

Approval Specification

2.4 GHz Internal Copper-Tube Antenna
IPEX 1.13 · 4th Generation · Black Cable · 200 mm · Heat-Shrink 32

English edition of the source approval sheet. Version A1 · 31 May 2026

1. Document identification

Field	Content
Description	2.4 GHz internal copper-tube antenna, L = 200 mm (4th generation)
Version	A1
Date	31 May 2026
Manufacturer:	Shenzhen HelloRadioSky Technology Co., Ltd
Address:	3F, Building B, No.7, Tongfu Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, China
Antenna type:	Internal copper tube antenna

2. Product configuration

The assembly is a 2.4 GHz internal antenna. The radiator is a copper tube. The feed is a black 1.13 coaxial cable terminated in a 4th-generation IPEX connector. The outline length is 200 mm. The source product name also specifies heat-shrink 32.

Item	Specification
Radiator	Internal copper tube
Frequency band	2.4 GHz (2400–2500 MHz)
Connector	IPEX, 4th generation
Cable	1.13 black coaxial cable
Overall length	200 mm
Heat-shrink	32
Cable color	Black

3. Electrical specifications

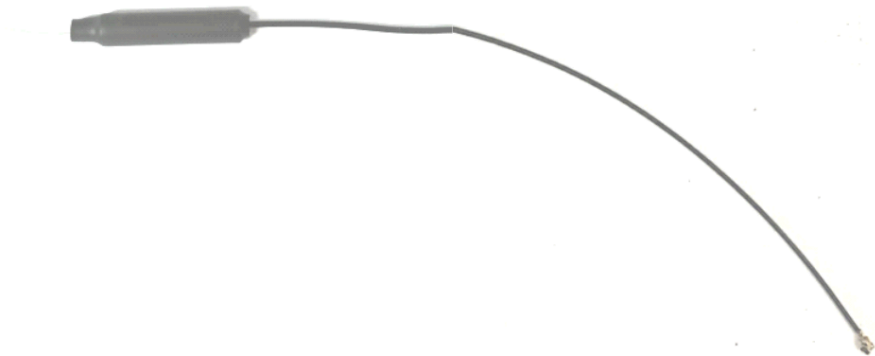
Parameter	Specification
Frequency range	2400–2500 MHz
VSWR	≤ 2.0
Gain	2.69 dBi
Input impedance	50 Ω

4. Mechanical and environmental ratings

Parameter	Specification
Cable color	Black

Input connector	IPEX-4 (4th generation)
Operating temperature	-40 °C to +85 °C
Operating humidity	20% to 80%

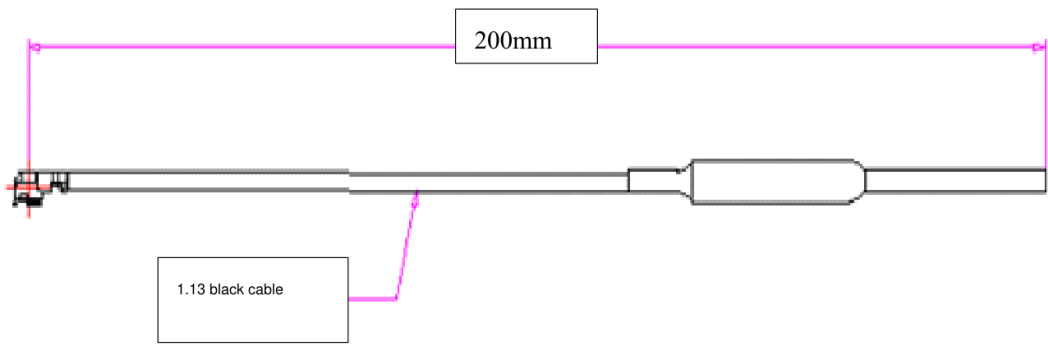
5. Product photograph



Copper-tube radiator, black 1.13 cable, and 4th-generation IPEX connector.

6. Outline drawing

Overall length is 200 mm, from the connector end to the end of the copper tube. The callout marks the 1.13 black cable.



7. Environmental performance tests

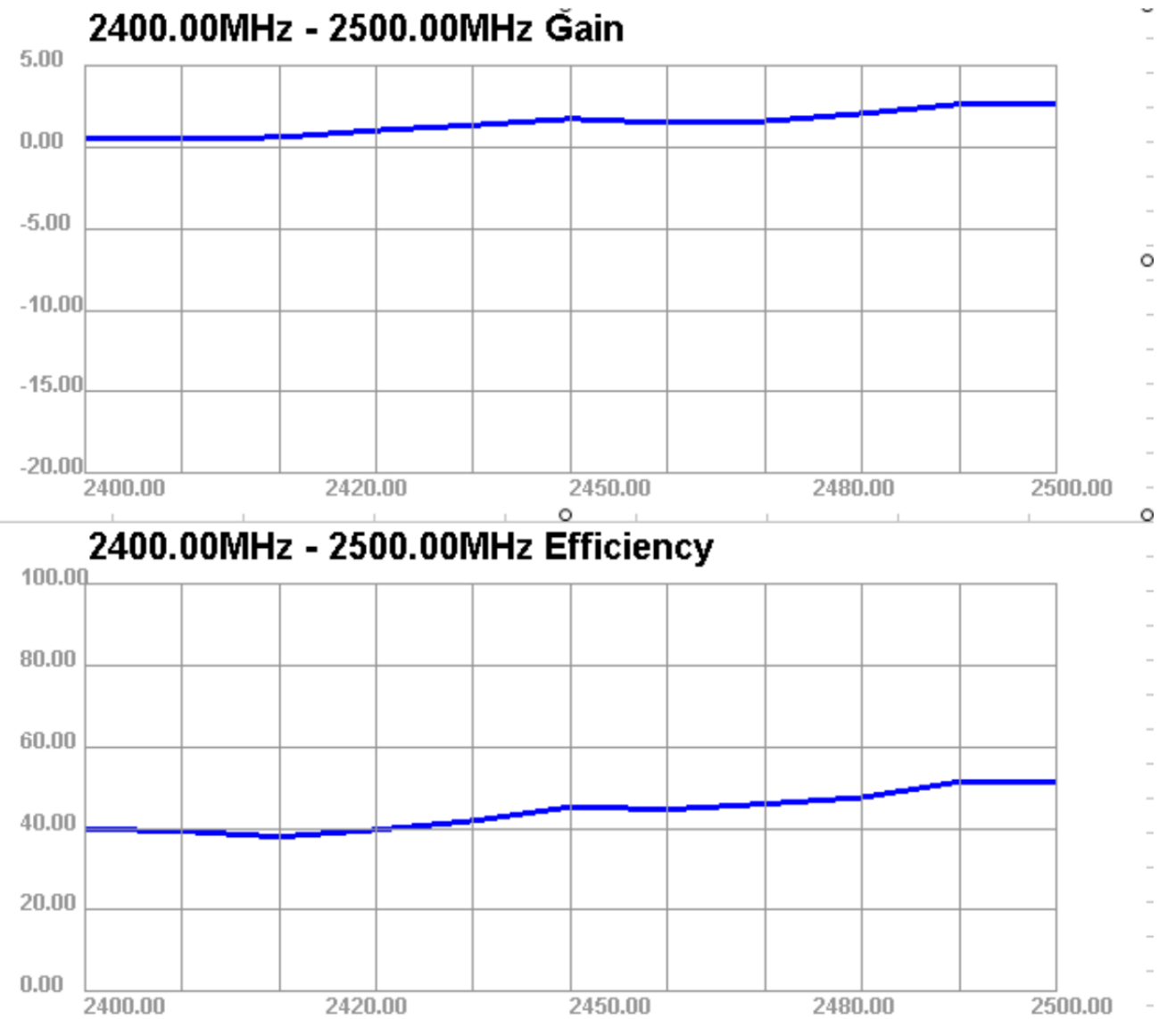
Item	Test condition	Requirement
Storage environment	Unless otherwise specified, temperature, humidity, and air pressure during test are: 1. Temperature: −30 °C to +80 °C 2. Relative humidity: 45% to 85% 3. Air pressure: 86 kPa to 106 kPa	Electrical and mechanical performance shall remain normal.
High / low temperature	Five cycles between 70 °C and 40 °C. Then hold the sample for 1–2 h under normal conditions and inspect the appearance.	Dimensions shall meet this specification. Mechanical and electrical performance shall be satisfactory.
Steady damp heat	Relative humidity 95 ± 3% at 40 °C for 2 h. Measure electrical performance within 5 minutes after the sample is removed. Then hold the sample for 1–2 h under normal conditions and inspect the appearance.	Dimensions shall meet this specification. Mechanical and electrical performance shall be satisfactory.
Vibration	Frequency range 10–55 Hz. Displacement amplitude 0.35 mm. Acceleration amplitude 50.0 m/s ² . Number of sweep cycles: 30.	Electrical and mechanical performance shall remain normal.
Drop	Free drop from a height of 1 m, three times, along mutually perpendicular axes.	Electrical and mechanical performance shall remain normal.

8. Sample test — passive Wi-Fi

Measured on the sample from 2400 MHz to 2500 MHz. UHIS, DHIS, AttH, and AttV are the column names from the source test sheet.

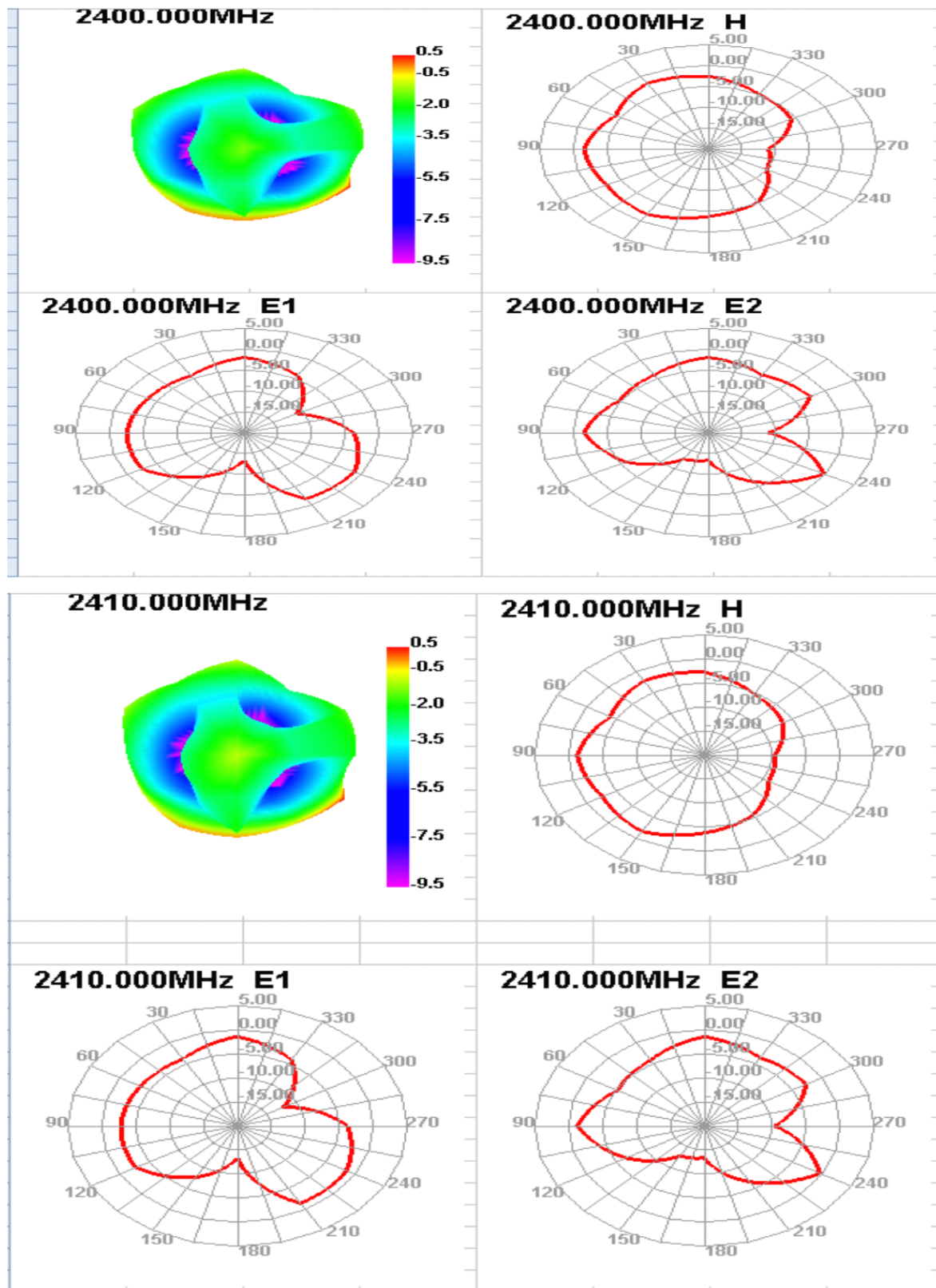
Freq (MHz)	Eff. (%)	Eff. (dB)	Gain (dBi)	Gain (dBd)	UHIS (%)	DHIS (%)	Max (dB)	Min (dB)	Directivity (dBi)	Beamwidth (3 dB)	AttH (dB)	AttV (dB)
2400	39.9	-3.99	0.52	-1.63	16.108	23.797	0.52	-13.42	4.51	60	43.91	43.89
2410	39.32	-4.05	0.51	-1.64	15.992	23.328	0.51	-13.61	4.56	60	44.05	43.95
2420	37.97	-4.21	0.6	-1.55	15.669	22.298	0.6	-14.15	4.8	150	43.94	43.81
2430	39.67	-4.01	1.01	-1.14	16.61	23.065	1.01	-15.14	5.03	120	44.07	43.87
2440	41.87	-3.78	1.33	-0.82	17.871	24.001	1.33	-16.2	5.12	120	44.39	44.15
2450	45.28	-3.44	1.72	-0.43	19.717	25.565	1.72	-15.97	5.16	120	44.63	44.34
2460	44.68	-3.5	1.47	-0.68	19.873	24.811	1.47	-16.74	4.97	120	44.63	44.43
2470	46.01	-3.37	1.57	-0.58	20.954	25.061	1.57	-17.79	4.95	120	44.56	44.29
2480	47.58	-3.23	2.05	-0.1	22.246	25.334	2.05	-19.85	5.27	60	44.67	44.37
2490	51.46	-2.89	2.62	0.47	24.645	26.814	2.62	-20.28	5.5	0	44.7	44.46
2500	51.32	-2.9	2.69	0.54	25.073	26.244	2.69	-22.69	5.59	0	44.59	44.18

9. Gain and efficiency



10. Radiation patterns

The source sheet shows patterns at 2400.000 MHz and 2410.000 MHz only. Each frequency has a 3D plot, an H-plane cut, and E1 / E2 cuts.



11. Approval

Sample submission

Engineering	Quality	Sales

Customer approval

Engineering	Quality	Purchasing

Customer remarks on the confirmed sample