

AP750NRe
Antenna PCB-000016-001-D
Radiation Pattern & Gain
Specifications
(Release)

Version: A

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1 Overview

1.1 Preface

This document describes the radiation pattern and gain specifications for the PCB-000016-001-D, which operates in the 5 GHz UNII-1/2a band (5150 MHz to 5350 MHz)

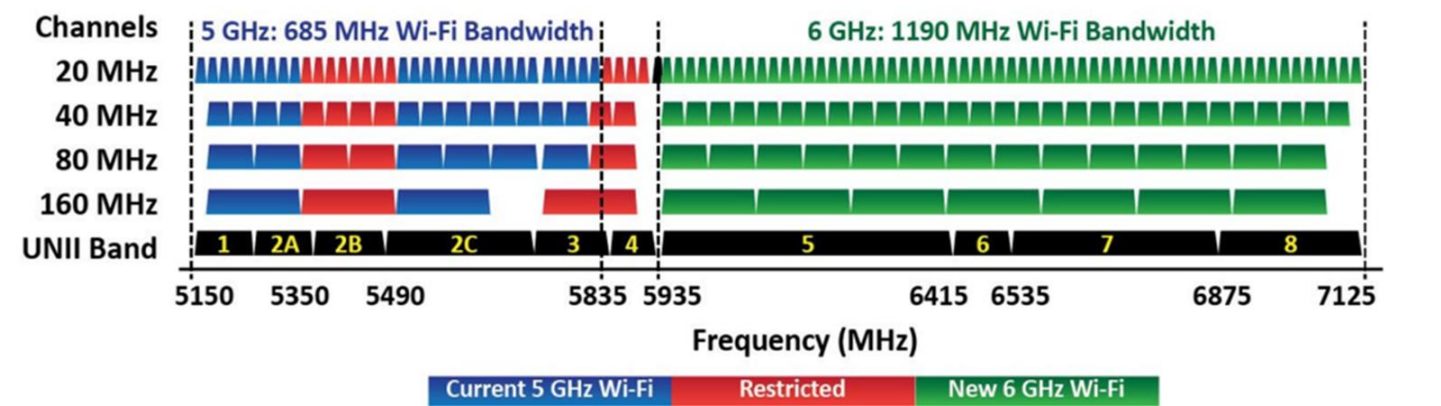
The PCB-000016-001-D, has been certified to be compliant when operated with the Everest Networks 4-Radio Narrow Directional Outdoor Wi-Fi 7 Access Point AP750NRe:

Model Number:AP750NRe

HW Version:v1.x

FCCID: 2AGMR-AP750NRE

IC: TBD



1.2 Contributors

Name	Role
Van Hoang Nguyen	Director of Engineering

1.3 Revision History

Version	Change Summery	Author	Date
0.1 (Draft)	Document Created	Van Hoang Nguyen	Feb. 13, 2024
1.0 Release	First release	Van Hoang Nguyen	July 12, 2024
1.1		Van Hoang Nguyen	July 15, 2024

1.4 Applicable PCB Part Numbers

Description	PCB Part Numbers
L-shape, Narrow, U-NII-1 + U-NII-2a bands	PCB-000016-001-D
	PCB-000016-xxx-x

1.5 Antenna Measurements

1.5.1 Measurement methods:

Measurement is performed over the air in a shielded anechoic chamber (NSI-MI compact range 4-110GHz) and the Antenna Under Test (AUT) is operating in radiated mode.

1.5.2 Measurement equipment

Equipment	Manufacturer	Model & Serial number	Last calibration
Standard Feed Horn 1-18GHz	ETS-Lindren	#3115 / #6532	n/a
Signal source	NSI-MI	ELE-SRC-DS(1010279) / 006	November 15, 2021
Vector Field Analyser	NSI-MI	ELE-VFA-S01 (100675-S01)/034	November 29, 2021

1.5.3 Measurement setup

1.6 *Photos of PCB-000016-001-D*

1.6.1 **Front**

1.6.2 **Back**

1.7 *AUT Descriptions and Summary*

The PCB-000016-001-D consists of a dual-polarized (vertical and horizontal polarizations) directional antenna array of 4x8 in the front and electronically controlled feeding networks in the back. The directional antenna array operates in the U-NII-1 and U-NII-2a bands. The feeding networks compose of quadrature matrices and switches, resulting in switched and orthogonal radiated beams in each polarization.

Table 0: RF chains’ connection to U-NII-1 and 2a

	U-NII-1 and 2a	
	Vertical Pol.	Horizontal Pol.
Chain 0	R2-5	
Chain 1		R2-6
Chain 2		R2-7
Chain 3	R2-8	

The maximum gain for vertical polarization, horizontal polarization and directional gain has been measured and summarized in the below table:

	U-NII-1 and 2a	
	Vertical Pol.	Horizontal Pol.
Max. Gain	11.76 dBi	11.46 dBi
Directional Gain (DG)	0 dB	0 dB
Max. Tested Antenna Gain	11.5 dBi	
Certified net antenna gain (Cable + switch loss)	9.0 dBi	

2 PCA-000016-001-D Antenna Pattern and Gain in U-NII-1/2a

2.1 Port R2-5 (Vertical polarization)

2.1.1 R2-5 Radiation Pattern in Elevation at 5220 MHz

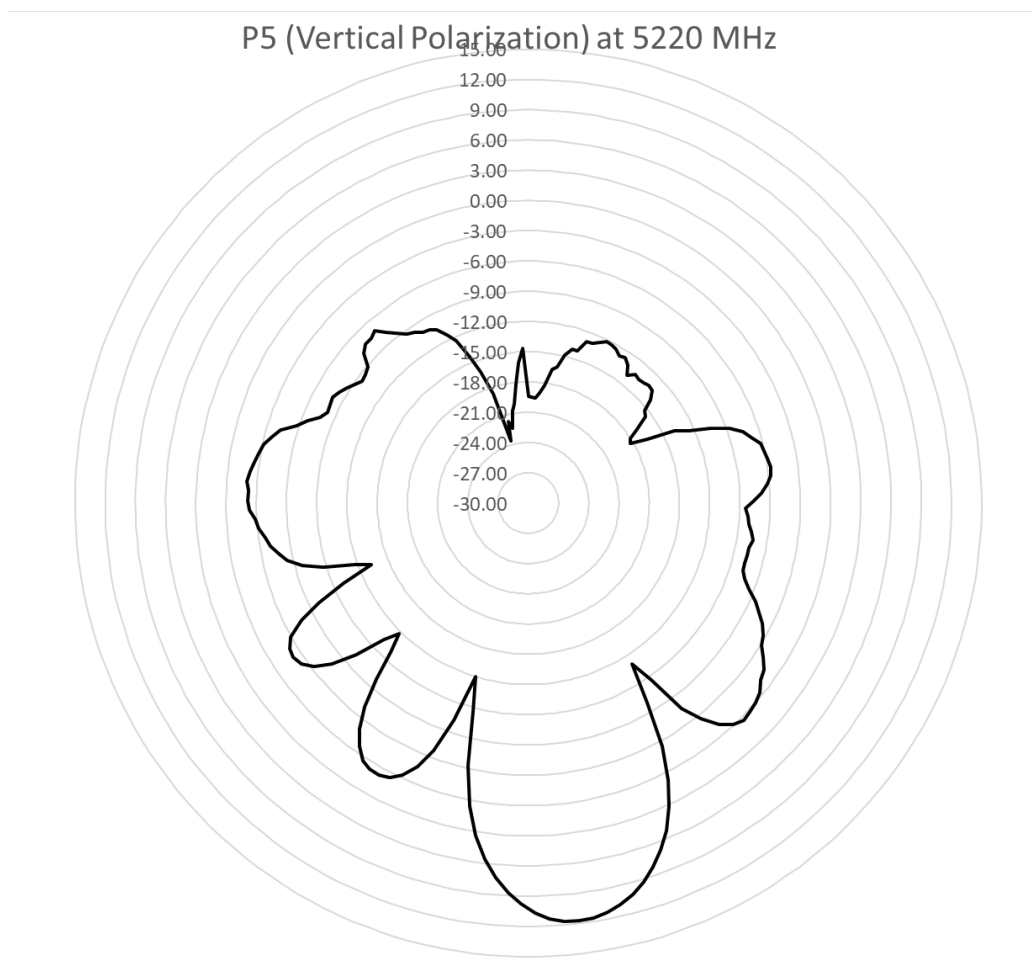


Figure 1 - Port R2-5, Vertical polarization, Elevation cut at 5220.00 MHz

2.1.2 Port R2-5 Gain table at 5220 MHz – Vertical Polarization

Angle	Gain	Angle	Gain	Angle	Gain	Angle	Gain
1	-19.42	46	-7.63	91	10.71	136	-2.34
2	-19.53	47	-8.44	92	9.80	137	-2.15
3	-19.55	48	-8.16	93	8.71	138	-2.17
4	-19.04	49	-8.00	94	7.31	139	-2.01
5	-18.21	50	-7.70	95	5.59	140	-2.24
6	-16.51	51	-7.38	96	3.41	141	-2.50
7	-16.19	52	-7.66	97	0.60	142	-2.77
8	-14.88	53	-7.71	98	-3.27	143	-3.13
9	-14.10	54	-7.73	99	-8.63	144	-3.75
10	-14.16	55	-7.69	100	-11.97	145	-4.32
11	-12.94	56	-7.24	101	-7.20	146	-5.72
12	-12.93	57	-6.53	102	-3.71	147	-6.59
13	-12.56	58	-5.41	103	-1.61	148	-7.66
14	-12.25	59	-4.66	104	-0.30	149	-8.15
15	-12.31	60	-3.89	105	0.48	150	-8.01
16	-12.43	61	-3.22	106	0.79	151	-7.90
17	-12.87	62	-2.91	107	0.77	152	-8.30
18	-12.64	63	-2.15	108	0.37	153	-8.73
19	-13.10	64	-1.35	109	-0.59	154	-9.10
20	-14.01	65	-1.04	110	-2.06	155	-9.57
21	-13.44	66	-0.35	111	-4.11	156	-9.45
22	-13.60	67	-0.02	112	-6.92	157	-9.15
23	-13.47	68	0.19	113	-9.85	158	-7.97
24	-13.26	69	0.34	114	-11.75	159	-7.39
25	-13.38	70	-0.12	115	-10.30	160	-7.43
26	-14.15	71	-1.01	116	-7.21	161	-7.08
27	-15.26	72	-2.61	117	-4.85	162	-8.00
28	-15.53	73	-4.54	118	-3.30	163	-8.65
29	-16.98	74	-8.61	119	-2.38	164	-9.29
30	-18.05	75	-11.05	120	-2.08	165	-9.68
31	-18.23	76	-6.99	121	-2.26	166	-10.06
32	-16.61	77	-2.44	122	-2.93	167	-10.20
33	-13.83	78	0.78	123	-4.62	168	-10.58
34	-12.59	79	3.16	124	-6.99	169	-11.49
35	-10.51	80	5.24	125	-10.05	170	-12.36
36	-8.72	81	6.81	126	-13.31	171	-14.33
37	-7.51	82	8.15	127	-11.62	172	-16.18
38	-6.90	83	9.29	128	-8.70	173	-18.59
39	-6.18	84	10.20	129	-6.73	174	-23.64
40	-6.01	85	10.87	130	-5.40	175	-21.69
41	-5.86	86	11.33	131	-4.72	176	-22.40
42	-5.66	87	11.64	132	-4.06	177	-20.71
43	-5.83	88	11.76	133	-3.69	178	-20.10
44	-6.17	89	11.65	134	-3.14	179	-18.08
45	-6.87	90	11.28	135	-2.86	180	-16.09

Table 1 - Port R2-5 Gain table at 5220 MHz – Vertical Polarization [1°-180°]

2.2 Port R2-7 (Horizontal polarization)

2.2.1 Port R2-7 Radiation Pattern in Elevation at 5200 MHz

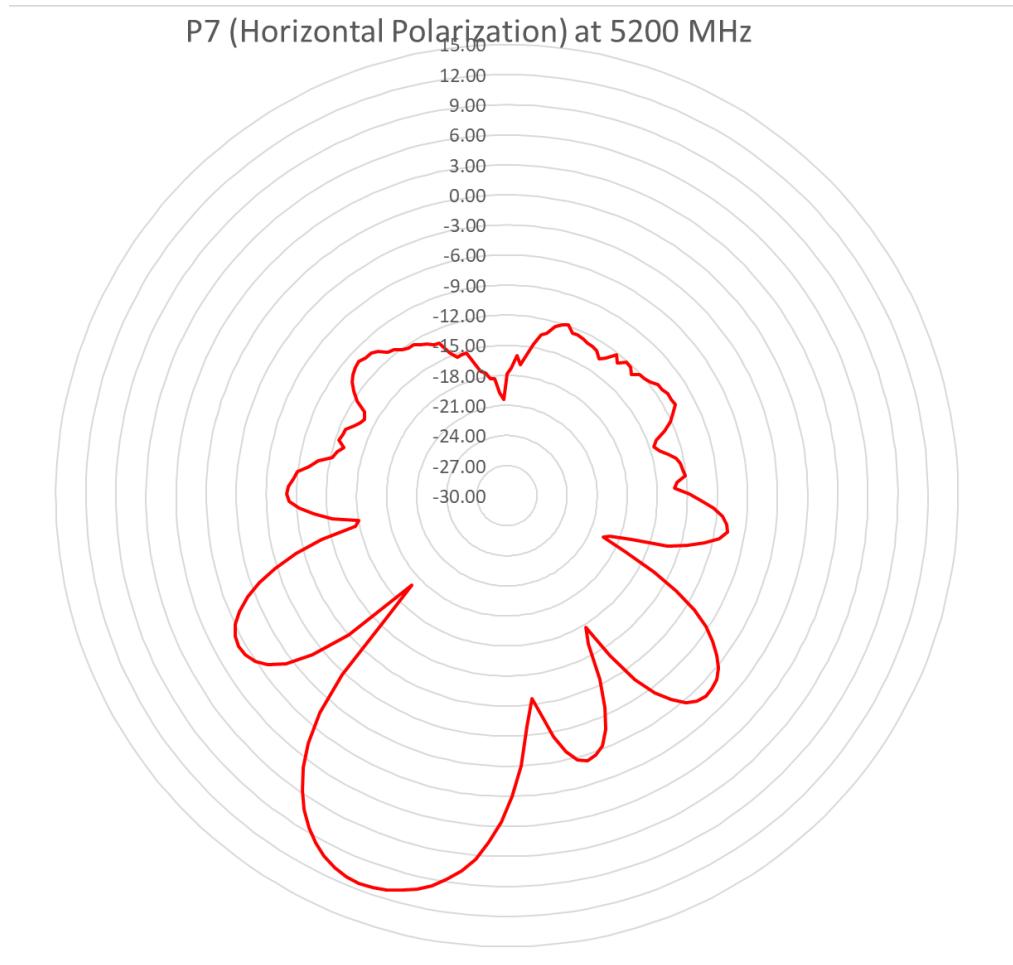


Figure 2 - Port R2-7, Horizontal polarization, Elevation cut at 5200.00 MHz

2.2.2 Port R2-7 Gain table at 5200 MHz – Horizontal Polarization

Angle	Gain	Angle	Gain	Angle	Gain	Angle	Gain
1	-17.82	46	-11.80	91	0.01	136	-8.29
2	-17.30	47	-10.67	92	2.56	137	-8.01
3	-16.01	48	-9.32	93	4.58	138	-8.21
4	-16.84	49	-8.41	94	6.39	139	-8.61
5	-15.87	50	-7.92	95	7.70	140	-8.95
6	-14.61	51	-7.68	96	8.74	141	-10.03
7	-13.64	52	-8.43	97	9.61	142	-10.85
8	-13.33	53	-9.77	98	10.28	143	-12.18
9	-12.45	54	-11.40	99	10.74	144	-12.56
10	-12.09	55	-13.20	100	11.14	145	-13.01
11	-11.89	56	-16.71	101	11.36	146	-12.33
12	-12.55	57	-19.00	102	11.41	147	-12.53
13	-12.50	58	-19.57	103	11.28	148	-12.61
14	-12.61	59	-16.88	104	10.90	149	-13.22
15	-12.80	60	-13.48	105	10.34	150	-13.67
16	-12.88	61	-10.65	106	9.54	151	-13.90
17	-12.96	62	-8.13	107	8.56	152	-13.52
18	-13.54	63	-6.23	108	7.31	153	-12.36
19	-13.11	64	-4.85	109	5.79	154	-11.53
20	-12.23	65	-3.66	110	3.89	155	-10.81
21	-12.75	66	-2.80	111	1.66	156	-10.46
22	-12.11	67	-2.19	112	-1.39	157	-10.17
23	-12.21	68	-1.91	113	-5.73	158	-10.05
24	-12.64	69	-1.81	114	-12.95	159	-10.27
25	-12.10	70	-2.08	115	-16.96	160	-10.37
26	-12.01	71	-2.66	116	-8.99	161	-10.72
27	-11.72	72	-3.87	117	-4.97	162	-11.42
28	-11.27	73	-5.42	118	-2.27	163	-11.59
29	-11.23	74	-7.67	119	-0.77	164	-12.07
30	-11.00	75	-11.01	120	0.04	165	-12.31
31	-10.98	76	-14.69	121	0.58	166	-12.30
32	-10.89	77	-13.13	122	0.71	167	-12.64
33	-11.53	78	-9.45	123	0.54	168	-12.91
34	-12.08	79	-6.68	124	-0.05	169	-13.32
35	-13.03	80	-4.75	125	-0.91	170	-13.33
36	-14.13	81	-3.26	126	-2.24	171	-14.67
37	-14.52	82	-2.68	127	-3.85	172	-15.35
38	-14.15	83	-2.39	128	-5.72	173	-15.26
39	-13.44	84	-2.73	129	-8.18	174	-15.24
40	-12.68	85	-3.80	130	-11.00	175	-16.49
41	-12.39	86	-5.54	131	-14.56	176	-17.29
42	-12.26	87	-7.76	132	-15.00	177	-17.57
43	-12.10	88	-9.61	133	-12.43	178	-18.19
44	-13.02	89	-6.92	134	-10.68	179	-18.30
45	-13.30	90	-3.05	135	-9.24	180	-19.69

Table 2 - Port R2-7 Gain table at 5200 MHz – Horizontal Polarization [1°-180°]

2.3 Maximum Gain versus Frequency

2.3.1 Port R2-5 (Vertical Polarization) and Port R2-7 (Horizontal Polarization)

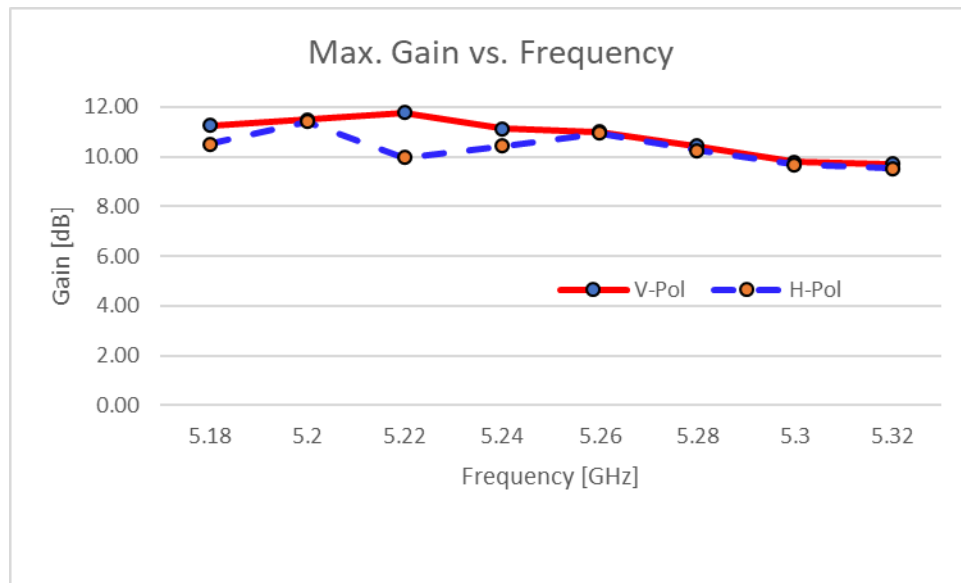


Figure 3 – Maximum Gain versus Frequency of port R2-5 (Vertical) and port R2-7 (Horizontal)

3 References

[1] FCC document KDB 662911 D01 Multiple Transmitter Output v02r01, October 31, 2013

[2] AP 10.4 Programmer's Guide, March 16, 2016