

Frequency Analysis for FM Channels at NAS El Centro Test Site

The standards used to develop the spacing among various classes of FM facilities with various frequency separations which are shown in Tables A, B, and C of 47CFR73.207 provide for a protected contour for each class of station and an interfering contour from other stations of various classes and frequency separations. The spacings assume uniform circular contours based on maximum height for full power operation of each class of station. The protected contours and allowable interfering signals are given in 47CFR73.215(a)(1) and (2) for Table A, in the "Working Arrangement for the Allotment and Assignment of FM Broadcasting Channels ..." between the USA and Canada for Table B, and in the "Agreement between the Government of the United States of America and the Government of the United Mexican States..." for Table C.

In each spacing requirement the minimum distance between two FM stations or allotments is determined by the "worst case" interference condition - that is, the greater of the two spacing requirements to avoid interference to either the "aggressor" or "victim" station/allotment.

In the present instance, the proposed test facilities to be operated on behalf of Spawar are with an FM antenna producing 1500 watts ERP, and at an antenna height of 50 feet (15.2 meters). This operation does not correspond with any of the classes of FM stations defined in 47CFR73.210. In addition, since the operation is for experimental operation for the test and evaluation of Psyop equipment, there is no need to provide protection to the test facility operation, only to prevent interference from the test facility to the operation of authorized FM stations.

The average terrain for the 3 to 16 kilometer portions of the 8 cardinal radials from the site has been calculated. The elevation of the transmitting antenna above the average of the 8 radials is 7.4 meters.

The required distances for protection of existing operating facilities have therefore been calculated for an ERP of 1500 watts (1.76 dBk) at an elevation of 30 meters, the lowest value in the propagation curves specified by FCC at 47CFR73.333 Figures 1 and 1a.

The protected contour distances for the various classes of US FM stations are:

Class	Distance, km.	Protected Contour dBuV/m
A	28.3	60
B1	44.7	57
B	65.1	54
C3	39.1	60
C2	52.2	60
C1	72.3	60
C0	83.4	60
C	91.8	60

The F(50,10) contour distances for the proposed experimental operation are:

Field, dBuV/m	Distance, km	
40	41.3)	
37 (B1)	53.6)	Co-channel protection to various classes
34 (B)	68.5)	
54	15.4)	
51 (B1)	19.7)	1 st adjacent channel protection to various classes
48 (B)	23.6)	
100	1.6)	
97 (B1)	1.6)	2 nd and 3 rd adjacent channel protection to various classes
94 (B)	1.6)	

The required protection distance to avoid interference to an existing operating FM facility is therefore the sum of the protected contour and the protection requirement for each case.

The El Centro NAS test site used by Spawar is located outside the USA/Canada coordination zone. It is, however, located well within the USA/Mexico coordination zone. Therefore separation requirements to Mexican authorizations (assignments and allotments) have been determined as though the proposed experimental operation is a full facilities class A (3 kW) operation.

The resulting domestic separation requirements for various classes of stations from the proposed "X1" class operation are:

Class of Protected Station	co-channel	1 st adj	2 nd & 3 rd adj
A	70	44	30
B1	98	64	46
B	134	89	67
C3	80	55	41
C2	94	68	54
C1	114	88	74
C0	125	99	85
C	133	107	93

The separations shown in the following channel studies are based on these separations, which have been rounded to the nearest whole kilometer, per normal FCC practice.

Therefore the proposed experimental operation at the SpaWar El Control NAS test site location will not result in interference to any authorized FM broadcast station in the U.S., or any authorized assignment or allotment in Mexico. The only operating FM translator within 100 km and +/- 3 channels of the proposed channels is at a distance of 68 km, and is 3rd adjacent to channel 228.