

MPE TEST REPORT

Applicant Sengled Co., Ltd.

FCC ID 2AGN8-ZM002

Product Sengled Zigbee Module

Brand sengled

Model ZM002

Report No. R2004A0256-M1

Issue Date May 27, 2020

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC 47 CFR Part 1 1.1310**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Performed by: Yu Wang

Approved by: Guangchang Fan

Guangchang Fan

TA Technology (Shanghai) Co., Ltd.

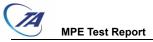
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Test Laboratory

Notes of the Test Report

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(shanghai) co., Ltd. The results documented in this report apply only to the tested sample, under the

conditions and modes of operation as described herein .Measurement Uncertainties were not taken

into account and are published for informational purposes only. This report is written to support

regulatory compliance of the applicable standards stated above.

1.2. Test facility

FCC (Designation number: CN1179, Test Firm Registration Number: 446626)

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

Testing Location

Company:

TA Technology (Shanghai) Co., Ltd.

Address:

No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, China

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1.4 Laboratory Environment

	Min 100C May 25 0C
Temperature	Min. = 18°C, Max. = 25 °C



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 Relative humidity
 Min. = 30%, Max. = 70%

 Ground system resistance
 $< 0.5 \Omega$

 Ambient noise is checked and found very low and in compliance with requirement of standards.

Reflection of surrounding objects is minimized and in compliance with requirement of standards.



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2 Description of Equipment under Test

Client Information

Applicant	Sengled Co., Ltd.		
Applicant address	Room 201/15,Building 1, No.498, Guoshoujing Road, Pilot Free Trade Zone, Shanghai, P.R. China		
Manufacturer	Sengled Co., Ltd.		
Manufacturer address	Room 201/15, Building 1, No.498, Guoshoujing Road, Pilot Free Trade Zone, Shanghai, P.R. China		

General Technologies

Model	ZM002
SN	1#
Hardware Version	V3
Software Version	V15
Date of Testing:	May 1, 2020 ~ May 16, 2020

Note: 1. The EUT is sent from the applicant to TA and the information of the EUT is declared by the applicant.

2. All indications of Pass/Fail in this report are opinions expressed by TA Technology (Shanghai) Co., Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only.



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3 Maximum conducted output power (measured) and antenna Gain

The numeric gain (G) of the antenna with a gain specified in dB is determined by Numeric gain (G)=10^(antenna gain/10)

Band	Maximum Conducted Output Power (dBm)		Antenna Gain	Numeric gain	
	(dBm)	(mW)	(dBi)		
Zigbee	5.02	3.177	1.00	1.259	



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4 Test Result

According to section 1.1310 of FCC 47 CFR Part 1, limits for maximum permissible exposure (MPE) are as following

TABLE 1 – LIMITS FOR MAXIMUN PERMISSIBLE EXPOSURE (MPE)

Frequency Range	Electric Field	Field Magnetic Field Power Densi		Averaging Time
(MHz)	Strength	Strength		250
A-1-0-17	(V/m)	(AVm)	(mVV/cm2)	(minutes)
	(A) Limits for Occu	upational/Controlle	d Exposures	
0.3-3.0	614	1.63	*(100)	6
3-30	1842/f	4.89/f	*(900/f2)	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
(B)	Limits for General	Population/Uncont	rolled Exposure	
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f2)	30
30-300	27.5	0.073	0.2	30
300-1500			f/1500	30
1500-100,000			1.0	30

f = frequency in MHz

Note1. Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational / controlled limits apply provided he or she is made aware of the potential for exposure.

Note2: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

The maximum permissible exposure for 1500~100,000MHz is 1.0.So

Band	The maximum permissible exposure
Zigbee	1.0mW/cm ²

^{* =} Plane-wave equivalent power density



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RF Exposure Calculations:

The following information provides the minimum separation distance for the highest gain antenna provided. This calculation is based on the conducted power, considering maximum power and antenna gain. The formula shown in KDB 447498 D01 is used in the calculation.

Equation from KDB 447498 D01 General RF Exposure Guidance v06 (10/23/2015) is:

$$S = PG / 4 \square R^2$$

Where: S = power density (in appropriate units, e.g. mW/cm²)

P = Time-average maximum tune up procedure (in appropriate units, e.g., mW)

G = the numeric gain of the antenna

R = distance to the center of radiation of the antenna (20 cm = limit for MPE)

Band	PG (mW)	Test Result (mW/cm ²)	Limit Value (mW/cm ²)	Conclusion
Zigbee	3.999	0.001	1.000	Pass
Note: R = 20cm				
П_ 2 1/16				

 Π = 3.1416

Note: For transmitters, minimum separation distance is 20cm, even if calculations indicate MPE distance is less.

******END OF REPORT ******