

Copy of Manufacturer's Directional Antenna Pattern Data



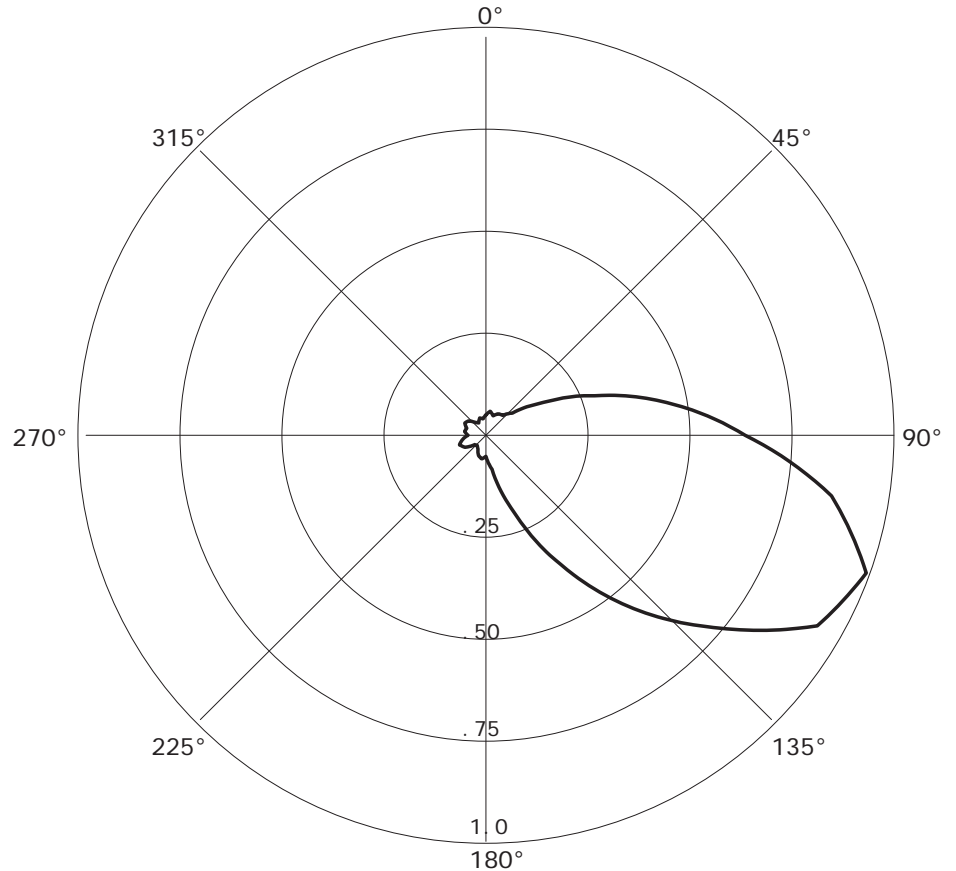
CL-FM(Slant-45)x2 "Side by Side" Configuration COMPOSITE PATTERN

03-07-2014

RMS(V) = .348

Graph is Relative Field

Azi	Field	dBk	kW
000	0.050	-32.041	0.001
010	0.060	-30.458	0.001
020	0.051	-31.869	0.001
030	0.061	-30.314	0.001
040	0.064	-29.897	0.001
050	0.085	-27.432	0.002
060	0.159	-21.993	0.006
070	0.284	-16.954	0.020
080	0.455	-12.860	0.052
090	0.635	-9.965	0.101
100	0.860	-7.331	0.185
110	0.992	-6.090	0.246
111	1.000	-6.021	0.250
120	0.938	-6.577	0.220
130	0.737	-8.671	0.136
140	0.554	-11.150	0.077
150	0.368	-14.704	0.034
160	0.201	-19.957	0.010
170	0.085	-27.432	0.002
180	0.052	-31.701	0.001
190	0.059	-30.604	0.001
200	0.053	-31.535	0.001
210	0.039	-34.199	0.000
220	0.033	-35.650	0.000
230	0.036	-34.895	0.000
240	0.059	-30.604	0.001
250	0.069	-29.244	0.001
260	0.058	-30.752	0.001
270	0.044	-33.152	0.000
280	0.053	-31.535	0.001
290	0.050	-32.041	0.001
300	0.060	-30.458	0.001
310	0.055	-31.213	0.001
320	0.041	-33.765	0.000
330	0.035	-35.139	0.000
340	0.045	-32.956	0.001
350	0.041	-33.765	0.000



The directional antenna pattern will be produced by means of two (2) Scala Log Periodic CL-FM broadcast elements mounted parallel to each other, (both) on a bearing of 111°T. Both elements will be mounted in the same horizontal plane with a horizontal spacing of 63 inches between each element. The elements will be fed via a phased power divid feeding each element equally. The elements will work in tandem to achieve a narrower beam than could be achieved with a single Scala CL-FM element. In addition, each element will be mounted at vertical 45° (degree) slant orientations to achieve horizontal and vertical polarization.

The CL-FM(Slant-45)x2 "Side by Side" Directional Pattern is therefore a maximum composite pattern of the current CL-FM(Horizontal) and CL-FM(Vertical) broadcast patterns as notified by the Scala Division (Kathrein-Scala) of Kathrein, Inc. and measured by Shivley Labs, a Division of Howell Laboratories, Inc. Stock antenna information from Kathrein-Scala and actual measurement information from Shivley Labs has been included here-in. The maximum antenna gain for a CL-FM(Slant-45)x2 "Side by Side" configuration has been measured by Shivley Labs to be 8.078 (9.073 dBd)

The antenna proposed in this application will be mounted in accordance with specific instructions provided by the antenna manufacturer. The directional antenna will be mounted on the tower which is of uniform cross section. No other antennas of any type are or will be mounted on the same tower level as the directional antenna.

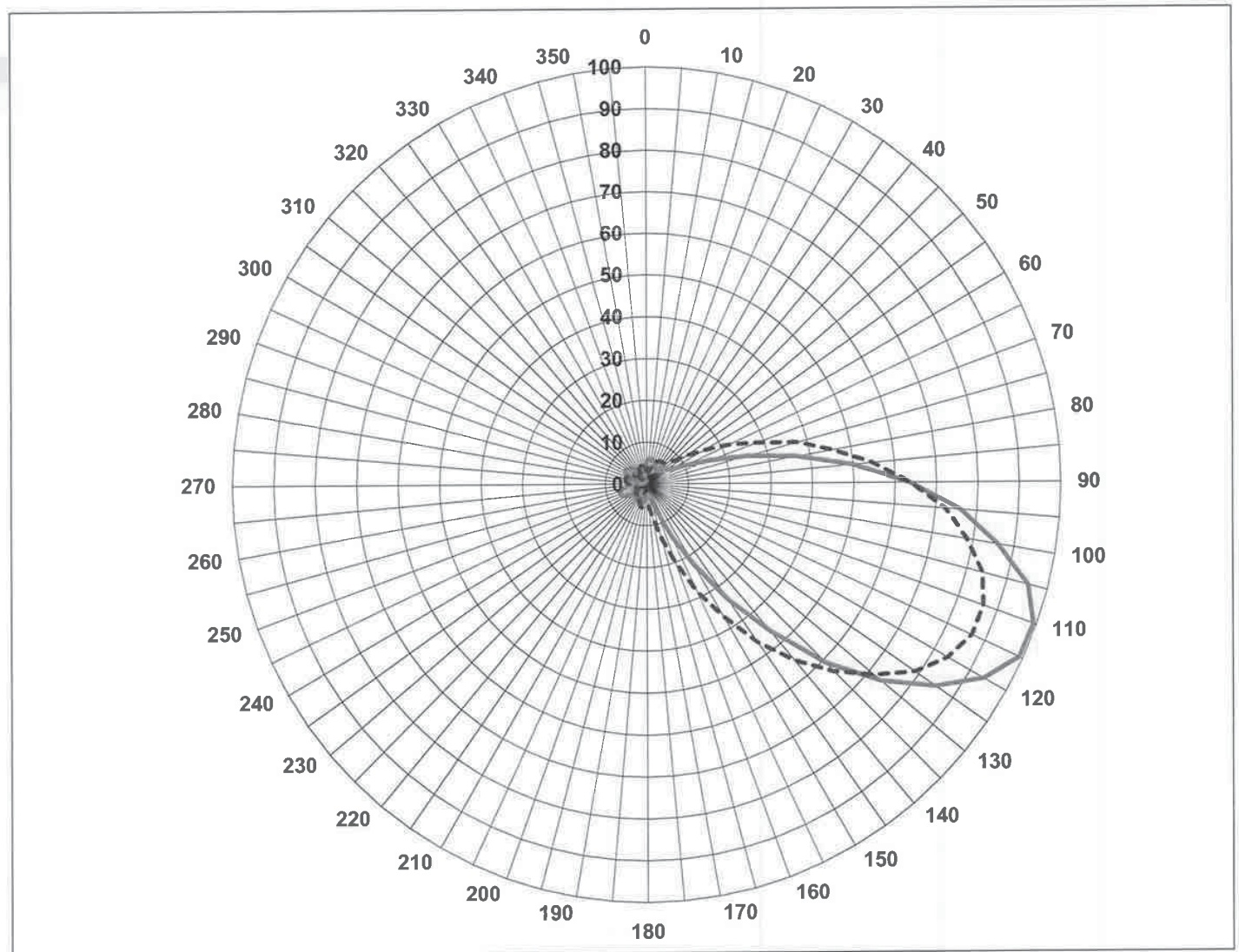
No antenna is or will be mounted within any vertical or horizontal distance specified by the antenna manufacturer as being necessary for proper operation of the directional antenna. In addition, the antenna will be assembled under the supervision of a qualified engineer and installed pursuant to the manufacturer's instructions and manufacturer specified antenna orientation.

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SCALA CL-FM SIDE BY SIDE (63-IN. APART) PATTERN STUDY

PROJECT #	W231BR
STATION	W231BR
FREQUENCY	94.1
ANTENNA TOWER	6025 1 / 1 3-FT FACE
AZIMUTHS	
YAGI 1	111
YAGI 2	
YAGI 3	
YAGI 4	
AMPLITUDE	dB
YAGI 1	0
YAGI 2	0
YAGI 3	0
YAGI 4	0
PHASING	
YAGI 1	0
YAGI 2	0
YAGI 3	0
YAGI 4	0
VERTICAL
RMS:	32.70%
HORIZONTAL	—————
RMS:	33.54%
DA-ENVELOPE	— — —
RMS:	0.00%
RMS: 85%	0.00%
COMP-RMS	35.18%



PATTERN-03
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TABULATION SHEET FOR CL-FM LOG PERIODIC 45-DEGREE ARRAY Tabulation 5 DEGREES

HORIZONTAL
RMS 33.54%
AZIMUTH GAIN 8.889

VERTICAL
RMS 32.70%

COMPOSITE
RMS 35.18%
POWER GAIN 8.078

PATTERN - 03

DEG	HORZ	VERT	DEG	HORZ	VERT	DEG	HORZ	VERT	DEG	HORZ	VERT
0	0.050	0.031	90	0.634	0.635	180	0.030	0.052	270	0.025	0.044
5	0.058	0.030	95	0.760	0.724	185	0.038	0.056	275	0.006	0.050
10	0.060	0.034	100	0.860	0.784	190	0.045	0.059	280	0.014	0.053
15	0.057	0.043	105	0.952	0.838	195	0.050	0.058	285	0.033	0.054
20	0.051	0.051	110	0.992	0.864	200	0.051	0.053	290	0.048	0.050
25	0.044	0.057	115	0.991	0.865	205	0.047	0.044	295	0.057	0.049
30	0.040	0.061	120	0.938	0.838	210	0.039	0.035	300	0.060	0.043
35	0.041	0.063	125	0.850	0.789	215	0.028	0.031	305	0.059	0.034
40	0.046	0.064	130	0.737	0.714	220	0.020	0.033	310	0.055	0.024
45	0.052	0.068	135	0.609	0.637	225	0.023	0.035	315	0.048	0.015
50	0.057	0.085	140	0.461	0.554	230	0.036	0.035	320	0.041	0.014
55	0.059	0.117	145	0.341	0.466	235	0.048	0.032	325	0.032	0.024
60	0.067	0.159	150	0.223	0.368	240	0.059	0.028	330	0.023	0.035
65	0.102	0.220	155	0.141	0.287	245	0.066	0.026	335	0.014	0.042
70	0.159	0.284	160	0.074	0.201	250	0.069	0.027	340	0.006	0.045
75	0.252	0.377	165	0.039	0.139	255	0.065	0.031	345	0.013	0.045
80	0.366	0.455	170	0.024	0.085	260	0.058	0.036	350	0.026	0.041
85	0.499	0.547	175	0.025	0.055	265	0.045	0.040	355	0.040	0.037

Copy of Manufacturer's Directional Antenna Pattern Data



CL-FM FM LOG-PERIODIC ANTENNA 7 dBd gain 88–108 MHz

The Kathrein Scala Division CL-FM is a ruggedly built log-periodic antenna, designed for professional FM transmit and receive applications.

Like all Kathrein Scala Division antennas, the CL-FM is made of the finest materials using state of the art electrical and mechanical designs, resulting in superior performance and long service life.

The CL-FM may be used stand-alone or in stacked arrays for higher gain, increased side-lobe suppression, or custom azimuth patterns.

Specifications:

Frequency range	88–108 MHz (broadband)
Gain	7 dBd
Impedance	50 or 75 ohms
VSWR	< 1.5:1
Polarization	Horizontal or vertical
Front-to-back ratio	>25 dB
Maximum input power	250 watts, type "N" 75 ohm connector 500 watts, type "N" 50 ohm connector
Azimuth pattern	52 degrees (half-power) horizontal polarization
Elevation pattern	78 degrees (half-power) horizontal polarization
Connector	Female 50Ω or 75Ω N
Weight	45 lb (20.4 kg)
Dimensions	104 x 67.9 inches (2642 x 1724 mm)

Equivalent flat plate area

CL-FM/HCM 5.31 ft² (0.494 m²)

CL-FM/HRM 5.86 ft² (0.544 m²)

CL-FM/VRM 5.86 ft² (0.544 m²)

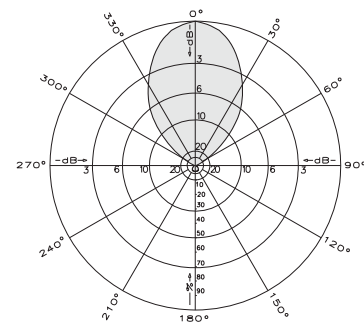
Wind survival rating*	120 mph (200 kph)
Shipping dimensions	116 x 14.5 x 6 inches (2946 x 369 x 153 mm)
Shipping weight	56 lb (25.4 kg)
Mounting	For masts of 2.375 inches (60 mm) OD.
CL-FM/HCM	Horizontal polarization center-mount
CL-FM/HRM	Horizontal polarization rear-mount
CL-FM/VRM	Vertical polarization rear-mount

See reverse for order information.

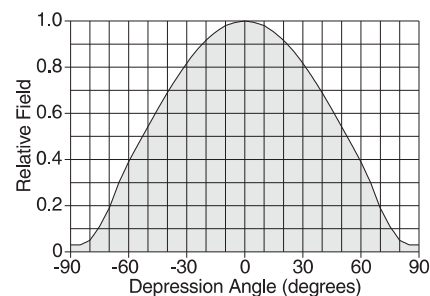
* Mechanical design is based on environmental conditions as stipulated in EIA-222-F (June 1996) and/or ETS 300 019-1-4 which include the static mechanical load imposed on an antenna by wind at maximum velocity. See the Engineering Section of the catalog for further details.



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Azimuth pattern (E-plane)

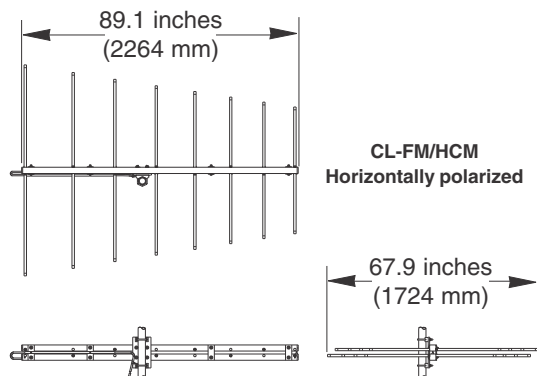


Elevation pattern (H-plane)

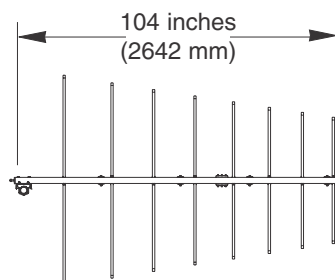
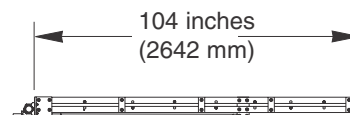
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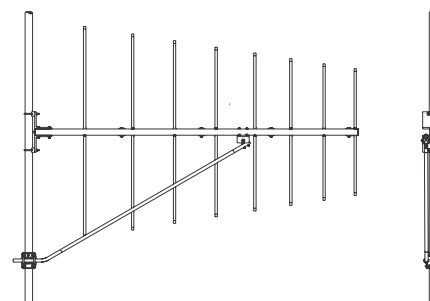
CL-FM FM LOG-PERIODIC ANTENNA 7 dBd gain 88–108 MHz



CL-FM/HCM
Horizontally polarized

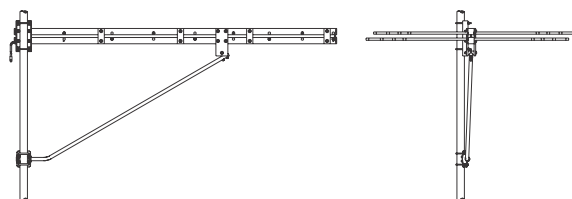


CL-FM/HRM
Horizontally polarized



CL-FM/VRM
Vertically polarized

Vertically polarized antennas require lateral stabilization (not supplied) to prevent the antenna from turning on the mounting pipe.



Order Information:

Model	Description
CL-FM/HCM/50N	Antenna with 50Ω N connector Horizontal polarization center-mount
CL-FM/HCM/75N	Antenna with 75Ω N connector Horizontal polarization center-mount
CL-FM/HRM/50N	Antenna with 50Ω N connector Horizontal polarization rear-mount

Order Information:

Model	Description
CL-FM/HRM/75N	Antenna with 75Ω N connector Horizontal polarization rear-mount
CL-FM/VRM/50N	Antenna with 50Ω N connector Vertical polarization rear-mount
CL-FM/VRM/75N	Antenna with 75Ω N connector Vertical polarization rear-mount

All specifications are subject to change without notice