



## RF Exposure Evaluation Declaration

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**FCC ID:** 2AVK9-30251

**Applicant:** Strong Current Enterprises Limited

**Application Type:** Certification

**Product:** RANGEXTD MVP

**Model No.:** 30251

**FCC Classification:** Digital Transmission System (DTS)

**Test Procedure(s):** KDB 447498 D01 General RF Exposure Guidance v06

Reviewed By:

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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 | Note  |
|---------------|---------|----------------|------------|-------|
| 2001RSU020-U2 | Rev. 01 | Initial Report | 02-24-2020 | Valid |
|               |         |                |            |       |

## 1. PRODUCT INFORMATION

### 1.1. Feature of Equipment under Test

|                      |              |
|----------------------|--------------|
| Product Name:        | RANGEXTD MVP |
| Model No.:           | 30251        |
| Wi-Fi Specification: | 802.11b/g/n  |

### 1.2. Product Specification Subjective to this Report

|                     |                                                                                         |
|---------------------|-----------------------------------------------------------------------------------------|
| Frequency Range:    | 802.11b/g/n-HT20: 2412 ~ 2462MHz<br>802.11n-HT40: 2422 ~ 2452MHz                        |
| Channel Number:     | 802.11b/g/n-HT20: 11<br>802.11n-HT40: 7                                                 |
| Type of Modulation: | 802.11b: DSSS<br>802.11g/n: OFDM                                                        |
| Data Rate:          | 802.11b: 1/2/5.5/11Mbps<br>802.11g: 6/9/12/18/24/36/48/54Mbps<br>802.11n: up to 300Mbps |

### 1.3. Working Frequencies for this report

#### 802.11b/g/n-HT20

| Channel | Frequency | Channel | Frequency | Channel | Frequency |
|---------|-----------|---------|-----------|---------|-----------|
| 01      | 2412 MHz  | 02      | 2417 MHz  | 03      | 2422 MHz  |
| 04      | 2427 MHz  | 05      | 2432 MHz  | 06      | 2437 MHz  |
| 07      | 2442 MHz  | 08      | 2447 MHz  | 09      | 2452 MHz  |
| 10      | 2457 MHz  | 11      | 2462 MHz  | --      | --        |

#### 802.11n-HT40

| Channel | Frequency | Channel | Frequency | Channel | Frequency |
|---------|-----------|---------|-----------|---------|-----------|
| 03      | 2422 MHz  | 04      | 2427 MHz  | 05      | 2432 MHz  |
| 06      | 2437 MHz  | 07      | 2442 MHz  | 08      | 2447 MHz  |
| 09      | 2452 MHz  | --      | --        | --      | --        |

#### 1.4. Description of Available Antennas

| Antenna Type     | Frequency Band (MHz) | TX Paths | Max Antenna Gain (dBi) |       | CDD Directional Gain (dBi) |         |
|------------------|----------------------|----------|------------------------|-------|----------------------------|---------|
|                  |                      |          | Ant 0                  | Ant 1 | For Power                  | For PSD |
| Shrapnel Antenna | 2412 ~ 2462          | 2        | 1.5                    | 1.5   | 1.5                        | 4.51    |

Note:

The EUT supports Cyclic Delay Diversity (CDD) mode, and CDD signals are correlated.

For CDD transmissions, directional gain is calculated as follows,  $N_{ANT} = 2$ ,  $N_{SS} = 1$ .

Directional gain =  $G_{ANT\ MAX} + \text{Array Gain}$ , where Array Gain is as follows.

- For power spectral density (PSD) measurements on all devices,

$$\text{Array Gain} = 10 \log (N_{ANT} / N_{SS}) \text{ dB} = 3.01;$$

- For power measurements on IEEE 802.11 devices,

$$\text{Array Gain} = 0 \text{ dB for } N_{ANT} \leq 4;$$

## 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 <sup>2</sup> ) | Averaging Time (Minutes) |
|-----------------------------------------------------------|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| (A) Limits for Occupational/ Control Exposures            |                               |                               |                                     |                          |
| 0.3-3.0                                                   | 614                           | 1.63                          | *100                                | 6                        |
| 3.0-30                                                    | 1842/f                        | 4.89/f                        | *900/f <sup>2</sup>                 | 6                        |
| 30-300                                                    | 61.4                          | 0.163                         | 1.0                                 | 6                        |
| 300-1,500                                                 | --                            | --                            | f/300                               | 6                        |
| 1,500-100,000                                             | --                            | --                            | 5                                   | 6                        |
| (B) Limits for General Population/ Uncontrolled Exposures |                               |                               |                                     |                          |
| 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                       |
| 300-1,500                                                 | --                            | --                            | f/1500                              | 30                       |
| 1,500-100,000                                             | --                            | --                            | 1.0                                 | 30                       |

f= Frequency in MHz

\* = Plane-wave equivalent power density

Calculation Formula:  $P_d = (P_{out} * G) / (4 * \pi * r^2)$

Where

$P_d$  = power density in mW/cm<sup>2</sup>

$P_{out}$  = 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

$P_d$  is the limit of MPE, 1mW/cm<sup>2</sup>. 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   | RANGEXTD MVP           |
| Test Item | RF Exposure Evaluation |

Antenna Gain: Refer to Clause 1.4 of this report.

| Test Mode   | Frequency Band (MHz) | Maximum Total Average Output Power (dBm) | Power Density at R = 20 cm (mW/cm <sup>2</sup> ) | Limit (mW/cm <sup>2</sup> ) | Result |
|-------------|----------------------|------------------------------------------|--------------------------------------------------|-----------------------------|--------|
| 802.11b/g/n | 2412 ~ 2462          | 19.81                                    | 0.0269                                           | 1                           | Pass   |

\_\_\_\_\_ The End \_\_\_\_\_

## **Appendix - EUT Photograph**

Refer to “2001RSU020-UE” file.