



**Engineering Statement
in support of an
Application for FM Translator
Channel Change Due to Displacement
and
Request for Waiver
W296AX
Escanaba, MI
Board of Trustees of Northern Michigan University**

Background

The Board of Trustees of Northern Michigan University (NMU) is the licensee of Non-Commercial (NCE) stations WNMU-FM (BLED-1511, Facility ID 49572), WNMU-TV and WNMU-DT, Marquette, MI. NMU also holds a license for translator W296AX at Escanaba, MI (BLFT-19980218TK, Facility ID 4262). W296AX (CH296, 107.1 MHz) is a vital link in bringing NMU educational programming to Escanaba. In March 2008, FM station WUPF-FM at Powers, MI (BLH-20080304AAD, Facility ID 164245), commenced broadcasting. WUPF-FM (CH297, 107.3 MHz) has notified NMU that W296AX is causing it interference and has requested that NMU change its frequency. Exhibit 1 (attached) shows that interference to WUPF-FM is predicted. WUPF-FM has consented to allow NMU to operate W296AX for a reasonable period of time until a new frequency can be found. An adjacent frequency is not available for W296AX to use where it is not predicted to cause interference to another full power FM station; therefore, NMU now wishes to apply for a change in frequency to 97.9 MHz (CH250) due to displacement^{1/} and respectfully requests a waiver of the Commission's Rules and Policies relating to major change applications and grant this application as a minor change.

^{1/} Section 74.1233(a) lists any frequency change, other than a change to the first, second or third adjacent channels, or intermediate frequency channels as a major change.



Station Parameters

Except for the change in frequency from CH296 to CH250 there are no proposed changes in the W296AX station parameters. The station parameters are listed below and include the proposed channel change.

The coordinates of the proposed site are:

45° 44' 43" N (NAD 27)
87° 03' 14" W

Proposed Frequency: 97.9 MHz (CH250)

Polarization: Horizontal

ERP: 0.031 kW

HAAT: 49m

RC AMSL: 241m

RC AGL: 58m

The antenna pattern and type (Scala CA-4 70° skew) remain the same. The antenna is mounted on top of a hotel that is 63m AGL in such a manner that it does not increase the overall height of the existing structure. The existing structure (hotel) does not pass the FCC's TOWAIR program.

Interference

An interference study that shows there is no predicted interference to other domestic or Canadian FM stations is included as Exhibit 2.



Request for Waiver

NMU has been providing Educational Programming to Escanaba through W296AX for many years. A new Full Service FM station (WUPF-FM) is now claiming that W296AX is interfering with it and requests that W296AX cease operation on CH296. NMU has searched for an adjacent frequency that would not cause interference to other Full Service FM stations or translators to no avail. Operation of W296AX on CH250 (97.9 MHz) is not predicted to cause interference to any other FM stations, domestic or Canadian, but such a change in frequency would be considered a major change. NMU requests a waiver of the Commission's Rules and Policies relating to major changes and allow W296AX to change its frequency from CH296 to CH250 as a minor change so that it may continue the Educational Programming it is providing to Escanaba.

Environmental & RFR

The proposed construction does not require preparation of an Environmental Assessment as it does not involve any of the factors listed in Section 1.1306.

The additional ground level RFR contributed to the site by this proposal in public areas is calculated to be 0.000012 mW/cm^2 which is less than 5% of the MPE for public exposure (0.2 mW/cm^2) at the proposed frequency and, therefore, the proposal is excluded from further consideration.

NMU agrees to comply with the Commission's requirements regarding power adjustments or cessation of operation as may be necessary to ensure a compliant environment for worker access. Workers will be encouraged to wear personal RFR monitors when on the structure. The tower base is enclosed by a locked security fence and appropriate signage warning of RFR hazards is posted.

**Certification**

I hereby certify that the foregoing report or statement was prepared by me but may include work performed by others under my supervision or direction. The statements of fact contained therein are believed to be true and correct based on personal knowledge, information and belief unless otherwise stated; with respect to facts not known of my own personal knowledge, I believe them to be true and correct based on their origin from sources known to me to be generally reliable and accurate. I have prepared this document with due care and in accordance with applicable standards of professional practice.

John F.X. Browne, P.E.

September 11, 2008

Exhibit 1

REFERENCE CH# 296D - W296AX Licensed Facility on Channel 296
 45 44 43.0 N. 107.1 MHz, Pwr= 0.031 kW, HAAT= 49.0 M, COR= 241 M DISPLAY DATES
 87 03 14.0 W. Average Protected F(50-50)= 5.4 km DATA 08-30-08
 Standard Directional SEARCH 09-04-08

CH CITY	CALL	TYPE STATE	ANT STATE	AZI <--	DIST FILE #	LAT LNG	PWR(kW) HAAT(M)	INT(km) COR(M)	PRO(km) LICENSEE	*IN* (Overlap in km)	*OUT*
297C3 Powers	WUPF	CP MI	_CX	260.5 80.3	23.13 BPH20080422AAY	45 42 39.0 87 20 49.0	25.000 97	63.3 329	41.7 Radioactive, Lic	-44.92*	-25.28*
297C3 Powers	WUPF	LIC MI	_CX	261.1 80.8	37.31 BLH20080304AAD	45 41 34.0 87 31 38.0	6.200 25	27.1 284	18.4 Radioactive, Lic	5.51	12.28
295A Ephraim	AU7049364	VAC WI	---	185.3 5.2	64.21 RM10008	45 10 12.0 87 07 46.0	6.000 100	45.2 284	29.3 Carrie Riordan	16.19	30.94
299C1 Ishpeming	WMQT-FM	LIC MI	_C_	331.7 151.2	95.84 BLH20040528ABO	46 30 08.0 87 38 52.0	100.000 195	8.4 625	64.4 Taconite Broadcasting, Inc	84.07	31.18
294C3 Iron Mountain	WHTO	LIC MI	ZCX	276.6 95.9	77.36 BLH20070620ADW	45 49 16.0 88 02 34.0	6.100 206	3.8 548	40.6 Results Broadcasting Of Ir	69.32	36.39
297D Stephenson	W297AE	LIC MI	_CN	228.6 48.2	54.57 BLFT19970108TC	45 25 11.0 87 34 38.0	0.027 78	9.1 295	6.4 Bd Of Cntrl, Northern Mich	39.82	40.24
296A Oconto	WOCO-FM	LIC WI	_CN	216.9 36.3	118.26 BLH4131	44 53 31.0 87 57 18.0	3.000 64	68.2 259	19.6 Lamardo Inc.	44.57	80.68
295A Baileys Harbor	WLGE	LIC WI	NCX	185.2 5.2	77.16 BLH20080428ACJ	45 03 14.0 87 08 37.0	6.000 56	28.9 244	19.7 Michael J. Mesic	45.41	53.51

Terrain database is USGS 03 SEC Distance + R = 73.215 or FCC Spacings in KM, Distance + M = Margin in KM
 Contour distances are on direct line to and from reference station. Reference zone = 2. With 3rd Adj Channels.
 Ant Column: (D= DA Standard, Z= DA 73.215, N= Not DA 73.215, _= Omni), Polarization (C,H,V,E), Beamtilt(Y,N,X)
 "*"affixed to 'IN' or 'OUT' values = site inside protected contour.
 "<" = Contour Overlap
 Reference station has protected zone issue: Canada

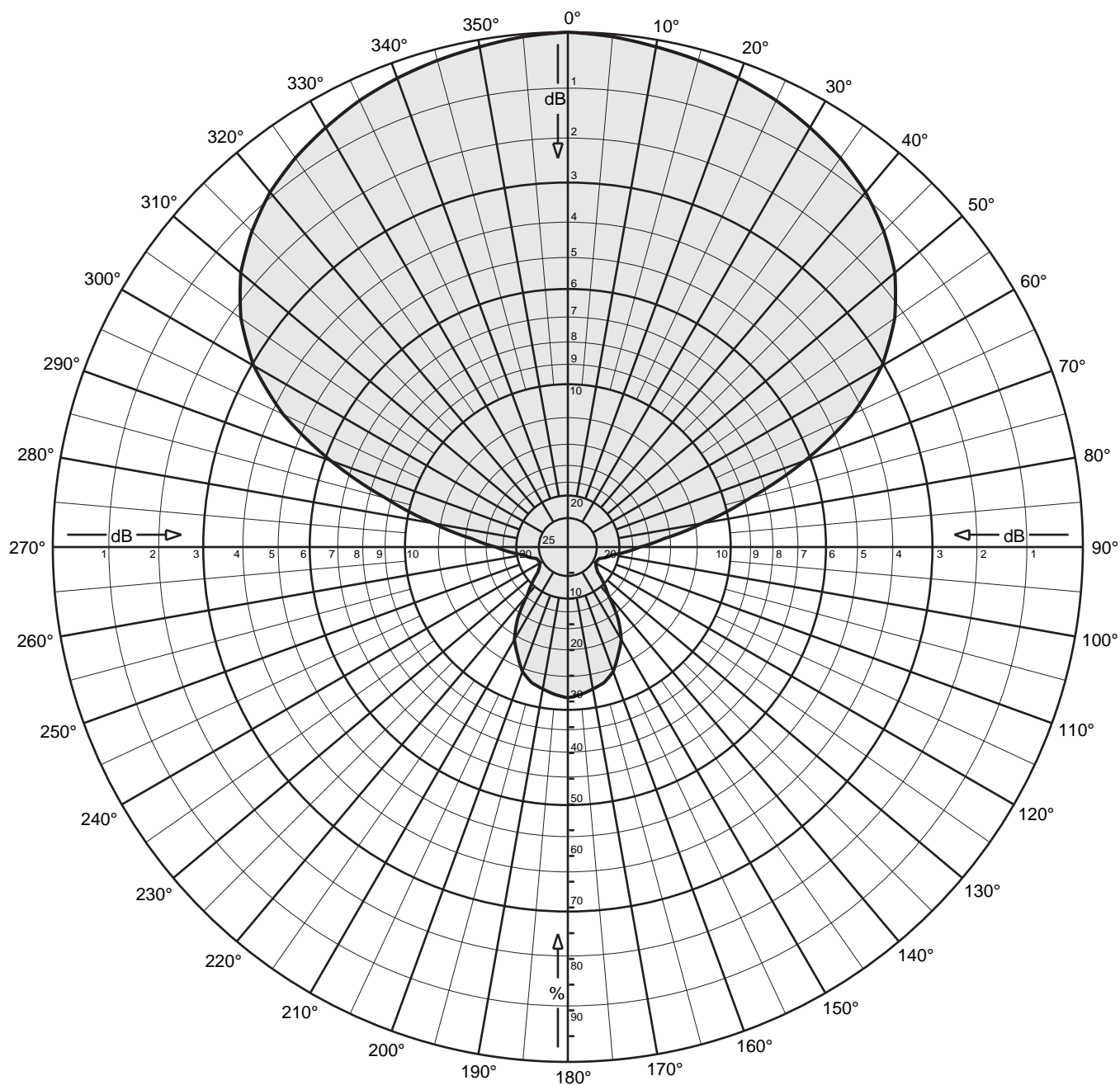
John F. X. Browne & Associates P.C.

Exhibit 2

REFERENCE CH# 250D - 97.9 MHz, Pwr= 0.031 kW, HAAT= 49.0 M, COR= 241 M DISPLAY DATES
 45 44 43.0 N. Average Protected F(50-50)= 5.4 km DATA 08-30-08
 87 03 14.0 W. Standard Directional SEARCH 09-04-08

CH CITY	CALL	TYPE ANT STATE	AZI <--	DIST FILE #	LAT LNG	PWR(kW) HAAT(M)	INT(km) COR(M)	PRO(km) LICENSEE	*IN* (Overlap in km)	*OUT*
250C2 Newberry	WI HC	LIC _CN MI	61.8 243.2	170.09 BLH199601118K	46 26 58.0 85 06 04.0	50.000 150	139.3 383	53.7 Northern Star Broadcasting	28.35	108.89
252C2 Munising	WRUP	LIC _CN MI	21.3 201.6	80.00 BLH19920313KB	46 24 53.0 86 40 27.0	32.000 109	4.0 360	38.4 Great Lakes Radio, Inc.	74.46	41.55
251A Kingsford	WEUL	LIC _C_ MI	277.3 96.6	80.57 BLED20010628ABG	45 49 58.0 88 04 57.0	1.000 142	34.8 495	23.3 Gospel Opportunities, Inc.	41.57	51.33
249A Sturgeon Bay	WSRG	LIC NCN WI	194.9 14.7	96.74 BLH19960422KC	44 54 14.0 87 22 13.0	1.850 182	41.0 378	27.2 Al Johnson Broadcasting, L	51.95	64.16
251C2 Glen Arbor	WGFN	LIC NCN MI	140.8 321.5	132.04 BLH19971212KD	44 49 16.0 85 59 47.0	21.000 225	76.7 447	52.0 Northern Star Broadcasting	53.65	77.64

Terrain database is USGS 03 SEC Distance + R = 73.215 or FCC Spacings in KM, Distance + M = Margin in KM
 Contour distances are on direct line to and from reference station. Reference zone = 2. With 3rd Adj Channels.
 Ant Column: (D= DA Standard, Z= DA 73.215, N= Not DA 73.215, _= Omni), Polarization (C,H,V,E), Beamtilt(Y,N,X)
 "<" = Contour Overlap
 Reference station has protected zone issue: Canada



Two CA2-FM Yagi antennas

Skewed 70 degrees

Gain: 5.0 dBd

Horizontal Polarization

Vertical stack

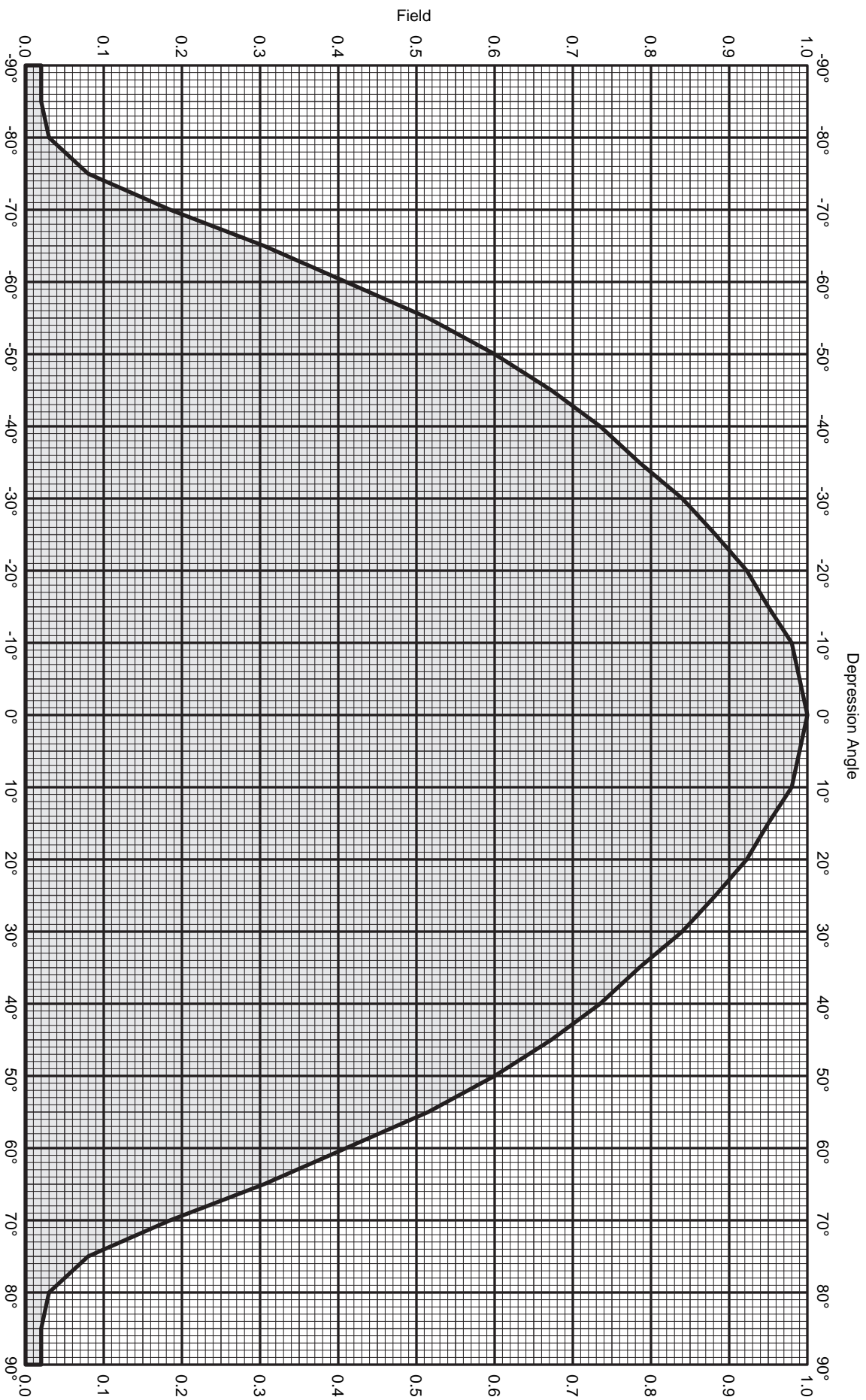
Horizontal plane Pattern



Two CA2-FM Yagi antennas
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Vertical stack
 Horizontal plane Pattern

Angle	Field	Rel.dB	dBd	PwrMult	Angle	Field	Rel.dB	dBd	PwrMult
0	1.000	0.00	5.00	3.16	180	0.293	-10.66	-5.66	0.27
5	0.995	-0.04	4.96	3.13	185	0.287	-10.83	-5.83	0.26
10	0.987	-0.12	4.88	3.08	190	0.280	-11.06	-6.06	0.25
15	0.979	-0.19	4.81	3.03	195	0.273	-11.29	-6.29	0.23
20	0.969	-0.27	4.73	2.97	200	0.257	-11.78	-6.78	0.21
25	0.957	-0.38	4.62	2.90	205	0.231	-12.73	-7.73	0.17
30	0.941	-0.53	4.47	2.80	210	0.207	-13.66	-8.66	0.14
35	0.923	-0.70	4.30	2.69	215	0.170	-15.39	-10.39	0.09
40	0.900	-0.92	4.08	2.56	220	0.123	-18.24	-13.24	0.05
45	0.868	-1.23	3.77	2.38	225	0.097	-20.22	-15.22	0.03
50	0.829	-1.63	3.37	2.17	230	0.075	-22.44	-17.44	0.02
55	0.775	-2.21	2.79	1.90	235	0.067	-23.48	-18.48	0.01
60	0.704	-3.04	1.96	1.57	240	0.062	-24.08	-19.08	0.01
65	0.610	-4.29	0.71	1.18	245	0.062	-24.08	-19.08	0.01
70	0.490	-6.20	-1.20	0.76	250	0.065	-23.74	-18.74	0.01
75	0.366	-8.74	-3.74	0.42	255	0.078	-22.21	-17.21	0.02
80	0.265	-11.54	-6.54	0.22	260	0.087	-21.16	-16.16	0.02
85	0.188	-14.54	-9.54	0.11	265	0.112	-18.98	-13.98	0.04
90	0.140	-17.08	-12.08	0.06	270	0.140	-17.08	-12.08	0.06
95	0.112	-18.98	-13.98	0.04	275	0.188	-14.54	-9.54	0.11
100	0.087	-21.16	-16.16	0.02	280	0.265	-11.54	-6.54	0.22
105	0.078	-22.21	-17.21	0.02	285	0.366	-8.74	-3.74	0.42
110	0.065	-23.74	-18.74	0.01	290	0.490	-6.20	-1.20	0.76
115	0.062	-24.08	-19.08	0.01	295	0.610	-4.29	0.71	1.18
120	0.062	-24.08	-19.08	0.01	300	0.704	-3.04	1.96	1.57
125	0.067	-23.48	-18.48	0.01	305	0.775	-2.21	2.79	1.90
130	0.075	-22.44	-17.44	0.02	310	0.829	-1.63	3.37	2.17
135	0.097	-20.22	-15.22	0.03	315	0.868	-1.23	3.77	2.38
140	0.123	-18.24	-13.24	0.05	320	0.900	-0.92	4.08	2.56
145	0.170	-15.39	-10.39	0.09	325	0.923	-0.70	4.30	2.69
150	0.207	-13.66	-8.66	0.14	330	0.941	-0.53	4.47	2.80
155	0.231	-12.73	-7.73	0.17	335	0.957	-0.38	4.62	2.90
160	0.257	-11.78	-6.78	0.21	340	0.969	-0.27	4.73	2.97
165	0.273	-11.29	-6.29	0.23	345	0.979	-0.19	4.81	3.03
170	0.280	-11.06	-6.06	0.25	350	0.987	-0.12	4.88	3.08
175	0.287	-10.83	-5.83	0.26	355	0.995	-0.04	4.96	3.13



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Two CA2-FM Yagi antennas

Skewed 70 degrees

Gain: 5.0 dBd

Horizontal Polarization

Vertical stack

Vertical plane Pattern



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 Vertical plane Pattern

Angle	Field	Rel.dB	dBd	PwrMult	Angle	Field	Rel.dB	dBd	PwrMult
-90	0.020	-33.98	-28.98	0.00	-45	0.673	-3.45	1.55	1.43
-89	0.020	-33.98	-28.98	0.00	-44	0.685	-3.29	1.71	1.48
-88	0.020	-33.98	-28.98	0.00	-43	0.697	-3.13	1.87	1.54
-87	0.020	-33.98	-28.98	0.00	-42	0.710	-2.97	2.03	1.59
-86	0.020	-33.98	-28.98	0.00	-41	0.722	-2.82	2.18	1.65
-85	0.020	-33.98	-28.98	0.00	-40	0.735	-2.67	2.33	1.71
-84	0.022	-33.15	-28.15	0.00	-39	0.745	-2.56	2.44	1.76
-83	0.024	-32.40	-27.40	0.00	-38	0.755	-2.44	2.56	1.80
-82	0.026	-31.70	-26.70	0.00	-37	0.765	-2.33	2.67	1.85
-81	0.028	-31.06	-26.06	0.00	-36	0.775	-2.21	2.79	1.90
-80	0.030	-30.46	-25.46	0.00	-35	0.785	-2.10	2.90	1.95
-79	0.040	-27.96	-22.96	0.01	-34	0.796	-1.98	3.02	2.00
-78	0.050	-26.02	-21.02	0.01	-33	0.807	-1.86	3.14	2.06
-77	0.060	-24.44	-19.44	0.01	-32	0.818	-1.74	3.26	2.12
-76	0.070	-23.10	-18.10	0.02	-31	0.829	-1.63	3.37	2.17
-75	0.080	-21.94	-16.94	0.02	-30	0.840	-1.51	3.49	2.23
-74	0.101	-19.91	-14.91	0.03	-29	0.849	-1.43	3.57	2.28
-73	0.122	-18.27	-13.27	0.05	-28	0.857	-1.34	3.66	2.32
-72	0.143	-16.89	-11.89	0.06	-27	0.865	-1.25	3.75	2.37
-71	0.164	-15.70	-10.70	0.09	-26	0.874	-1.17	3.83	2.42
-70	0.185	-14.66	-9.66	0.11	-25	0.883	-1.09	3.91	2.46
-69	0.209	-13.60	-8.60	0.14	-24	0.891	-1.01	3.99	2.51
-68	0.233	-12.65	-7.65	0.17	-23	0.898	-0.93	4.07	2.55
-67	0.257	-11.80	-6.80	0.21	-22	0.906	-0.85	4.15	2.60
-66	0.281	-11.03	-6.03	0.25	-21	0.914	-0.78	4.22	2.64
-65	0.305	-10.31	-5.31	0.29	-20	0.923	-0.70	4.30	2.69
-64	0.326	-9.74	-4.74	0.34	-19	0.928	-0.65	4.35	2.72
-63	0.347	-9.19	-4.19	0.38	-18	0.933	-0.60	4.40	2.76
-62	0.368	-8.68	-3.68	0.43	-17	0.939	-0.55	4.45	2.79
-61	0.389	-8.20	-3.20	0.48	-16	0.944	-0.50	4.50	2.82
-60	0.410	-7.74	-2.74	0.53	-15	0.950	-0.45	4.55	2.85
-59	0.431	-7.31	-2.31	0.59	-14	0.956	-0.39	4.61	2.89
-58	0.452	-6.90	-1.90	0.65	-13	0.962	-0.34	4.66	2.93
-57	0.473	-6.50	-1.50	0.71	-12	0.968	-0.28	4.72	2.96
-56	0.494	-6.13	-1.13	0.77	-11	0.974	-0.23	4.77	3.00
-55	0.515	-5.76	-0.76	0.84	-10	0.980	-0.18	4.82	3.04
-54	0.532	-5.48	-0.48	0.90	-9	0.982	-0.16	4.84	3.05
-53	0.549	-5.21	-0.21	0.95	-8	0.984	-0.14	4.86	3.06
-52	0.566	-4.94	0.06	1.01	-7	0.986	-0.12	4.88	3.07
-51	0.583	-4.69	0.31	1.07	-6	0.988	-0.10	4.90	3.09
-50	0.600	-4.44	0.56	1.14	-5	0.990	-0.09	4.91	3.10
-49	0.615	-4.23	0.77	1.19	-4	0.992	-0.07	4.93	3.11
-48	0.629	-4.03	0.97	1.25	-3	0.994	-0.05	4.95	3.12
-47	0.643	-3.83	1.17	1.31	-2	0.996	-0.03	4.97	3.14
-46	0.658	-3.64	1.36	1.37	-1	0.998	-0.02	4.98	3.15
					0	1.000	0.00	5.00	3.16



Two CA2-FM Yagi antennas
 Skewed 70 degrees
 Gain: 5.0 dBd
 Horizontal Polarization

Vertical stack
 Vertical plane Pattern

Angle	Field	Rel.dB	dBd	PwrMult	Angle	Field	Rel.dB	dBd	PwrMult
0	1.000	0.00	5.00	3.16	45	0.673	-3.45	1.55	1.43
1	0.998	-0.02	4.98	3.15	46	0.658	-3.64	1.36	1.37
2	0.996	-0.03	4.97	3.14	47	0.643	-3.83	1.17	1.31
3	0.994	-0.05	4.95	3.12	48	0.629	-4.03	0.97	1.25
4	0.992	-0.07	4.93	3.11	49	0.615	-4.23	0.77	1.19
5	0.990	-0.09	4.91	3.10	50	0.600	-4.44	0.56	1.14
6	0.988	-0.10	4.90	3.09	51	0.583	-4.69	0.31	1.07
7	0.986	-0.12	4.88	3.07	52	0.566	-4.94	0.06	1.01
8	0.984	-0.14	4.86	3.06	53	0.549	-5.21	-0.21	0.95
9	0.982	-0.16	4.84	3.05	54	0.532	-5.48	-0.48	0.90
10	0.980	-0.18	4.82	3.04	55	0.515	-5.76	-0.76	0.84
11	0.974	-0.23	4.77	3.00	56	0.494	-6.13	-1.13	0.77
12	0.968	-0.28	4.72	2.96	57	0.473	-6.50	-1.50	0.71
13	0.962	-0.34	4.66	2.93	58	0.452	-6.90	-1.90	0.65
14	0.956	-0.39	4.61	2.89	59	0.431	-7.31	-2.31	0.59
15	0.950	-0.45	4.55	2.85	60	0.410	-7.74	-2.74	0.53
16	0.944	-0.50	4.50	2.82	61	0.389	-8.20	-3.20	0.48
17	0.939	-0.55	4.45	2.79	62	0.368	-8.68	-3.68	0.43
18	0.933	-0.60	4.40	2.76	63	0.347	-9.19	-4.19	0.38
19	0.928	-0.65	4.35	2.72	64	0.326	-9.74	-4.74	0.34
20	0.923	-0.70	4.30	2.69	65	0.305	-10.31	-5.31	0.29
21	0.914	-0.78	4.22	2.64	66	0.281	-11.03	-6.03	0.25
22	0.906	-0.85	4.15	2.60	67	0.257	-11.80	-6.80	0.21
23	0.898	-0.93	4.07	2.55	68	0.233	-12.65	-7.65	0.17
24	0.891	-1.01	3.99	2.51	69	0.209	-13.60	-8.60	0.14
25	0.883	-1.09	3.91	2.46	70	0.185	-14.66	-9.66	0.11
26	0.874	-1.17	3.83	2.42	71	0.164	-15.70	-10.70	0.09
27	0.865	-1.25	3.75	2.37	72	0.143	-16.89	-11.89	0.06
28	0.857	-1.34	3.66	2.32	73	0.122	-18.27	-13.27	0.05
29	0.849	-1.43	3.57	2.28	74	0.101	-19.91	-14.91	0.03
30	0.840	-1.51	3.49	2.23	75	0.080	-21.94	-16.94	0.02
31	0.829	-1.63	3.37	2.17	76	0.070	-23.10	-18.10	0.02
32	0.818	-1.74	3.26	2.12	77	0.060	-24.44	-19.44	0.01
33	0.807	-1.86	3.14	2.06	78	0.050	-26.02	-21.02	0.01
34	0.796	-1.98	3.02	2.00	79	0.040	-27.96	-22.96	0.01
35	0.785	-2.10	2.90	1.95	80	0.030	-30.46	-25.46	0.00
36	0.775	-2.21	2.79	1.90	81	0.028	-31.06	-26.06	0.00
37	0.765	-2.33	2.67	1.85	82	0.026	-31.70	-26.70	0.00
38	0.755	-2.44	2.56	1.80	83	0.024	-32.40	-27.40	0.00
39	0.745	-2.56	2.44	1.76	84	0.022	-33.15	-28.15	0.00
40	0.735	-2.67	2.33	1.71	85	0.020	-33.98	-28.98	0.00
41	0.722	-2.82	2.18	1.65	86	0.020	-33.98	-28.98	0.00
42	0.710	-2.97	2.03	1.59	87	0.020	-33.98	-28.98	0.00
43	0.697	-3.13	1.87	1.54	88	0.020	-33.98	-28.98	0.00
44	0.685	-3.29	1.71	1.48	89	0.020	-33.98	-28.98	0.00
					90	0.020	-33.98	-28.98	0.00