

众驰电子

ZC-SL03

Antenna made of PCB

USER MANUAL

ZC-SL03

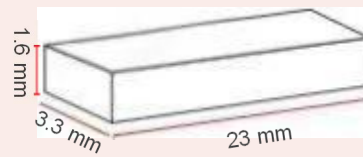
Independent package, Apply to SMT process.

Operating Rang:

824~960 MHz
1710~2690 MHz

Dimenision :

23mm*3.3mm*1.6mm

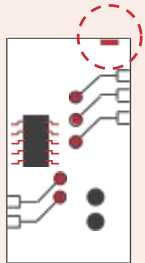


「 ZC-SL03 」

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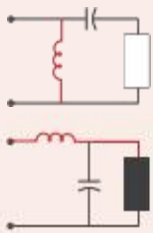
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How to embed an Antenna



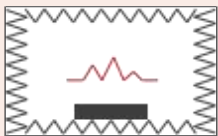
STEP 1: Place the antenna component

1. Select one corner of your PCB
2. Design the feeder of antenna and connect it with antenna at clearance area,
3. Make sure that the space around the antenna maintains a clearance of 5mm, away from metal objects and circuits.



STEP 2: Design your matching network

1. It is recommended to control the impedance of RF microstrip feeder by 50 ohms , and reserve π - type LC matching network to adjust the antenna and module for optimal impedance matching, to avoid antenna signal transmission loss.
2. It is very important to fine-tune the matching network in the design process to obtain the best signal.



STEP 3: Test your device

1. Perform a field test in which your antenna is placed in its final housing. Fine-tune the MN if needed
2. Use network analyzer to adjust mismatch
3. Test the antenna efficiency with an anechoic chamber.

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Antenna Specifications

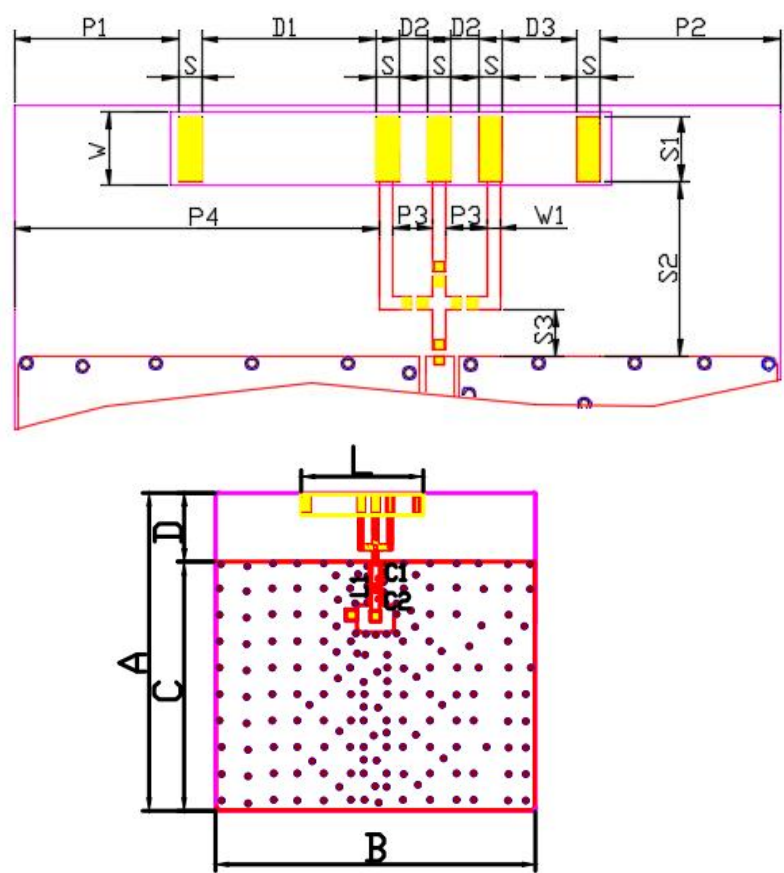
The SL03 antenna power amplifier is specifically designed to enhance Bluetooth and WiFi performance in wireless devices with limited space requirements. Here, we will use our evaluation board to compare the performance in the 2.4GHz frequency band, and also demonstrate a common placement example of the SL03. Finally, by utilizing the test port to select a matching network, we will be able to test, capture, and analyze VSWR, total efficiency, gain, and radiation patterns.

Quick Reference Guide

Technical features	Low Frequency	Medium Frequency	High Frequency
	824~960Mhz	1710~2170Mhz	1710~2690Mhz
Average Efficiency	> 8%	> 50%	> 40%
Peak Gain	1 dBi	2 dBi	2 dBi
VSWR	< 2.1		
Radiation Pattern	Omnidirectional		
Polarization	Linear		
Weight <small>(approx.)</small>	0.13 g		
Temperature	-40 to +125 °C		
Impedance	50 Ω		
Dimensions <small>(L x W x H)</small>	23.0 mm x3.3 mm x 1.6 mm		

Table 1 – Technical Features. Measures from the Evaluation Board.

Evaluation Board



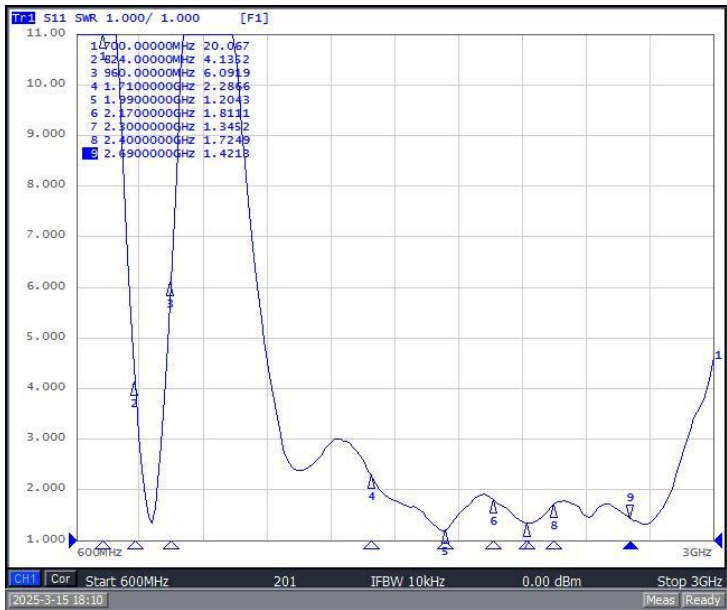
Measure	mm	Measure	mm
A	60	S	1.2
B	60.4	S1	3.5
C	40.7	S2	9.05
D	13	S3	2.37
L	23	D1	9.1
P1	8.6	D2	1.5
P2	9.4	D3	3.9
P3	2.1	W	3.8
P4	19.05	W1	0.7

Tolerance: ±0.2

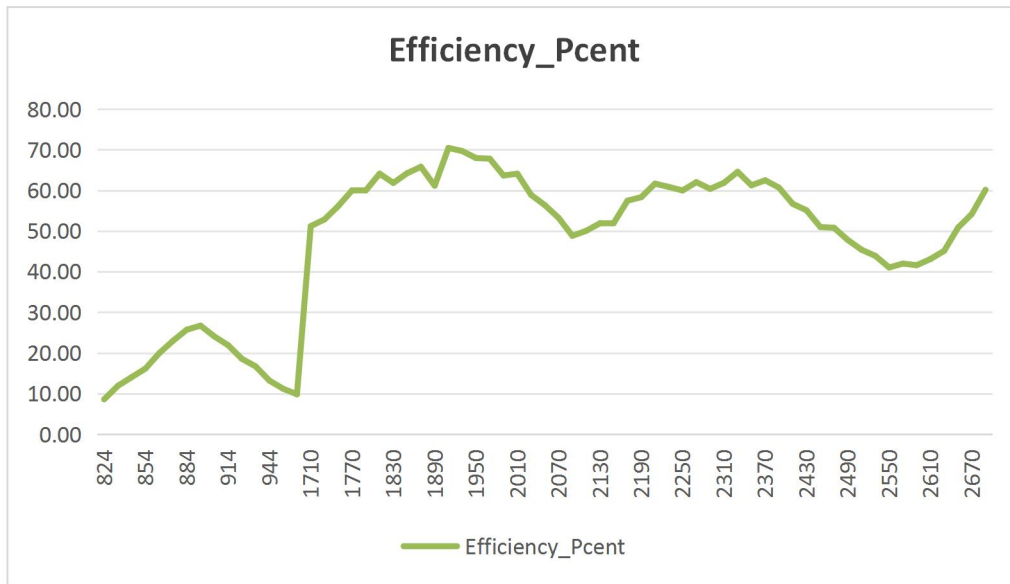
Material: The Evaluation Boards are built on FR4 substrate. Thickness is 1.5 mm.

Figure 1–Evaluation Board

Antenna S11 parametetr



Radiation Patterns, Gain and Efficiency



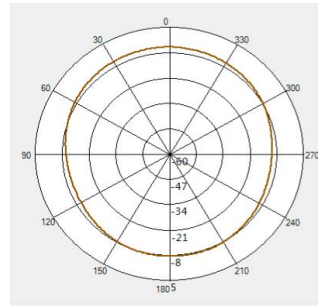
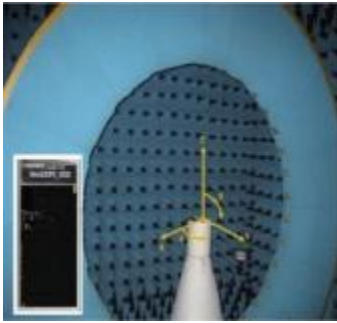
Frequency&Gain chart

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Frequency&Efficiency chart

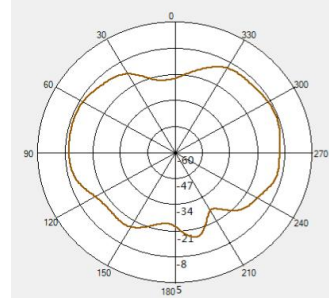
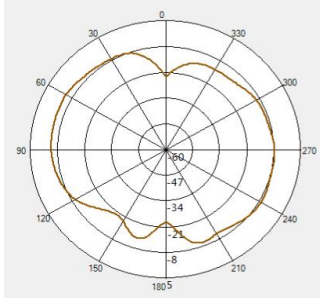
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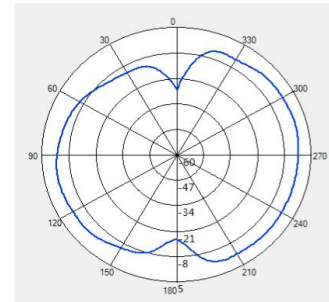
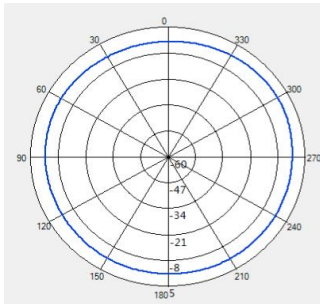
Measurement System Set- Up Evaluation
Board in Plane XY

$\theta = 90^\circ$ Plane XY at 888 MHz



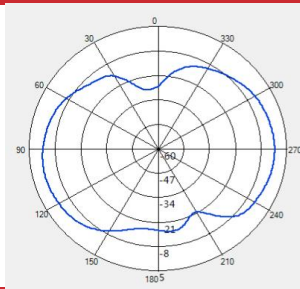
$\phi = 0^\circ$ Plane XY at 888 MHz

$\phi = 90^\circ$ Plane XY at 888 MHz

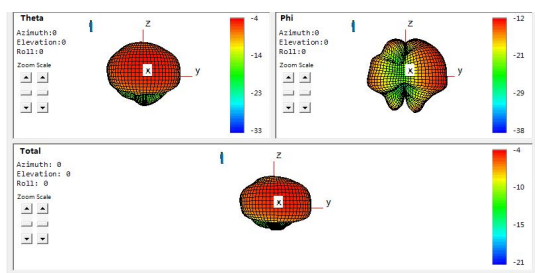


$\theta = 90^\circ$ Plane XY at 2.170 GHz

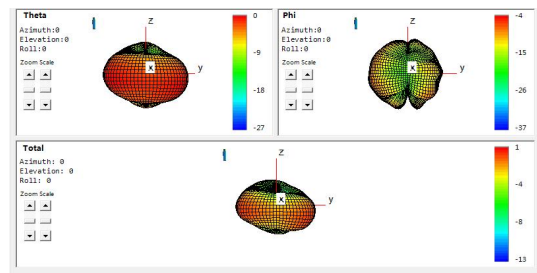
$\phi = 0^\circ$ Plane XY at 2.170 GHz



$\phi = 90^\circ$ Plane XY at 2.170 GHz



3D Radiation Pattern at 2.170 GHz



3D Radiation Pattern at 2.170 GHz

Gain and efficiency	824–960MHz	1710–2170Mhz	2170–2690Mhz
Peak Gain	1.76dBi	2.57dBi	2.08dBi
Average Gain across the band	1.36dBi	2.12dBi	1.73dBi
Gain Range across the band	1.09dBi ~ 1.76dBi	1.66dBi ~ 2.57dBi	1.36dBi ~ 2.08dBi
Peak Efficiency	26.70%	70.41%	64.53%
Average Efficiency across the band	17.42%	59.90%	53.92%
Efficiency Range across the band	8.58%~26.70%	52.83%~70.41%	41.01%~64.53%

Table 2: – The performance evaluation sheet for WiFi and Bluetooth antennas.

Recommended Antenna Footprint for Evaluation Board

Assuming that the SL03 antenna booster is placed in the middle of the PCB, see below the recommended footprint dimensions.

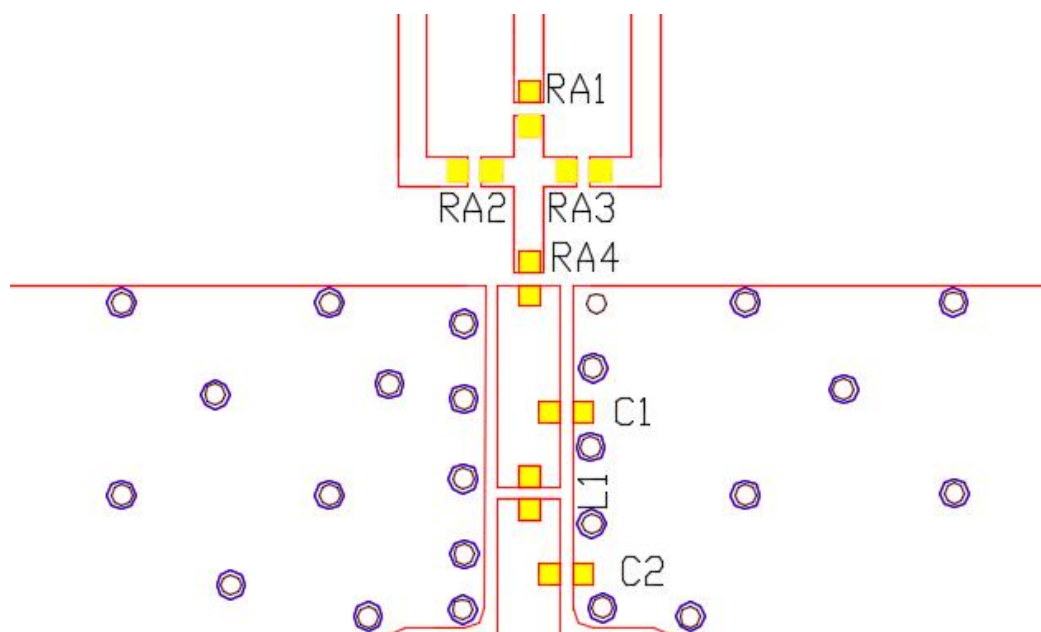


Figure 2 – Footprint dimensions for the evaluation board

Component matching value	Series Circuit RA1	11pF
	Series Circuit RA2	18nH
	Series Circuit RA3	4.3pF
	Series Circuit RA4	0 Ω
	Series Circuit L 1	18pF
	Parallel Circuit C1	15nH
	Parallel Circuit C2	5.1nH

Tolerance : ±0.05mm

For additional support in the integration process, please contact jackchen@dgzhongchi.cn

Next graphic shows temperature profile (grey zone) for the SL03 antenna booster assembly process reflow ovens..

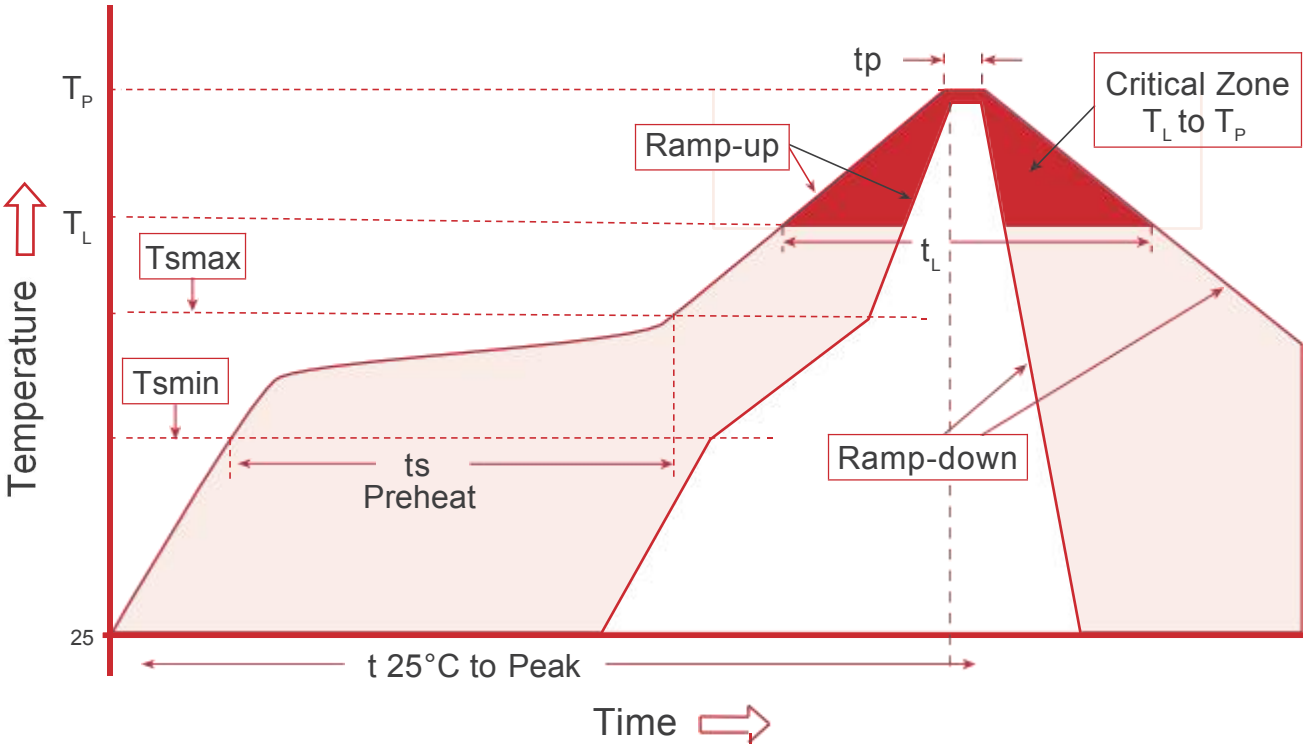
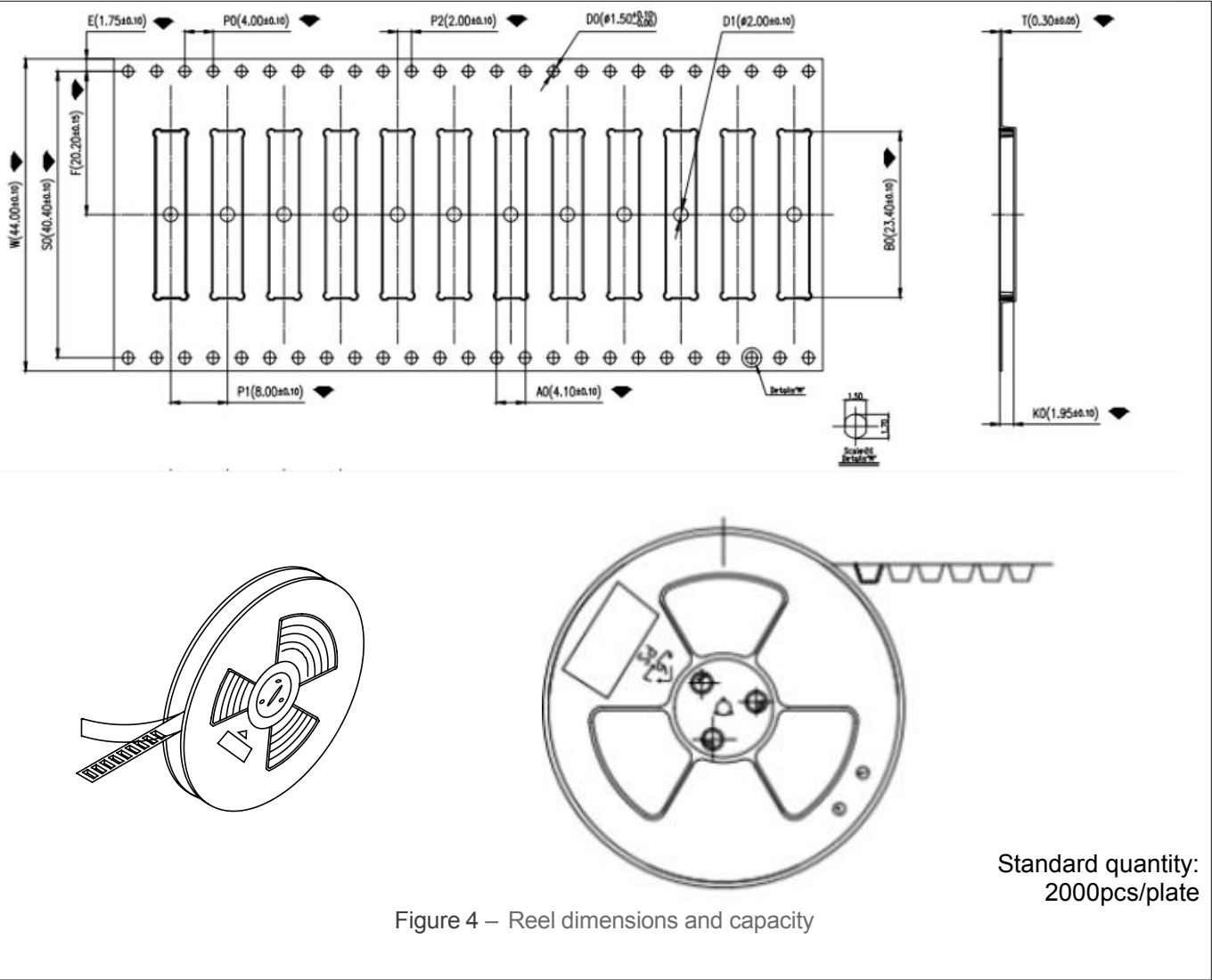


Figure 3– Temperature profile

Packaging

The SL03 antenna booster is delivered in plastic tape and reel packaging.



ITEM	W	S ₀	A ₀	B ₀	K ₀	P ₀	F	E	D ₀	D ₁	P ₁	P ₂	T ₀
DIM	44. 0±0.1	40. 4±0.1	4.1±0.1	23.4±0.1	1.95±0.3	4.0±0.1	20.2±0.3	1. 75±0.1	1. 5±0.1	2.0±0.1	8. 0±0.1	2. 0±0.1	0. 3±0.05