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**ENGINEERING REPORT**

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**San Jose, CA, Channel 224D Minor Modification**

**ENGINEERING STATEMENT**

All required protections are met by contour non-overlap pursuant to Section 74.1204, with the exception of protection to WSJO, San Jose, CA 222B. WSJO is protected, as discussed below.

**PROTECTION TO WSJO**

WSJO, San Jose, CA, 222B, is second adjacent-channel to the proposed channel 224D facility and is located only 6 kilometers (at 93 degrees True bearing) from the proposed 224D transmitter site. The 54 dBu F50,50 service contour extends beyond the proposed 224D transmitter site. Using the well-established *Living Way Ministries* Methodology, no actual interference to any population is predicted to exist to WSJO.

Note that a rule waiver of Section 74.1204 for this second/third adjacent-channel protection using the well-established *Living Way Ministries* Methodology is respectfully requested if such a rule waiver is deemed necessary for protection to this station.

The F50,50 signal strength from WSJO at the proposed 224D transmitter site is greater than 100 dBu (the "desired" signal). The second/third adjacent-channel protection of Section 74.1204 is an undesired-to-desired ("U/D") dB signal strength ratio of 40:1. Therefore, predicted interference to WSJO from the proposed 224D facility is a signal of greater than or equal to 140 dBu.

Figure EE1 is the vertical plane relative field pattern for the proposed Scala one-bay CA2-FM/CP antenna. By adjusting for the vertical plane downward relative field values of the proposed antenna, it is herein demonstrated that the 140 dBu interfering signal (using a free space field determination) does not exist at any point a ground level. (Actually, the study is made to 2 meters above ground level to account for a person's height. Note that the maximum distance of the 140 dBu FSL signal of the translator extends to 12 meters from the antenna.)

Attached as Figure EE2 is a tabulation of various points (at 2 meters above ground level) from the proposed translator tower base. (Column B is the different distances from the tower base to each studied point.) The actual distance from the antenna to each point is listed in Column C, the hypotenuse of the vertical height (Column A) and the horizontal distance (Column B). Also, the vertical distance from the antenna bottom to the calculated interference signal for each studied point is provided in Column K. Because the calculated distance to the free space interfering signal (Column J) is less than the hypotenuse distance (Column C) and the interfering signal vertical distance (Column K) is less than the vertical distance (Column A) for each studied point, the interfering signal does not reach any studied point. (In other words, the interfering signal does not make it to 2 meters any point.) The clearance shown by Figure EE2 is at least 8 meters in all instances. Since there are no tall buildings within the worst-case study distance of 12 meters of the transmitter site, pursuant to Section 74.1204(d) of the FCC Rules, WSJO is adequately protected by the proposed facility.

**FIGURE EE1 - Proposed Vertical Plane Pattern**

Antenna: CA2-FM/CP

10-25-2016

Frequency: 93 MHz

Polarization: Circular

Depression Angle	Field	Rel.dB	dBd	Pwr Gain
0	1.000	0.0	1.0	1.259
1	0.998	-0.0	1.0	1.259
2	0.996	-0.0	1.0	1.259
3	0.994	-0.1	0.9	1.230
4	0.992	-0.1	0.9	1.230
5	0.990	-0.1	0.9	1.230
6	0.988	-0.1	0.9	1.230
7	0.986	-0.1	0.9	1.230
8	0.984	-0.1	0.9	1.230
9	0.981	-0.2	0.8	1.202
10	0.979	-0.2	0.8	1.202
11	0.974	-0.2	0.8	1.202
12	0.969	-0.3	0.7	1.175
13	0.963	-0.3	0.7	1.175
14	0.958	-0.4	0.6	1.148
15	0.952	-0.4	0.6	1.148
16	0.946	-0.5	0.5	1.122
17	0.939	-0.5	0.5	1.122
18	0.933	-0.6	0.4	1.096
19	0.927	-0.7	0.3	1.072
20	0.920	-0.7	0.3	1.072
21	0.911	-0.8	0.2	1.047
22	0.903	-0.9	0.1	1.023
23	0.894	-1.0	0.0	1.000
24	0.885	-1.1	-0.1	0.977
25	0.877	-1.1	-0.1	0.977
26	0.867	-1.2	-0.2	0.955
27	0.858	-1.3	-0.3	0.933
28	0.848	-1.4	-0.4	0.912
29	0.839	-1.5	-0.5	0.891
30	0.829	-1.6	-0.6	0.871
31	0.818	-1.7	-0.7	0.851
32	0.806	-1.9	-0.9	0.813
33	0.795	-2.0	-1.0	0.794
34	0.783	-2.1	-1.1	0.776
35	0.772	-2.3	-1.3	0.741
36	0.760	-2.4	-1.4	0.724
37	0.749	-2.5	-1.5	0.708
38	0.738	-2.6	-1.6	0.692
39	0.726	-2.8	-1.8	0.661
40	0.715	-2.9	-1.9	0.646
41	0.701	-3.1	-2.1	0.617

42	0.688	-3.3	-2.3	0.589
43	0.674	-3.4	-2.4	0.575
44	0.660	-3.6	-2.6	0.550
45	0.647	-3.8	-2.8	0.525
46	0.631	-4.0	-3.0	0.501
47	0.616	-4.2	-3.2	0.479
48	0.601	-4.4	-3.4	0.457
49	0.585	-4.7	-3.7	0.427
50	0.570	-4.9	-3.9	0.407
51	0.553	-5.1	-4.1	0.389
52	0.537	-5.4	-4.4	0.363
53	0.520	-5.7	-4.7	0.339
54	0.503	-6.0	-5.0	0.316
55	0.487	-6.3	-5.3	0.295
56	0.467	-6.6	-5.6	0.275
57	0.447	-7.0	-6.0	0.251
58	0.428	-7.4	-6.4	0.229
59	0.408	-7.8	-6.8	0.209
60	0.388	-8.2	-7.2	0.191
61	0.369	-8.7	-7.7	0.170
62	0.350	-9.1	-8.1	0.155
63	0.330	-9.6	-8.6	0.138
64	0.311	-10.1	-9.1	0.123
65	0.292	-10.7	-9.7	0.107
66	0.271	-11.4	-10.4	0.091
67	0.250	-12.1	-11.1	0.078
68	0.229	-12.8	-11.8	0.066
69	0.208	-13.7	-12.7	0.054
70	0.187	-14.6	-13.6	0.044
71	0.168	-15.5	-14.5	0.035
72	0.150	-16.5	-15.5	0.028
73	0.132	-17.6	-16.6	0.022
74	0.113	-18.9	-17.9	0.016
75	0.095	-20.4	-19.4	0.011
76	0.085	-21.4	-20.4	0.009
77	0.075	-22.5	-21.5	0.007
78	0.065	-23.7	-22.7	0.005
79	0.055	-25.2	-24.2	0.004
80	0.045	-26.9	-25.9	0.003
81	0.042	-27.5	-26.5	0.002
82	0.040	-28.0	-27.0	0.002
83	0.037	-28.6	-27.6	0.002
84	0.034	-29.3	-28.3	0.001
85	0.032	-30.0	-29.0	0.001
86	0.031	-30.1	-29.1	0.001
87	0.031	-30.2	-29.2	0.001
88	0.031	-30.3	-29.3	0.001
89	0.030	-30.4	-29.4	0.001
90	0.030	-30.5	-29.5	0.001

## FIGURE EE2

### FREE SPACE FIELD STRENGTH AT A DISTANCE STUDY RESULTS

PROJECT: SAN JOSE, CA, CHANNEL 224D

25-Oct-16

Column A	Column B	Column C	Column D	Column E	Column F	Column G	Column H	Column I	Column J	Column K	
Vert Dist From Ant Bottom	Horiz Dist From Tower Base	Hypot- enuse Dist fr Ant Bottom	Down- ward Angle fr Ant Bottom	Max ERP	Max ERP	Pattern Relative Field at Down- ward Angle	Free Space Inter- ferring Signal (dBu)	Adjusted ERP in Down- ward Angle (dBmW)	Interf Distance along Hypot- enuse (meters)	Vert Interf Distance below Antenna (meters)	
1	13	0.1	13.0	<a href="#">89.6</a>	250	<a href="#">53.98</a>	0.030	140.0	<a href="#">23.52</a>	0.3	<a href="#">0.3</a>
2	13	1	13.0	<a href="#">85.6</a>	250	<a href="#">53.98</a>	0.032	140.0	<a href="#">24.08</a>	0.4	<a href="#">0.4</a>
3	13	2	13.2	<a href="#">81.3</a>	250	<a href="#">53.98</a>	0.042	140.0	<a href="#">26.44</a>	0.5	<a href="#">0.5</a>
4	13	3	13.3	<a href="#">77.0</a>	250	<a href="#">53.98</a>	0.075	140.0	<a href="#">31.48</a>	0.8	<a href="#">0.8</a>
5	13	4	13.6	<a href="#">72.9</a>	250	<a href="#">53.98</a>	0.150	140.0	<a href="#">37.50</a>	1.7	<a href="#">1.6</a>
6	13	5	13.9	<a href="#">69.0</a>	250	<a href="#">53.98</a>	0.208	140.0	<a href="#">40.34</a>	2.3	<a href="#">2.2</a>
7	13	6	14.3	<a href="#">65.2</a>	250	<a href="#">53.98</a>	0.292	140.0	<a href="#">43.29</a>	3.2	<a href="#">3.0</a>
8	13	7	14.8	<a href="#">61.7</a>	250	<a href="#">53.98</a>	0.369	140.0	<a href="#">45.32</a>	4.1	<a href="#">3.6</a>
9	13	8	15.3	<a href="#">58.4</a>	250	<a href="#">53.98</a>	0.428	140.0	<a href="#">46.61</a>	4.8	<a href="#">4.1</a>
10	13	9	15.8	<a href="#">55.3</a>	250	<a href="#">53.98</a>	0.487	140.0	<a href="#">47.73</a>	5.4	<a href="#">4.5</a>
11	13	10	16.4	<a href="#">52.4</a>	250	<a href="#">53.98</a>	0.537	140.0	<a href="#">48.58</a>	6.0	<a href="#">4.7</a>
12	13	11	17.0	<a href="#">49.8</a>	250	<a href="#">53.98</a>	0.585	140.0	<a href="#">49.32</a>	6.5	<a href="#">5.0</a>
13	13	12	17.7	<a href="#">47.3</a>	250	<a href="#">53.98</a>	0.616	140.0	<a href="#">49.77</a>	6.9	<a href="#">5.0</a>

NOTE: Study point at 2 meters above ground (or rooftop, see write-up) level.

**RESULTS: COLUMN J DISTANCES ARE LESS THAN COLUMN C AND COLUMN K DISTANCES ARE LESS THAN COLUMN A DISTANCES IN ALL INSTANCES; THEREFORE, INTERFERRING SIGNAL DOES NOT EXIST AT ANY LOCATION (TWO METERS OR LESS ABOVE GROUND LEVEL).**



Google Earth

