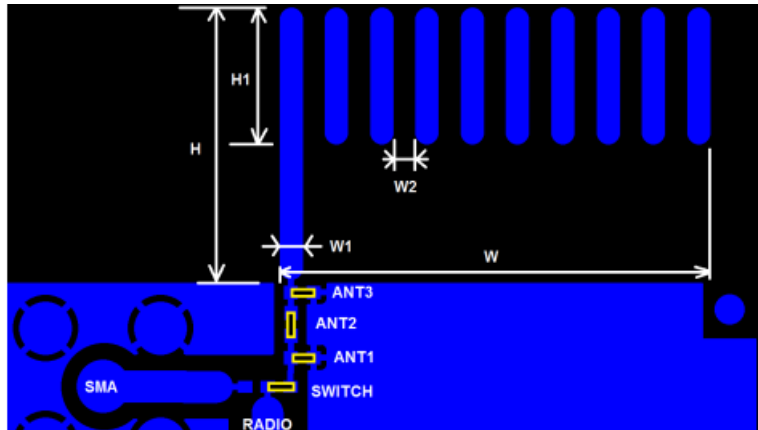


ANTENNA

- **Name and address of the manufacturer:** NCAB Group AB - Suntak Dalian plant No.11, Guangming West Street, Economic Developing District, Dalian, China
- **Model number of the antenna:** PCB printed antenna, no number
- **Maximum gain of the antenna for the frequency band of operation:** -1.3 dBi
- **Antenna patterns:**



Top Layer Layout



Zoom of Top and Bottom Layer Layout with Via Markings (the X markers indicate via positions which route between the top and bottom layers).

Dimension	H	H1	H2	W	W1	W2	Via dia
	12 mm	6 mm	0.5 mm	19 mm	1 mm	1 mm	0.38 mm

Report – 915 MHz (Antenna matched at 868 MHz)

OTA Evaluation Results:

Total Radiated Power	-3.35 dBm
Peak EIRP	0.01 dBm
Directivity	3.37 dBi
Efficiency	-3.35 dB
Efficiency	46.20 %
Gain	0.01 dBi
NHPRP 45°	-5.54 dBm
NHPRP 45° / TRP	-2.19 dB
NHPRP 45° / TRP	60.42 %
NHPRP 30°	-7.39 dBm
NHPRP 30° / TRP	-4.04 dB
NHPRP 30° / TRP	39.49 %
NHPRP 22.5°	-8.72 dBm
NHPRP 22.5° / TRP	-5.37 dB
NHPRP 22.5° / TRP	29.05 %
UHRP	-6.28 dBm
UHRP / TRP	-2.92 dB
UHRP / TRP	51.01 %
LHRP	-6.45 dBm
LHRP / TRP	-3.10 dB
LHRP / TRP	48.99 %
Front/Back Ratio	4.40
PhiBW	85.3 deg
PhiBW Up	40.5 deg
PhiBW Down	44.8 deg
ThetaBW	272.4 deg
ThetaBW Up	118.8 deg
ThetaBW Down	153.5 deg
Boresight Phi	210 deg
Boresight Theta	105 deg
Maximum Power	0.01 dBm
Minimum Power	-15.33 dBm
Average Power	-2.61 dBm
Max/Min Ratio	15.34 dB
Max/Avg Ratio	2.62 dB
Min/Avg Ratio	-12.72 dB
Best Single Value	-0.16 dBm
Best Position	Phi = 210 deg; Theta = 105 deg; Pol = Ver

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Azimuth (deg)	Elevation 0 deg (dB)	Elevation 15 deg (dB)	Elevation 30 deg (dB)	Elevation 45 deg (dB)	Elevation 60 deg (dB)	Elevation 75 deg (dB)	Elevation 90 deg (dB)	Elevation 105 deg (dB)
0.00	-1.09	-2.11	-2.67	-3.21	-6.21	-7.46	-7.02	-6.05
15.00	-1.29	-2.11	-2.21	-3.23	-5.40	-5.93	-5.16	-5.56
30.00	-1.24	-1.80	-1.61	-2.63	-4.14	-4.38	-3.52	-4.43
45.00	-1.31	-1.26	-1.82	-1.96	-2.98	-3.29	-2.76	-3.39
60.00	-1.51	-1.20	-1.54	-1.21	-2.09	-2.39	-2.36	-2.48
75.00	-1.54	-1.00	-1.76	-0.66	-1.73	-2.82	-2.75	-2.86
90.00	-1.87	-0.83	-1.77	-0.65	-2.03	-3.90	-4.55	-4.72
105.00	-2.24	-0.90	-1.61	-0.77	-3.02	-5.23	-7.19	-8.17
120.00	-2.37	-1.11	-1.05	-1.20	-3.40	-6.89	-12.40	-13.73
135.00	-2.45	-1.41	-0.56	-1.38	-3.29	-6.70	-13.49	-10.32
150.00	-2.33	-1.40	-0.26	-1.33	-2.57	-4.63	-8.31	-5.78
165.00	-2.26	-1.45	-0.19	-1.42	-1.81	-2.49	-4.92	-3.01
180.00	-2.32	-1.49	-0.07	-1.35	-1.47	-1.17	-2.67	-1.34
195.00	-2.03	-1.42	-0.32	-1.41	-1.75	-0.68	-1.96	-0.23
210.00	-2.26	-1.42	-0.66	-1.46	-2.13	-1.04	-2.35	0.01
225.00	-2.05	-1.12	-0.87	-1.87	-2.80	-1.70	-3.32	-0.52
240.00	-1.78	-1.42	-1.48	-2.69	-4.50	-3.24	-5.18	-1.64
255.00	-1.57	-1.43	-2.17	-3.49	-6.35	-4.76	-7.75	-3.56
270.00	-1.39	-1.80	-2.71	-4.99	-8.18	-6.66	-11.21	-5.51
285.00	-1.20	-2.25	-3.41	-5.66	-8.97	-8.81	-14.00	-7.68
300.00	-1.31	-2.55	-3.62	-6.05	-8.69	-10.09	-15.33	-8.97
315.00	-1.24	-2.58	-3.72	-5.53	-8.54	-10.57	-14.59	-8.42
330.00	-1.15	-2.71	-3.40	-4.94	-7.90	-10.23	-11.90	-7.50
345.00	-1.10	-2.81	-3.10	-3.94	-7.34	-9.36	-9.25	-6.90
360.00	-1.38	-2.29	-2.77	-3.35	-6.74	-8.00	-7.42	-6.26

Azimuth (deg)	Elevation 120 deg (dB)	Elevation 135 deg (dB)	Elevation 150 deg (dB)	Elevation 165 deg (dB)	Elevation 180 deg (dB)
0.00	-5.15	-5.17	-2.23	-1.10	-0.45
15.00	-4.56	-4.45	-1.75	-1.39	-0.59
30.00	-3.45	-3.11	-1.54	-1.38	-0.69
45.00	-2.44	-2.29	-1.76	-1.13	-0.99
60.00	-2.04	-1.92	-2.02	-0.96	-1.10
75.00	-2.64	-2.14	-2.55	-0.81	-0.81
90.00	-4.14	-2.87	-3.26	-0.70	-1.11
105.00	-6.22	-3.71	-3.98	-0.75	-0.80
120.00	-7.19	-4.78	-3.75	-0.77	-0.72
135.00	-6.89	-4.75	-3.15	-1.25	-0.56
150.00	-4.91	-3.95	-2.43	-1.63	-0.45
165.00	-3.36	-3.28	-1.93	-1.67	-0.69
180.00	-2.42	-2.48	-1.59	-1.61	-0.88
195.00	-1.81	-1.96	-1.28	-1.73	-1.25
210.00	-1.81	-1.70	-1.38	-1.55	-1.69
225.00	-2.13	-1.54	-1.56	-1.31	-1.87
240.00	-2.58	-1.75	-1.79	-1.48	-2.12
255.00	-3.76	-2.01	-1.93	-1.42	-1.93
270.00	-4.80	-2.81	-2.21	-1.57	-2.17
285.00	-5.12	-3.09	-2.20	-1.42	-1.65
300.00	-5.04	-3.96	-2.32	-1.31	-1.05
315.00	-4.92	-5.05	-2.38	-1.27	-0.53
330.00	-5.22	-5.78	-2.28	-1.05	-0.20
345.00	-4.90	-5.78	-2.04	-1.25	-0.09
360.00	-5.13	-5.74	-2.02	-1.06	-0.52

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Azimuth (deg)	Elevation 0 deg (dB)	Elevation 15 deg (dB)	Elevation 30 deg (dB)	Elevation 45 deg (dB)	Elevation 60 deg (dB)	Elevation 75 deg (dB)	Elevation 90 deg (dB)	Elevation 105 deg (dB)
0.0	-5.94	-7.73	-8.14	-7.43	-11.86	-17.06	-13.93	-12.37
15.0	-8.64	-9.66	-9.28	-9.11	-13.79	-17.09	-13.79	-13.93
30.0	-11.34	-11.09	-11.32	-10.70	-16.72	-17.39	-13.19	-16.91
45.0	-11.19	-11.23	-13.18	-10.66	-14.84	-15.17	-13.74	-16.93
60.0	-8.60	-8.44	-10.43	-8.20	-11.28	-12.36	-14.86	-15.84
75.0	-6.50	-5.78	-7.36	-5.27	-8.07	-12.08	-15.99	-14.05
90.0	-4.42	-3.56	-4.41	-3.41	-5.76	-10.82	-17.80	-13.93
105.0	-3.65	-2.28	-2.67	-2.26	-5.02	-9.19	-16.46	-14.61
120.0	-3.18	-1.78	-1.58	-1.94	-4.05	-7.93	-16.27	-14.53
135.0	-3.10	-1.95	-1.46	-2.14	-3.88	-7.37	-15.70	-14.36
150.0	-3.61	-2.64	-2.15	-3.11	-4.43	-7.74	-15.07	-14.98
165.0	-4.67	-4.38	-3.69	-5.38	-5.90	-8.34	-14.86	-17.32
180.0	-6.61	-6.61	-6.08	-8.28	-8.49	-9.48	-13.82	-24.22
195.0	-9.20	-10.13	-8.91	-11.62	-11.75	-11.60	-14.53	-18.21
210.0	-12.09	-12.92	-11.64	-11.30	-14.18	-14.35	-14.23	-14.21
225.0	-10.64	-10.41	-10.31	-10.59	-14.40	-15.25	-16.41	-12.86
240.0	-7.46	-7.71	-8.14	-9.35	-14.35	-18.25	-17.74	-11.80
255.0	-5.09	-5.60	-6.74	-8.56	-14.72	-20.89	-22.62	-11.90
270.0	-3.52	-4.57	-5.73	-8.61	-14.80	-21.74	-24.22	-11.33
285.0	-2.42	-4.04	-5.57	-8.01	-14.86	-20.89	-23.74	-11.91
300.0	-2.25	-3.96	-5.62	-8.46	-14.28	-22.09	-21.88	-11.37
315.0	-2.33	-4.21	-6.13	-8.28	-13.69	-21.93	-21.81	-10.50
330.0	-2.91	-5.02	-6.69	-8.06	-12.50	-21.43	-17.15	-10.06
345.0	-4.08	-6.32	-7.02	-7.48	-11.70	-17.58	-14.45	-10.65
360.0	-5.87	-7.16	-7.91	-6.99	-11.67	-17.16	-13.44	-11.62

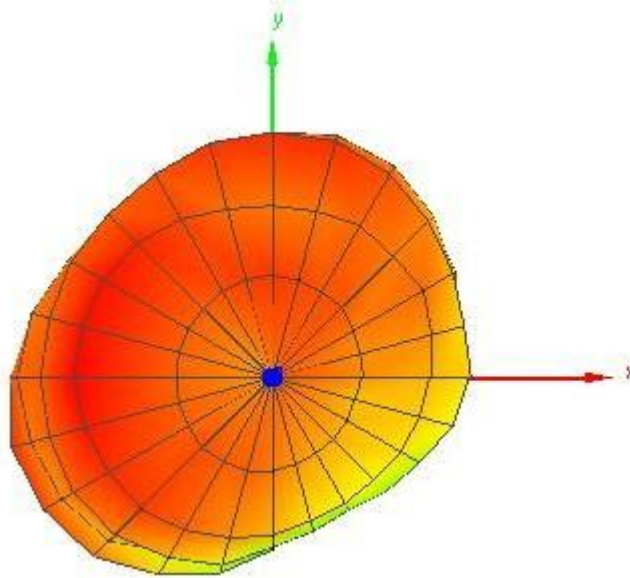
Azimuth (deg)	Elevation 120 deg (dB)	Elevation 135 deg (dB)	Elevation 150 deg (dB)	Elevation 165 deg (dB)	Elevation 180 deg (dB)
0.0	-10.25	-10.26	-5.37	-5.43	-5.89
15.0	-12.10	-10.81	-6.04	-8.45	-8.80
30.0	-13.54	-10.83	-8.16	-12.64	-13.95
45.0	-15.14	-11.47	-11.00	-12.96	-12.58
60.0	-15.91	-11.56	-12.65	-8.18	-7.78
75.0	-16.34	-9.84	-10.26	-5.17	-4.36
90.0	-13.65	-7.55	-6.87	-2.91	-2.71
105.0	-10.47	-5.91	-5.28	-1.75	-1.43
120.0	-8.50	-5.14	-3.91	-1.03	-0.85
135.0	-8.49	-5.00	-3.73	-1.42	-0.76
150.0	-8.58	-5.64	-4.63	-2.56	-1.34
165.0	-9.88	-7.56	-6.12	-4.13	-2.50
180.0	-12.47	-10.42	-9.03	-6.54	-4.49
195.0	-18.10	-15.90	-13.95	-10.81	-7.72
210.0	-16.44	-18.39	-15.79	-12.95	-12.09
225.0	-10.94	-11.95	-10.92	-9.39	-13.28
240.0	-8.60	-7.67	-7.32	-6.68	-8.84
255.0	-7.11	-5.73	-4.94	-4.25	-5.23
270.0	-6.38	-4.95	-3.43	-2.85	-3.51
285.0	-5.92	-4.27	-2.61	-1.78	-1.97
300.0	-5.75	-4.75	-2.50	-1.40	-1.17
315.0	-6.00	-6.03	-2.78	-1.58	-1.06
330.0	-6.98	-7.32	-3.13	-2.10	-1.52
345.0	-7.68	-8.73	-3.81	-3.30	-2.78
360.0	-9.74	-10.81	-4.79	-4.58	-4.95

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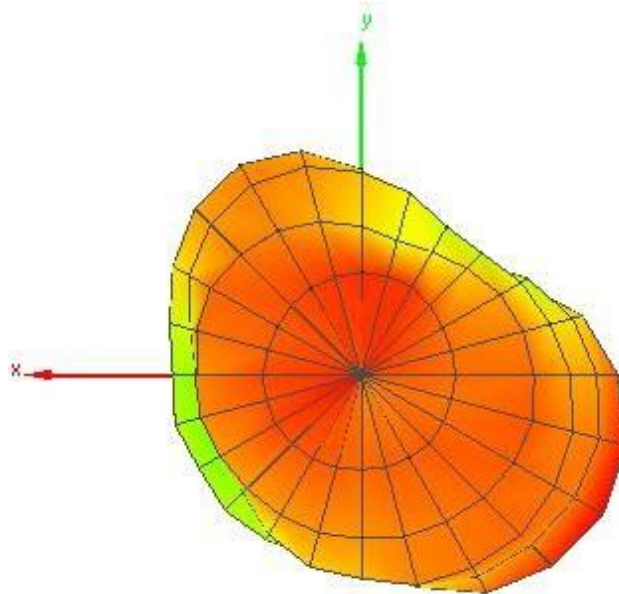
Azimuth (deg)	Elevation 0 deg (dB)	Elevation 15 deg (dB)	Elevation 30 deg (dB)	Elevation 45 deg (dB)	Elevation 60 deg (dB)	Elevation 75 deg (dB)	Elevation 90 deg (dB)	Elevation 105 deg (dB)
0.0	-2.81	-3.50	-4.12	-5.27	-7.59	-7.96	-8.01	-7.20
15.0	-2.17	-2.96	-3.16	-4.53	-6.08	-6.28	-5.80	-6.24
30.0	-1.68	-2.34	-2.10	-3.37	-4.39	-4.61	-4.01	-4.68
45.0	-1.78	-1.72	-2.15	-2.59	-3.27	-3.58	-3.12	-3.58
60.0	-2.45	-2.11	-2.14	-2.17	-2.64	-2.85	-2.62	-2.69
75.0	-3.21	-2.76	-3.16	-2.50	-2.87	-3.37	-2.96	-3.21
90.0	-5.40	-4.13	-5.19	-3.92	-4.42	-4.89	-4.76	-5.28
105.0	-7.81	-6.56	-8.26	-6.14	-7.36	-7.46	-7.74	-9.29
120.0	-10.07	-9.59	-10.38	-9.27	-11.95	-13.64	-14.70	-21.45
135.0	-11.00	-10.72	-7.86	-9.28	-12.26	-15.16	-17.48	-12.49
150.0	-8.28	-7.43	-4.78	-6.06	-7.16	-7.54	-9.33	-6.34
165.0	-5.98	-4.56	-2.76	-3.65	-3.95	-3.80	-5.38	-3.17
180.0	-4.35	-3.09	-1.33	-2.33	-2.43	-1.86	-3.01	-1.36
195.0	-2.95	-2.05	-0.97	-1.84	-2.21	-1.05	-2.20	-0.30
210.0	-2.73	-1.74	-1.02	-1.93	-2.41	-1.24	-2.64	-0.16
225.0	-2.70	-1.67	-1.40	-2.50	-3.11	-1.89	-3.54	-0.79
240.0	-3.15	-2.58	-2.53	-3.74	-4.98	-3.38	-5.43	-2.08
255.0	-4.12	-3.54	-4.04	-5.11	-7.03	-4.86	-7.90	-4.25
270.0	-5.49	-5.07	-5.72	-7.46	-9.25	-6.79	-11.43	-6.83
285.0	-7.31	-6.97	-7.49	-9.45	-10.26	-9.08	-14.49	-9.75
300.0	-8.43	-8.13	-7.93	-9.77	-10.09	-10.37	-16.41	-12.69
315.0	-7.78	-7.63	-7.43	-8.81	-10.12	-10.90	-15.50	-12.62
330.0	-5.94	-6.55	-6.16	-7.85	-9.75	-10.57	-13.44	-11.03
345.0	-4.13	-5.38	-5.36	-6.47	-9.32	-10.06	-10.81	-9.28
360.0	-3.28	-4.00	-4.35	-5.81	-8.43	-8.56	-8.67	-7.76

Azimuth (deg)	Elevation 120 deg (dB)	Elevation 135 deg (dB)	Elevation 150 deg (dB)	Elevation 165 deg (dB)	Elevation 180 deg (dB)
0.0	-6.75	-6.77	-5.12	-3.09	-1.91
15.0	-5.40	-5.59	-3.77	-2.34	-1.30
30.0	-3.90	-3.92	-2.60	-1.72	-0.90
45.0	-2.68	-2.85	-2.31	-1.42	-1.30
60.0	-2.22	-2.42	-2.41	-1.88	-2.15
75.0	-2.83	-2.94	-3.36	-2.79	-3.34
90.0	-4.65	-4.68	-5.75	-4.68	-6.21
105.0	-8.26	-7.73	-9.83	-7.61	-9.45
120.0	-13.01	-15.76	-18.06	-12.98	-16.31
135.0	-11.99	-17.34	-12.18	-15.57	-13.97
150.0	-7.34	-8.86	-6.43	-8.79	-7.76
165.0	-4.46	-5.32	-4.01	-5.31	-5.37
180.0	-2.87	-3.24	-2.45	-3.29	-3.36
195.0	-1.91	-2.14	-1.52	-2.30	-2.36
210.0	-1.97	-1.79	-1.55	-1.88	-2.11
225.0	-2.75	-1.95	-2.10	-2.05	-2.20
240.0	-3.83	-3.04	-3.21	-3.05	-3.16
255.0	-6.45	-4.41	-4.95	-4.62	-4.66
270.0	-9.94	-6.92	-8.35	-7.51	-7.93
285.0	-12.83	-9.34	-12.66	-12.43	-13.22
300.0	-13.25	-11.78	-16.18	-18.26	-16.54
315.0	-11.50	-12.01	-12.94	-12.92	-9.96
330.0	-9.98	-11.03	-9.77	-7.72	-6.00
345.0	-8.15	-8.85	-6.79	-5.49	-3.44
360.0	-6.98	-7.36	-5.28	-3.62	-2.46

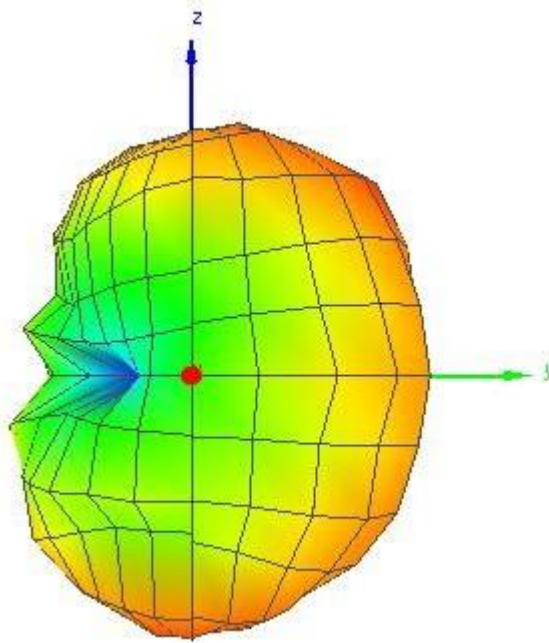
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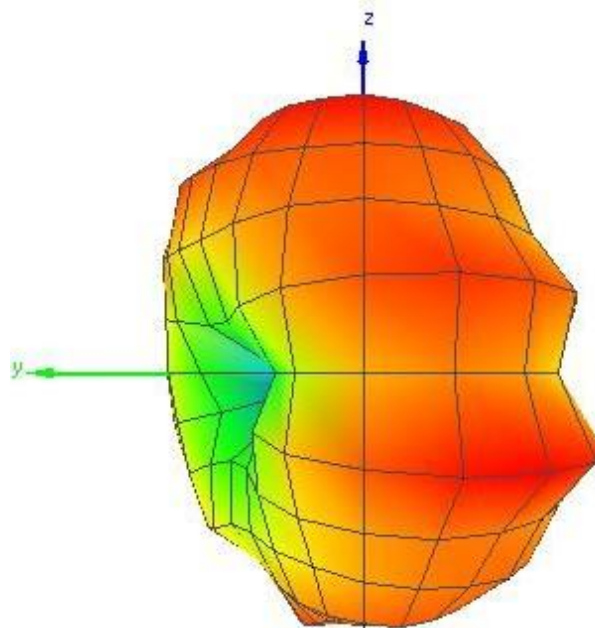
Theta = 180, Phi = 0



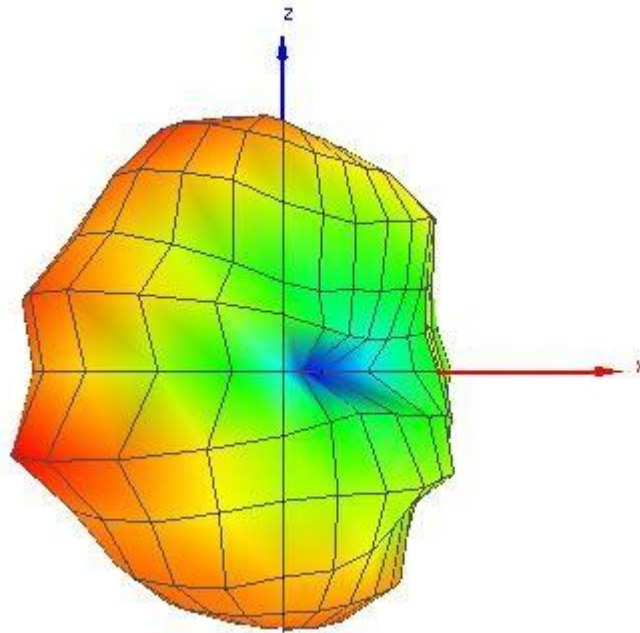
Theta = 90, Phi = 0



Theta = 90, Phi = 180



Theta = 90, Phi = 270



Theta = 90, Phi = 90

