

Dial Mini

Antenna Test Report

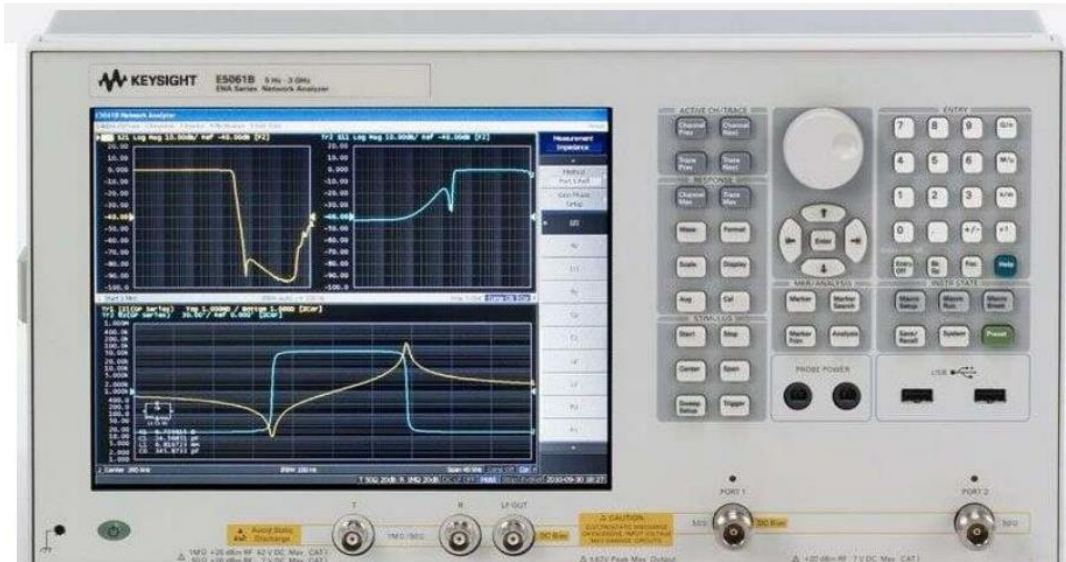
June 24, 2026

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Test Items and Equipment

Test Item	Test Parameters	Test Equipment
1. S-parameters	VSWR; Smith chart	Network analyzer: Agilent 5071B
2. Passive test	Efficiency	Comprehensive test system; network analyzer: Agilent 5071B Microwave anechoic chamber: GTS Chamber

Test equipment



Key Terms

VSWR: The abbreviation for voltage standing wave ratio, defined as the ratio of reflected-wave amplitude to incident-wave amplitude. Under ideal conditions of complete impedance matching, VSWR is 1. In practical engineering, some reflection is always present; the greater the reflection, the greater the VSWR. Therefore, a VSWR value closer to 1 indicates better performance.

Return Loss: RL is the ratio of the power of the reflected RF input signal to the power of the input signal. It is expressed in dB and is a negative quantity. Under ideal conditions, the antenna and RF circuit are completely matched and no power is reflected, so return loss approaches negative infinity. In practice, perfect matching is impossible and reflected power always exists. In the worst case, all input power is reflected and return loss is 0. For this parameter, a lower (more negative) value indicates better antenna performance.

Effi: The ratio of the power radiated by the antenna (the power effectively converted into electromagnetic energy) to the power input to the antenna. It is always less than 100%.

Gain: The ratio, under equal input power, of the power density produced by the actual antenna at a point in space to that produced by an ideal isotropic radiator at the same point. It quantitatively describes how strongly the antenna concentrates the input power for radiation. The unit is generally dBi.

Smith chart: A chart showing the one-to-one relationship between impedance and reflection coefficient. Complex impedance is represented as a trajectory on the reflection-coefficient plane.

TRP: Total Radiated Power. This is the surface integral (spherical average) over three-dimensional space of the effective isotropic radiated power, EIRP. It reflects the transmission characteristics of the mobile device in all directions.

TIS: Total Isotropic Sensitivity. This is the surface integral (spherical average) over three-dimensional space of the effective isotropic sensitivity, EIS. It reflects the reception characteristics of the mobile device in all directions.

1 / Complete Device / Anechoic Chamber Test Setup



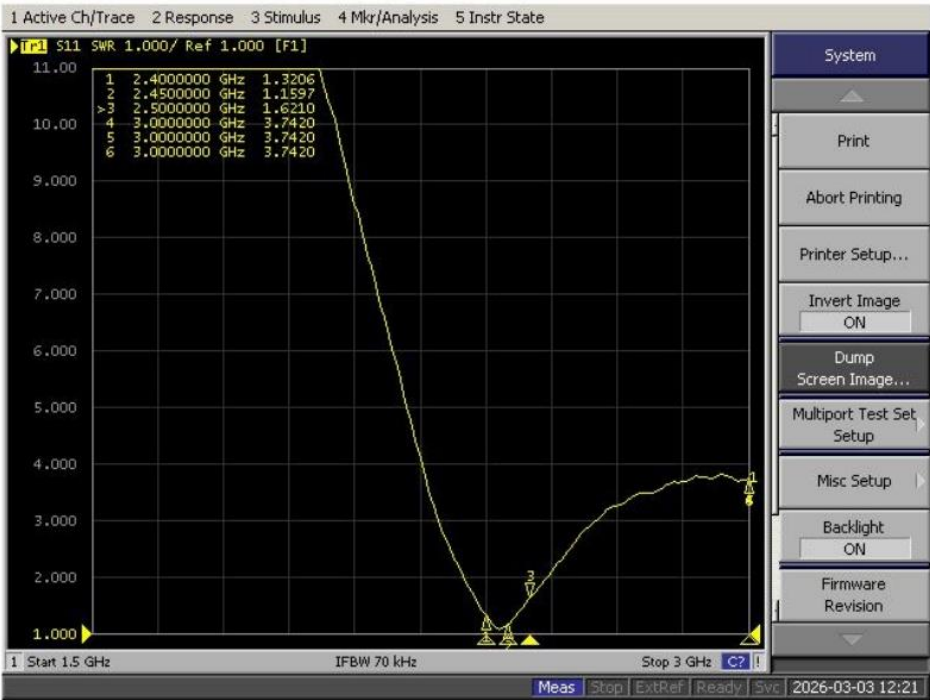
Complete device overview



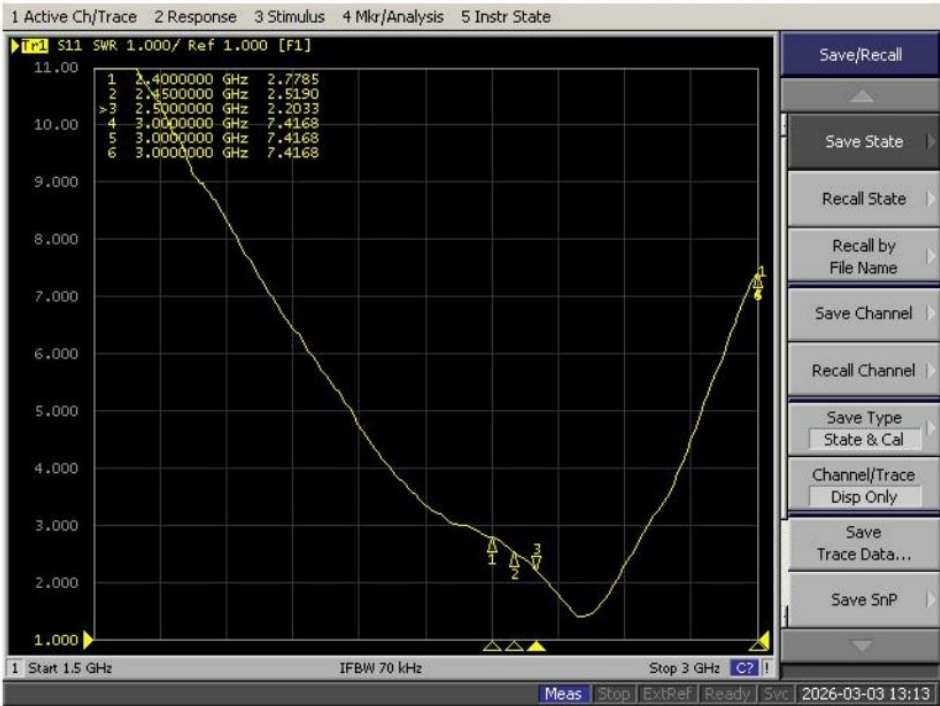
Antenna

3 / Antenna VSWR Plots

Before board edge



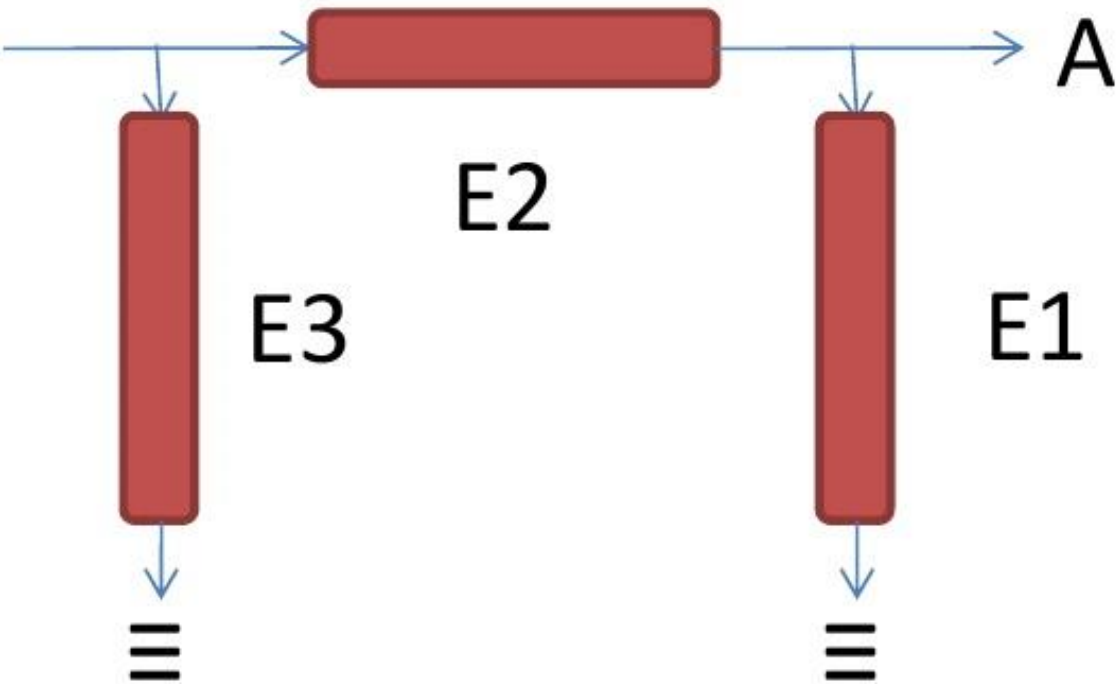
After board edge



4 / Matching Explanation

E1	E2	E3
NC	0 ohm	NC

RF input -> E2 (0 ohm) -> Antenna



Note: The antenna matching network was not modified.

5 / 2.4 GHz Passive Efficiency and Gain Test Data

Antenna end (before PCB)

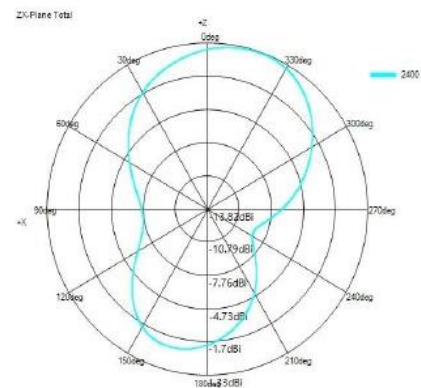
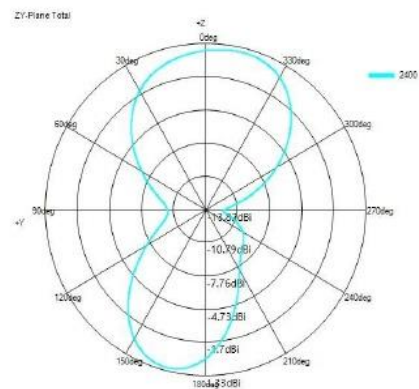
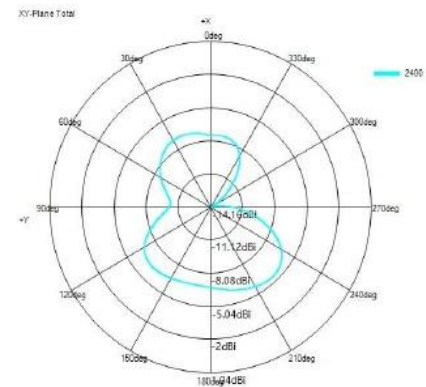
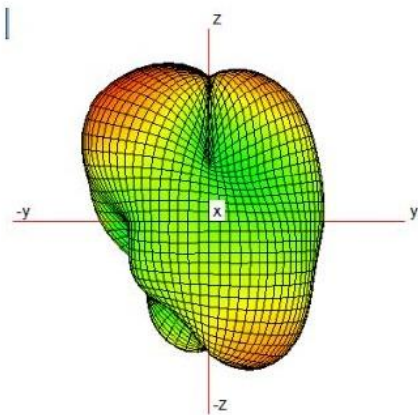
Freq (MHz)	Gain (dBi)	Efficiency (%)
2400	1.04	35.20
2410	1.03	36.44
2420	1.17	35.36
2430	1.14	36.91
2440	1.05	36.04
2450	1.10	35.64
2460	1.10	34.84
2470	1.44	35.16
2480	1.57	35.20
2490	1.55	35.29
2500	1.38	35.01

Board end (after PCB)

Freq (MHz)	Gain (dBi)	Efficiency (%)
2400	-1.93	21.95
2410	-1.54	22.99
2420	-1.35	24.00
2430	-1.18	23.30
2440	-1.16	23.80
2450	-1.10	24.38
2460	-1.01	24.48
2470	-0.34	23.18
2480	-0.27	24.59
2490	-0.08	24.97
2500	0.19	26.46

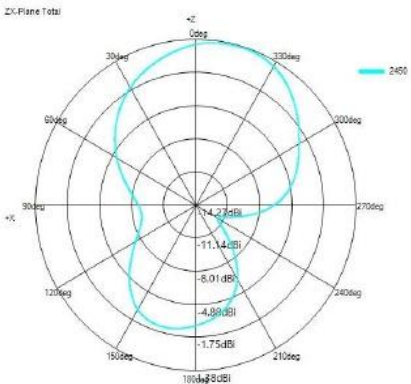
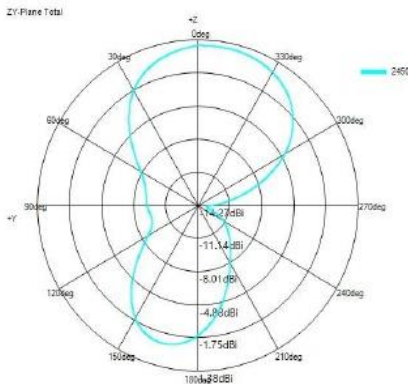
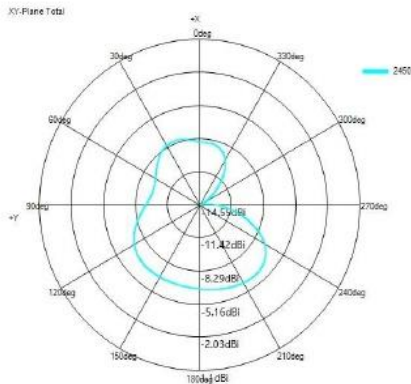
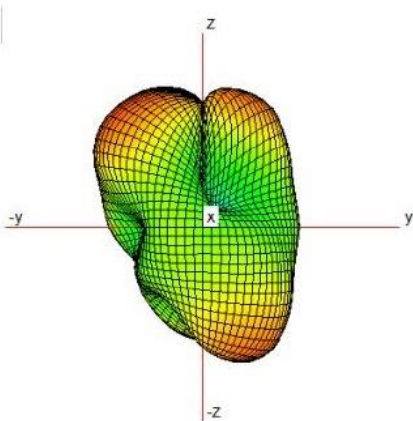
6 / Passive Test 3D and 2D Plots - Antenna End (Before Board)

Frequency: 2400 MHz



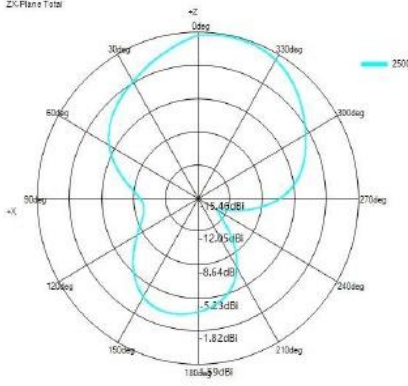
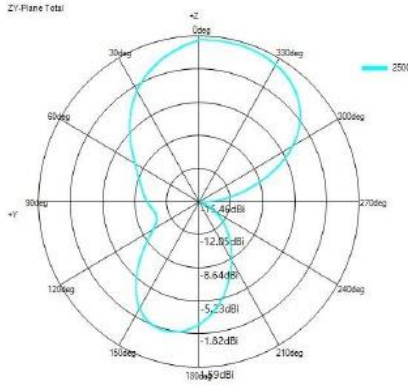
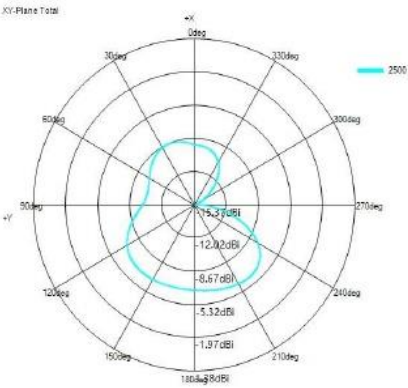
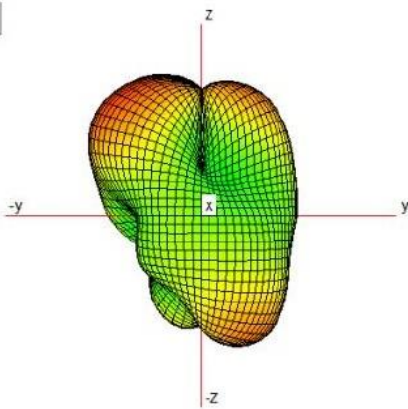
6 / Passive Test 3D and 2D Plots - Antenna End (Before Board)

Frequency: 2450 MHz



6 / Passive Test 3D and 2D Plots - Antenna End (Before Board)

Frequency: 2500 MHz



7 / Remarks

1. The data above are passive test results at 2.4 GHz.
2. Please be informed. Contact us if you have any questions. Thank you.

THANK YOU