

SWARD Antenna Debugging Report

Customer Name: Bmorn

Project name: N15RPG-8821 WIFI module

Date: 2024. 12. 21

Project Contact Information

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Project Introduction

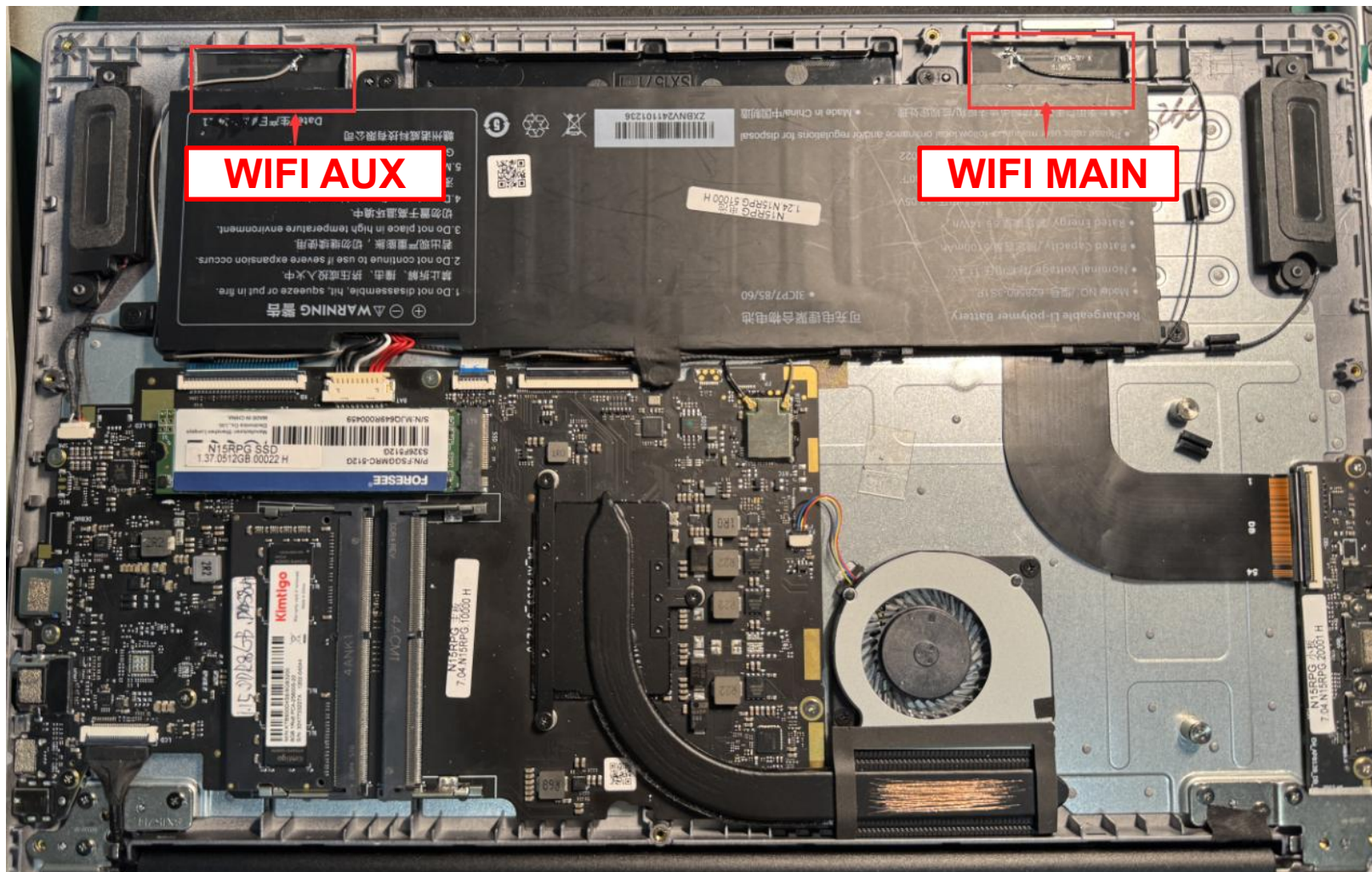
1. Project Overview

Number of antennas	Machine type
2	Notebook computer
Shell material: 15 inch plastic shell	

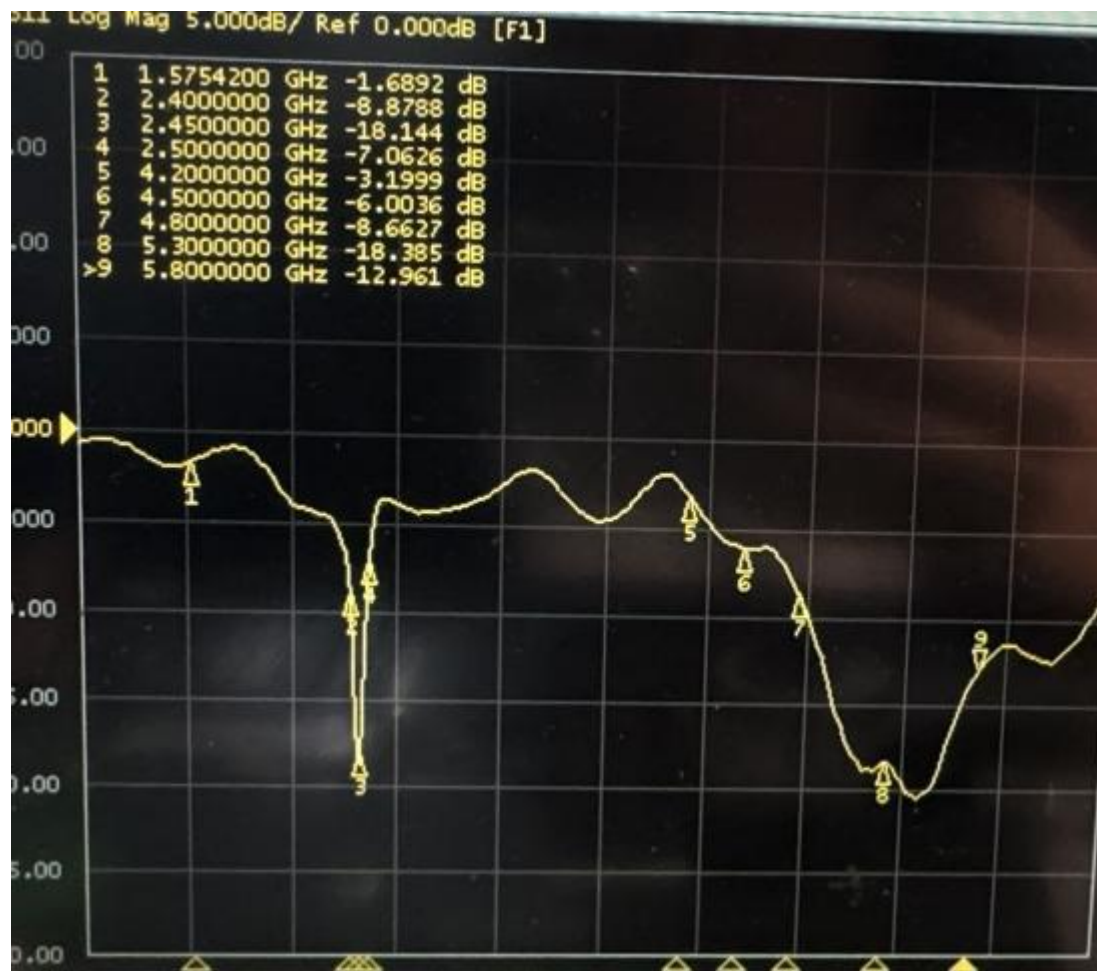
2. Antenna Overview

Antenna number	Name	Working frequency band/MHZ	Material
1	WIFI&BT&5Gwifi	2400MHz/2500MHz&5.8GHz	FPC
1	WIFI&BT&5Gwifi	2400MHz/2500MHz&5.8GHz	FPC

Antenna position

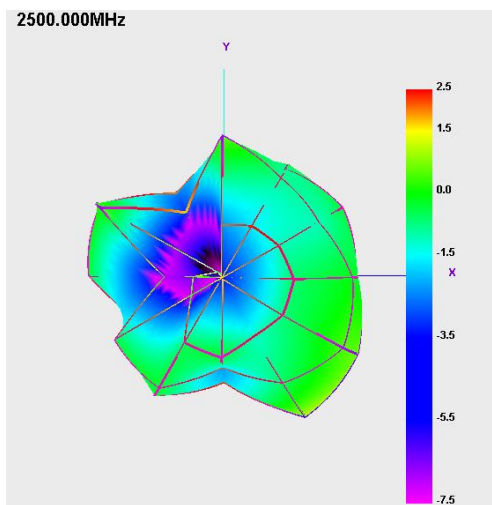
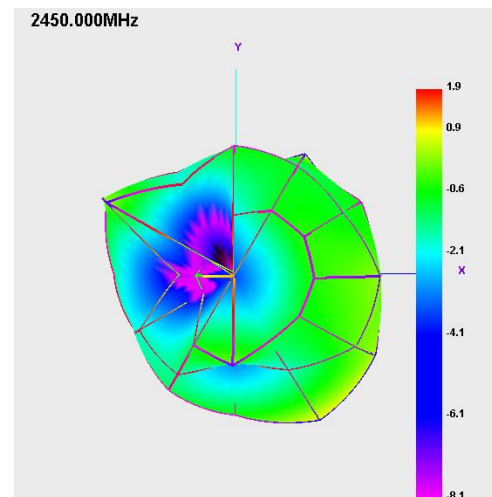
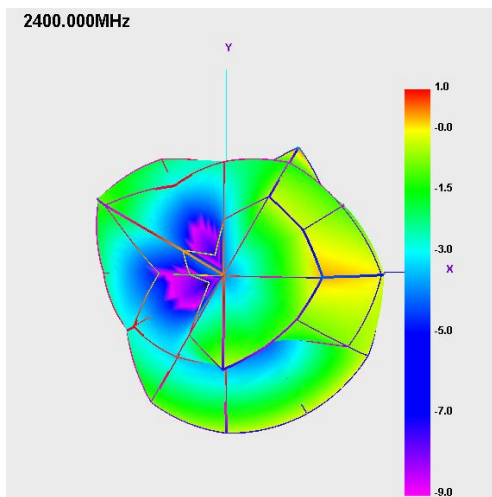


WIFI&BT MAIN S11



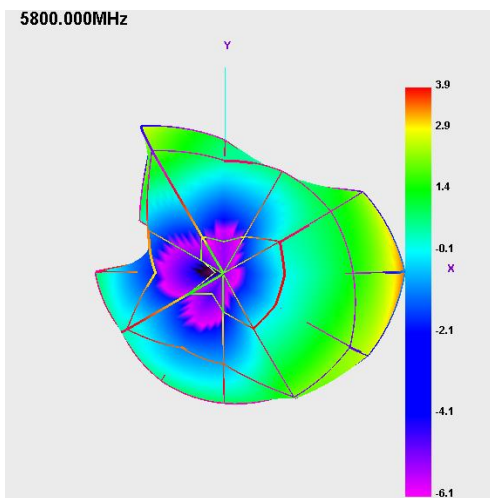
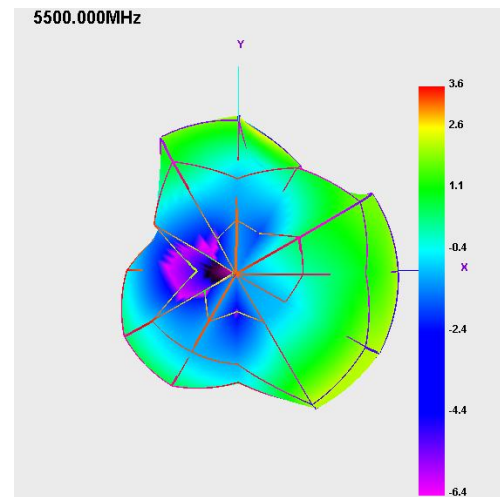
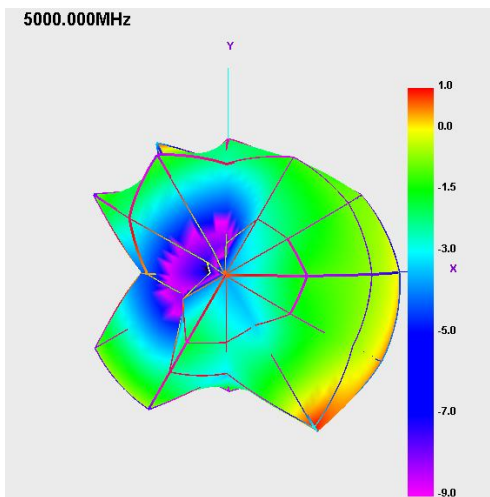
WIFI&BT MAIN Passive data

Passive Test For 2.4G			
Freq	Effi	Effi	Gain
(MHz)	(%)	(dB)	(dBi)
2400	45.99	-3.37	0.96
2410	47.67	-3.22	1.13
2420	51.05	-2.92	1.63
2430	54.25	-2.66	2.11
2440	55.75	-2.54	2.27
2450	49.93	-3.02	1.93
2460	50.36	-2.98	2.06
2470	47.05	-3.27	1.8
2480	49.23	-3.08	2.08
2490	50.74	-2.95	2.36
2500	50.16	-3	2.51

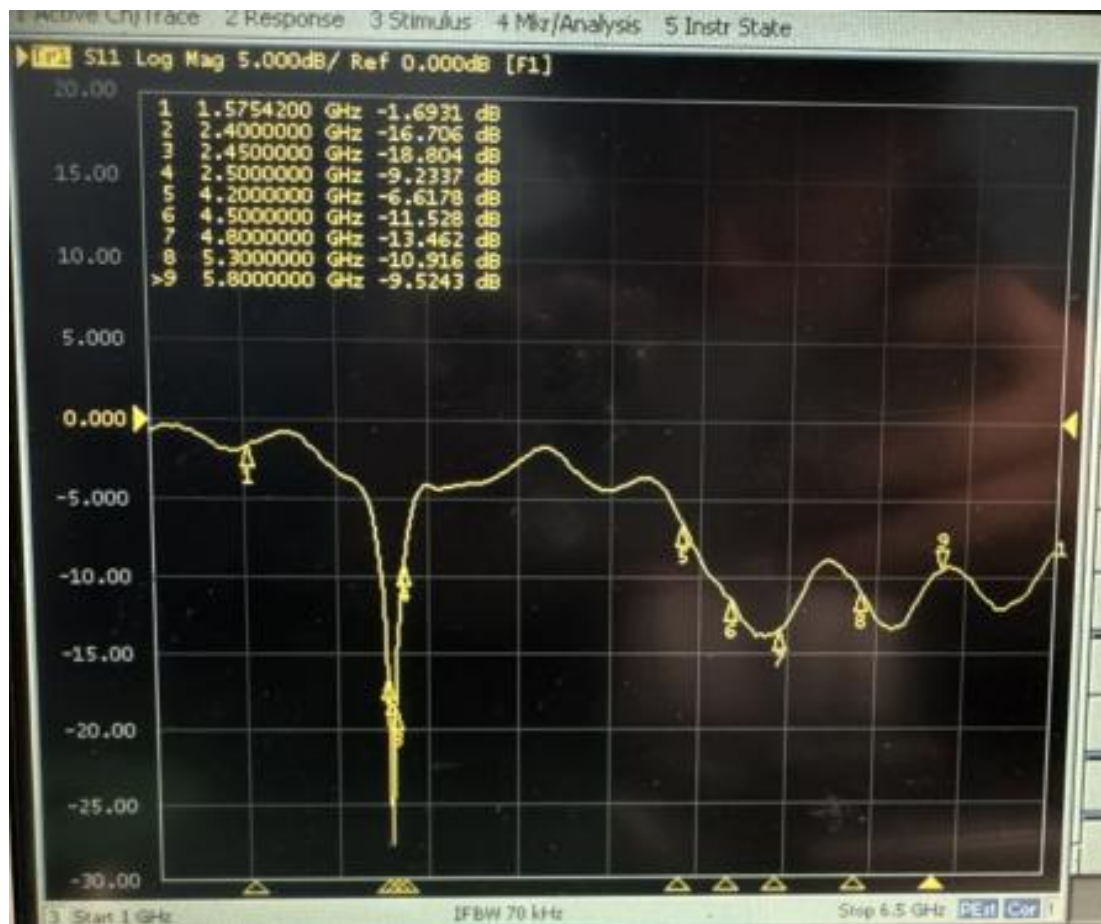


5GWIFI MAIN Passive data

Passive Test For 5G-WIFI			
Freq	Effi	Effi	Gain
(MHz)	(%)	(dB)	(dBi)
5000	39.7	-4.01	1.02
5100	40.38	-3.94	1.21
5200	38.61	-4.13	0.68
5300	46.55	-3.32	2.71
5400	42.88	-3.68	3.17
5500	44.62	-3.51	3.55
5600	37.69	-4.24	1.12
5700	46.05	-3.37	3.22
5800	50.44	-2.97	3.89
5900	39.92	-3.99	2.46
6000	42.24	-3.74	2.71

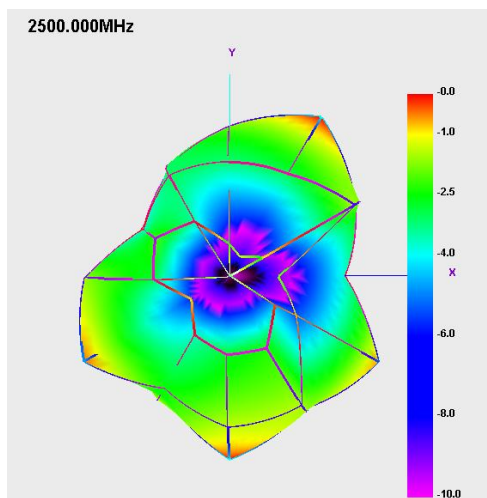
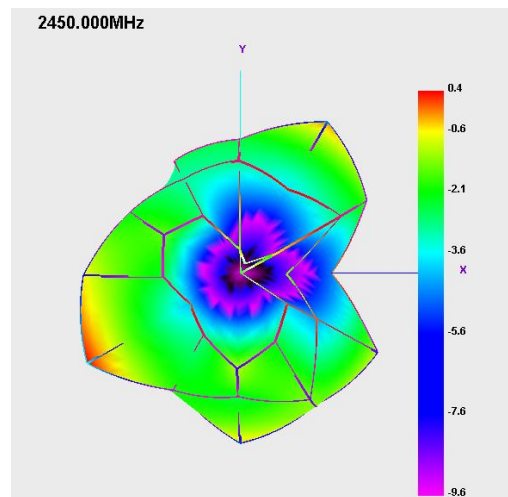
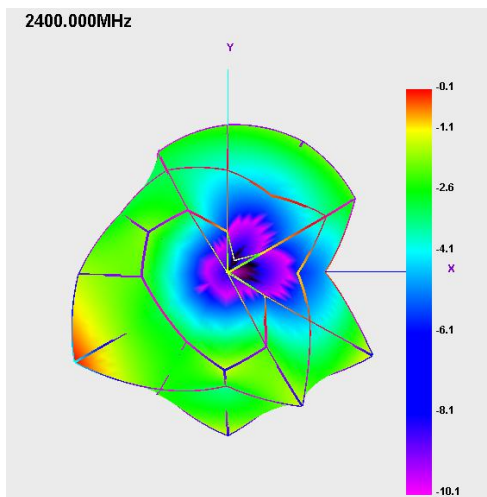


WIFI&BT AUX S11



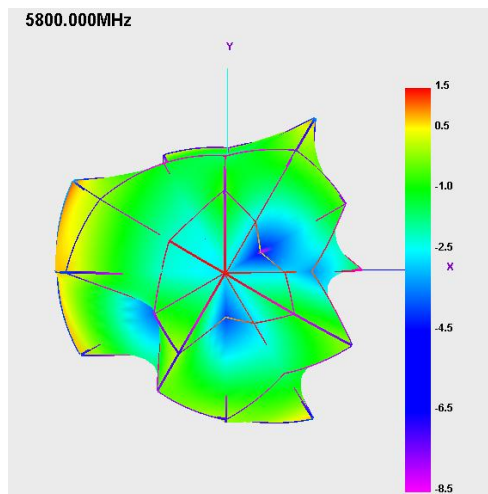
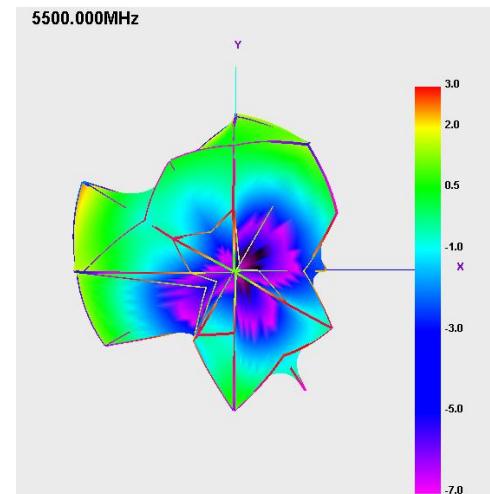
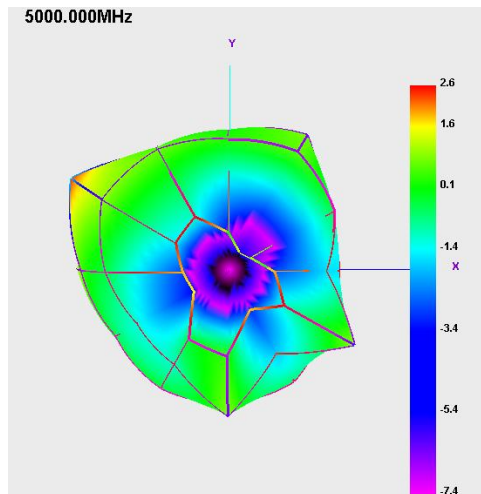
WIFI&BT **AUX** Passive data

Passive Test For 2.4G			
Freq	Effi	Effi	Gain
(MHz)	(%)	(dB)	(dBi)
2400	37.1	-4.31	-0.11
2410	38.3	-4.17	-0.01
2420	39.87	-3.99	0.07
2430	43.69	-3.6	0.56
2440	45.06	-3.46	0.75
2450	42.84	-3.68	0.43
2460	43.26	-3.64	0.45
2470	40.15	-3.96	-0.08
2480	41.8	-3.79	-0.04
2490	43.27	-3.64	-0.01
2500	43.05	-3.66	-0.04



5GWIFI AUX Passive data

Passive Test For 5G-WIFI			
Freq	Effi	Effi	Gain
(MHz)	(%)	(dB)	(dBi)
5000	44.58	-3.51	2.59
5100	41.78	-3.79	2.62
5200	39.77	-4	2.31
5300	48.86	-3.11	2.6
5400	51.05	-2.92	2.6
5500	47.97	-3.19	2.99
5600	40.87	-3.89	2.02
5700	39.82	-4	2.25
5800	43.75	-3.59	1.54
5900	34.43	-4.63	0.21
6000	41.06	-3.87	1.52



WIFI Throughput testing (Test image)

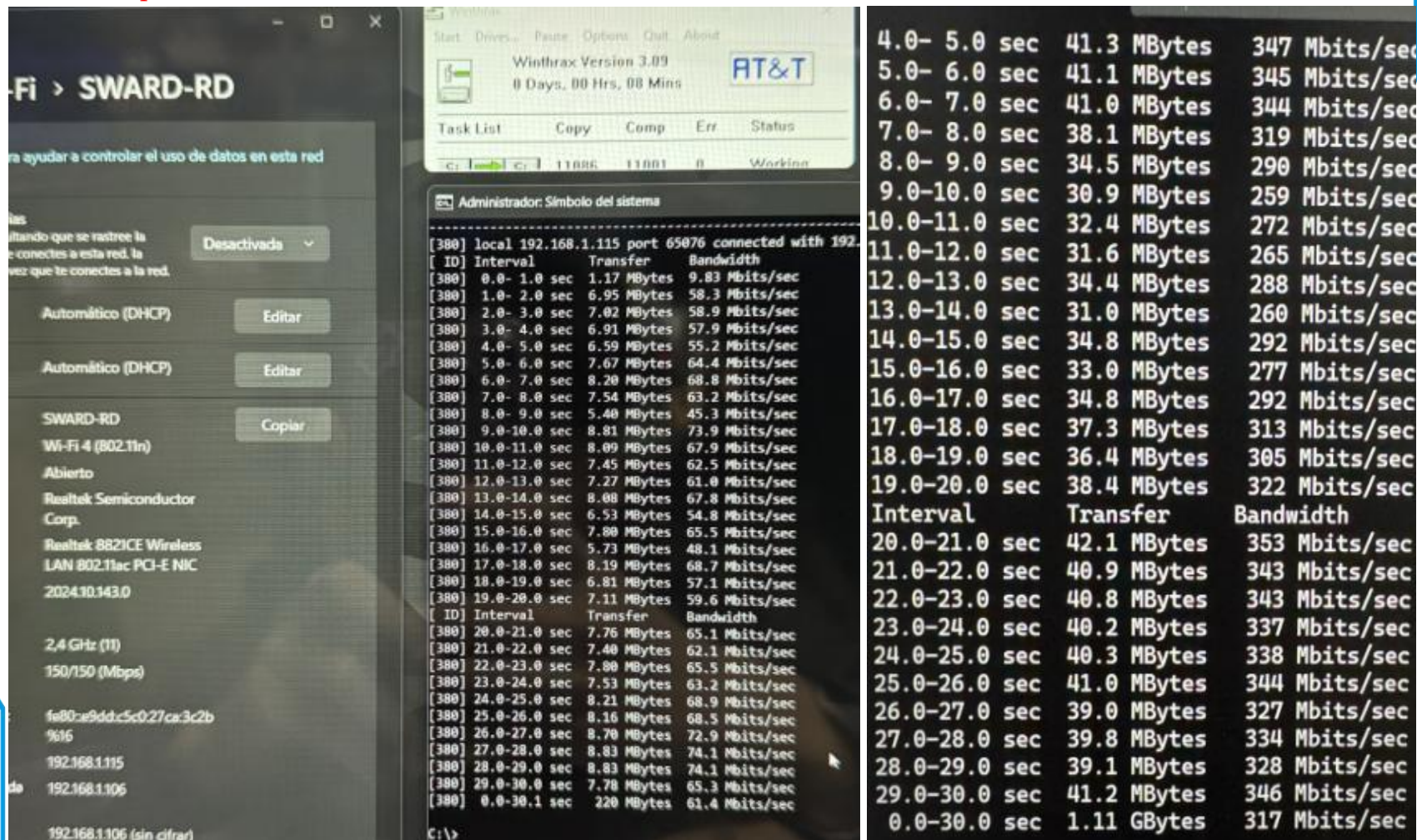
2. 4Gwifi Upload/Download



4.0- 5.0 sec	10.2 MBytes	85.5 Mbits/sec
5.0- 6.0 sec	11.7 MBytes	98.0 Mbits/sec
6.0- 7.0 sec	11.7 MBytes	98.4 Mbits/sec
7.0- 8.0 sec	12.1 MBytes	101 Mbits/sec
8.0- 9.0 sec	11.9 MBytes	99.9 Mbits/sec
9.0-10.0 sec	12.4 MBytes	104 Mbits/sec
10.0-11.0 sec	12.4 MBytes	104 Mbits/sec
11.0-12.0 sec	12.2 MBytes	103 Mbits/sec
12.0-13.0 sec	10.8 MBytes	90.8 Mbits/sec
13.0-14.0 sec	10.2 MBytes	85.7 Mbits/sec
14.0-15.0 sec	11.7 MBytes	97.8 Mbits/sec
15.0-16.0 sec	12.4 MBytes	104 Mbits/sec
16.0-17.0 sec	12.2 MBytes	102 Mbits/sec
17.0-18.0 sec	12.8 MBytes	107 Mbits/sec
18.0-19.0 sec	12.5 MBytes	105 Mbits/sec
19.0-20.0 sec	11.3 MBytes	95.2 Mbits/sec
Interval Transfer		Bandwidth
20.0-21.0 sec	11.4 MBytes	95.6 Mbits/sec
21.0-22.0 sec	11.2 MBytes	93.7 Mbits/sec
22.0-23.0 sec	11.2 MBytes	93.7 Mbits/sec
23.0-24.0 sec	10.8 MBytes	90.4 Mbits/sec
24.0-25.0 sec	11.1 MBytes	93.5 Mbits/sec
25.0-26.0 sec	10.1 MBytes	84.7 Mbits/sec
26.0-27.0 sec	11.1 MBytes	93.3 Mbits/sec
27.0-28.0 sec	10.8 MBytes	90.4 Mbits/sec
28.0-29.0 sec	9.20 MBytes	77.2 Mbits/sec
29.0-30.0 sec	9.90 MBytes	83.0 Mbits/sec
0.0-30.1 sec	328 MBytes	91.5 Mbits/sec

WIFI Throughput testing (Test image)

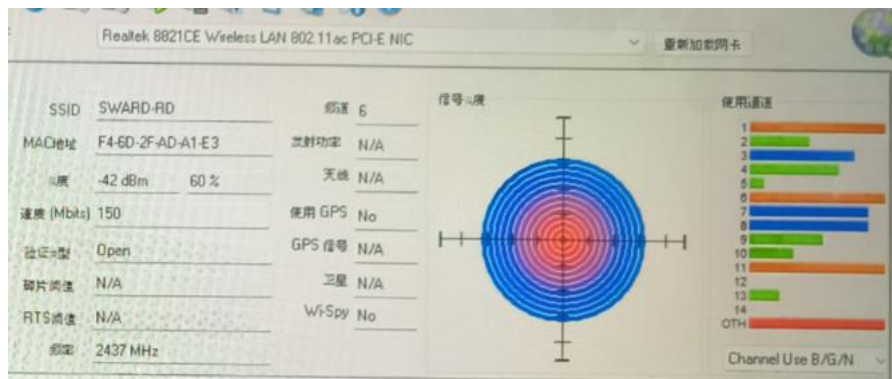
5Gwifi Upload/Download



WIFI Throughput testing

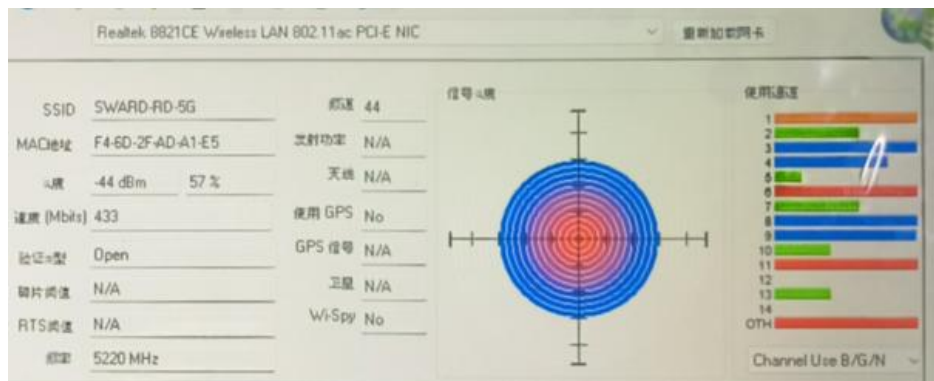
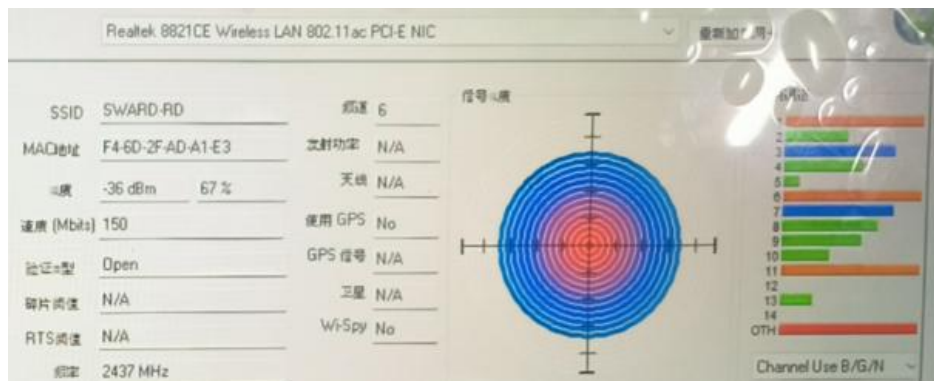
Iperf Throughput testing						
Model		WIFI module	8821	Software version		
Model number	Channel	Distance	Test angle	(TX) 1min mean value	(RX) 1min mean value	Number of packet drops
2.4GWIFI		15 meters	0°	62.5 Mbps	79.5 Mbps	0
			90°	63.1 Mbps	78.6 Mbps	0
			180°	60.2 Mbps	77.5 Mbps	0
			270°	60.8 Mbps	79.7 Mbps	0
5GWIFI		15 meters	0°	203 Mbps	276 Mbps	0
			90°	210 Mbps	287 Mbps	0
			180°	208 Mbps	280 Mbps	0
			270°	201 Mbps	285 Mbps	0

WIFI Actual measurement image of signal strength



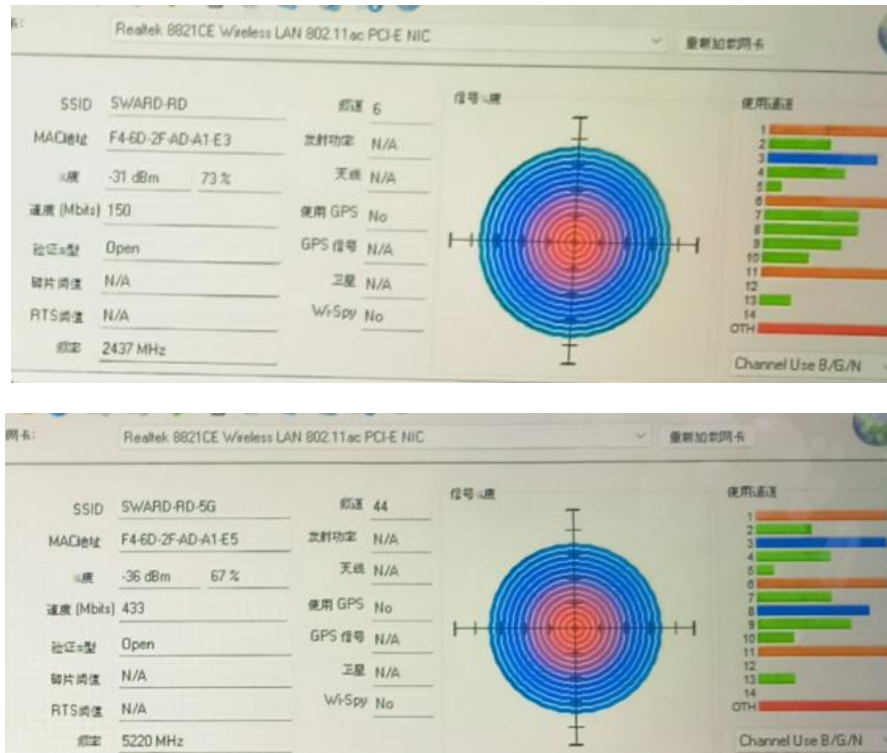
Testing location: SWARD R&D Center
Test time: 14:00-14:30
Test distance: 15 meters
Signal strength: -47dBm~-40dBm

WIFI Actual measurement image of signal strength



Testing location: SWARD R&D Center
Test time: 14:00-14:30
Test distance: 10 meters
Signal strength: -40dBm~-34dBm

WIFI Actual measurement image of signal strength



Testing location: SWARD R&D Center
Test time: 14:00-14:30
Test distance: 5 meters
Signal strength: -35dBm~-31dBm

Bluetooth test

Actual test effect	
Machine No	1
Testing environment	SWARD R&D Center
Test equipment	AM08/HUAWEI
Test distance	≥ 10 meters

Note:

1. This report is based on the actual debugging and testing of the prototype, including environmental treatment, antenna position, and assembly position of each component Cannot be changed arbitrarily;
2. If there are any changes in the materials used in the prototype, please promptly provide feedback to our company for further verification;
3. List of sensitive components:
TP (Material, Coating, Wiring, etc.)
Screen (amplifier circuit, LED, cable design, etc.)
Shell material (antenna assembly method, structural interference, shell material, antenna position height and area, etc.)
Motherboard (motherboard conduction, RF circuit matching, PA, dual power, filtering, LNA, power circuit, etc.)
Camera, battery, motor MIC、Fingerprint recognition module, etc
4. Due to the small number or only one sample testing machine, some probabilistic issues cannot be fully identified. It is recommended to conduct a small batch trial production before mass production to investigate the problem points (such as flashing screens, speaker noise, TP jump points, black screen crashes, signal drops, etc.)