

Client Name:Blue Morning

Item Name:AE1012(10" Metal Case-

H60

motherboa
rd)

BND-Japan

Period:2025.03.12

6/F, Building B, Hexi Hangcheng Industrial Zone, No.135 Qianjin 2nd Road, Bao'an District, Shenzhen, China
Building B, Hexi Hangcheng Industrial Zone, No. 135 Qianjin No. 2 Road, Baoan District, Shenzhen

Project Linkage

Customer
Contact:Hands
MACHI
NE.
post Box.

Thorwald
Structure:Hands
MACHI

NE.
electricity Words:0755-29985185
post Box. yangwende@szsward. com

Thorwald RF:Xiao
Chunyan Hands MACHINE.
electricity Words:0755-29985185
post Box. swdrd005@szsward. com

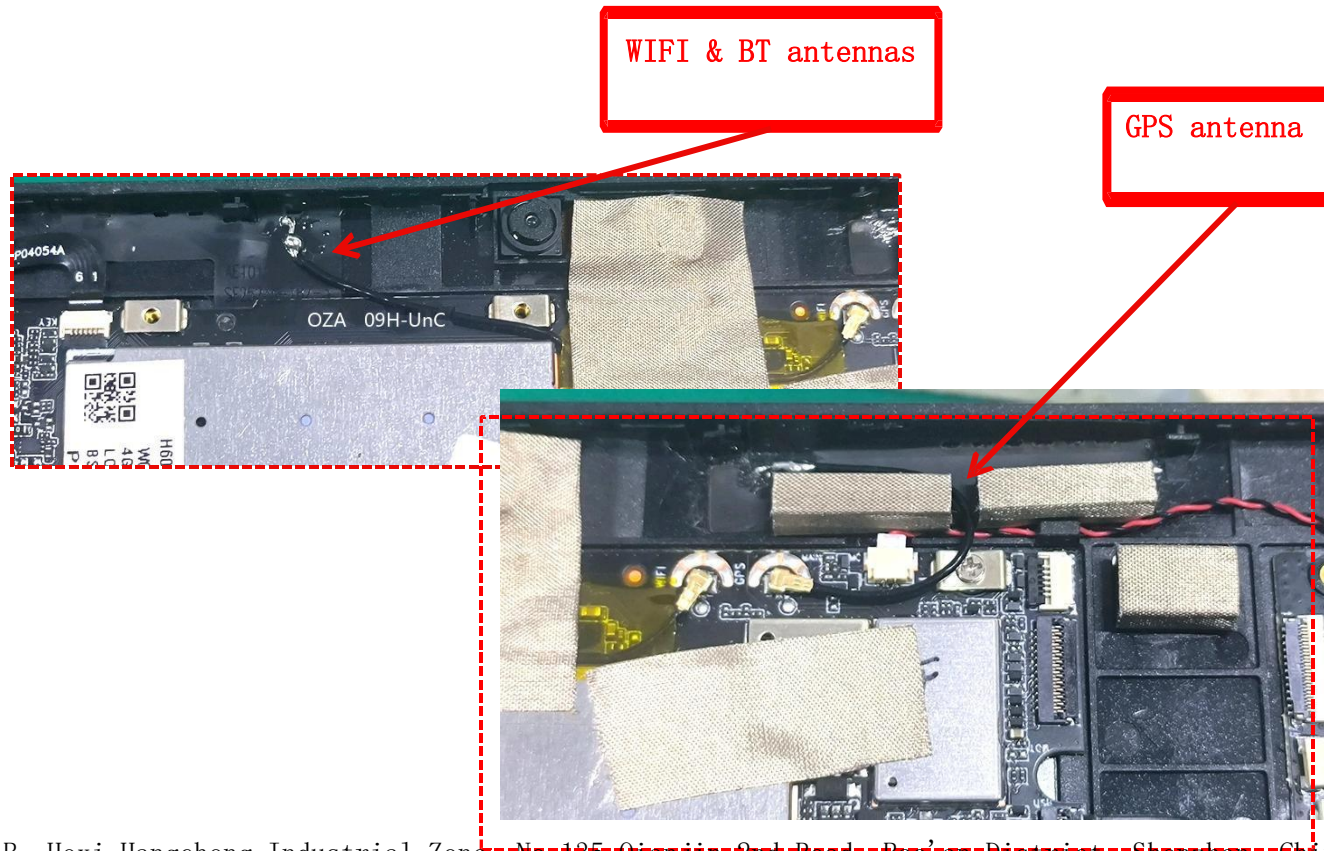
1. A brief description of the project

Number of project antennas	Type of machine
2	Flatbed
Shell material: 10 inch metal shell (full shell metal, side full plastic)	

2. A brief description of the antenna

Antenna number	Name	Operating frequency band/MHZ	material/structure
1	GPS	1575MHz	FPC
2	WIFI&BT&5Gwifi	2400MHz/2500MHz&5.8GHz	FPC

Antenna layout



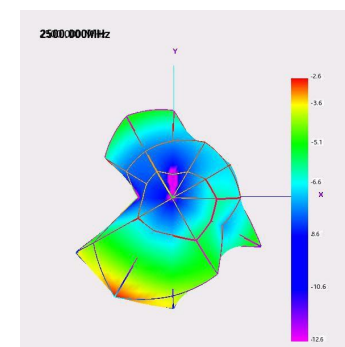
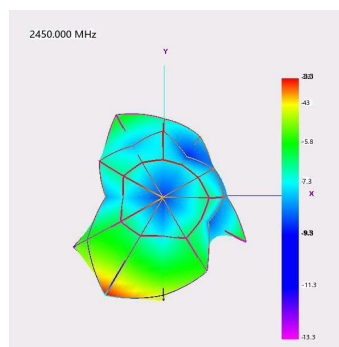
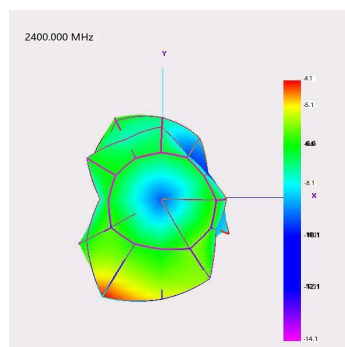
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WIFI&BT Antenna S11



WIFI & BT antenna efficiency

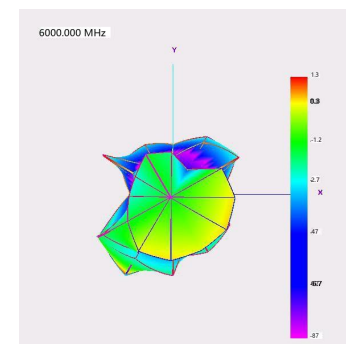
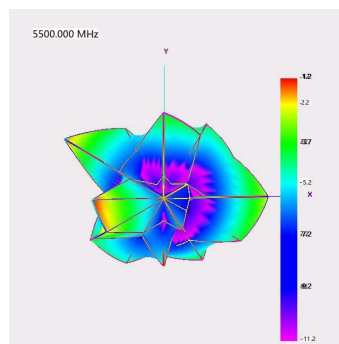
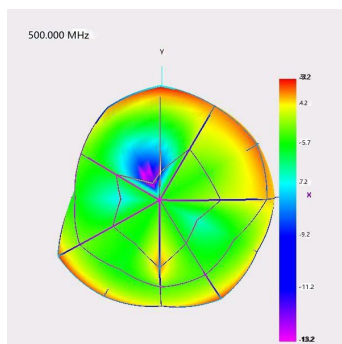
Passive Test For 2.4Gwifi								
Freq	Effi	Effi	Gain	Gain	UHS	DHIS	Max	Min
(MHz)	(%)	(dB)	(dBi)	(dBd)	(%)	(%)	(dB)	(dB)
2400	14.11	-8.5	-4.06	-6.21	7.614	6.501	-4.06	-17.72
2410	14.68	-8.33	-3.73	-5.88	7.827	6.85	-3.73	-18.54
2420	14.77	-8.31	-3.53	-5.68	7.824	6.944	-3.53	-19.84
2430	14.54	-8.38	-3.4	-5.55	7.653	6.884	-3.4	-19.99
2440	13.7	-8.63	-3.45	-5.6	7.194	6.505	-3.45	-19.44
2450	13.86	-8.58	-3.31	-5.46	7.199	6.664	-3.31	-18.89
2460	14.12	-8.5	-3.21	-5.36	7.284	6.84	-3.21	-19.11
2470	15.42	-8.12	-2.72	-4.87	7.918	7.501	-2.72	-20.77
2480	16.05	-7.95	-2.42	-4.57	8.359	7.69	-2.42	-18.5
2490	16.34	-7.87	-2.29	-4.44	8.536	7.806	-2.29	-18.5
2500	14.91	-8.26	-2.64	-4.79	7.906	7.007	-2.64	-19.02



5GWIFI antenna efficiency

Passive Test For 5Gwifi

Freq	Effi	Effi	Gain	Gain	UHS	DHIS	Max	Min
(MHz)	(%)	(dB)	(dBi)	(dBd)	(%)	(%)	(dB)	(dB)
5000	11	-9.58	-4.48	-6.63	5.051	5.954	-4.48	-18.76
5100	9.09	-10.41	-4.55	-6.7	4.239	4.85	-4.55	-20.4
5200	9.21	-10.36	-4.27	-6.42	5.124	4.09	-4.27	-24.87
5300	8.45	-10.73	-4.08	-6.23	5.337	3.108	-4.08	-22.3
5400	17.7	-7.52	2.35	0.2	10.525	7.172	2.35	-23.38
5500	27.17	-5.66	3.47	1.32	16.929	10.237	3.47	-22.92
5600	32.33	-4.9	3.15	1	19.012	13.313	3.15	-21.71
5700	35.79	-4.46	3.99	1.84	21.905	13.884	3.99	-17.33
5800	33.74	-4.72	4.28	2.13	20.573	13.166	4.28	-21.49
5900	30.33	-5.18	2.3	0.15	18.264	12.067	2.3	-18.69
6000	35.53	-4.49	3.07	0.92	21.271	14.257	3.07	-22.03



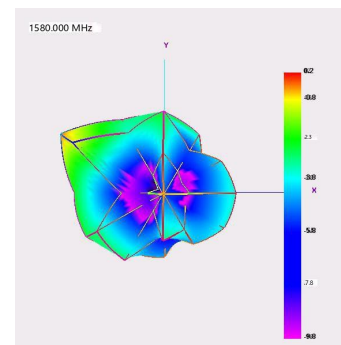
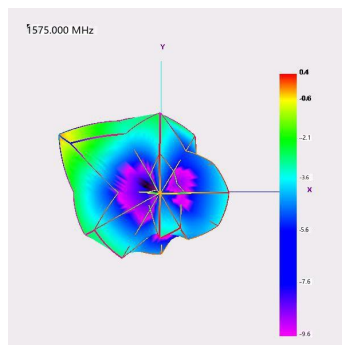
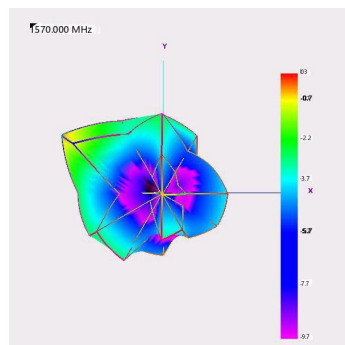
GPS Antenna S11



6/F, Building B, Hexi
Building B, Hexi Hangc

GPS antenna efficiency

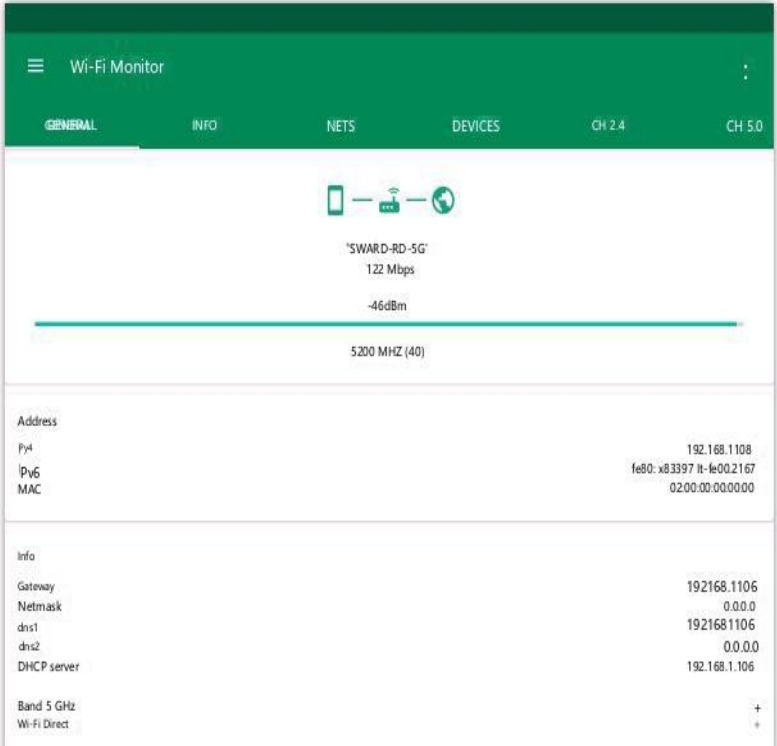
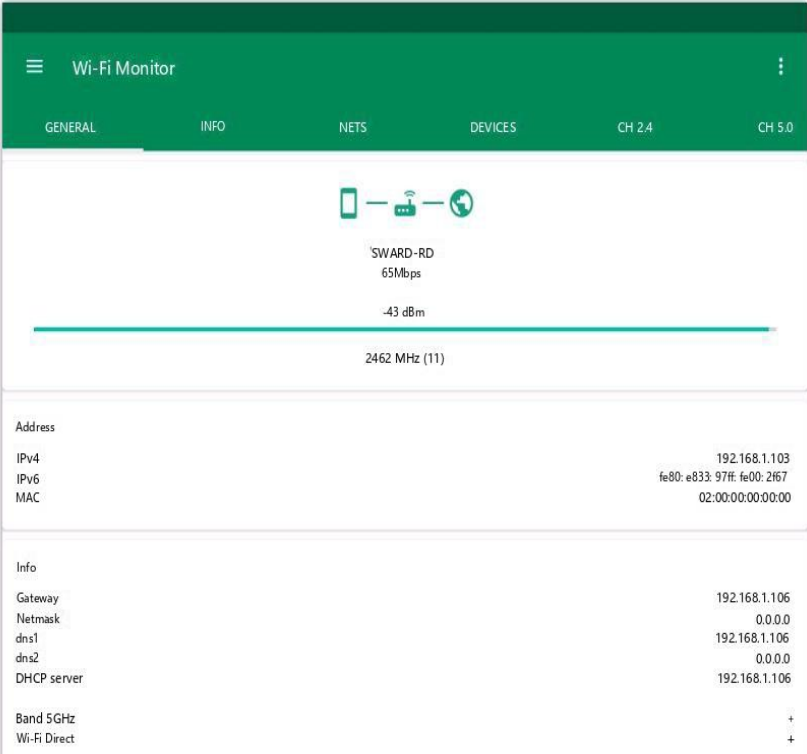
Passive Test For GPS2								
Freq	Effi	Effi	Gain	Gain	UHS	DHS	Max	Min
(MHz)	(%)	(dB)	(dBi)	(dBd)	(%)	(%)	(dB)	(dB)
1570	31.12	-5.07	0.27	-1.88	15.195	15.924	0.27	-11.63
1571	31.17	-5.06	0.29	-1.86	15.222	15.945	0.29	-11.81
1572	31.26	-5.05	0.3	-1.85	15.278	15.977	0.3	-11.69
1573	31.41	-5.03	0.31	-1.84	15.353	16.056	0.31	-11.77
1574	31.64	-5	0.36	-1.79	15.459	16.177	0.36	-11.84
1575	31.88	-4.97	0.39	-1.76	15.566	16.311	0.39	-11.78
1576	31.88	-4.96	0.41	-1.74	15.571	16.311	0.41	-11.96
1577	31.8	-4.98	0.37	-1.78	15.526	16.272	0.37	-11.94
1578	31.65	-5	0.35	-1.8	15.459	16.193	0.35	-12.06
1579	31.44	-5.03	0.31	-1.84	15.349	16.092	0.31	-12.18
1580	31.04	-5.08	0.24	-1.91	15.155	15.886	0.24	-12.29



The measured distance of the BT antenna

Real-world results	
model number	1
test environment	R&D Center, Thorwald
test equipment	Huawei AM08
Test distance	> 10 meters

WIFI antenna signal strength measurement pictures (data)



test site	Our R&D office					
Test Groups	2.4G/5G - Distance 15 meters		2.4G/5G - Distance 10 meters		2.4G/5G - distance 5 meters	
Test bands	2.4Gwifi	5Gwifi	2.4Gwifi	5Gwifi	2.4Gwifi	5Gwifi
signal strength	-43 dBm	-46 dBm	-37 dBm	-42 dBm	-31 dBm	-36 dBm

GPS real picture (data)



Test location: on the roof of our building

Test time: 9:30 a.m. to 10:00 a.m.

Test direction: East, South, West,

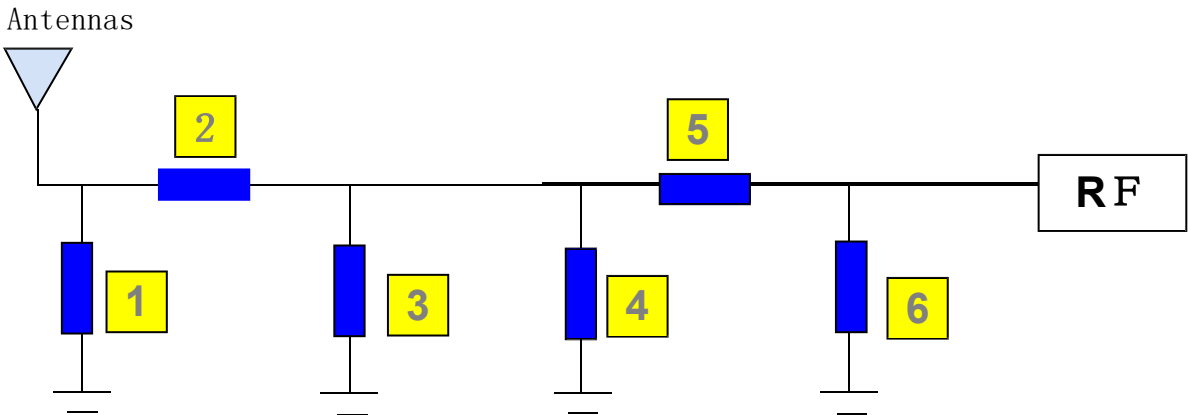
North Cold start positioning time:

< 60sec

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No.135 Qianjin 2nd Road, Bao'an District, Shenzhen,
China

Building B, Hexi Hangcheng Industrial Zone, No. 135 Qianjin No. 2 Road, Baoan District, Shenzhen

Antenna matching



Antenna matching has not been changed.

The main antenna	1	2	3	4	5	6	Remarks
The original match							
Change Match							

