

## FCC MPE REPORT

### Certification

**Applicant Name:**  
WISOL CO., LTD

**Address:**  
531-7, Gajang-ro, Osan-si Gyeonggi-do, 18103, Korea

**Date of Issue:**

August 2, 2017

**Test Site/Location:**

HCT CO., LTD., 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA

**Report No.:** HCT-R-1706-E007-3

**HCT FRN:** 0005866421

**ISED Registration Number:** 5944A-5

**FCC ID:** 2ABA2SFM20R4

**APPLICANT:** WISOL CO., LTD

**Model(s):** SFM20R4

**EUT Type:** Sigfox Quad-mode module

The measurements shown in this report were made in accordance with the procedures specified in §2.947. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.

HCT CO., LTD. Certifies that no party to this application has subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998, 21 U.S. C.853(a)



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**Manager of Telecommunication testing center**

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## Version

| TEST REPORT NO.   | DATE           | DESCRIPTION                                                  |
|-------------------|----------------|--------------------------------------------------------------|
| HCT-R-1706-E007   | June 12, 2017  | - First Approval Report                                      |
| HCT-R-1706-E007-1 | July 10, 2017  | - Added the results for Simultaneous transmission operations |
| HCT-R-1706-E007-2 | July 18, 2017  | - Revised results                                            |
| HCT-R-1706-E007-3 | August 2, 2017 | - Revised the Ant gain ( Sigfox )                            |
|                   |                |                                                              |

## RF Exposure Statement

### 1. LIMITS

According to §1.1310 and §2.1091 RF exposure is calculated.

#### (B) Limits for General Population/Uncontrolled Exposures

| Frequency range<br>(MHz) | Electric field<br>Strength (V/m) | Magnetic field<br>Strength (A/m) | Power density<br>(mW/cm <sup>2</sup> ) | Averaging time<br>(minutes) |
|--------------------------|----------------------------------|----------------------------------|----------------------------------------|-----------------------------|
| 0.3 - 1.34.....          | 614                              | 1.63                             | *(100)                                 | 30                          |
| 1.34 - 30.....           | 824/f                            | 2.19/f                           | *(180/ f <sup>2</sup> )                | 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

\* = Plane-wave equivalent power density

### 2. MAXIMUM PERMISSIBLE EXPOSURE Prediction

Prediction of MPE limit at a given distance

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

S = Power density

P = power input to antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna

### 3.RESULTS

#### 3-1. Sigfox Mode

|                                                             |         |                    |
|-------------------------------------------------------------|---------|--------------------|
| Max Peak output Power at antenna input terminal             | 23.639  | dBm                |
| Max Peak output Power at antenna input terminal             | 231.153 | mW                 |
| Prediction distance                                         | 20.000  | cm                 |
| Prediction frequency                                        | 920.138 | MHz                |
| Antenna Gain(typical)                                       | 2.010   | dBi                |
| Antenna Gain(numeric)                                       | 1.589   | -                  |
| Power density at prediction frequency( S)                   | 0.0731  | mW/cm <sup>2</sup> |
| MPE limit for uncontrolled exposure at prediction frequency | 0.613   | mW/cm <sup>2</sup> |

#### 3-2. Bluetooth LE Mode

|                                                             |          |                    |
|-------------------------------------------------------------|----------|--------------------|
| Max Peak output Power at antenna input terminal             | 7.480    | dBm                |
| Max Peak output Power at antenna input terminal             | 5.598    | mW                 |
| Prediction distance                                         | 20.000   | cm                 |
| Prediction frequency                                        | 2480.000 | MHz                |
| Antenna Gain(typical)                                       | 4.440    | dBi                |
| Antenna Gain(numeric)                                       | 2.780    | -                  |
| Power density at prediction frequency( S)                   | 0.0031   | mW/cm <sup>2</sup> |
| MPE limit for uncontrolled exposure at prediction frequency | 1.000    | mW/cm <sup>2</sup> |

#### 3-3. WLAN Mode

|                                                             |          |                    |
|-------------------------------------------------------------|----------|--------------------|
| Max Peak output Power at antenna input terminal             | 22.000   | dBm                |
| Max Peak output Power at antenna input terminal             | 158.489  | mW                 |
| Prediction distance                                         | 20.000   | cm                 |
| Prediction frequency                                        | 2437.000 | MHz                |
| Antenna Gain(typical)                                       | 4.440    | dBi                |
| Antenna Gain(numeric)                                       | 2.780    | -                  |
| Power density at prediction frequency( S)                   | 0.0876   | mW/cm <sup>2</sup> |
| MPE limit for uncontrolled exposure at prediction frequency | 1.000    | mW/cm <sup>2</sup> |

### Simultaneous transmission operations

1. The power density level at 20 cm is **0.0731 mW/cm<sup>2</sup>**, which is below the uncontrolled exposure limit of **0.613 mW/cm<sup>2</sup>** at **Sigfox**.
2. The power density level at 20 cm is **0.0031 mW/cm<sup>2</sup>**, which is below the uncontrolled exposure limit of **1.0 mW/cm<sup>2</sup>** at **Bluetooth LE**.
3. The power density level at 20 cm is **0.0876 mW/cm<sup>2</sup>**, which is below the uncontrolled exposure limit of **1.0 mW/cm<sup>2</sup>** at **WLAN**.

->Simultaneous MPE 20cm is Sigfox(0.0731/1.0) + BT LE(0.0031/1.0) = 0.0762 mW/cm<sup>2</sup> < 0.613 mW/cm<sup>2</sup>

->Simultaneous MPE 20cm is BT LE(0.0031/1.0) + WLAN(0.0876/1.0) = 0.0907 mW/cm<sup>2</sup> < 1.000 mW/cm<sup>2</sup>