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Engineering Statement in Regard to:

Post Detune System Inspection and Adjustment After Modification of a Telecommunications Structure in the Vicinity of an AM Broadcast Antenna

WILS (AM) 1320 kHz (DA2)
Lansing, MI

25.0 kW Daytime/1.9 kW Nighttime

Client: Crown Castle

Whitney RL (T-Mobile Colo on Crown Castle) 829077 - 577410

Report Generated: September 19, 2023
Report By: Ericka Endrikat
Report Reviewed By: Patrick Smith

Introduction

This engineering statement has been prepared for Crown Castle, an antenna support structure owner in wireless telecommunications services on behalf of T-Mobile a Federal Communications Commission ("FCC") licensee providing wireless telecommunication services. Crown Castle has contracted with Site Safe, LLC. ("Sitesafe"), an independent Radio Frequency (RF) regulatory and engineering consulting firm, to determine whether the modification of a telecommunications structure is in compliance with FCC Rules and Regulations for structures in the vicinity of AM broadcast stations. This determination is based on post detune system inspection and adjustment after modification of a telecommunications structure in the vicinity of an AM broadcast antenna.

T-Mobile has modified a Crown Castle base station antenna support structure known as "Whitney RL" (Site Number: 829077) on Crown Castle/T-Mobile Order 577410 in the vicinity of the antenna system for AM broadcast station WILS (see Figure 1). According to the Consolidated Database System ("CDBS") maintained by the FCC, WILS is licensed to serve Lansing, MI and the surrounding area on 1320 kHz, with a power of 25.0 kW during daytime hours (directional) and 1.9 kW during nighttime hours (directional), utilizing a directional antenna system ("DA2"). A copy of the WILS daytime directional radiation pattern is attached as Figure 2 and tabulated as Figure 3. A copy of the WILS nighttime directional radiation pattern is attached as Figure 4 and tabulated as Figure 5.

Description of Crown Castle/T-Mobile's Base Station Support Structure

Whitney RL 829077 577410 is located at 4751 N. Smith Road, Windsor, MI, NAD 83 (N42-38-3.72, W84-38-40.85), approximately 1.4 kilometers (0.9 miles) at a bearing of 357.2º (true) from the WILS (AM) antenna system. The antenna support structure is a detuned monopole tower that stands with an overall height of 61.0 meters (200.0 feet) (above ground level). This is approximately 6.1 wavelengths away and 96.6 electrical degrees high at WILS's operating frequency, 1320 kHz.

Analysis of Reradiation Potential

An analysis was performed to quantify the potential for impact to the WILS pattern caused by the proposed modification. Given that there has been no increase in the overall height of the structure and the tower is detuned, we feel that there has been little change in the reradiation characteristics of this structure. Therefore, a limited set of measurements was agreed upon in order to minimize disruption to WILS's normal licensed operations.

Notification

In keeping with the terms and intent of FCC Rules Section §1.30004, Kevin Hawley, Chief Engineer of radio station WILS was notified by email and first-class mail of the impending modification on January 4, 2022. A copy of the notification is attached to this report with the pertinent correspondences. For FCC rules pertaining to this report and regulatory background discussion, please see Appendix A, attached.

Detuning Adjustment and Measurements

After the T-Mobile modification to the Crown Castle tower the existing detuning apparatus was re-adjusted as to ensure that the antenna support structure was effectively detuned at the WILS frequency. The reradiated field strength of the structure with the detuning network shorted was 1010.0 mV/m, versus a field strength of 5.2 mV/m with the detuning network adjusted for minimum reradiated signal, for a decrease of 45.8 dB in reradiated signal between the un-detuned and detuned states. This adjustment was performed with the field intensity meter located 22.9 meters (75 feet) from the structure at an azimuth of 87.2°. These measurements were conducted by Mr. M. Slabaugh of Sitesafe on 9/18/2023, using a Potomac Instruments model FIM-4100 Field Intensity Meter ("FIM"), serial number 167, which was last calibrated 8/17/2022.

The detune adjustments and measurements were completed while WILS was operating on their daytime pattern. Please see Appendix B for methodology concerning detune system adjustments and measurements.

Conclusion & Certification

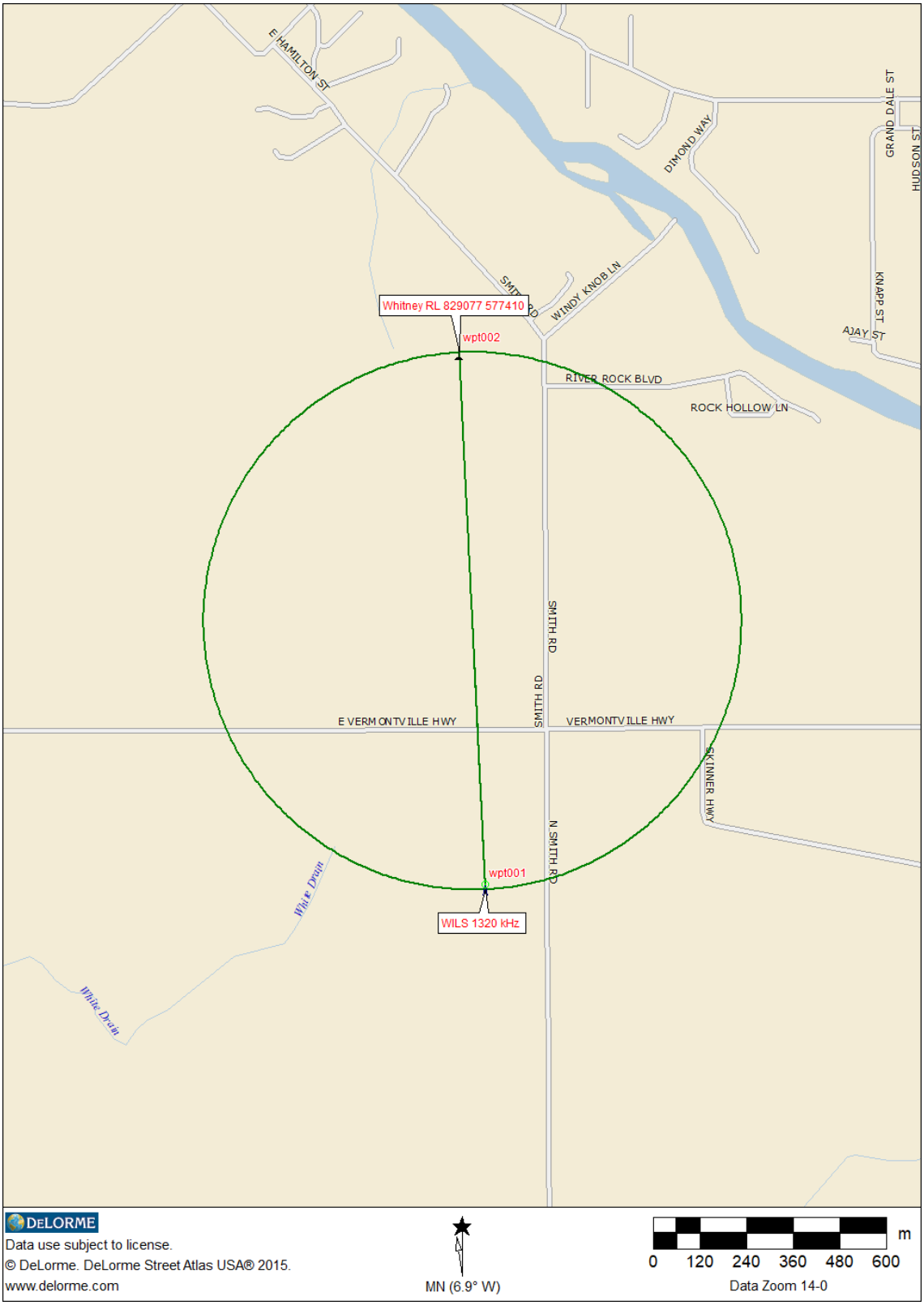
In our expert opinion, it is stated here that there is no indication that the Crown Castle antenna support structure modified by T-Mobile has had any adverse effect on the WILS daytime directional or nighttime directional antenna system based on the operability and adjustment of the existing detune system and the measurements and analysis indicated above.

Patrick T. Smith

Patrick T. Smith

AM Engineering - Compliance and Regulatory

Figure 1


E HAMILTON ST
DIMOND WAY
GRAND DALE ST
HUDSON ST
WINDY KNOB LN
KNAPP ST
AJAY ST
Whitney RL 829077 577410
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RIVER ROCK BLVD
ROCK HOLLOW LN
SMITH RD
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E VERMONTVILLE HWY
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SKINNER HWY
N SMITH RD
wpt001
WILS 1320 kHz
White Drain
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MN (6.9° W)
0 120 240 360 480 600 m
Data Zoom 14-0

Figure 2
WILS (AM) 1320 kHz (DA2)
Lansing, MI

Standard Directional Pattern
Licensed Day 25.0 kW
Last Modified: 10/7/2020

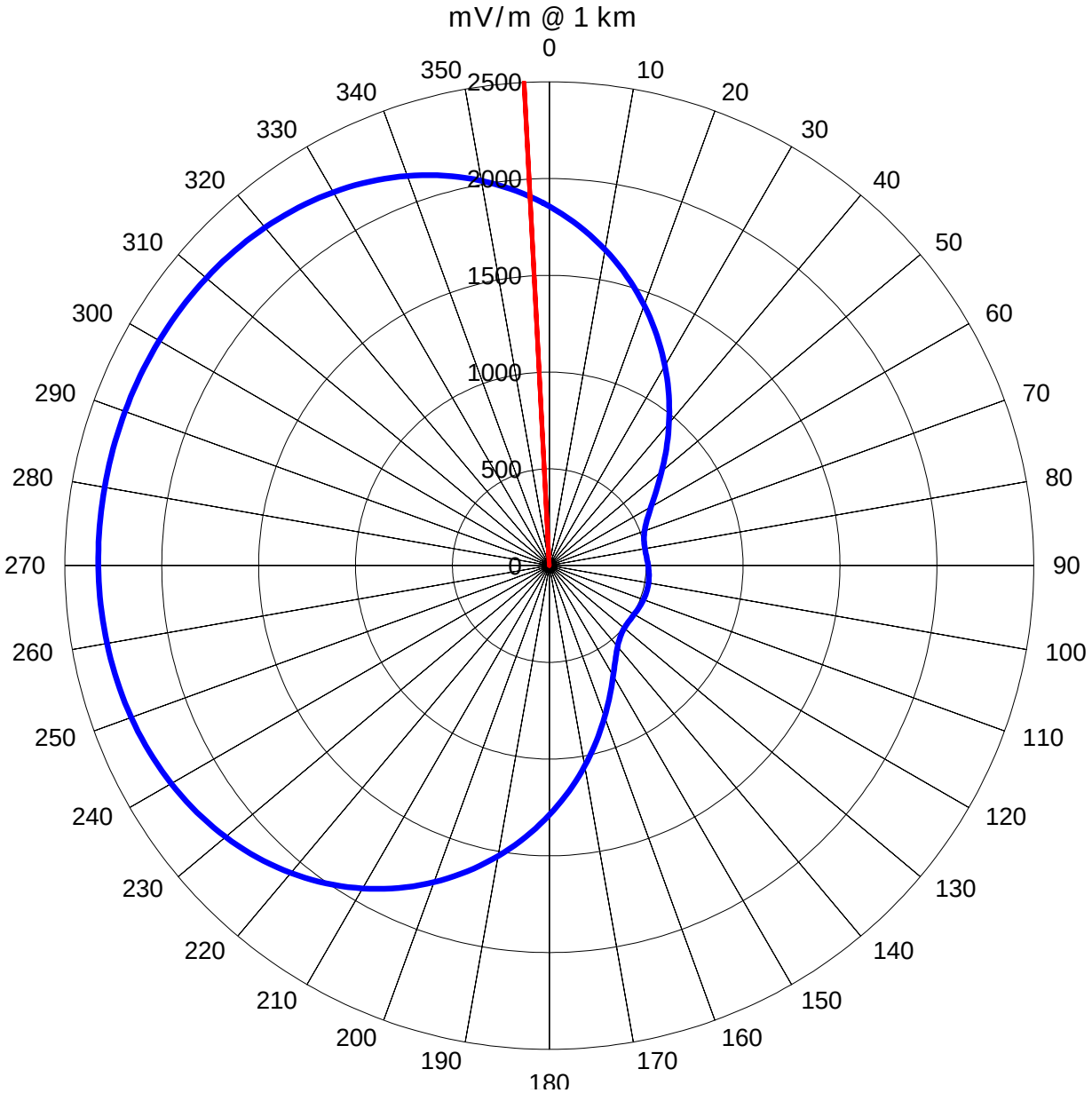

Figure 3
WILS (AM) 1320 kHz (DA2)
Lansing, MI

Standard Directional Pattern
Licensed Day 25.0 kW
Last Modified: 10/7/2020

Degree	mV/m @ 1km	Degree	mV/m @ 1km	Degree	mV/m @ 1km	Degree	mV/m @ 1km
0	1856.724	41	938.9794	82	501.7665	123	502.3295
1	1838.335	42	917.2598	83	502.3295	124	501.7665
2	1819.585	43	895.8723	84	503.0871	125	501.4327
3	1800.483	44	874.8409	85	504.0065	126	501.3634
4	1781.037	45	854.1898	86	505.0558	127	501.5948
5	1761.254	46	833.9434	87	506.205	128	502.1636
6	1741.144	47	814.1262	88	507.4255	129	503.1068
7	1720.717	48	794.7625	89	508.6906	130	504.4612
8	1699.982	49	775.8765	90	509.9752	131	506.2633
9	1678.95	50	757.4922	91	511.256	132	508.5486
10	1657.632	51	739.6337	92	512.5118	133	511.3514
11	1636.041	52	722.3235	93	513.7228	134	514.7044
12	1614.188	53	705.5846	94	514.8713	135	518.6381
13	1592.087	54	689.4389	95	515.9412	136	523.1808
14	1569.75	55	673.9073	96	516.9183	137	528.358
15	1547.192	56	659.0093	97	517.7902	138	534.1921
16	1524.427	57	644.7635	98	518.5458	139	540.7024
17	1501.469	58	631.1863	99	519.1765	140	547.9047
18	1478.335	59	618.2928	100	519.6746	141	555.8115
19	1455.039	60	606.0955	101	520.0345	142	564.4313
20	1431.599	61	594.6045	102	520.252	143	573.7693
21	1408.031	62	583.8277	103	520.3248	144	583.8277
22	1384.351	63	573.7693	104	520.252	145	594.6047
23	1360.578	64	564.4312	105	520.0345	146	606.0955
24	1336.73	65	555.8113	106	519.6746	147	618.2928
25	1312.824	66	547.9047	107	519.1765	148	631.1865
26	1288.88	67	540.7023	108	518.5458	149	644.7635
27	1264.917	68	534.192	109	517.7902	150	659.0093
28	1240.955	69	528.3579	110	516.9183	151	673.9073
29	1217.012	70	523.1808	111	515.9412	152	689.4391
30	1193.11	71	518.6381	112	514.8713	153	705.5848
31	1169.269	72	514.7043	113	513.7228	154	722.3235
32	1145.51	73	511.3514	114	512.5118	155	739.6337
33	1121.855	74	508.5486	115	511.256	156	757.4925
34	1098.324	75	506.2633	116	509.9751	157	775.8768
35	1074.94	76	504.4612	117	508.6906	158	794.7626
36	1051.724	77	503.1068	118	507.4255	159	814.1262
37	1028.7	78	502.1636	119	506.205	160	833.9434
38	1005.891	79	501.5948	120	505.0558	161	854.1898
39	983.3187	80	501.3634	121	504.0065	162	874.8409
40	961.0069	81	501.4327	122	503.0871	163	895.8723

Degree	mV/m @ 1km	Degree	mV/m @ 1km	Degree	mV/m @ 1km	Degree	mV/m @ 1km
164	917.26	213	1974.895	262	2320.667	311	2308.916
165	938.9794	214	1990.216	263	2321.85	312	2306.649
166	961.0069	215	2005.139	264	2322.929	313	2304.212
167	983.3187	216	2019.661	265	2323.913	314	2301.596
168	1005.891	217	2033.782	266	2324.806	315	2298.791
169	1028.701	218	2047.502	267	2325.615	316	2295.791
170	1051.724	219	2060.82	268	2326.346	317	2292.585
171	1074.94	220	2073.738	269	2327.003	318	2289.166
172	1098.324	221	2086.256	270	2327.593	319	2285.523
173	1121.855	222	2098.376	271	2328.119	320	2281.65
174	1145.51	223	2110.101	272	2328.586	321	2277.537
175	1169.269	224	2121.433	273	2328.999	322	2273.176
176	1193.11	225	2132.375	274	2329.361	323	2268.557
177	1217.012	226	2142.931	275	2329.675	324	2263.673
178	1240.955	227	2153.104	276	2329.946	325	2258.514
179	1264.917	228	2162.9	277	2330.174	326	2253.072
180	1288.881	229	2172.323	278	2330.363	327	2247.34
181	1312.824	230	2181.377	279	2330.515	328	2241.308
182	1336.73	231	2190.07	280	2330.632	329	2234.969
183	1360.578	232	2198.406	281	2330.714	330	2228.316
184	1384.351	233	2206.392	282	2330.763	331	2221.34
185	1408.031	234	2214.035	283	2330.779	332	2214.035
186	1431.599	235	2221.34	284	2330.763	333	2206.392
187	1455.039	236	2228.316	285	2330.714	334	2198.406
188	1478.335	237	2234.969	286	2330.632	335	2190.07
189	1501.469	238	2241.308	287	2330.515	336	2181.377
190	1524.427	239	2247.34	288	2330.363	337	2172.323
191	1547.192	240	2253.072	289	2330.174	338	2162.9
192	1569.75	241	2258.514	290	2329.946	339	2153.104
193	1592.087	242	2263.673	291	2329.675	340	2142.931
194	1614.188	243	2268.557	292	2329.361	341	2132.375
195	1636.041	244	2273.176	293	2328.999	342	2121.433
196	1657.633	245	2277.537	294	2328.586	343	2110.101
197	1678.95	246	2281.65	295	2328.119	344	2098.376
198	1699.982	247	2285.523	296	2327.593	345	2086.256
199	1720.717	248	2289.166	297	2327.003	346	2073.738
200	1741.144	249	2292.585	298	2326.346	347	2060.82
201	1761.254	250	2295.791	299	2325.615	348	2047.502
202	1781.037	251	2298.791	300	2324.806	349	2033.782
203	1800.483	252	2301.596	301	2323.913	350	2019.661
204	1819.585	253	2304.212	302	2322.929	351	2005.139
205	1838.335	254	2306.649	303	2321.85	352	1990.216
206	1856.724	255	2308.916	304	2320.667	353	1974.895
207	1874.748	256	2311.019	305	2319.375	354	1959.177
208	1892.399	257	2312.968	306	2317.967	355	1943.065
209	1909.672	258	2314.771	307	2316.434	356	1926.562
210	1926.562	259	2316.434	308	2314.771	357	1909.672
211	1943.065	260	2317.967	309	2312.968	358	1892.399
212	1959.177	261	2319.375	310	2311.019	359	1874.748

Figure 4
WILS (AM) 1320 kHz (DA2)
Lansing, MI

Standard Directional Pattern
Licensed Night 1.9 kW
Last Modified: 10/7/2020

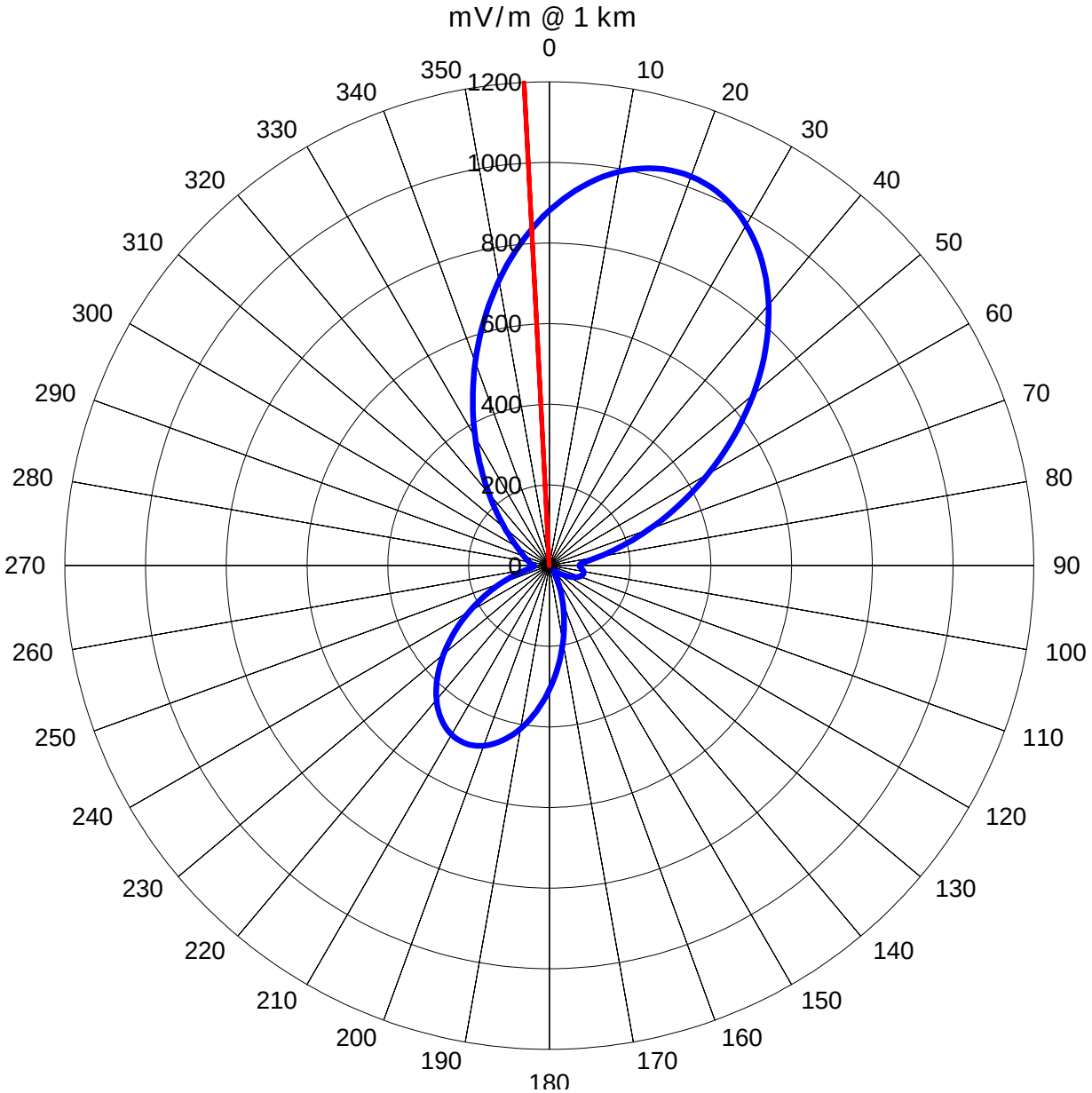

Figure 5
WILS (AM) 1320 kHz (DA2)
Lansing, MI

Standard Directional Pattern
Licensed Night 1.9 kW
Last Modified: 10/7/2020

Degree	mV/m @ 1km	Degree	mV/m @ 1km	Degree	mV/m @ 1km	Degree	mV/m @ 1km
0	880.5134	41	828.4503	82	104.5383	123	44.43235
1	894.4628	42	811.3394	83	96.88552	124	41.50408
2	907.8633	43	793.7356	84	90.35722	125	38.65969
3	920.6854	44	775.6721	85	84.99152	126	35.92339
4	932.9001	45	757.1835	86	80.79819	127	33.31921
5	944.4799	46	738.3049	87	77.74817	128	30.8708
6	955.398	47	719.0717	88	75.76786	129	28.60069
7	965.629	48	699.5204	89	74.74199	130	26.5299
8	975.1489	49	679.6874	90	74.5233	131	24.67645
9	983.9347	50	659.6096	91	74.94801	132	23.05431
10	991.965	51	639.3243	92	75.85149	133	21.67221
11	999.2198	52	618.8688	93	77.07974	134	20.53241
12	1005.681	53	598.2806	94	78.49738	135	19.63061
13	1011.331	54	577.597	95	79.99002	136	18.95709
14	1016.155	55	556.8554	96	81.46445	137	18.49897
15	1020.14	56	536.093	97	82.8465	138	18.24405
16	1023.273	57	515.3466	98	84.07887	139	18.18489
17	1025.546	58	494.6529	99	85.11812	140	18.32249
18	1026.949	59	474.0483	100	85.9324	141	18.66875
19	1027.477	60	453.5686	101	86.49922	142	19.247
20	1027.124	61	433.2494	102	86.80392	143	20.09042
21	1025.889	62	413.1255	103	86.83808	144	21.23831
22	1023.771	63	393.2314	104	86.59835	145	22.73145
23	1020.77	64	373.6015	105	86.08574	146	24.6071
24	1016.891	65	354.269	106	85.3045	147	26.89599
25	1012.138	66	335.2674	107	84.26211	148	29.62056
26	1006.519	67	316.6293	108	82.96825	149	32.7952
27	1000.041	68	298.3875	109	81.43479	150	36.42715
28	992.7169	69	280.5743	110	79.67529	151	40.51871
29	984.5579	70	263.2225	111	77.70467	152	45.06829
30	975.5787	71	246.3648	112	75.53951	153	50.07148
31	965.7955	72	230.0348	113	73.19704	154	55.52214
32	955.2261	73	214.267	114	70.69585	155	61.41267
33	943.8899	74	199.0971	115	68.05507	156	67.73435
34	931.8082	75	184.5634	116	65.29485	157	74.47737
35	919.0037	76	170.7063	117	62.4357	158	81.63094
36	905.5006	77	157.5697	118	59.49909	159	89.1834
37	891.3246	78	145.2017	119	56.50675	160	97.12177
38	876.5027	79	133.6549	120	53.48092	161	105.4323
39	861.0632	80	122.987	121	50.44445	162	114.1
40	845.0354	81	113.2599	122	47.42037	163	123.1089

Degree	mV/m @ 1km	Degree	mV/m @ 1km	Degree	mV/m @ 1km	Degree	mV/m @ 1km
164	132.4418	213	475.0322	262	46.91657	311	150.1181
165	142.0804	214	470.8433	263	43.65558	312	157.5625
166	152.0052	215	466.1001	264	41.05521	313	165.4323
167	162.1959	216	460.8171	265	39.11925	314	173.7365
168	172.6309	217	455.0103	266	37.82775	315	182.4824
169	183.2875	218	448.697	267	37.13537	316	191.6763
170	194.1423	219	441.8962	268	36.97293	317	201.3227
171	205.1708	220	434.6281	269	37.2571	318	211.4249
172	216.3476	221	426.9138	270	37.89927	319	221.9844
173	227.6463	222	418.7762	271	38.81507	320	233.0012
174	239.0403	223	410.2385	272	39.93025	321	244.474
175	250.5018	224	401.3254	273	41.18335	322	256.3997
176	262.0027	225	392.0623	274	42.52645	323	268.7739
177	273.5142	226	382.4752	275	43.92351	324	281.5905
178	285.0072	227	372.5909	276	45.34923	325	294.8422
179	296.4525	228	362.4367	277	46.78656	326	308.52
180	307.8202	229	352.0405	278	48.22559	327	322.6133
181	319.0805	230	341.4304	279	49.66177	328	337.1105
182	330.2038	231	330.6346	280	51.09481	329	351.9981
183	341.1601	232	319.682	281	52.52769	330	367.2616
184	351.92	233	308.6008	282	53.96584	331	382.8847
185	362.4543	234	297.4197	283	55.41648	332	398.8502
186	372.7339	235	286.1672	284	56.88829	333	415.1393
187	382.7305	236	274.8714	285	58.39088	334	431.732
188	392.4163	237	263.5601	286	59.93456	335	448.6069
189	401.7642	238	252.2608	287	61.53021	336	465.7417
190	410.7477	239	241.0006	288	63.18916	337	483.1125
191	419.3416	240	229.8056	289	64.9229	338	500.6947
192	427.5216	241	218.702	290	66.74337	339	518.4625
193	435.2639	242	207.715	291	68.66263	340	536.3888
194	442.5468	243	196.8689	292	70.69321	341	554.4459
195	449.3492	244	186.1877	293	72.84786	342	572.605
196	455.6516	245	175.6945	294	75.14005	343	590.8364
197	461.4358	246	165.4118	295	77.58336	344	609.1097
198	466.6851	247	155.3612	296	80.19217	345	627.3939
199	471.3845	248	145.5639	297	82.98119	346	645.6572
200	475.5203	249	136.0405	298	85.96595	347	663.8671
201	479.081	250	126.8111	299	89.16226	348	681.9911
202	482.0561	251	117.8955	300	92.58656	349	699.9956
203	484.4375	252	109.3138	301	96.25562	350	717.8474
204	486.2183	253	101.0858	302	100.1865	351	735.5123
205	487.3939	254	93.23235	303	104.3966	352	752.9567
206	487.9612	255	85.7751	304	108.9029	353	770.1465
207	487.9191	256	78.73729	305	113.7226	354	787.0474
208	487.2682	257	72.14407	306	118.8726	355	803.6259
209	486.0111	258	66.02339	307	124.369	356	819.8482
210	484.152	259	60.4058	308	130.2274	357	835.6807
211	481.6968	260	55.32511	309	136.4627	358	851.0908
212	478.6538	261	50.8168	310	143.0886	359	866.0455

Appendix A
FCC Rules: CFR/Title 47/Chapter I/Subchapter A/Part 1/Subpart BB
Regulatory Considerations

It is recognized that certain types of construction, such as the erection of an antenna support structure in the immediate vicinity of a standard broadcast (AM) transmitting antenna, can upset the radiation characteristics of the AM antenna system. This possibility is explicitly addressed in Subpart BB of Section 1 of the FCC Rules and Regulations ("the FCC Rules" or "the Rules") and it applies to all licensees. In 2014 these regulations replaced regulations that were applied with variations to different services.

Title 47 Part 1 Subpart BB—Disturbance of AM Broadcast Station Antenna Patterns

SOURCE: 78 FR 66295, Nov. 5, 2013, as amended at 78 FR 70499, Nov. 26, 2013.

§1.30000 Purpose.

This rule part protects the operations of AM broadcast stations from nearby tower construction that may distort the AM antenna patterns. All parties holding or applying for Commission authorizations that propose to construct or make a significant modification to an antenna tower or support structure in the immediate vicinity of an AM antenna, or propose to install an antenna on an AM tower, are responsible for completing the analysis and notice process described in this subpart, and for taking any measures necessary to correct disturbances of the AM radiation pattern, if such disturbances occur as a result of the tower construction or modification or as a result of the installation of an antenna on an AM tower. In the event these processes are not completed before an antenna structure is constructed, any holder of or applicant for a Commission authorization is responsible for completing these processes before locating or proposing to locate an antenna on the structure, as described in this subpart.

§1.30001 Definitions.

For purposes of this subpart:

(a) Wavelength at the AM frequency. In this subpart, critical distances from an AM station are described in terms of the AM wavelength. The AM wavelength, expressed in meters, is computed as follows:

(300 meters)/(AM frequency in megahertz) = AM wavelength in meters.

For example, at the AM frequency of 1000 kHz, or 1 MHz, the wavelength is (300/1 MHz) = 300 meters.

(b) Electrical degrees at the AM frequency. This term describes the height of a proposed tower as a function of the frequency of a nearby AM station. To compute tower height in electrical degrees, first determine the AM wavelength in meters as described in paragraph (a) of this section. Tower height in electrical degrees is computed as follows: (Tower height in meters)/(AM wavelength in meters) × 360 degrees = Tower height in electrical degrees. For example, if the AM frequency is 1000 kHz, then the wavelength is 300 meters, per paragraph (a) of this section. A nearby tower 75 meters tall is therefore [75/300] × 360 = 90 electrical degrees tall at the AM frequency.

(c) Proponent. The term proponent refers in this section to the party proposing tower construction or significant modification of an existing tower or proposing installation of an antenna on an AM tower.

(d) Distance from the AM station. The distance shall be calculated from the tower coordinates in the case of a nondirectional AM station, or from the array center coordinates given in CDBS or any successor database for a directional AM station.

§1.30002 Tower construction or modification near AM stations.

(a) Proponents of construction or significant modification of a tower which is within one wavelength of a nondirectional AM station, and is taller than 60 electrical degrees at the AM frequency, must notify the AM station at least 30 days in advance of the commencement of construction. The proponent shall examine the potential impact of the construction or modification as described in paragraph (c) of this section. If the construction or modification would distort the radiation pattern by more than 2 dB, the proponent shall be responsible for the installation and maintenance of any detuning apparatus necessary to restore proper operation of the nondirectional antenna.

(b) Proponents of construction or significant modification of a tower which is within the lesser of 10 wavelengths or 3 kilometers of a directional AM station, and is taller than 36 electrical degrees at the AM frequency, must notify the AM station at least 30 days in advance of the commencement of construction. The proponent shall examine the potential impact of the construction or modification as described in paragraph (c) of this section. If the construction or modification would result in radiation in excess of the AM station's licensed standard pattern or augmented standard pattern values, the proponent shall be responsible for the installation and maintenance of any detuning apparatus necessary to restore proper operation of the directional antenna.

(c) Proponents of construction or significant modification of a tower within the distances defined in paragraphs (a) and (b) of this section of an AM station shall examine the potential effects thereof using a moment method analysis. The moment method analysis shall consist of a model of the AM antenna together with the potential re-radiating tower in a lossless environment. The model shall employ the methodology specified in §73.151(c) of this chapter, except that the AM antenna elements may be modeled as a series of thin wires driven to produce the required radiation pattern, without any requirement for measurement of tower impedances.

(d) A significant modification of a tower in the immediate vicinity of an AM station is defined as follows:

(1) Any change that would alter the tower's physical height by 5 electrical degrees or more at the AM frequency; or

(2) The addition or replacement of one or more antennas or transmission lines on a tower that has been detuned or base-insulated.

(e) The addition or modification of an antenna or antenna-supporting structure on a building shall be considered a construction or modification subject to the analysis and notice requirements of this subpart if and only if the height of the antenna-supporting structure alone exceeds the thresholds in paragraphs (a) and (b) of this section.

(f) With respect to an AM station that was authorized pursuant to a directional proof of performance based on field strength measurements, the proponent of the tower construction or modification may, in lieu of the study described in paragraph (c) of this section, demonstrate through measurements taken before and after construction that field strength values at the monitoring points do not exceed the licensed values. In the event that the pre-construction monitoring point values exceed the licensed values, the proponent may demonstrate that post-construction monitoring point values do not exceed the pre-construction values. Alternatively, the AM station may file for authority to increase the relevant monitoring-point value after performing a partial proof of performance in

accordance with §73.154 to establish that the licensed radiation limit on the applicable radial is not exceeded.

(g) Tower construction or modification that falls outside the criteria described in the preceding paragraphs is presumed to have no significant effect on an AM station. In some instances, however, an AM station may be affected by tower construction or modification notwithstanding the criteria set forth above. In such cases, an AM station may submit a showing that its operation has been affected by tower construction or modification. Such a showing shall consist of either a moment method analysis as described in paragraph (c) of this section, or of field strength measurements. The showing shall be provided to:

(1) The tower proponent if the showing relates to a tower that has not yet been constructed or modified and otherwise to the current tower owner; and

(2) To the Commission, within two years after the date of completion of the tower construction or modification. If necessary, the Commission shall direct the tower proponent or tower owner, if the tower proponent or tower owner holds a Commission authorization, to install and maintain any detuning apparatus necessary to restore proper operation of the AM antenna. An applicant for a Commission authorization may not propose, and a party holding a Commission authorization may not locate, an antenna on any tower or support structure that has been shown to affect an AM station's operation pursuant to this subparagraph, or for which a disputed showing of effect on an AM station's operation is pending, unless the applicant, party, or tower owner notifies the AM station and takes appropriate action to correct the disturbance to the AM pattern.

(h) An AM station may submit a showing that its operation has been affected by tower construction or modification that was commenced or completed prior to or on the effective date of the rules adopted in this Part pursuant to MM Docket No. 93-177. Such a showing shall consist of either a moment method analysis as described in paragraph (c) of this section, or of field strength measurements. The showing shall be provided to the current tower owner and the Commission within one year of the effective date of the rules adopted in this Part pursuant to MM Docket No. 93-177. If necessary, the Commission shall direct the tower owner, if the tower owner holds a Commission authorization, to install and maintain any detuning apparatus necessary to restore proper operation of the AM antenna.

(i) An applicant for a Commission authorization may not propose, and a party holding a Commission authorization may not locate, an antenna on any tower or support structure, whether constructed before or after December 5, 2013, that meets the criteria in paragraphs (a) and (b) of this section, unless the analysis and notice process described in this subpart, and any necessary measures to correct disturbances of the AM radiation pattern, have been completed by the tower owner, the party proposing to locate the antenna, or any other party, either prior to construction or at any other time prior to the proposal or antenna location.

[78 FR 66295, Nov. 5, 2013]

§1.30004 Notice of tower construction or modification near AM stations.

(a) Proponents of proposed tower construction or significant modification to an existing tower near an AM station that are subject to the notification requirement in §1.30002 and §1.30003 shall provide notice of the proposed tower construction or modification to the AM station at least 30 days prior to commencement of the planned tower construction or modification. Notice shall be provided to any AM station that is licensed or operating under Program Test Authority using the official licensee information and address listed in CDBS or any successor database. Notification to an AM station and any responses may be oral or written. If such notification and/or response is oral, the party providing such notification or

response must supply written documentation of the communication and written documentation of the date of communication upon request of the other party to the communication or the Commission. Notification must include the relevant technical details of the proposed tower construction or modification. At a minimum, the notification should include the following:

(1) Proponent's name and address. Coordinates of the tower to be constructed or modified.

(2) Physical description of the planned structure.

(3) Results of the analysis showing the predicted effect on the AM pattern, if performed.

(b) Response to a notification should be made as quickly as possible, even if no technical problems are anticipated. Any response to a notification indicating a potential disturbance of the AM radiation pattern must specify the technical details and must be provided to the proponent within 30 days. If no response to notification is received within 30 days, the proponent may proceed with the proposed tower construction or modification.

(c) The 30-day response period is calculated from the date of receipt of the notification by the AM station. If notification is by mail, this date may be ascertained by:

(1) The return receipt on certified mail;

(2) The enclosure of a card to be dated and returned by the recipient; or

(3) A conservative estimate of the time required for the mail to reach its destination, in which case the estimated date when the 30-day period would expire shall be stated in the notification.

(d) An expedited notification period (less than 30 days) may be requested when deemed necessary by the proponent. The notification shall be identified as "expedited" and the requested response date shall be clearly indicated. The proponent may proceed with the proposed tower construction or modification prior to the expiration of the 30-day notification period only upon receipt of written concurrence from the affected AM station (or oral concurrence, with written confirmation to follow).

(e) To address immediate and urgent communications needs in the event of an emergency situation involving essential public services, public health, or public welfare, a tower proponent may erect a temporary new tower or make a temporary significant modification to an existing tower without prior notice to potentially affected nearby AM stations, provided that the tower proponent shall provide written notice to such AM stations within five days of the construction or modification of the tower and shall cooperate with such AM stations to promptly remedy any pattern distortions that arise as a consequence of such construction.

[78 FR 66295, Nov. 5, 2013]

Appendix B

Methodology for Detune Adjustments & Proximity Measurements

An AM detune system is normally verified to be operational based on a field measurement known as a "detune drop" at a given tower site being studied. The detune drop consist of a field strength measurement taken with the AM detune system on a tower being studied shorted out to tower ground so the reradiation can be measured (in mV/m) at distance from the tower with the detune system inoperative. This figure represents the full reradiation potential from the tower at that distance. The same measurement is then repeated with the AM detune system in its "normal" or in the detuned condition (usually after adjustment) for the frequency of the AM station. This measurement is also in mV/m and represents the tower in the detuned condition. This measurement is then expressed as a ratio with the not detuned measurement and factored into a dB "detune drop".

To obtain these measurements the Field Strength Measurement Receiver ("Field Meter or FIM") is placed at a distant point orthogonal to the AM station direct signal arriving at the FIM and the radiating tower being studied. The FIM azimuth is nulled for minimum arriving signal from the AM station using the FIM shielded loop directional antenna characteristics. The remaining signal is what is being reradiated by the tower being studied and possibly other surrounding objects since the FIM antenna is now pointing at the tower and the AM station direct signal is nulled.

****

The extent of the perturbation of an antenna system's radiation pattern, resulting from an object such as a new antenna support structure, can be accurately gauged through analysis of field strength measurement data collected at locations immediately proximate to the subject structure.

A Potomac Instruments Field Strength Measurement Receiver ("Field Meter"), which was used for data collection in the case at hand, utilizes a loop antenna. Such antennas have a figure-eight reception pattern, which makes it possible to distinguish the signal arriving directly from the AM station from the signal being reflected by the new tower. Measurements are taken at closely spaced points along the section of arc, drawn from the AM station and passing through the new tower. At those points, the natural directionality of the loop antenna, when oriented so as to be most sensitive to signals arriving from the new tower, strongly discriminates against signals arriving directly from the AM station. (The converse also holds, when the loop is oriented in the direction of the AM station, the instrument is virtually insensitive to signals being reflected by the new tower.)

The field meter's antenna is enclosed in an electrostatic shield. Therefore, the device is sensitive only to the magnetic field components of the incident electromagnetic wave. From basic electromagnetic theory, the magnetic field component produced by a current element *Idl*, is expressed in spherical coordinates as

$$H\phi = \frac{Idl\sin\theta}{4\pi}\left(\frac{-\varpi\sin\varpi t}{r\upsilon}+\frac{\cos\varpi t}{r^2}\right)$$

where ϖ is the radian frequency of the alternating current, υ is the velocity of propagation (300,000 km/sec), and r is the distance to an arbitrary point.

In the above expression, the term that varies with inverse distance is referred to as the radiation field. The term that varies inversely with distance squared is the induction field. The distance at which the two fields have equal amplitudes may be calculated from

$$\frac{\varpi}{r\upsilon} = \frac{1}{r^2}$$

Solving,

$$r = \frac{\upsilon}{\varpi} = \frac{\lambda}{2\pi}$$

It is convenient to refer to this particular distance as the "pivot point". For example, at 1000 kHz, the two magnetic field components are equal (and in phase quadrature) at a distance of 47.7 meters (156.5 feet) from the current element. At closer distances, the induction field predominates, and at distances greater than 47.7 meters, the radiation field is the stronger of the two.

At some distance, the signal being scattered by the subject structure becomes masked by signals arriving from other (generally unidentifiable) scattering objects. Thus, even though data were collected at distances somewhat greater than the "pivot point", only the close-in values, as just defined, were used to determine the best fit to the measured data.

The magnitude of current flow in the new structure, as induced by the passing wave, can be approximated as being sinusoidal, with a zero value at the top of the structure. Since the height of the new structure and the AM station wavelength are known, it is a straightforward, if computationally involved, task to predict the shape of the vector sum of the two magnetic field components as a function of distance by integrating the individual contributions of incremental "current elements" along the height of the structure. The magnitude of the two fields can be quantified by a best-fit to the observed field strength vs. distance data.

Sitesafe AM Project Coordination

From: Microsoft Outlook
To: kevinh@macdonaldbroadcasting.com; cindytuck@macdonaldbroadcasting.com
Sent: Tuesday, January 4, 2022 1:44 PM
Subject: Relayed: AM Notification - Whitney RL 829077 577410 (T-Mobile Colo)

Delivery to these recipients or groups is complete, but no delivery notification was sent by the destination server:

kevinh@macdonaldbroadcasting.com (kevinh@macdonaldbroadcasting.com)

cindytuck@macdonaldbroadcasting.com (cindytuck@macdonaldbroadcasting.com)

Subject: AM Notification - Whitney RL 829077 577410 (T-Mobile Colo)

8618 Westwood Center Dr, Suite 315
Vienna, VA 22182

January 4, 2022

Kevin Hawley
Chief Engineer
Radio Station WILS (AM)
600 West Cavanaugh
Lansing, MI 48910

Via FAX: 000-000-0000 Original Via First Class Mail

Dear Kevin Hawley:

We have been retained by: Crown Castle
For their site: Whitney RL 829077 577410

On behalf of: T-Mobile
On a structure owned and or managed by: Crown Castle

T-Mobile plans to reconfigure its antennas, cabling and related hardware on an existing Crown Castle detuned antenna support structure in the vicinity of the WILS (AM) antenna system. The reconfiguration may include the addition/removal or change of antennas, cables and other on-tower hardware.

In an effort to comply with FCC rules and regulations, Crown Castle and T-Mobile are obliged to ensure that the reconfiguration does not cause the WILS (AM) radiation parameters any harm and that the existing AM detuning system is operating correctly. This obligation pertains to tower construction or modification within 10 wavelengths at WILS's frequency or up to 3.0 km whichever is less from a directional AM antenna, (or any distance which has detuning equipment installed even when negative for WILS under the current FCC rules).

Site Name	Address	Latitude	Longitude
Whitney RL 829077 577410	4751 N. Smith Road Windsor, MI 48821	N42-38-3.72	W84-38-40.85

Structure Type	Structure Height	Electrical Height @ AM Frequency	Bearing to Site	Distance to Site in km	Distance to Site in Wavelengths	FCC Action Criteria Result
Monopole	200 ft	96.6° @ 1320 kHz	357.2°	1.38 km	6.07 @ 1320 kHz	Positive

The antenna support structure at Whitney RL 829077 577410 site is currently detuned for WILS's frequency. Our firm has been hired by Crown Castle to ensure that the addition/removal/change-out of antennas, cables and other hardware on the tower does not cause harmful re-radiation of WILS's RF energy.

Once the T-Mobile/Crown Castle modifications to the tower are completed we will adjust the detuning system for WILS's frequency. We will take measurements near and around the tower to prove the detuning system is effective at WILS's frequency. WILS will receive a report detailing our findings.

As this structure is already detuned for WILS, the detuning network will be inspected, adjusted, and proper operation verified prior to all measurements. Should you disagree with the proposed construction, our conclusions or the planned measurements we respectfully request that you notify us by February 8, 2022. Otherwise we will conclude that you agree and our client, Crown Castle will proceed with construction. Should you have any questions, please contact us at (703) 276-1100. This is a general office number at Sitesafe. Our technician will be in touch with you before any measurements or

adjustments for WILS are made at Whitney RL 829077 577410. We thank you for your attention to this matter, and we look forward to working with you.

IMPORTANT CONTACT INFORMATION:

The contact number in the previous text is a general business office telephone number for Sitesafe.

If you have questions or comments regarding this notification, they should be directed to:

Philip Harris CSRE, AMD
Principal Engineer, AM Compliance & Regulatory
SiteSafe, LLC.
8618 Westwood Center Drive, Suite 315
Vienna, VA 22182
571-527-8716 mobile
e-mail: pharris@sitesafe.com
www.sitesafe.com

IMPORTANT: When communicating by e-mail, please include the following in your e-mail subject line:

Whitney RL 829077 577410 WILS

Sincerely,

Philip Harris CSRE, AMD
Principal Engineer, AM Compliance & Regulatory

cc: Susan Bottone, Crown Castle

8618 Westwood Center Dr, Suite 315
Vienna, VA 22182

January 4, 2022

AM Station WILS
THE MACDONALD BROADCASTING COMPANY
2000 WHITTIER
SAGINAW, MI 48601

Original Via First Class Mail

To AM Station WILS:

We have been retained by: Crown Castle
For their site: Whitney RL 829077 577410

On behalf of: T-Mobile
On a structure owned and or managed by: Crown Castle

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IMPORTANT: When communicating by e-mail, please include the following in your e-mail subject line:

Whitney RL 829077 577410 WILS

Sincerely,

Philip Harris CSRE, AMD
Principal Engineer, AM Compliance & Regulatory