

MRT Technology (Suzhou) Co., Ltd

Phone: +86-512-66308358 Fax: +86-512-66308368 www.mrt-cert.com Report No.: 1604RSU01604 Report Version: Issue Date: 04-27-2016

RF Exposure Evaluation Declaration

FCC ID: 2AGN8-Z02HUB

Sengled Co., Ltd. APPLICANT:

Application Type: Certification

Product: Element hub

Model No.: Z02-hub

Trademark: sengled

FCC Classification: Digital Transmission System (DTS)

April 20 ~ 27, 2016 Test Date:

Reviewed By : Robin Wu)

Approved By : Marlinchen

(Marlin Chen)



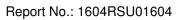


The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standards through the calibration of the equipment and evaluated measurement uncertainty herein.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

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Revision History

Report No.	Version	Description	Issue Date
1604RSU01604	Rev. 01	Initial report	04-27-2016

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1. PRODUCT INFORMATION

1.1. Equipment Description

Product Name	Element hub	
Model No.	Z02-hub	
Frequency Range	802.15.4: 2405 ~ 2475 MHz	
	802.11b/g/n-HT20: 2412 ~ 2462MHz	
	802.11n-HT40: 2422 ~ 2452MHz	
Type of Modulation	802.15.4: O-QPSK	
	802.11b: DSSS	
	802.11g/n: OFDM	
ZigBee Antenna Gain	2.8dBi	
Wi-Fi Antenna Gain	3.1dBi	

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2. RF Exposure Evaluation

2.1. Limits

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range	Electric Field	Magnetic Field	Power Density	Average Time
(MHz)	Strength (V/m)	Strength (A/m)	(mW/cm ²)	(Minutes)
(A) Limits for Occupational/ Control Exposures				
300-1500			f/300	6
1500-100,000			5	6
(B) Limits for General Population/ Uncontrolled Exposures				
300-1500			f/1500	6
1500-100,000			1	30

f= Frequency in MHz

Calculation Formula: $Pd = (Pout*G)/(4*pi*r^2)$

Where

Pd = power density in mW/cm²

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

r = distance between observation point and center of the radiator in cm

Pd is the limit of MPE, 1mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

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2.2. Test Result of RF Exposure Evaluation

Product	Element hub
Test Item	RF Exposure Evaluation

Test Mode	Frequency Band	Maximum Average	Power Density at	Limit
	(MHz)	Output Power	R = 20 cm	(mW/cm ²)
		(dBm)	(mW/cm ²)	
802.15.4	2405 ~ 2475	17.86	0.0232	1
802.11b/g/n	2412 ~ 2462	13.28	0.0086	1

CONCULISON:

Both of the 2.4GHz ZigBee and 2.4GHz WLAN can transmit simultaneously. Therefore, the Max Power Density at R (20 cm) = $0.0232 \text{mW/cm}^2 + 0.0086 \text{mW/cm}^2 = 0.0318 \text{mW/cm}^2 < 1 \text{mW/cm}^2$. So the EUT complies with the requirement.

——— The End