

APPENDIX K

WWTL FIELD STRENGTH MEASUREMENTS

(Extracted from WWTL 1995 Full Proof
of Performance - BL-19950921AC)

Figure 11
Page 1 of 1

Tabulation of Field Strength Measurements									
Call: WWTL Frequency(kHz): 700 Bearing: 018° Power(kW): 1.25/5.0									
Point ###	1995 NON-DIRECTIONAL			1995 DAY DIRECTIONAL			Distance	Ratio	MP
	mV/m	Time	Date	mV/m	Time	Date	km		*
1	330.000	1325	06-01-95				0.40		
2	250.000	1320	06-01-95	760.000	1312	06-01-95	0.60	3.0400	
3	270.000	1315	06-01-95	740.000	1309	06-01-95	0.80	2.7407	
4	230.000	1311	06-01-95	660.000	1306	06-01-95	1.00	2.8696	
5	249.000	1308	06-01-95	660.000	1303	06-01-95	1.20	2.6506	
6	210.000	1305	06-01-95	540.000	1300	06-01-95	1.40	2.5714	
7	180.000	1300	06-01-95	470.000	1255	06-01-95	1.60	2.6111	
8	140.000	1330	06-01-95	350.000	1220	06-01-95	1.80	2.5000	
9	100.000	1010	07-03-95	222.000	0945	06-19-95	2.00	2.2200	
10	96.000	1345	06-01-95	239.000	1206	06-01-95	2.80	2.4896	
11	90.000	1350	06-01-95	239.000	1200	06-01-95	3.00	2.6556	
12	47.000	1020	07-03-95	100.000	0957	06-19-95	4.15	2.1277	
13	44.000	1024	07-03-95	102.000	1001	06-19-95	4.25	2.3182	
14	39.000	1032	07-03-95	104.000	1052	06-19-95	4.70	2.6667	
15	35.000	1042	07-03-95	98.000	1032	06-19-95	5.88	2.8000	
16	27.000	1047	07-03-95	72.000	1028	06-19-95	7.05	2.6667	
17	22.000	1052	07-03-95	65.000	1020	06-19-95	7.70	2.9545	
18	12.900	1028	07-03-95	35.000	1109	06-19-95	8.75	2.7132	
19	5.400	1103	07-03-95	16.200	1119	06-19-95	9.80	3.0000	
20	12.000	1108	07-03-95	30.000	1123	06-19-95	10.55	2.5000	
21	7.500	1112	07-03-95	23.000	1132	06-19-95	11.10	3.0667	
22	7.800	1116	07-03-95	17.500	1140	06-19-95	12.70	2.2436	
23	7.600	1120	07-03-95	18.500	1151	06-19-95	13.50	2.4342	
24	8.200	1130	07-03-95	20.000	1157	06-19-95	15.15	2.4390	
25	5.600	1138	07-03-95	14.000	1206	06-19-95	17.28	2.5000	
26	6.700	1153	07-03-95	14.000	1212	06-19-95	18.30	2.0896	
27	4.400	1200	07-03-95	11.300	1221	06-19-95	19.50	2.5682	
28	4.100	1211	07-03-95	11.800	1228	06-19-95	21.00	2.8780	
29	3.900	1208	07-03-95	10.900	1235	06-19-95	21.80	2.7949	
30	3.500	1216	07-03-95	9.600	1243	06-19-95	22.65	2.7429	
31	3.600	1224	07-03-95	9.900	1250	06-19-95	24.50	2.7500	
32	3.050	1229	07-03-95	8.000	1256	06-19-95	25.90	2.6230	
33	2.580	1253	07-03-95	6.900	1325	06-19-95	28.25	2.6744	
34	2.900	1245	07-03-95	7.000	1316	06-19-95	29.90	2.4138	
35	2.480	1308	07-03-95	6.300	1336	06-19-95	31.10	2.5403	
36	2.580	1315	07-03-95	6.200	1344	06-19-95	33.10	2.4031	
Average Arithmetic Ratio =								2.6073	
Average Logarithmic Ratio =								2.5960	

Millivolts Per Meter (Multiply Scale by 10)

1995 NON-DIRECTIONAL

GROUND WAVE FIELD STRENGTH
VERSUS
DISTANCE

Call sign : WVTL
Frequency: 700 kHz
Power : 1.25 kW
Direction: 018 Deg.
Exhibit : 11A

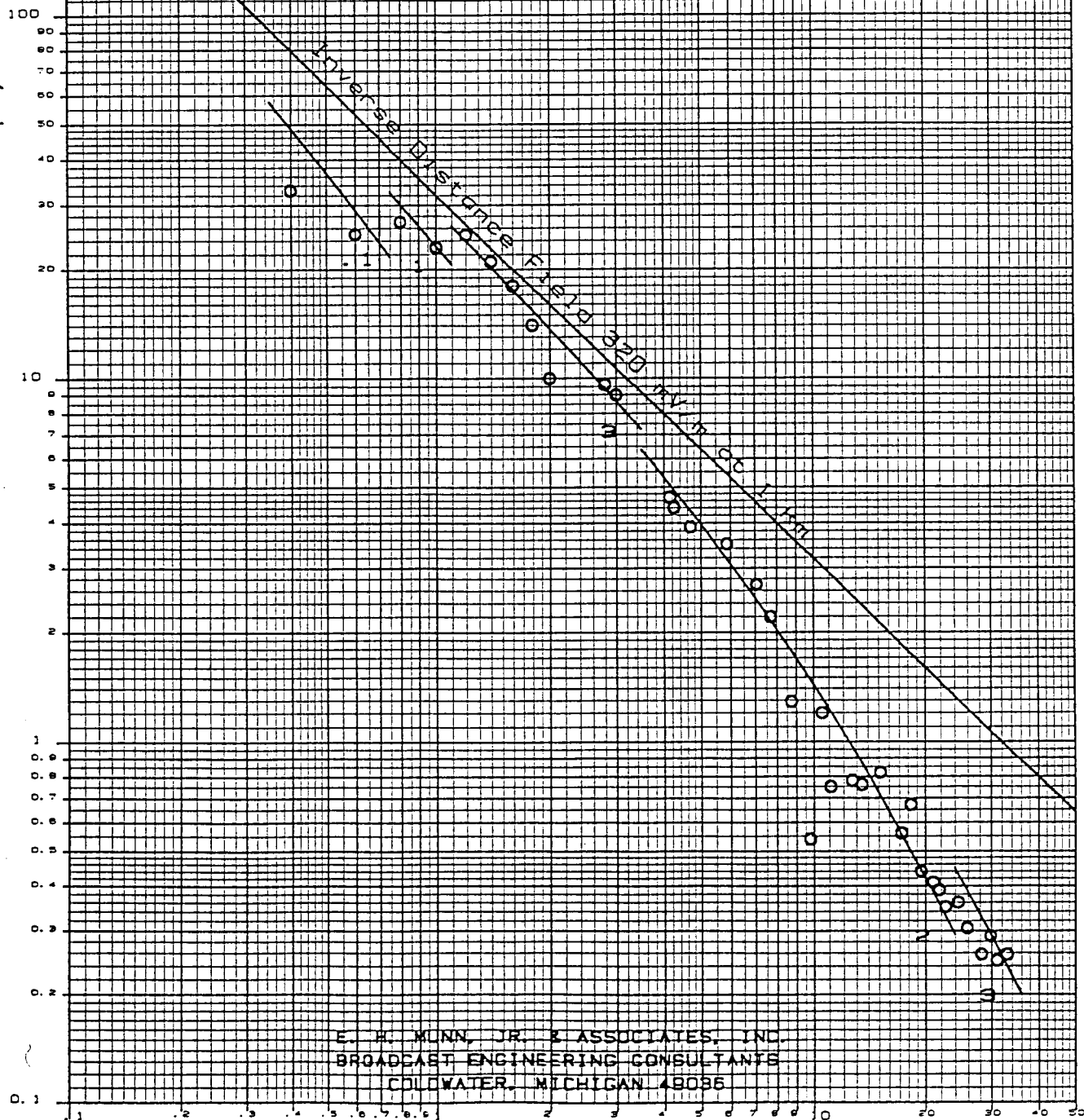
690-710 kHz

Curves computed for 700 kHz

$n=15$

BASED UPON GRAPH 6-A

Multiply Vertical Scale By 10



E. H. MUNN, JR. & ASSOCIATES, INC.
BROADCAST ENGINEERING CONSULTANTS
COLDWATER, MICHIGAN 49036

Kilometers From Antenna

E. H. Munn, Jr. & Associates
BROADCAST ENGINEERING CONSULTANTS
Coldwater, Michigan 49036

Figure 12
Page 1 of 2

Tabulation of Field Strength Measurements										
Call: WWTL Frequency(kHz): 700 Bearing: 050° Power(kW): 1.25/5.0										
Point ###	1995 NON-DIRECTIONAL			1995 DAY DIRECTIONAL			Distance	Ratio	MP	
	mV/m	Time	Date	mV/m	Time	Date	km		*	
1	760.000	1130	06-20-95	1500.000	1236	06-01-95	0.40	1.9737		
2	630.000	1120	06-20-95	1120.000	1228	06-01-95	0.50	1.7778		
3	580.000	1100	06-20-95	860.000	1224	06-01-95	0.60	1.4828		
4	420.000	1050	06-20-95	760.000	1217	06-01-95	0.70	1.8095		
5	375.000	1040	06-20-95	620.000	1212	06-01-95	0.80	1.6533		
6	255.000	1030	06-20-95	500.000	1209	06-01-95	0.90	1.9608		
7	232.000	1730	06-09-95	500.000	1202	06-01-95	1.00	2.1552		
8	199.000	1032	06-09-95	440.000	1154	06-01-95	1.10	2.2111		
9	159.000	1725	06-09-95	330.000	1510	06-01-95	1.20	2.0755		
10	158.000	1720	06-09-95	300.000	1515	06-01-95	1.40	1.8987		
11	155.000	1155	06-20-95	240.000	1520	06-01-95	1.50	1.5484		
12	157.000	1715	06-09-95	230.000	1524	06-01-95	1.60	1.4650		
13	116.000	1710	06-09-95	220.000	1526	06-01-95	1.70	1.8966		
14	99.000	1700	06-09-95	200.000	1538	06-01-95	1.80	2.0202		
15	86.000	1645	06-09-95	170.000	1632	06-01-95	2.00	1.9767		
16	76.000	1630	06-09-95	170.000	1545	06-01-95	2.40	2.2368		
17	77.000	1205	06-20-95	150.000	1556	06-01-95	2.50	1.9481		
18	72.000	1630	06-09-95	140.000	1600	06-01-95	2.60	1.9444		
19	72.000	1620	06-09-95	130.000	1614	06-01-95	2.80	1.8056		
20	48.000	1555	06-09-95	135.000	1620	06-01-95	3.00	2.8125		
21	45.000	1354	06-05-95	81.000	1355	05-30-95	3.10	1.8000		
22	48.500	1545	06-09-95	82.000	1258	06-05-95	3.20	1.6907		
23	34.000	1400	06-05-95	64.000	1409	05-30-95	4.00	1.8824		
24	33.000	1410	06-05-95	47.000	1415	05-30-95	4.70	1.4242		
25	19.500	1418	06-05-95	38.000	1420	05-30-95	6.10	1.9487		
26	12.500	1454	06-05-95	24.000	1429	05-30-95	7.00	1.9200		
27	7.000	1640	06-20-95	13.000	1437	05-30-95	9.50	1.8571		
28	12.000	1532	06-05-95	23.000	1441	05-30-95	10.00	1.9167		
29	9.100	1603	06-05-95	18.000	1448	05-30-95	11.10	1.9780		
30	7.800	1650	06-05-95	14.000	1508	05-30-95	12.40	1.7949		
31	8.200	1727	06-05-95	16.000	1524	05-30-95	13.60	1.9512		
32	7.700	1708	06-05-95	15.000	1518	05-30-95	14.60	1.9481		
33	5.100	1746	06-05-95	10.000	1541	05-30-95	15.35	1.9608		
34	5.000	1759	06-05-95	10.000	1537	05-30-95	15.50	2.0000		
35	5.100	1806	06-05-95	11.000	1532	05-30-95	16.10	2.1569		
36	4.600	1559	06-05-95	10.000	1432	06-05-95	16.20	2.1739		
37	4.200	1616	06-05-95	8.500	1420	06-05-95	17.20	2.0238		
38	3.700	1339	06-05-95	7.900	1552	05-30-95	19.80	2.1351		
39	2.500	1427	06-05-95	4.700	1601	05-30-95	21.10	1.8800		
40	2.200	1638	06-05-95	4.200	1607	05-30-95	22.60	1.9091		
41	1.200	1429	06-05-95	2.100	1611	05-30-95	23.60	1.7500		
42	2.800	1447	06-05-95	5.200	1620	05-30-95	24.40	1.8571		

Figure 12
Page 2 of 2

Average Arithmetic Ratio = 1.9024
Average Logarithmic Ratio = 1.8882

Millivolts Per Meter (Multiply Scale by 10)

1995 NON-DIRECTIONAL

GROUND WAVE FIELD STRENGTH
VERSUS
DISTANCE

Coll sign : WTL
Frequency: 700 kHz
Power : 1.25 kW
Direction: 050 Deg.
Exhibit : 12A

690-710 kHz
Curves computed for 700 kHz
 $\epsilon=15$

BASED UPON GRAPH 5-A
Multiply Vertical Scale By 10

E. H. MUNN, JR. & ASSOCIATES, INC.
BROADCAST ENGINEERING CONSULTANTS
COLLWATER, MICHIGAN 49036

Kilometers From Antenna

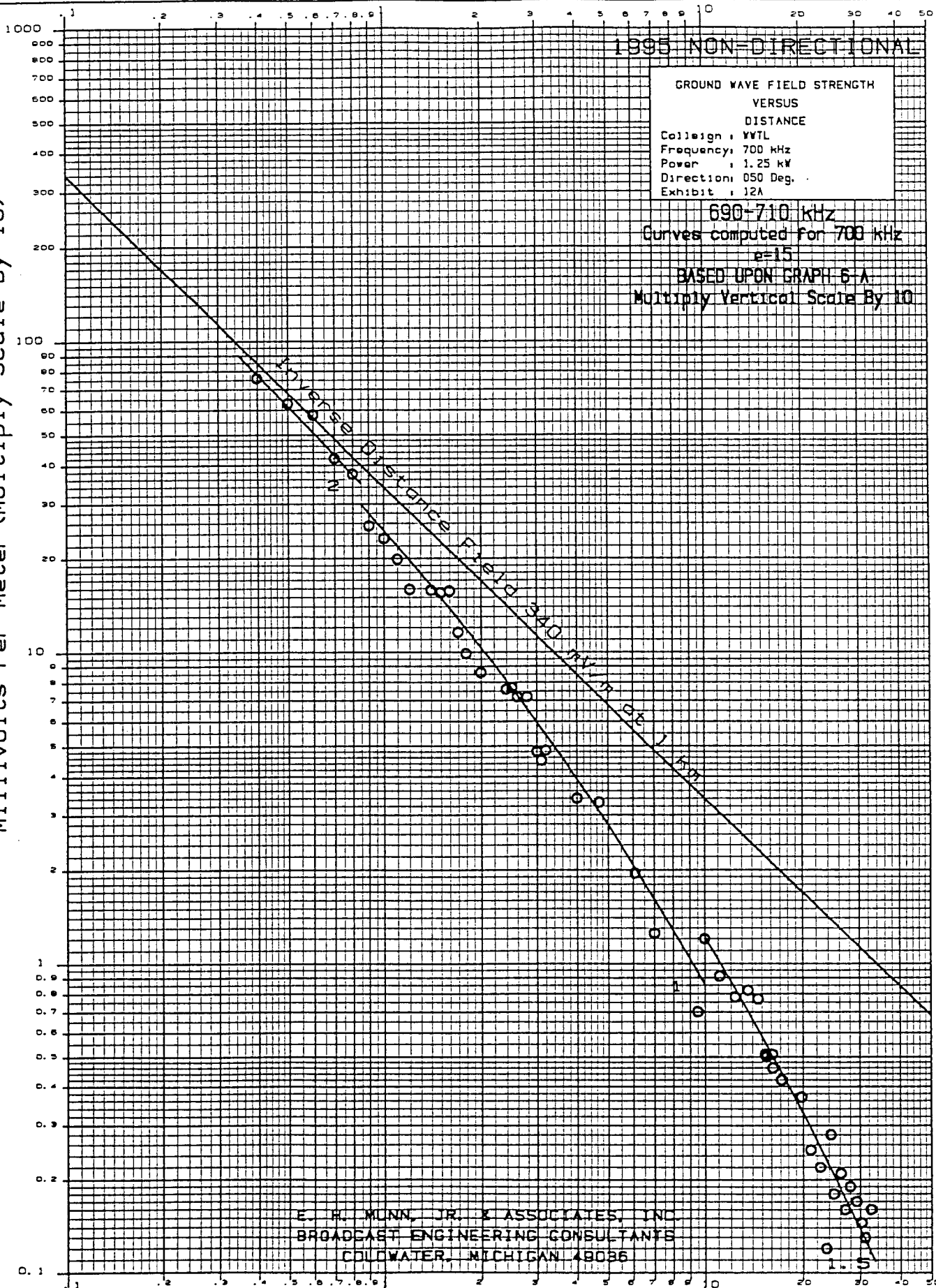


Figure 13
Page 1 of 1

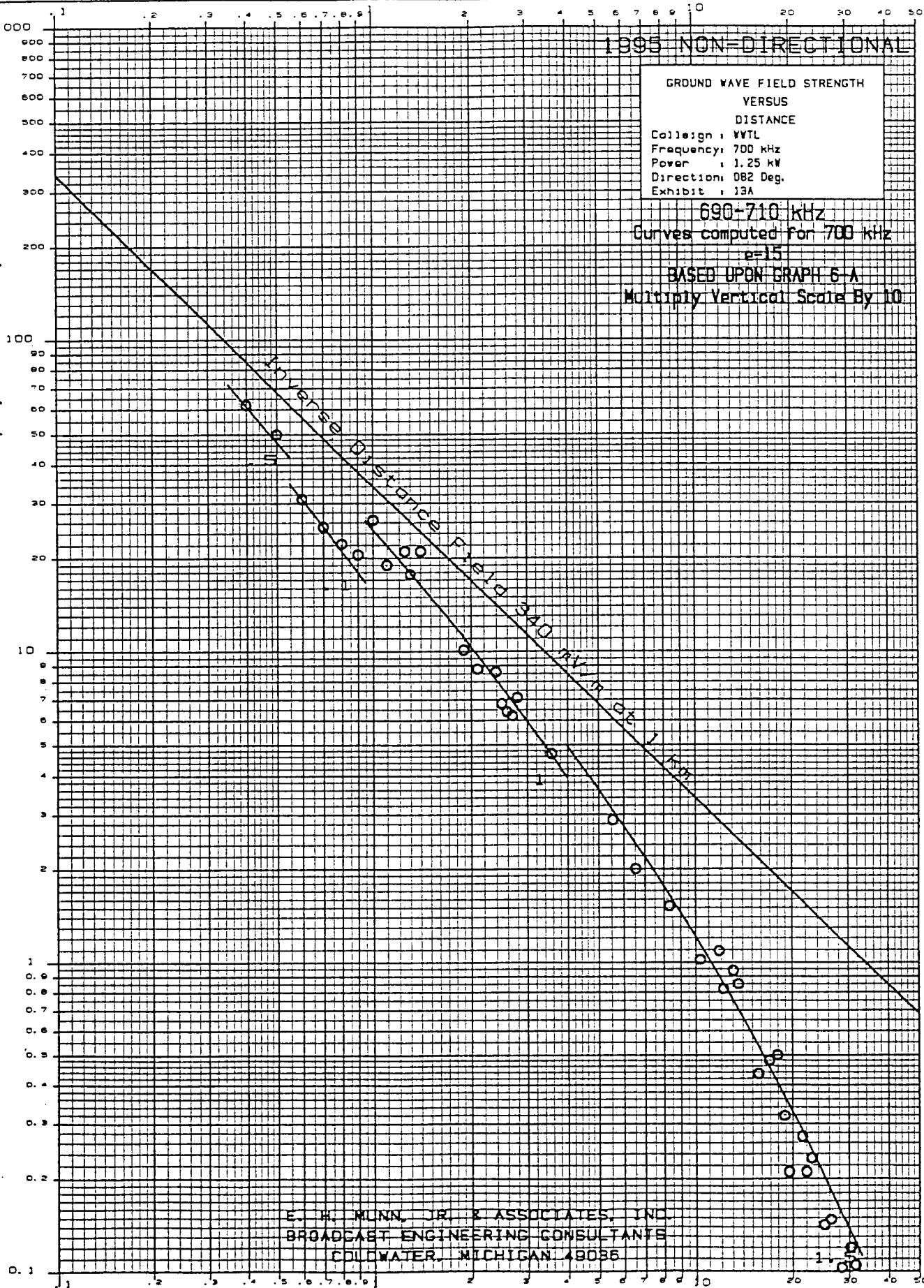
Average Arithmetic Ratio = 1.4994✓
Average Logarithmic Ratio = 1.4860✓

Millivolts Per Meter (Multiply Scale by 10)

1995 NON-DIRECTIONAL

GROUND WAVE FIELD STRENGTH
VERSUS
DISTANCE
Call sign : WVTL
Frequency: 700 kHz
Power : 1.25 kW
Direction: 082 Deg.
Exhibit : 13A

690-710 KHz
Curves computed for 700 kHz
 $p=15$
BASED UPON GRAPH 6-A
Multiply Vertical Scale By 10



E. H. MUNN, JR. & ASSOCIATES, INC.
BROADCAST ENGINEERING CONSULTANTS
COLDWATER, MICHIGAN 49036

Kilometers From Antenna

Figure 14
Page 1 of 1

Tabulation of Field Strength Measurements									
Call: WWTL Frequency(kHz): 700 Bearing: 130° Power(kW): 1.25/5.0									
Point ###	1995 NON-DIRECTIONAL			1995 DAY DIRECTIONAL			Distance	Ratio	MP *
	mV/m	Time	Date	mV/m	Time	Date	km		
1	940.000	1252	08-02-95				0.40		
2	530.000	1211	08-02-95				0.62		
3	282.000	1325	08-02-95	373.000	1003	08-02-95	1.00	1.3227	
4	200.000	1328	08-02-95	288.000	1113	08-02-95	1.40	1.4400	
5	177.000	1332	08-02-95	260.000	1015	08-02-95	1.50	1.4689	
6	153.000	1333	08-02-95	250.000	1109	08-02-95	1.63	1.6340	
7	130.000	1335	08-02-95	202.000	1021	08-02-95	2.00	1.5538	
8	80.000	1340	08-02-95	132.000	1030	08-02-95	2.95	1.6500	
9	25.000	1349	08-02-95	44.000	1041	08-02-95	5.30	1.7600	
10	25.200	1356	08-02-95	47.500	1044	08-02-95	6.10	1.8849	
11	26.500	1402	08-02-95	47.500	1049	08-02-95	6.95	1.7925	
12	15.200	1407	08-02-95	26.500	1256	05-31-95	7.70	1.7434	
13	8.000	1427	08-02-95	14.000	1314	05-31-95	10.00	1.7500	
14	9.500	1438	08-02-95	17.800	1324	05-31-95	11.50	1.8737	
15	6.200	1232	06-08-95	11.900	1327	05-31-95	13.50	1.9194	
16	4.200	1224	06-08-95	9.000	1347	05-31-95	14.88	2.1429	
17	3.050	1210	06-08-95	6.400	1407	05-31-95	17.30	2.0984	
18	2.450	1154	06-08-95	4.800	1416	05-31-95	18.70	1.9592	
19	2.000	1150	06-08-95	4.200	1426	05-31-95	20.20	2.1000	
20	1.530	1139	06-08-95	3.400	1441	05-31-95	23.10	2.2222	
21	1.150	1133	06-08-95	2.400	1205	06-06-95	24.50	2.0870	
22	1.000	1155	06-08-95	2.100	1226	06-06-95	27.30	2.1000	
23	0.930	1120	06-08-95	1.800	1230	06-06-95	28.10	1.9355	
24	0.920	1116	06-08-95	1.900	1235	06-06-95	28.50	2.0652	
25	0.820	1110	06-08-95	1.600	1243	06-06-95	29.70	1.9512	
26	0.850	1041	06-08-95	1.950	1257	06-06-95	32.10	2.2941	
27	0.730	1055	06-08-95	1.400	1312	06-06-95	33.30	1.9178	
28	0.790	1049	06-08-95	1.550	1322	06-06-95	34.70	1.9620	
Average Arithmetic Ratio =							1.8703		
Average Logarithmic Ratio =							1.8534		

Millivolts Per Meter (Multiply Scale by 10)

1895 NON-DIRECTIONAL

GROUND WAVE FIELD STRENGTH
VERSUS
DISTANCE

STATION : WTL
FREQUENCY: 700 kHz
POWER : 1.25 kW
DIRECTION: 130 Deg.
EXHIBIT : 14A

690-710 kHz

Curves computed for 700 kHz

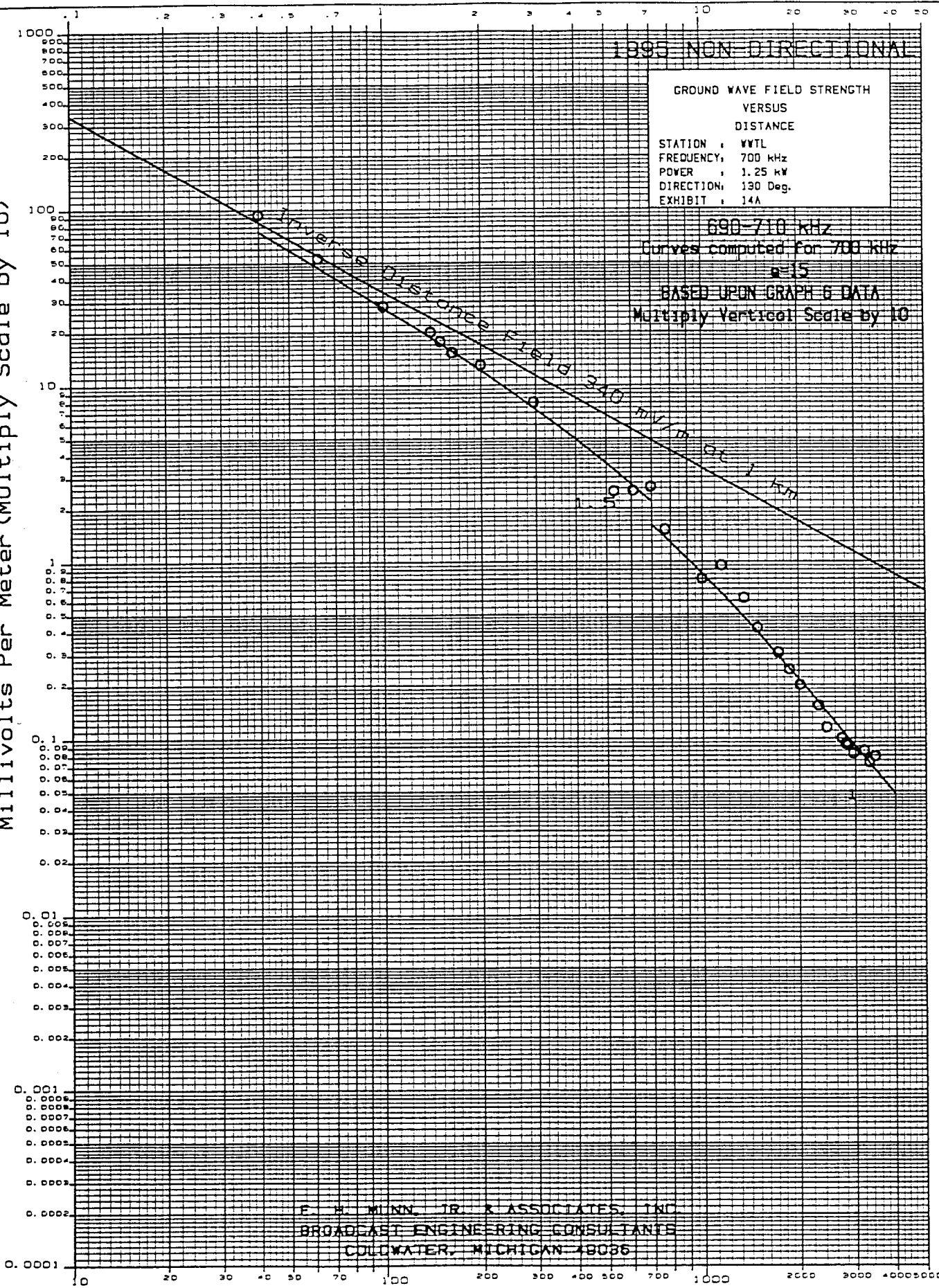
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BASED UPON GRAPH 6 DATA

Multiply Vertical Scale by 10

F. H. MINN, JR. & ASSOCIATES, INC.
BROADCAST ENGINEERING CONSULTANTS
COLUMBIA, MICHIGAN 49036

Kilometers From Antenna



E. H. Munn, Jr. & Associates
BROADCAST ENGINEERING CONSULTANTS
Coldwater, Michigan 49036

Figure 15
Page 1 of 1

Tabulation of Field Strength Measurements									
Call: WWTL Frequency(kHz): 700 Bearing: 190° Power(kW): 1.25/5.0									
Point ###	1995 NON-DIRECTIONAL mV/m Time Date			1995 DAY DIRECTIONAL mV/m Time Date			Distance km	Ratio	MP *
1	845.000	1530	06-07-95				0.29		
2	800.000	1237	05-22-95	2700.000	1830	06-15-95	0.42	3.3750	
3	580.000	1555	06-05-95	1700.000	1135	06-05-95	0.60	2.9310	
4	356.000	1600	06-05-95	1150.000	1140	06-05-95	0.80	3.2303	
5	270.000	1255	05-22-95	990.000	1835	06-15-95	1.00	3.6667	
6	230.000	1257	05-22-95	750.000	1836	06-15-95	1.20	3.2609	
7	210.500	1609	06-05-95	540.000	1155	06-05-95	1.40	2.5653	
8	170.000	1400	05-22-95	540.000	1839	06-15-95	1.60	3.1765	
9	135.000	1356	05-22-95	460.000	1841	06-15-95	1.80	3.4074	
10	140.000	1614	06-05-95	440.000	1205	06-05-95	2.00	3.1429	
11	100.000	1336	05-22-95	380.000	1845	06-15-95	2.20	3.8000	
12	105.000	1327	05-22-95	330.000	1846	06-15-95	2.40	3.1429	
13	100.500	1617	06-05-95	310.000	1210	06-05-95	2.60	3.0846	
14	88.000	1618	06-05-95	255.000	1215	06-05-95	2.80	2.8977	
15	78.000	1313	05-22-95	230.000	1853	06-15-95	3.00	2.9487	
16	40.000	1408	05-22-95	130.000	1859	06-15-95	4.80	3.2500	
17	24.000	1437	05-22-95	80.000	1337	06-15-95	6.45	3.3333	
18	23.000	1444	05-22-95	72.000	1340	06-15-95	7.10	3.1304	
19	11.300	1456	05-22-95	32.000	1347	06-15-95	9.18	2.8319	
20	7.600	1529	05-22-95	23.000	1357	06-15-95	11.60	3.0263	
21	6.000	1544	05-31-95	15.000	1829	06-15-95	14.88	2.5000	
22	4.500	1554	05-22-95	13.400	1822	06-15-95	17.80	2.9778	
23	3.600	1605	05-22-95	10.000	1809	06-15-95	18.70	2.7778	
24	3.300	1612	05-22-95	10.050	1800	06-15-95	20.55	3.0455	
25	3.200	1621	05-22-95	8.800	1754	06-15-95	21.50	2.7500	
26	2.500	1632	05-22-95	9.400	1740	06-15-95	23.42	3.7600	
27	1.700	1650	05-22-95	4.500	1727	06-15-95	27.10	2.6471	
28	1.600	1719	05-22-95	4.200	1719	06-15-95	29.65	2.6250	
29	1.000	1712	05-22-95	1.500	1705	06-15-95	32.15	1.5000	
30	1.050	1725	05-22-95	2.600	1658	06-15-95	33.00	2.4762	
31	1.400	1729	05-22-95	2.150	1655	06-15-95	34.20	1.5357	
32	1.100	1747	05-22-95	3.000	1641	06-15-95	36.70	2.7273	
								Average Arithmetic Ratio =	2.9524
								Average Logarithmic Ratio =	2.8995

Millivolts Per Meter (Multiply Scale by 10)

1995 NON-DIRECTIONAL

GROUND WAVE FIELD STRENGTH
VERSUS
DISTANCE

Call sign : WVTI
Frequency: 700 kHz
Power : 1.25 kW
Direction: 190 Deg.
Exhibit : 15A

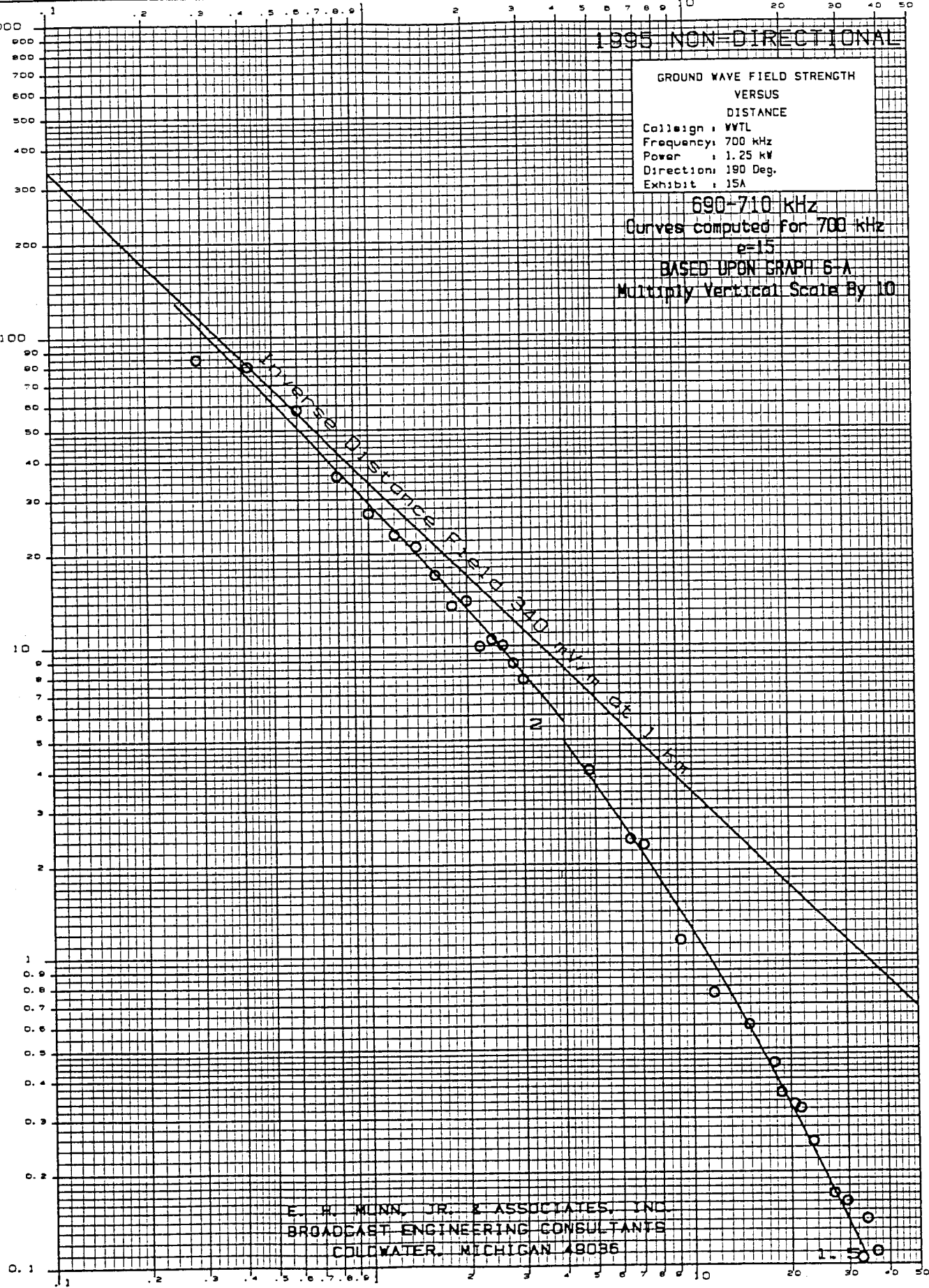
690-710 kHz

Curves computed for 700 kHz

$\epsilon=15$

BASED UPON GRAPH 5-A

Multiply Vertical Scale By 10



E. W. MUNN, JR. & ASSOCIATES, INC.
BROADCAST ENGINEERING CONSULTANTS
COLUMBIA, MICHIGAN 48036

Kilometers From Antenna