RF Exposure Evaluation Declaration

FCC ID:	2AGN8-Z02HUB
APPLICANT:	Sengled Co., Ltd.

Application Type:	Certification
Product:	Element hub
Model No.:	Z02-hub
Trademark:	sengled
FCC Classification:	Digital Transmission System (DTS)
Test Date:	April 20 ~ 27, 2016

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ACCREDITED
TESTING LABORATORY
CERTIFICATE #3628.01

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.
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Revision History

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

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

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 (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Average Time (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/cm^2
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, $1mW/cm^2$. 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.

2.2. Test Result of RF Exposure Evaluation

Product	Element hub
Test Item	RF Exposure Evaluation

Test Mode	Frequency Band (MHz)	Maximum Average Output Power (dBm)	Power Density at R = 20 cm (mW/cm^2)	Limit (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) = $0.0232mW/cm^2 + 0.0086mW/cm^2 = 0.0318mW/cm^2 < 1mW/cm^2$. So the EUT complies with the requirement.

The End