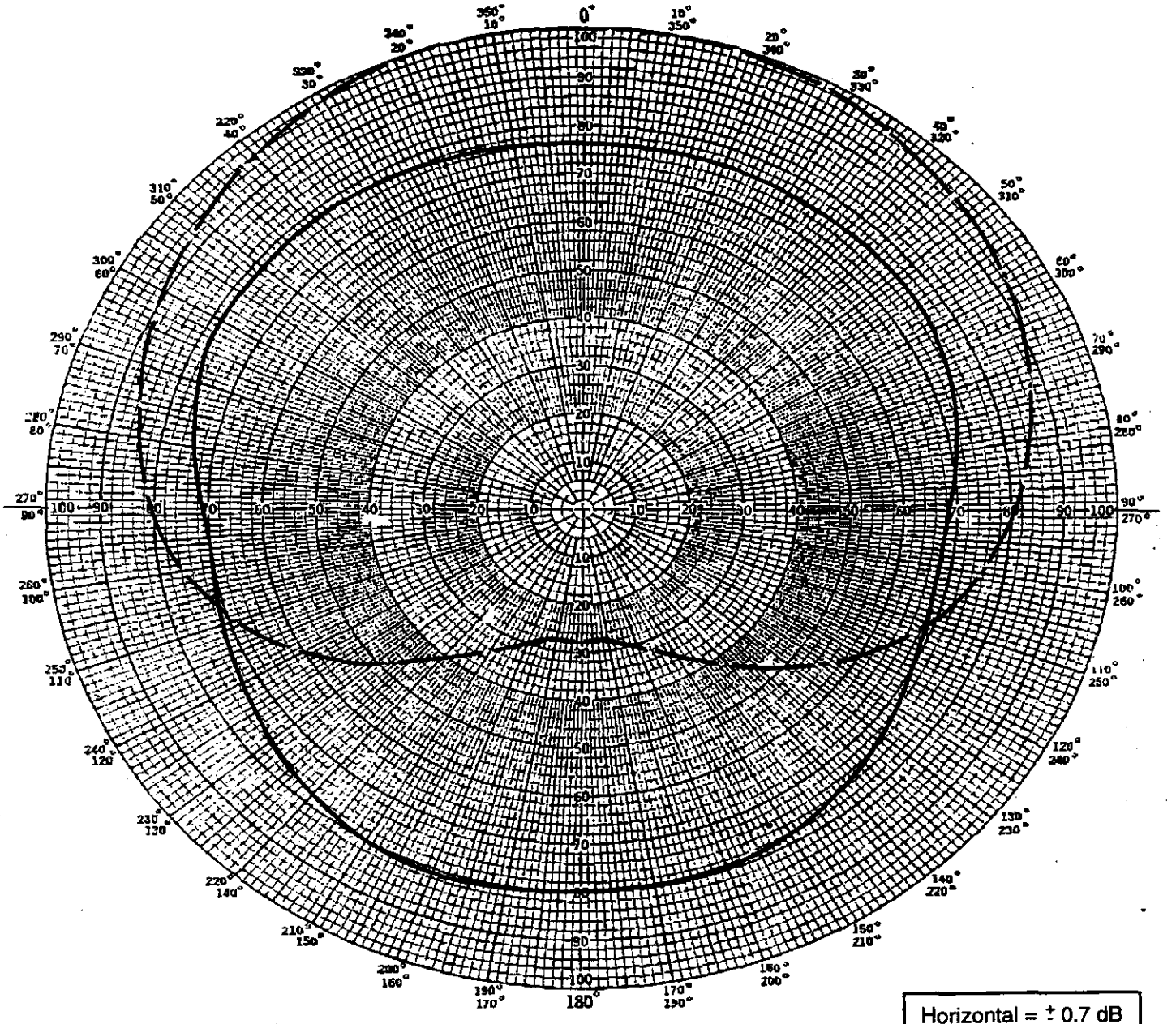
CURVE PLOTTED IN: VOLTAGE (X) POWER( ) DB( )

OBSERVER PAR (Relative Field)

ANTENNA TYPE 6810

PATTERN TYPE Omnidirectional with pole effects

REMARKS: Pole has a 6" diameter. Antenna is mounted 23" out from the pole. This is a sample only, varying the mounting, frequency antenna model or pole model will cause variations from this pattern.



Horizontal = ± 0.7 dB
Vertical = ± 5.6 dB

Shively Labs

PROJECT NAME Sample Pole Mount

PROJECT NUMBER SAMPLE DATE 8/29/96

MODEL (X) FULL SCALE ( ) FREQUENCY 98.0 MHz (441 range)

POLARIZATION HORIZ. (——); VERT. (- - -)
(Relative Field)

CURVE PLOTTED IN: VOLTAGE (X) POWER( ) DB( )

OBSERVER PAR

ANTENNA TYPE 6813

PATTERN TYPE Omnidirectional with pole effects

REMARKS: Pole has a 12" diameter. Antenna is mounted 20" out from the pole. This is a sample only, varying the mounting, frequency antenna model or pole model will cause variations from this pattern.

APPENDIX C

LISTING OF UNAUTHORIZED BROADCAST OPERATIONS

LIST OF FCC NEWS RELEASES REGARDING UNLICENSED RADIO STATIONS

1. *News Release*, Report No. CI 98-8 (May 5, 1998) (unlicensed radio station in Detroit);

2. *News Release*, Report No. G 98-10 (June 17, 1998) (unlicensed broadcaster Stephen Dunifer);

3. *News Release*, Report No. CIB 98-10 (June 24, 1998) (unlicensed radio station in Philadelphia);

4. *News Release*, Report No. CI 98-11 (July 7, 1998) (Howell Township, New Jersey pirate radio operator);

5. *News Release*, Report No. CI 98-13 (August 18, 1998) (15 unlicensed radio stations in Miami area);

6. *News Release*, Report No. CI 98-15 (August 28, 1998) (four unlicensed radio stations in Cleveland);

7. *News Release*, Report No. CI 98-20 (November 9, 1998) (unlicensed radio station in Pittsburgh);

8. *News Release*, Report No. CI 98-18 (September 29, 1998) (unlicensed radio station in Memphis);

9. *News Release*, Report No. CI 98-19 (October 16, 1998) (unlicensed radio station in Detroit);

10. *News Release*, Report No. CI 98-29 (December 11, 1998) (unlicensed radio station in Gainesville, Florida);

11. *News Release*, Report No. CI 98-30 (December 16, 1998) (19 unlicensed radio stations in Miami area);

12. *News Release*, Report No. CI 99-5 (February 5, 1999) (unlicensed radio station in Greenwood, South Carolina);

13. *News Release*, Report No. CI 99-6 (February 8, 1999) (unlicensed radio station in Palm Beach Gardens, Florida);

14. *News Release*, Report No. CI 99-7 (February 16, 1999) (unlicensed radio station in Milwaukee, Wisconsin);

15. *News Release*, Report No. CI 99-8 (February 18, 1999) (unlicensed radio station in Oakland Park, Florida);

16. *News Release*, Report No. CI 99-9 (February 23, 1999) (unlicensed radio station in Howell, Michigan);

17. *News Release*, Report No. CI 99-10 (February 24, 1999) (unlicensed radio station in Bronx, New York);

18. *News Release*, Report No. CI 99-12 (March 4, 1999) (unlicensed radio station in Canyon Lake, Texas);

19. *News Release*, Report No. CI 99-17 (April 28, 1999) (unlicensed radio station in Brooklyn, New York);

20. *News Release*, Report No. CI 99-18 (April 30, 1999) (unlicensed radio station in Houston); and

21. *News Release*, Report No. CI 99-21 (May 7, 1999) (unlicensed radio station in Grand Rapids, Michigan).

CERTIFICATE OF SERVICE

I, Barbara Lyle, a secretary in the law firm of Fletcher, Heald & Hildreth, P.L.C., hereby certify that on this 2nd day of August, 1999, copies of the foregoing "Comments of Salem Communications Corporation" were hand delivered to the following:

The Honorable William E. Kennard
Chairman
Federal Communications Commission
The Portals II
445 12th Street, S.W., Room 8-B201
Washington, DC 20554

The Honorable Susan Ness
Federal Communications Commission
The Portals II
445 12th Street, S.W., Room 8-B115
Washington, DC 20554

The Honorable Harold Furchtgott-Roth
Federal Communications Commission
The Portals II
445 12th Street, S.W., Room 8-A302
Washington, DC 20554

The Honorable Michael K. Powell
Federal Communications Commission
The Portals II
445 12th Street, S.W., Room 8-A204
Washington, DC 20554

The Honorable Gloria Tristani
Federal Communications Commission
The Portals II
445 12th Street, S.W., Room 8-C302
Washington, DC 20554

Barbara Lyle

Barbara Lyle