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ENGINEERING REPORT

W237CD, Harrisville, NJ, Channel 237D Minor Change

ENGINEERING STATEMENT

For this channel 237D proposal, all required protections are met by contour non-overlap pursuant to Section 74.1204, with the exception of protection to WDSD Dover, DE (234B). (Note that WBEN-FM, Philadelphia, PA 239B is protected by non-contour overlap even with its 54 dBu F50,50 contour coming within 400 meters to the north of the proposed 237D site.) WDSD is protected, as discussed below.

PROTECTION TO WDSD

WDSD (234B) is a third adjacent-channel station to the proposed channel 237D translator facility. The 54 F50,50 service contour of WDSD extends beyond the 237D transmitter site. Using the well-established *Living Way Ministries* Methodology, no actual interference to any residential population is predicted to exist to WDSD.

Note that a rule waiver of Section 74.1204 for this second and 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.

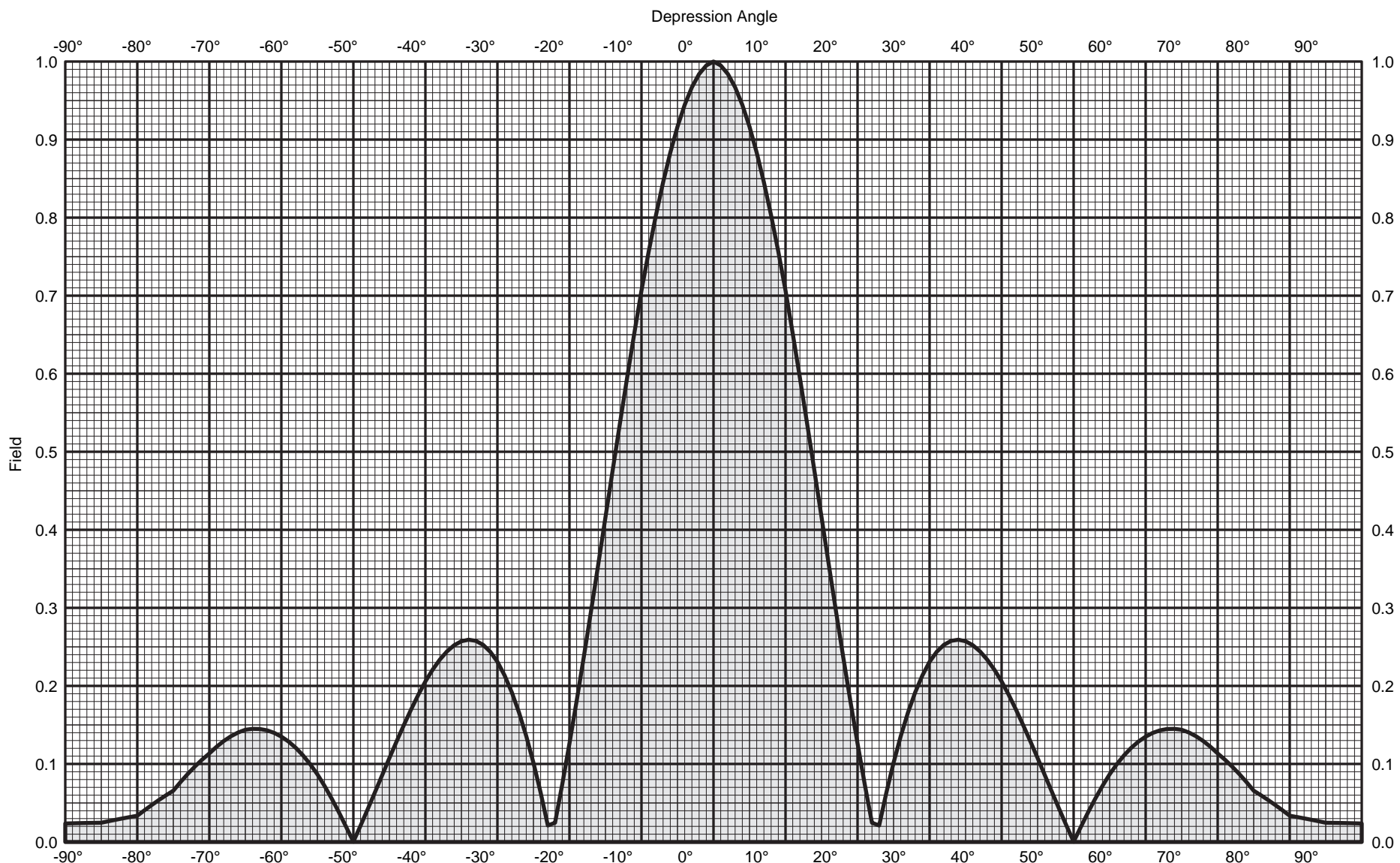
The F50,50 signal strength from WDSD at the proposed 237D transmitter site is greater than 65.5 dBu (the “desired” signal). The second/third adjacent-channel protection is an undesired-to-desired (“U/D”) dB signal strength ratio of 40:1. Therefore, predicted interference to WDSD is a 237D signal of greater than or equal to 105.5 dBu.

Figure EE1 is the vertical plane relative field pattern for the proposed Scala CA2-FM/CP three-bay (0.87 wavelength-spaced) antenna. By adjusting for the vertical plane downward relative field values of the proposed antenna, it is herein demonstrated that the 105.5 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.)

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 center 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 5 meters at locations within the 105.5 dBu FSL Contour (shown on the attached Aerial Radial) for points at least 50 meters away from the base of the antenna. Any buildings located within the 105.5 dBu FSL contour are protected from interference based on the 5 meter clearance (7 meters above ground level)—such building have no more than two floors of public access. All buildings within 50 meters of the tower are single floor buildings—the 1.7 meter clearance (3.7 meters above ground level) are also protected. Therefore, pursuant to Section 74.1204(d) of the FCC Rules, WDSD is adequately protected by the proposed facility.

FIGURE EE1 (1 of 3)



Three CA2-FM/CP yagis

Maximum array gain: 4.9 dBd (x 3.09)

Circular polarization

Vertical stack at 0.87 wavelength

Vertical plane pattern



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Vertical plane pattern

Maximum array gain: 4.9 dBd (x 3.09)

Circular polarization

Vertical stack at 0.87 wavelength

Angle	Field	Rel.dB	dBd	PwrMult	Angle	Field	Rel.dB	dBd	PwrMult
-90	0.024	-32.51	-27.61	0.00	-45	0.108	-19.37	-14.47	0.04
-89	0.024	-32.42	-27.52	0.00	-44	0.129	-17.80	-12.90	0.05
-88	0.024	-32.34	-27.44	0.00	-43	0.150	-16.50	-11.60	0.07
-87	0.024	-32.26	-27.36	0.00	-42	0.170	-15.42	-10.52	0.09
-86	0.025	-32.20	-27.30	0.00	-41	0.188	-14.50	-9.60	0.11
-85	0.025	-32.15	-27.25	0.00	-40	0.206	-13.73	-8.83	0.13
-84	0.027	-31.50	-26.60	0.00	-39	0.221	-13.12	-8.22	0.15
-83	0.028	-30.91	-26.01	0.00	-38	0.234	-12.63	-7.73	0.17
-82	0.030	-30.38	-25.48	0.00	-37	0.244	-12.24	-7.34	0.18
-81	0.032	-29.90	-25.00	0.00	-36	0.252	-11.97	-7.07	0.20
-80	0.034	-29.46	-24.56	0.00	-35	0.257	-11.79	-6.89	0.20
-79	0.041	-27.82	-22.92	0.01	-34	0.259	-11.73	-6.83	0.21
-78	0.047	-26.49	-21.59	0.01	-33	0.258	-11.78	-6.88	0.21
-77	0.054	-25.39	-20.49	0.01	-32	0.253	-11.95	-7.05	0.20
-76	0.060	-24.45	-19.55	0.01	-31	0.244	-12.26	-7.36	0.18
-75	0.066	-23.65	-18.75	0.01	-30	0.231	-12.73	-7.83	0.16
-74	0.077	-22.30	-17.40	0.02	-29	0.213	-13.42	-8.52	0.14
-73	0.087	-21.20	-16.30	0.02	-28	0.192	-14.35	-9.45	0.11
-72	0.097	-20.29	-15.39	0.03	-27	0.166	-15.61	-10.71	0.08
-71	0.106	-19.53	-14.63	0.03	-26	0.136	-17.34	-12.44	0.06
-70	0.113	-18.90	-14.00	0.04	-25	0.102	-19.86	-14.96	0.03
-69	0.122	-18.28	-13.38	0.05	-24	0.063	-23.98	-19.08	0.01
-68	0.129	-17.77	-12.87	0.05	-23	0.021	-33.50	-28.60	0.00
-67	0.135	-17.36	-12.46	0.06	-22	0.025	-32.16	-27.26	0.00
-66	0.140	-17.06	-12.16	0.06	-21	0.074	-22.63	-17.73	0.02
-65	0.144	-16.85	-11.95	0.06	-20	0.126	-17.98	-13.08	0.05
-64	0.145	-16.77	-11.87	0.06	-19	0.181	-14.86	-9.96	0.10
-63	0.145	-16.79	-11.89	0.06	-18	0.238	-12.49	-7.59	0.17
-62	0.143	-16.89	-11.99	0.06	-17	0.296	-10.57	-5.67	0.27
-61	0.140	-17.09	-12.19	0.06	-16	0.356	-8.98	-4.08	0.39
-60	0.135	-17.39	-12.49	0.06	-15	0.416	-7.61	-2.71	0.54
-59	0.129	-17.81	-12.91	0.05	-14	0.476	-6.44	-1.54	0.70
-58	0.121	-18.37	-13.47	0.05	-13	0.536	-5.42	-0.52	0.89
-57	0.111	-19.09	-14.19	0.04	-12	0.595	-4.52	0.38	1.09
-56	0.100	-20.02	-15.12	0.03	-11	0.652	-3.72	1.18	1.31
-55	0.087	-21.23	-16.33	0.02	-10	0.707	-3.02	1.88	1.54
-54	0.072	-22.88	-17.98	0.02	-9	0.756	-2.43	2.47	1.77
-53	0.055	-25.12	-20.22	0.01	-8	0.803	-1.91	2.99	1.99
-52	0.038	-28.42	-23.52	0.00	-7	0.845	-1.46	3.44	2.21
-51	0.019	-34.31	-29.41	0.00	-6	0.883	-1.08	3.82	2.41
-50	0.010	-40.00	-35.10	0.00	-5	0.916	-0.76	4.14	2.60
-49	0.021	-33.55	-28.65	0.00	-4	0.944	-0.50	4.40	2.76
-48	0.042	-27.50	-22.60	0.01	-3	0.967	-0.29	4.61	2.89
-47	0.064	-23.90	-19.00	0.01	-2	0.984	-0.14	4.76	2.99
-46	0.086	-21.35	-16.45	0.02	-1	0.995	-0.04	4.86	3.06
					0	1.000	0.00	4.90	3.09



FIGURE EE1 (3 of 3)

Three CA2-FM/CP yagis

Vertical plane pattern

Maximum array gain: 4.9 dBd (x 3.09)

Circular polarization

Vertical stack at 0.87 wavelength

Angle	Field	Rel.dB	dBd	PwrMult	Angle	Field	Rel.dB	dBd	PwrMult
0	1.000	0.00	4.90	3.09	45	0.108	-19.37	-14.47	0.04
1	0.995	-0.04	4.86	3.06	46	0.086	-21.34	-16.44	0.02
2	0.984	-0.14	4.76	2.99	47	0.064	-23.90	-19.00	0.01
3	0.967	-0.29	4.61	2.89	48	0.042	-27.50	-22.60	0.01
4	0.945	-0.50	4.40	2.76	49	0.021	-33.55	-28.65	0.00
5	0.917	-0.76	4.14	2.60	50	0.010	-40.00	-35.10	0.00
6	0.883	-1.08	3.82	2.41	51	0.019	-34.32	-29.42	0.00
7	0.845	-1.46	3.44	2.21	52	0.038	-28.42	-23.52	0.00
8	0.803	-1.91	2.99	1.99	53	0.055	-25.12	-20.22	0.01
9	0.756	-2.43	2.47	1.77	54	0.072	-22.88	-17.98	0.02
10	0.707	-3.02	1.88	1.54	55	0.087	-21.23	-16.33	0.02
11	0.652	-3.72	1.18	1.31	56	0.100	-20.02	-15.12	0.03
12	0.595	-4.52	0.38	1.09	57	0.111	-19.09	-14.19	0.04
13	0.536	-5.42	-0.52	0.89	58	0.121	-18.37	-13.47	0.05
14	0.476	-6.44	-1.54	0.70	59	0.129	-17.81	-12.91	0.05
15	0.416	-7.61	-2.71	0.54	60	0.135	-17.39	-12.49	0.06
16	0.356	-8.98	-4.08	0.39	61	0.140	-17.09	-12.19	0.06
17	0.296	-10.57	-5.67	0.27	62	0.143	-16.89	-11.99	0.06
18	0.238	-12.48	-7.58	0.17	63	0.145	-16.79	-11.89	0.06
19	0.181	-14.86	-9.96	0.10	64	0.145	-16.77	-11.87	0.06
20	0.126	-17.98	-13.08	0.05	65	0.144	-16.85	-11.95	0.06
21	0.074	-22.63	-17.73	0.02	66	0.140	-17.06	-12.16	0.06
22	0.025	-32.16	-27.26	0.00	67	0.135	-17.36	-12.46	0.06
23	0.021	-33.51	-28.61	0.00	68	0.129	-17.77	-12.87	0.05
24	0.063	-23.98	-19.08	0.01	69	0.122	-18.28	-13.38	0.05
25	0.102	-19.86	-14.96	0.03	70	0.113	-18.90	-14.00	0.04
26	0.136	-17.34	-12.44	0.06	71	0.106	-19.53	-14.63	0.03
27	0.166	-15.61	-10.71	0.08	72	0.097	-20.29	-15.39	0.03
28	0.192	-14.35	-9.45	0.11	73	0.087	-21.20	-16.30	0.02
29	0.213	-13.42	-8.52	0.14	74	0.077	-22.30	-17.40	0.02
30	0.231	-12.73	-7.83	0.16	75	0.066	-23.65	-18.75	0.01
31	0.244	-12.26	-7.36	0.18	76	0.060	-24.45	-19.55	0.01
32	0.253	-11.95	-7.05	0.20	77	0.054	-25.39	-20.49	0.01
33	0.258	-11.78	-6.88	0.21	78	0.047	-26.49	-21.59	0.01
34	0.259	-11.73	-6.83	0.21	79	0.041	-27.82	-22.92	0.01
35	0.257	-11.79	-6.89	0.20	80	0.034	-29.46	-24.56	0.00
36	0.252	-11.97	-7.07	0.20	81	0.032	-29.90	-25.00	0.00
37	0.244	-12.24	-7.34	0.18	82	0.030	-30.38	-25.48	0.00
38	0.234	-12.63	-7.73	0.17	83	0.028	-30.91	-26.01	0.00
39	0.221	-13.12	-8.22	0.15	84	0.027	-31.50	-26.60	0.00
40	0.206	-13.73	-8.83	0.13	85	0.025	-32.15	-27.25	0.00
41	0.188	-14.50	-9.60	0.11	86	0.025	-32.20	-27.30	0.00
42	0.170	-15.42	-10.52	0.09	87	0.024	-32.26	-27.36	0.00
43	0.150	-16.50	-11.60	0.07	88	0.024	-32.34	-27.44	0.00
44	0.129	-17.80	-12.90	0.05	89	0.024	-32.42	-27.52	0.00
					90	0.024	-32.51	-27.61	0.00

FIGURE EE2

FREE SPACE FIELD STRENGTH AT A DISTANCE STUDY RESULTS

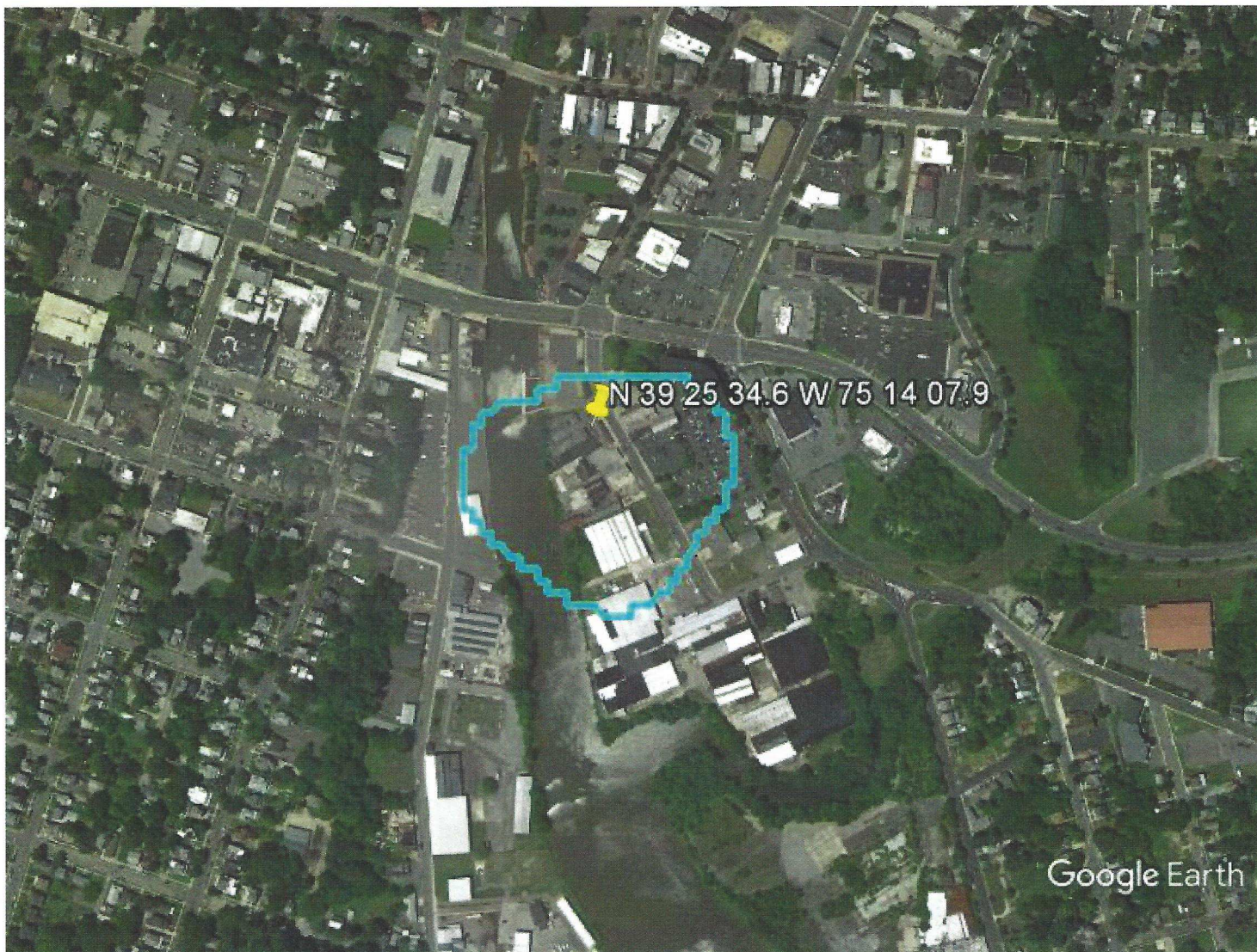
PROJECT: HARRISONVILLE, NJ, CHANNEL 237D

11-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	Horiz	Hypot-	Down-			Pattern	Free	Adjusted	Interf	Vert
	Dist	Dist	enuse	ward			Relative	Space	ERP in	Distance	Interf
	From	From	Dist	Angle			Field at	Inter-	Down-	along	Distance
	Ant	Tower	fr Ant	fr Ant	Max	Max	Down-	ferring	ward	Hypot-	below
	Bottom	Base	Bottom	Bottom	ERP	ERP	ward	Signal	Angle	enuse	Antenna
Pt	(meters)	(meters)	(meters)	(degrees)	(watts)	(dBmw)	Angle	(dBu)	(dBmW)	(meters)	(meters)
1	30	0.1	30.0	89.8	25	43.98	0.010	105.5	3.98	1.9	1.9
2	30	10	31.6	71.6	25	43.98	0.106	105.5	24.49	19.8	18.8
3	30	20	36.1	56.3	25	43.98	0.111	105.5	24.89	20.7	17.3
4	30	30	42.4	45.0	25	43.98	0.108	105.5	24.65	20.2	14.3
5	30	40	50.0	36.9	25	43.98	0.252	105.5	32.01	47.1	28.3
6	30	50	58.3	31.0	25	43.98	0.244	105.5	31.73	45.6	23.5
7	30	60	67.1	26.6	25	43.98	0.166	105.5	28.38	31.0	13.9
8	30	70	76.2	23.2	25	43.98	0.025	105.5	11.94	4.7	1.8
9	30	80	85.4	20.6	25	43.98	0.126	105.5	25.99	23.5	8.3
10	30	100	104.4	16.7	25	43.98	0.356	105.5	35.01	66.5	19.1
11	30	120	123.7	14.0	25	43.98	0.476	105.5	37.53	88.9	21.6
12	30	140	143.2	12.1	25	43.98	0.595	105.5	39.47	111.2	23.3
13	30	160	162.8	10.6	25	43.98	0.707	105.5	40.97	132.1	24.3
14	30	175	177.6	9.7	25	43.98	0.756	105.5	41.55	141.3	23.9
15	30	187	189.4	9.1	25	43.98	0.756	105.5	41.55	141.3	22.4

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

