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ENGINEERING REPORT

K237GS, Houston, TX, Channel 235D Minor Mod

ENGINEERING STATEMENT

PROTECTION TO KTBZ-FM

All contour non-overlap protection requirements are met with the exception of KTBZ-FM, Houston, TX (233C), discussed below.

KTBZ-FM (41.6 kilometers at 181 degrees True) is second adjacent-channel to the proposed channel 235D facility. The 60 dBu F50,50 service contour of KTBZ-FM extends well beyond the proposed 235D transmitter site. Using the well-established *Living Way Ministries* Methodology, no actual interference to any population is predicted to exist to KTBZ-FM.

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 any station.

The F50,50 signal strength from KTBZ-FM at the proposed 235D transmitter site is at least 81 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 KTBZ-FM from the proposed 235D facility is a signal of greater than or equal to 121 dBu.

Figure EE1 is the vertical plane relative field pattern for the proposed Scala CL-FM(H) single-bay antenna. By adjusting for the vertical plane downward relative field values of the proposed antenna, it is herein demonstrated that the 121 dBu interfering signal (using a free space field determination) does not exist at any point at ground level. (Actually, the study is made to 2 meters above ground level to account for a person’s height.)

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 is at least 28 meters. Therefore, pursuant to Section 74.1204(d) of the FCC Rules, KTBZ-FM is adequately protected by the proposed facility.

FIGURE EE1 (Page 1 of 2)

Antenna: CL-FM

Vertical Polarization (**Vertical Pattern** for H-Pol Antenna)

Azimuth	Field	Rel.dB	dBd	Pwr Gain
0	1.000	0.0	7.0	5.012
1	0.998	-0.0	7.0	5.012
2	0.997	-0.0	7.0	5.012
3	0.996	-0.0	7.0	5.012
4	0.995	-0.0	7.0	5.012
5	0.993	-0.1	6.9	4.898
6	0.991	-0.1	6.9	4.898
7	0.988	-0.1	6.9	4.898
8	0.985	-0.1	6.9	4.898
9	0.982	-0.2	6.8	4.786
10	0.980	-0.2	6.8	4.786
11	0.975	-0.2	6.8	4.786
12	0.969	-0.3	6.7	4.677
13	0.964	-0.3	6.7	4.677
14	0.958	-0.4	6.6	4.571
15	0.952	-0.4	6.6	4.571
16	0.946	-0.5	6.5	4.467
17	0.938	-0.6	6.4	4.365
18	0.931	-0.6	6.4	4.365
19	0.923	-0.7	6.3	4.266
20	0.916	-0.8	6.2	4.169
21	0.908	-0.8	6.2	4.169
22	0.899	-0.9	6.1	4.074
23	0.890	-1.0	6.0	3.981
24	0.882	-1.1	5.9	3.890
25	0.873	-1.2	5.8	3.802
26	0.862	-1.3	5.7	3.715
27	0.851	-1.4	5.6	3.631
28	0.840	-1.5	5.5	3.548
29	0.829	-1.6	5.4	3.467
30	0.817	-1.8	5.2	3.311
31	0.806	-1.9	5.1	3.236
32	0.793	-2.0	5.0	3.162
33	0.781	-2.2	4.8	3.020
34	0.767	-2.3	4.7	2.951
35	0.756	-2.4	4.6	2.884
36	0.742	-2.6	4.4	2.754
37	0.729	-2.7	4.3	2.692
38	0.716	-2.9	4.1	2.570
39	0.704	-3.1	3.9	2.455
40	0.690	-3.2	3.8	2.399
41	0.675	-3.4	3.6	2.291
42	0.661	-3.6	3.4	2.188
43	0.646	-3.8	3.2	2.089
44	0.632	-4.0	3.0	1.995
45	0.618	-4.2	2.8	1.905

FIGURE EE1 (Page 2 of 2)

Antenna: CL-FM

Vertical Polarization (**Vertical Pattern** for H-Pol Antenna)

Azimuth	Field	Rel.dB	dBd	Pwr Gain
46	0.602	-4.4	2.6	1.820
47	0.588	-4.6	2.4	1.738
48	0.573	-4.8	2.2	1.660
49	0.558	-5.1	1.9	1.549
50	0.544	-5.3	1.7	1.479
51	0.528	-5.5	1.5	1.413
52	0.513	-5.8	1.2	1.318
53	0.498	-6.1	0.9	1.230
54	0.483	-6.3	0.7	1.175
55	0.467	-6.6	0.4	1.096
56	0.452	-6.9	0.1	1.023
57	0.436	-7.2	-0.2	0.955
58	0.421	-7.5	-0.5	0.891
59	0.405	-7.8	-0.8	0.832
60	0.390	-8.2	-1.2	0.759
61	0.372	-8.6	-1.6	0.692
62	0.354	-9.0	-2.0	0.631
63	0.336	-9.5	-2.5	0.562
64	0.318	-10.0	-3.0	0.501
65	0.300	-10.5	-3.5	0.447
66	0.278	-11.1	-4.1	0.389
67	0.256	-11.8	-4.8	0.331
68	0.234	-12.6	-5.6	0.275
69	0.212	-13.5	-6.5	0.224
70	0.190	-14.4	-7.4	0.182
71	0.174	-15.2	-8.2	0.151
72	0.158	-16.0	-9.0	0.126
73	0.142	-17.0	-10.0	0.100
74	0.126	-18.0	-11.0	0.079
75	0.110	-19.2	-12.2	0.060
76	0.098	-20.2	-13.2	0.048
77	0.086	-21.3	-14.3	0.037
78	0.074	-22.6	-15.6	0.028
79	0.062	-24.2	-17.2	0.019
80	0.050	-26.0	-19.0	0.013
81	0.046	-26.7	-19.7	0.011
82	0.042	-27.5	-20.5	0.009
83	0.038	-28.4	-21.4	0.007
84	0.034	-29.4	-22.4	0.006
85	0.030	-30.5	-23.5	0.004
86	0.030	-30.5	-23.5	0.004
87	0.030	-30.5	-23.5	0.004
88	0.030	-30.5	-23.5	0.004
89	0.030	-30.5	-23.5	0.004
90	0.030	-30.5	-23.5	0.004

FIGURE EE2
FREE SPACE FIELD STRENGTH AT A DISTANCE STUDY RESULTS

PROJECT: HOUSTON, TX, CHANNEL 235D

8-Aug-17

Pt	Column A Vert Dist From Ant Bottom (meters)	Column B Horiz Dist From Tower Base (meters)	Column C Hypot-enuse Dist fr Ant Bottom (meters)	Column D Down-ward Angle fr Ant Bottom (degrees)	Column E Max ERP (watts)	Column F Max ERP (dBmw)	Column G Pattern Relative Field at Down-ward Angle	Column H Free Space Inter-ferring Signal (dBu)	Column I Adjusted ERP in Down-ward Angle (dBmW)	Column J Interf Distance along Hypot-enuse (meters)	Column K **Vert Interf Distance below Antenna (meters)**
1	72	0.1	**72.0**	89.9	250	53.98	0.030	121.0	23.52	3.0	3.0
2	72	10	**72.7**	82.1	250	53.98	0.042	121.0	26.44	4.2	4.1
3	72	20	**74.7**	74.5	250	53.98	0.126	121.0	35.99	12.5	12.0
4	72	25	**76.2**	70.9	250	53.98	0.190	121.0	39.55	18.8	17.8
5	72	30	**78.0**	67.4	250	53.98	0.256	121.0	42.14	25.4	23.4
6	72	35	**80.1**	64.1	250	53.98	0.318	121.0	44.03	31.5	28.4
7	72	40	**82.4**	60.9	250	53.98	0.390	121.0	45.80	38.7	33.8
8	72	45	**84.9**	58.0	250	53.98	0.421	121.0	46.47	41.8	35.4
9	72	50	**87.7**	55.2	250	53.98	0.467	121.0	47.37	46.3	38.0
10	72	55	**90.6**	52.6	250	53.98	0.513	121.0	48.18	50.9	40.4
11	72	60	**93.7**	50.2	250	53.98	0.544	121.0	48.69	54.0	41.5
12	72	70	**100.4**	45.8	250	53.98	0.618	121.0	49.80	61.3	44.0
13	72	80	**107.6**	42.0	250	53.98	0.661	121.0	50.38	65.6	43.9
14	72	90	**115.3**	38.7	250	53.98	0.716	121.0	51.08	71.0	44.4
15	72	100	**123.2**	35.8	250	53.98	0.756	121.0	51.55	75.0	43.8

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)

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