



**STATEMENT OF JAMES D. SADLER  
BEFORE AND AFTER PARTIAL PROOFS  
AM STATION WWRC – WASHINGTON, DC  
IN SUPPORT OF AN APPLICATION FOR LICENSE  
FM TRANSLATOR STATION W284CQ - WASHINGTON, DC  
FACILITY ID: 31140**

Applicant: AMFM Radio Licenses, LLC

I am a Technical Consultant, an employee in the firm of Carl T. Jones Corporation with offices located in Springfield, VA. My education and experience are a matter of record with the Federal Communications Commission.

**Introduction**

FM Translator Station W284CQ is authorized in its Construction Permit, FCC File No. BMPFT-20151026ABC, to mount a new transmitting antenna and associated transmission line on the center tower of the WWRC nighttime directional array. A special operating condition was placed on the Construction Permit requiring the permittee to conduct a partial proof of performance as defined in Section 73.154 of the Commission's Rules both before and after construction to show that the AM Station has not been adversely affected.

Radio Station WWRC(AM), Washington, DC, is licensed to operate on a frequency of 1260 kHz, on an unlimited time basis, with a daytime power of 35 kW and



a nighttime power of 5 kW. The station utilizes different directional patterns for its daytime and nighttime operations (DA-2). The daytime directional antenna system employs the two end towers (Towers 2 and 3) while the nighttime directional antenna system employs all three towers including tower #1 which the W284CQ transmitting antenna is located. Just prior to the start of construction, Station WWRC filed an Application for Direct Measurement of Power, FCC Form 302-AM, (FCC File No. BZ-20151222BQR) with the Commission. The pending application contains partial proof of performance measurements for the nighttime directional antenna system. These measurements were used as the “before” measurements for the purpose of this partial proof of performance since they were completed just prior to the start of construction authorized for FM Translator Station W284CQ.

Because the center tower is not employed in the daytime directional antenna system, partial proof of performance measurements have not been performed on the daytime directional antenna pattern. Modifications to antennas and transmission lines on the center tower have been found to have little or no effect on the WWRC daytime directional antenna pattern; therefore, “before” and “after” measurements relative to the daytime directional antenna were only made at the daytime monitoring points. Due to the seasonal variation of ground conductivity expected to occur between the start of construction and the completion of construction partial proof of performance measurements were made on both the non-directional and nighttime directional antennas to provide a more accurate assessment of the effect of the construction on the WWRC antenna system.

**Non-directional and Nighttime Directional Partial Proof Field Strength Measurements**

Following the construction, the non-directional antenna impedance of Tower #1 (center) was measured, by the undersigned, using a Delta Electronics, Model OIB-1, operating impedance bridge and found to be  $Z_{ND\#1} = 132 + j 3.2$  Ohms. The transmitter was adjusted for a base current of 6.88 Amperes corresponding to a non-directional antenna input power of approximately 6,250 Watts. The measurement was performed at the J-Plug located in the output branch of the tower #1 ATU network with Towers #2 and #3 detuned. The nighttime common point impedance was adjusted for  $Z_{cp} = 50.0 - j 8.8$  Ohms and the transmitter was adjusted for a common point current of 10.39 Amperes for the nighttime directional antenna partial proof measurements.

Non-directional and nighttime directional partial proof field strength measurements were performed on all four nighttime monitored radials before and after construction. As stated, the “before” measurements were obtained directly from the pending Application for Direct Measurement of Power. A minimum of ten field strength measurements were performed on each radial bearing at the same locations that were measured in the 2012 nighttime full proof-of-performance, including the monitor point locations. All measurements were made during the period between two hours following local sunrise and two hours prior to local sunset to minimize the potential for skywave interference. The “after” measurements were made at the same locations as the “before” measurements.

The nighttime directional pattern measured inverse distance fields were determined in the following manner. The logarithm of the ratio of the nighttime directional field strength to the non-directional field strength was calculated for each measurement location, and an average logarithmic ratio determined for each radial bearing. The antilogarithm of the average was multiplied by the 2012 measured non-directional inverse distance field to determine the “before” and “after” nighttime directional inverse distance field. Figure 1 provides a summary of the “before” and “after” nighttime measured inverse distance fields. In no case does the value of the measured “before” and “after” nighttime inverse distance field exceed the authorized modified standard pattern value. A tabulation of the “before” and “after” measured nighttime directional and non-directional field strength data for each of the four measured radials is contained in Figure 2, Sheets 1 through 4.

A description of the “before” measurement procedure is contained in the pending WWRC Application for Direct Measurement of Power. All of the “after” field strength measurements were performed by Mr. Tom Ringer, a contract engineer working for Carl T. Jones Corporation, and the undersigned. A total of four field intensity meters were used to make the “after” measurements. Pertinent information on each field intensity meter is contained in the table below.

<b><u>Manufacturer/Model</u></b>	<b><u>Serial Number</u></b>	<b><u>Calibration Date</u></b>
Potomac Instruments/FIM-41	446	October, 2009
Potomac Instruments/FIM-41	989	March, 2012
Potomac Instruments/PI 4100	352	March 11, 2016
Potomac Instruments/PI 4100	353	March 11, 2016

The performance of the four field intensity meters was verified by comparing measured field strength values at several different full scale settings and verifying that the field strength values, as measured on each meter, agreed within the manufactures stated accuracy.

### **Daytime Monitoring Points**

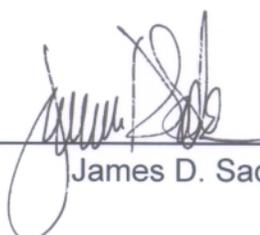
The daytime directional antenna monitoring points were measured “before” and “after” the construction. The points were within the normal variance range and well within the licensed maximum values.

### **Summary**

It is submitted that the daytime and nighttime directional patterns of Station WWRC(AM) are in proper adjustment and compliant with the station’s authorization. The construction of FM Translator Station W284CQ has not adversely effected the operation of Station WWRC.

This engineering statement and the associated figures were prepared by me or under my direct supervision and the information therein is believed to be true and correct.

Dated: March 16, 2016

  
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James D. Sadler

**TABULATION OF NIGHTTIME MEASURED FIELD STRENGTH DATA  
STATION WWRC, WASHINGTON, DC  
1260 kHz, 35 kW-D, 5 kW-N, DA-2**

BEFORE MEASUREMENTS

<u>Monitored Radial (deg. T.)</u>	<u>2015 ND Inverse Distance Field Strength (mV/m at 1 km)</u>	<u>DA-N / ND Antilog of Average Ratio</u>	<u>DA-N Measured Inverse Distance Field Strength (mV/m at 1 km)</u>	<u>Nighttime Modified Standard Pattern Radiation (mV/m at 1 km)</u>
52	725	0.0725	52.5	60.0
198	760	1.1239	854	877
280	800	0.0502	40.2	61.2
325	790	0.3911	309	368

AFTER MEASUREMENTS

<u>Monitored Radial (deg. T.)</u>	<u>2012 ND Inverse Distance Field Strength (mV/m at 1 km)</u>	<u>DA-N / ND Antilog of Average Ratio</u>	<u>DA-N Measured Inverse Distance Field Strength (mV/m at 1 km)</u>	<u>Nighttime Modified Standard Pattern Radiation (mV/m at 1 km)</u>
52	725	0.0604	43.8	60.0
198	760	0.9770	743	877
280	800	0.0544	43.5	61.2
325	790	0.4335	342	368

<sup>1</sup> Non-directional inverse distance field strength obtained from most recent nighttime full proof-of-performance, FCC File No. BL-20120221ADS, Granted April 27, 2012.

**TABULATION OF FIELD STRENGTH MEASUREMENT DATA  
STATION WWRC, WASHINGTON, DC  
1260 kHz, 35 kW-D, 5 kW-N, DA-2**

**52 Degrees True Radial**

**BEFORE MEASUREMENTS**

2012 Proof Point Number	Distance (kilometers)	6.25 kW, ND			5 kW, DA-NIGHT				
		Date	Time (local)	Field Strength (mV/m)	Date	Time (local)	Field Strength (mV/m)	Ratio (DA-N/ND)	Log Ratio (DA-N/ND)
11	3.41	11/22/2015	1327	90.0	12/16/2015	1314	10	0.1111	-0.9542
12	4.22	11/22/2015	1332	52.0	12/16/2015	1310	4.5	0.0865	-1.0628
13 MP	5.58	11/22/2015	1340	28.6	12/16/2015	1303	2.39	0.0836	-1.0780
14	6.48	11/22/2015	1345	26.6	12/16/2015	1259	1.37	0.0515	-1.2882
15	7.31	11/22/2015	1349	16.4	12/16/2015	1250	0.79	0.0482	-1.3172
16	8.02	11/22/2015	1353	23.4	12/16/2015	1240	0.88	0.0376	-1.4247
17	8.24	11/22/2015	1355	14.4	12/16/2015	1318	0.62	0.0431	-1.3660
18	9.69	11/22/2015	1359	11.3	12/16/2015	1309	0.82	0.0726	-1.1393
19	11.20	11/22/2015	1404	8.70	12/16/2015	1304	0.6	0.0690	-1.1614
20	12.90	11/22/2015	1415	7.10	12/16/2015	1255	0.6	0.0845	-1.0731
21	14.00	11/22/2015	1421	5.30	12/16/2015	1246	0.72	0.1358	-0.8669
22	15.40	11/22/2015	1426	2.83	12/16/2015	1241	0.32	0.1131	-0.9466
Average Ratio								0.0780	-1.1399
Antilog of Average									0.0725

**AFTER MEASUREMENTS**

2012 Proof Point Number	Distance (kilometers)	6.25 kW, ND			5 kW, DA-NIGHT				
		Date	Time (local)	Field Strength (mV/m)	Date	Time (local)	Field Strength (mV/m)	Ratio (DA-N/ND)	Log Ratio (DA-N/ND)
11	3.41	3/12/2016	848	89.5	3/12/2016	1236	9.92	0.1108	-0.9553
12	4.22	3/12/2016	857	52.0	3/12/2016	1241	4.25	0.0817	-1.0876
13 MP	5.58	3/12/2016	906	28.1	3/12/2016	1247	2.6	0.0925	-1.0337
14	6.48	3/12/2016	911	28.0	3/12/2016	1251	1.9	0.0679	-1.1684
15	7.31	3/12/2016	917	16.3	3/12/2016	1256	0.4	0.0245	-1.6101
16	8.02	3/12/2016	924	23.2	3/12/2016	1300	0.52	0.0224	-1.6495
17	8.24	3/12/2016	927	14.9	3/12/2016	1303	0.76	0.0510	-1.2924
18	9.69	3/12/2016	933	10.6	3/12/2016	1308	0.62	0.0585	-1.2329
19	11.20	3/12/2016	939	8.2	3/12/2016	1312	0.52	0.0634	-1.1978
20	12.90	3/12/2016	950	6.7	3/12/2016	1321	0.4	0.0597	-1.2240
21	14.00	3/12/2016	959	4.95	3/12/2016	1332	0.35	0.0707	-1.1505
22	15.40	3/12/2016	1004	2.73	3/12/2016	1336	0.26	0.0952	-1.0212
Average Ratio								0.0665	-1.2186
Antilog of Average									0.0604

**TABULATION OF FIELD STRENGTH MEASUREMENT DATA  
STATION WWRC, WASHINGTON, DC  
1260 kHz, 35 kW-D, 5 kW-N, DA-2**

**198 Degrees True Radial**

**BEFORE MEASUREMENTS**

2012 Proof Point Number	Distance (kilometers)	6.25 kW, ND			5 kW, DA-NIGHT				
		Date	Time (local)	Field Strength (mV/m)	Date	Time (local)	Field Strength (mV/m)	Ratio (DA-N/ND)	Log Ratio (DA-N/ND)
14	2.38	11/23/2015	1025	110	12/16/2015	1352	127	1.1545	0.0624
15	2.87	11/23/2015	1031	92	12/16/2015	1404	111	1.2065	0.0815
16	3.34	11/23/2015	1035	82	12/16/2015	1400	92	1.1220	0.0500
17	3.77	11/23/2015	1040	43	12/16/2015	1411	49	1.1395	0.0567
18	4.41	11/23/2015	1044	71	12/16/2015	1445	74	1.0423	0.0180
19	4.91	11/23/2015	1049	41	12/16/2015	1422	43	1.0488	0.0207
20 MP	5.31	11/23/2015	1055	51	12/16/2015	1425	64	1.2549	0.0986
21	6.63	11/23/2015	1104	26.5	12/16/2015	1417	31.5	1.1887	0.0751
22	7.94	11/23/2015	1108	14.5	12/16/2015	1404	14.5	1.0000	0.0000
23	9.75	11/23/2015	1116	5.6	12/16/2015	1355	6.2	1.1071	0.0442
Average Ratio								1.1264	0.0507
Antilog of Average									1.1239

**AFTER MEASUREMENTS**

2012 Proof Point Number	Distance (kilometers)	6.25 kW, ND			5 kW, DA-NIGHT				
		Date	Time (local)	Field Strength (mV/m)	Date	Time (local)	Field Strength (mV/m)	Ratio (DA-N/ND)	Log Ratio (DA-N/ND)
14	2.38	3/12/2016	842	152	3/12/2016	1238	158	1.0395	0.0168
15	2.87	3/12/2016	853	110	3/12/2016	1242	108	0.9818	-0.0080
16	3.34	3/12/2016	857	110	3/12/2016	1246	72.2	0.6564	-0.1829
17	3.77	3/12/2016	909	54.3	3/12/2016	1251	53.9	0.9926	-0.0032
18	4.41	3/12/2016	915	77.8	3/12/2016	1256	74.9	0.9627	-0.0165
19	4.91	3/12/2016	923	43.8	3/12/2016	1306	45.9	1.0479	0.0203
20 MP	5.31	3/12/2016	929	62	3/12/2016	1309	60.2	0.9710	-0.0128
21	6.63	3/12/2016	937	28.5	3/12/2016	1318	30.4	1.0667	0.0280
22	7.94	3/12/2016	943	11.5	3/12/2016	1324	12.8	1.1130	0.0465
23	9.75	3/12/2016	951	5.3	3/12/2016	1330	5.43	1.0245	0.0105
Average Ratio								0.9856	-0.0101
Antilog of Average									0.9770

**TABULATION OF FIELD STRENGTH MEASUREMENT DATA  
STATION WWRC, WASHINGTON, DC  
1260 kHz, 35 kW-D, 5 kW-N, DA-2**

**280 Degrees True Radial**

**BEFORE MEASUREMENTS**

2012 Proof Point Number	Distance (kilometers)	6.25 kW, ND			5 kW, DA-NIGHT				
		Date	Time (local)	Field Strength (mV/m)	Date	Time (local)	Field Strength (mV/m)	Ratio (DA-N/ND)	Log Ratio (DA-N/ND)
10	3.82	11/22/2015	1335	64	12/16/2015	1321	7	0.1094	-0.9611
11 MP	4.38	11/22/2015	1339	37.5	12/16/2015	1315	1.35	0.0360	-1.4437
12	5.02	11/22/2015	1343	39.5	12/16/2015	1308	2.25	0.0570	-1.2444
13	5.76	11/22/2015	1347	11	12/16/2015	1300	0.92	0.0836	-1.0776
14	6.81	11/22/2015	1351	21.75	12/16/2015	1252	1.45	0.0667	-1.1761
15	7.77	11/22/2015	1355	15.25	12/16/2015	1331	0.85	0.0557	-1.2539
16	9.34	11/22/2015	1403	8.5	12/16/2015	1315	0.2	0.0235	-1.6284
17	10.70	11/22/2015	1410	5.7	12/16/2015	1309	0.4	0.0702	-1.1538
18	12.00	11/22/2015	1417	4.7	12/16/2015	1230	0.12	0.0255	-1.5929
19	13.10	11/22/2015	1424	5.2	12/16/2015	1247	0.12	0.0231	-1.6368
20	14.50	11/22/2015	1439	4.25	12/16/2015	1257	0.32	0.0753	-1.1232
Average Ratio								0.0569	-1.2993
Antilog of Average									0.0502

**AFTER MEASUREMENTS**

2012 Proof Point Number	Distance (kilometers)	6.25 kW, ND			5 kW, DA-NIGHT				
		Date	Time (local)	Field Strength (mV/m)	Date	Time (local)	Field Strength (mV/m)	Ratio (DA-N/ND)	Log Ratio (DA-N/ND)
10	3.82	3/12/2016	1031	64	3/12/2016	1614	5.86	0.0916	-1.0383
11 MP	4.38	3/12/2016	1037	29.5	3/12/2016	1611	2	0.0678	-1.1688
12	5.02	3/12/2016	1043	36.5	3/12/2016	1604	2.99	0.0819	-1.0866
13	5.76	3/12/2016	1047	13.75	3/12/2016	1601	1.05	0.0764	-1.1171
14	6.81	3/12/2016	1052	21	3/12/2016	1553	0.84	0.0400	-1.3979
15	7.77	3/12/2016	1056	14	3/12/2016	1549	0.35	0.0250	-1.6021
16	9.34	3/12/2016	1106	7.3	3/12/2016	1539	0.44	0.0603	-1.2199
17	10.70	3/12/2016	1113	5.5	3/12/2016	1531	0.24	0.0436	-1.3602
18	12.00	3/12/2016	1120	3.85	3/12/2016	1524	0.11	0.0286	-1.5441
19	13.10	3/12/2016	1127	4.45	3/12/2016	1518	0.28	0.0629	-1.2012
20	14.50	3/12/2016	1142	3.9	3/12/2016	1509	0.26	0.0667	-1.1761
Average Ratio								0.0586	-1.2647
Antilog of Average									0.0544

**TABULATION OF FIELD STRENGTH MEASUREMENT DATA  
STATION WWRC, WASHINGTON, DC  
1260 kHz, 35 kW-D, 5 kW-N, DA-2**

**325 Degrees True Radial**

**BEFORE MEASUREMENTS**

2012 Proof Point Number	Distance (kilometers)	6.25 kW, ND			5 kW, DA-NIGHT				
		Date	Time (local)	Field Strength (mV/m)	Date	Time (local)	Field Strength (mV/m)	Ratio (DA-N/ND)	Log Ratio (DA-N/ND)
10 MP	2.57	11/23/2015	1027	118	12/17/2015	1010	49	0.4153	-0.3817
11	3.75	11/23/2015	1033	60	12/17/2015	1015	22.4	0.3733	-0.4279
12	4.24	11/23/2015	1036	59	12/17/2015	1017	21.9	0.3712	-0.4304
13	5.09	11/23/2015	1040	31.3	12/17/2015	1021	12.7	0.4058	-0.3917
14	5.47	11/23/2015	1044	34.2	12/17/2015	1024	11.8	0.3450	-0.4621
15	6.29	11/23/2015	1048	29.2	12/17/2015	1028	11.4	0.3904	-0.4085
16	7.83	11/23/2015	1055	16.6	12/17/2015	1033	7.2	0.4337	-0.3628
17	8.90	11/23/2015	1059	17.2	12/17/2015	1042	6	0.3488	-0.4574
18	9.55	11/23/2015	1104	11.7	12/17/2015	1045	5	0.4274	-0.3692
19	9.83	11/23/2015	1115	12	12/17/2015	1054	5.1	0.4250	-0.3716
20	11.30	11/23/2015	1121	7.4	12/17/2015	1100	2.87	0.3878	-0.4113
21	11.64	11/23/2015	1126	4.95	12/17/2015	1103	1.89	0.3818	-0.4181
Average Ratio								0.3921	-0.4077
Antilog of Average									0.3911

**AFTER MEASUREMENTS**

2012 Proof Point Number	Distance (kilometers)	6.25 kW, ND			5 kW, DA-NIGHT				
		Date	Time (local)	Field Strength (mV/m)	Date	Time (local)	Field Strength (mV/m)	Ratio (DA-N/ND)	Log Ratio (DA-N/ND)
10 MP	2.57	3/12/2016	1038	100	3/12/2016	1556	43	0.4300	-0.3665
11	3.75	3/12/2016	1043	50.5	3/12/2016	1550	22	0.4356	-0.3609
12	4.24	3/12/2016	1046	46	3/12/2016	1546	19.1	0.4152	-0.3817
13	5.09	3/12/2016	1050	25	3/12/2016	1542	11	0.4400	-0.3565
14	5.47	3/12/2016	1054	26	3/12/2016	1539	10.7	0.4115	-0.3856
15	6.29	3/12/2016	1058	21	3/12/2016	1536	9.6	0.4571	-0.3399
16	7.83	3/12/2016	1104	13.3	3/12/2016	1531	6.1	0.4586	-0.3385
17	8.90	3/12/2016	1110	15	3/12/2016	1522	6.4	0.4267	-0.3699
18	9.55	3/12/2016	1122	10.5	3/12/2016	1519	4.5	0.4286	-0.3680
19	9.83	3/12/2016	1127	10.4	3/12/2016	1516	4.5	0.4327	-0.3638
20	11.30	3/12/2016	1132	6.07	3/12/2016	1511	2.7	0.4448	-0.3518
21	11.64	3/12/2016	1136	3.94	3/12/2016	1502	1.67	0.4239	-0.3728
Average Ratio								0.4337	-0.3630
Antilog of Average									0.4335