



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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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: $Pd = (Pout \cdot G) / (4 \cdot \pi \cdot r^2)$

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.

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 |

CONCLUSION:

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 _____