



# RF EXPOSURE EVALUATION REPORT

**APPLICANT** : Nortek Security & Control LLC  
**PRODUCT NAME** : Edge Panel  
**MODEL NAME** : 2GIG-EDG-NA-V  
**BRAND NAME** : 2GIG  
**FCC ID** : EF400220  
**STANDARD(S)** : FCC 47CFR Part 2(2.1091)  
**RECEIPT DATE** : 2020-07-10  
**TEST DATE** : 2020-07-22 to 2022-09-12  
**ISSUE DATE** : 2022-10-11

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# DIRECTORY

|                                                 |    |
|-------------------------------------------------|----|
| 1. Technical Information.....                   | 3  |
| 1.1 Applicant and Manufacturer Information..... | 3  |
| 1.2 Equipment under Test (EUT) Description..... | 3  |
| 1.3 Applied Reference Documents .....           | 5  |
| 2. Device Category and RF Exposure Limit .....  | 6  |
| 3. Test Equipment List.....                     | 7  |
| 4. RF Output Power.....                         | 8  |
| 5. RF Exposure Assessment .....                 | 15 |
| Annex A General Information .....               | 17 |

| Change History |            |                   |
|----------------|------------|-------------------|
| Version        | Date       | Reason for Change |
| 1.0            | 2022-10-11 | First edition     |
|                |            |                   |



# 1. Technical Information

**Note:** Provide by applicant.

## 1.1 Applicant and Manufacturer Information

|                              |                                                                                                                |
|------------------------------|----------------------------------------------------------------------------------------------------------------|
| <b>Applicant:</b>            | Nortek Security & Control LLC                                                                                  |
| <b>Applicant Address:</b>    | 5919 Sea Otter Place, Carlsbad, CA 92010, United States                                                        |
| <b>Manufacturer:</b>         | Flextronics Electronics Technology (Shenzhen) Co., Ltd                                                         |
| <b>Manufacturer Address:</b> | 89 Yong Fu Road, Tong Fu Yu Industrial Park, Fu Yong Town, Bao An District, Shenzhen, Guangdong, 518103, China |

## 1.2 Equipment under Test (EUT) Description

|                          |                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>EUT Name:</b>         | Edge Panel                                                                                                                                                                                                                                                                                                                                       |
| <b>Hardware Version:</b> | A                                                                                                                                                                                                                                                                                                                                                |
| <b>Software Version:</b> | 0-LR                                                                                                                                                                                                                                                                                                                                             |
| <b>Frequency Bands:</b>  | LTE Band 4: 1710 MHz ~ 1755 MHz<br>LTE Band 13: 777 MHz ~ 787 MHz<br>WLAN 2.4GHz: 2412 MHz ~ 2462 MHz<br>WLAN 5.2GHz: 5180 MHz ~ 5240 MHz<br>WLAN 5.8GHz: 5745 MHz ~ 5825 MHz<br>Bluetooth: 2402 MHz ~ 2480 MHz<br>Z-wave: 916MHz, 908.4MHz, 908.42MHz, 912MHz, 920MHz<br>900MHz: 904MHz, 906MHz, 910MHz, 912MHz, 914MHz, 918MHz, 920MHz, 922MHz |
| <b>Modulation Mode:</b>  | LTE: QPSK/16QAM<br>802.11b: DSSS<br>802.11g/n-HT20: OFDM<br>Bluetooth: GFSK, $\pi/4$ -DQPSK, 8-DPSK<br>Z-wave: GFSK, FSK, DSSS, OQPSK<br>900MHz: OQPSK                                                                                                                                                                                           |
| <b>Antenna Type:</b>     | FPC Antenna                                                                                                                                                                                                                                                                                                                                      |
| <b>Antenna Gain:</b>     | LTE Band 4: 1.24dBi;<br>LTE Band 13: 0.89dBi;<br>WLAN 2.4GHz: 3.13dBi;<br>WLAN 5.2GHz: 0.75dBi;<br>WLAN 5.8GHz: 0.32dBi;<br>Bluetooth: 3.13dBi;<br>Z-wave: 1.35dBi;                                                                                                                                                                              |



REPORT No.: SZ22090043S01

|  |                  |
|--|------------------|
|  | 900MHz: 0.02dBi; |
|--|------------------|

**Note:**

1. This report was updated based on the original report SZ21050037S01, Model: 2GIG-EDG-NA-V, both of them are different from add Z-wave long range mode by software (frequency: 912MHz, 920MHz) and change Software Version.
2. When the test result is a critical value, we will use the measurement uncertainty give the judgment result based on the 95% confidence intervals.



### 1.3 Applied Reference Documents

Leading reference documents for testing:

| Identity                                                                                                                                                                                                                                                                                            | Document Title                                                | Method determination /Remark |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|------------------------------|
| FCC 47CFR Part 2(2.1091)                                                                                                                                                                                                                                                                            | Radio Frequency Radiation Exposure Assessment: mobile devices | No deviation                 |
| KDB 447498 D01v06                                                                                                                                                                                                                                                                                   | General RF Exposure Guidance                                  | No deviation                 |
| <p><b>Note 1:</b> The test item is not applicable.</p> <p><b>Note 2:</b> Additions to, deviation, or exclusions from the method shall be judged in the "method determination" column of add, deviate or exclude from the specific method shall be explained in the "Remark" of the above table.</p> |                                                               |                              |



## 2. Device Category and RF Exposure Limit

Per user manual, Based on 47CFR 2.1091, this device belongs to mobile device category with General Population/Uncontrolled exposure.

### Mobile Devices:

47CFR 2.1091(b)

For purposes of this section, a mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. In this context, the term "fixed location" means that the device is physically secured at one location and is not able to be easily moved to another location. Transmitting devices designed to be used by consumers or workers that can be easily re-located, such as wireless devices associated with a personal computer, are considered to be mobile devices if they meet the 20 centimeter separation requirement.

### General Population/Uncontrolled Exposure:

The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity. Warning labels placed on low-power consumer devices such as cellular telephones are not considered sufficient to allow the device to be considered under the occupational/controlled category, and the general population/uncontrolled exposure limits apply to these devices.

**Table 1—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) |
|----------------------------------------------------------------|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| <b>(B) Limits for General Population/Uncontrolled Exposure</b> |                               |                               |                                     |                          |
| 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



### 3. Test Equipment List

| Manufacturer | Name of Equipment | Type/Model | Serial Number | Calibration |            |
|--------------|-------------------|------------|---------------|-------------|------------|
|              |                   |            |               | Last Cal.   | Due Date   |
| R&S          | Network Emulator  | CMW500     | 165755        | 2021.02.25  | 2022.02.24 |
| Anritsu      | Network Emulator  | MT8820C    | 6200985414    | 2020.10.28  | 2021.10.27 |

**Note:**

The EUT was connected to Base Station Anritsu MT8820C referred to the Setup Configuration. For the maximum power, it was established between EUT and Base Station with following setting:

1. For LTE testing, the frequency band, channel bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and different configurations which are requested to be reported to FCC.

## 4. RF Output Power

### ➤ LTE Output Power

#### <LTE Band 4>

| BW [MHz]        | Modulation | RB Size | RB Offset | Low Channel | Middle Channel | High Channel | Tune-up limit (dBm) |
|-----------------|------------|---------|-----------|-------------|----------------|--------------|---------------------|
| Channel         |            |         |           | 20050       | 20175          | 20300        |                     |
| Frequency (MHz) |            |         |           | 1720        | 1732.5         | 1745         |                     |
| 20              | QPSK       | 1       | 0         | 23.87       | 23.79          | 23.91        | 24.50               |
| 20              | QPSK       | 1       | 49        | 23.66       | 23.64          | 23.41        |                     |
| 20              | QPSK       | 1       | 99        | 23.47       | 23.51          | 23.49        |                     |
| 20              | QPSK       | 50      | 0         | 22.90       | 22.99          | 23.04        | 23.50               |
| 20              | QPSK       | 50      | 24        | 23.13       | 23.01          | 22.79        |                     |
| 20              | QPSK       | 50      | 50        | 22.98       | 23.02          | 22.80        |                     |
| 20              | QPSK       | 100     | 0         | 22.96       | 23.05          | 22.93        |                     |
| 20              | 16QAM      | 1       | 0         | 22.67       | 22.63          | 22.89        | 23.50               |
| 20              | 16QAM      | 1       | 49        | 22.86       | 22.95          | 22.58        |                     |
| 20              | 16QAM      | 1       | 99        | 23.08       | 22.79          | 22.60        |                     |
| 20              | 16QAM      | 50      | 0         | 22.17       | 22.13          | 22.39        | 23.00               |
| 20              | 16QAM      | 50      | 24        | 22.36       | 22.45          | 22.08        |                     |
| 20              | 16QAM      | 50      | 50        | 22.48       | 22.29          | 22.10        |                     |
| 20              | 16QAM      | 100     | 0         | 22.35       | 22.44          | 22.32        |                     |
| Channel         |            |         |           | 20025       | 20175          | 20325        | Tune-up limit (dBm) |
| Frequency (MHz) |            |         |           | 1717.5      | 1732.5         | 1747.5       |                     |
| 15              | QPSK       | 1       | 0         | 23.74       | 23.66          | 23.78        | 24.50               |
| 15              | QPSK       | 1       | 37        | 23.53       | 23.51          | 23.28        |                     |
| 15              | QPSK       | 1       | 74        | 23.35       | 23.38          | 23.36        |                     |
| 15              | QPSK       | 36      | 0         | 22.77       | 22.86          | 22.91        | 23.50               |
| 15              | QPSK       | 36      | 20        | 23.00       | 22.87          | 22.66        |                     |
| 15              | QPSK       | 36      | 39        | 22.85       | 22.89          | 22.67        |                     |
| 15              | QPSK       | 75      | 0         | 22.83       | 22.92          | 22.80        |                     |
| 15              | 16QAM      | 1       | 0         | 22.54       | 22.50          | 22.75        | 23.50               |
| 15              | 16QAM      | 1       | 37        | 22.73       | 22.82          | 22.44        |                     |
| 15              | 16QAM      | 1       | 74        | 22.92       | 22.66          | 22.47        |                     |
| 15              | 16QAM      | 36      | 0         | 22.12       | 22.08          | 22.33        | 23.00               |
| 15              | 16QAM      | 36      | 20        | 22.31       | 22.40          | 22.02        |                     |
| 15              | 16QAM      | 36      | 39        | 22.50       | 22.24          | 22.05        |                     |





|                 |       |    |    |        |        |        |                           |
|-----------------|-------|----|----|--------|--------|--------|---------------------------|
| 15              | 16QAM | 75 | 0  | 22.42  | 22.51  | 22.39  |                           |
| Channel         |       |    |    | 20000  | 20175  | 20350  | Tune-up<br>limit<br>(dBm) |
| Frequency (MHz) |       |    |    | 1715   | 1732.5 | 1750   |                           |
| 10              | QPSK  | 1  | 0  | 23.60  | 23.52  | 23.64  | 24.50                     |
| 10              | QPSK  | 1  | 25 | 23.39  | 23.37  | 23.14  |                           |
| 10              | QPSK  | 1  | 49 | 23.25  | 23.31  | 23.22  |                           |
| 10              | QPSK  | 25 | 0  | 22.63  | 22.69  | 22.77  | 23.50                     |
| 10              | QPSK  | 25 | 12 | 22.86  | 22.76  | 22.52  |                           |
| 10              | QPSK  | 25 | 25 | 22.71  | 22.74  | 22.53  |                           |
| 10              | QPSK  | 50 | 0  | 22.69  | 22.78  | 22.66  |                           |
| 10              | 16QAM | 1  | 0  | 22.40  | 22.36  | 22.61  | 23.50                     |
| 10              | 16QAM | 1  | 25 | 22.59  | 22.68  | 22.30  |                           |
| 10              | 16QAM | 1  | 49 | 22.78  | 22.52  | 22.33  |                           |
| 10              | 16QAM | 25 | 0  | 22.02  | 21.98  | 22.23  | 23.00                     |
| 10              | 16QAM | 25 | 12 | 22.21  | 22.30  | 21.92  |                           |
| 10              | 16QAM | 25 | 25 | 22.40  | 22.14  | 21.95  |                           |
| 10              | 16QAM | 50 | 0  | 22.32  | 22.41  | 22.29  |                           |
| Channel         |       |    |    | 19975  | 20175  | 20375  | Tune-up<br>limit<br>(dBm) |
| Frequency (MHz) |       |    |    | 1712.5 | 1732.5 | 1752.5 |                           |
| 5               | QPSK  | 1  | 0  | 23.48  | 23.40  | 23.52  | 24.00                     |
| 5               | QPSK  | 1  | 12 | 23.27  | 23.25  | 23.02  |                           |
| 5               | QPSK  | 1  | 24 | 23.13  | 23.19  | 23.10  |                           |
| 5               | QPSK  | 12 | 0  | 22.51  | 22.57  | 22.65  | 23.00                     |
| 5               | QPSK  | 12 | 7  | 22.74  | 22.64  | 22.40  |                           |
| 5               | QPSK  | 12 | 13 | 22.59  | 22.62  | 22.41  |                           |
| 5               | QPSK  | 25 | 0  | 22.57  | 22.66  | 22.54  |                           |
| 5               | 16QAM | 1  | 0  | 22.28  | 22.24  | 22.49  | 23.00                     |
| 5               | 16QAM | 1  | 12 | 22.47  | 22.56  | 22.18  |                           |
| 5               | 16QAM | 1  | 24 | 22.66  | 22.40  | 22.21  |                           |
| 5               | 16QAM | 12 | 0  | 21.91  | 21.87  | 22.12  | 23.00                     |
| 5               | 16QAM | 12 | 7  | 22.10  | 22.19  | 21.81  |                           |
| 5               | 16QAM | 12 | 13 | 22.29  | 22.03  | 21.84  |                           |
| 5               | 16QAM | 25 | 0  | 22.21  | 22.30  | 22.18  |                           |
| Channel         |       |    |    | 19965  | 20175  | 20385  | Tune-up<br>limit<br>(dBm) |
| Frequency (MHz) |       |    |    | 1711.5 | 1732.5 | 1753.5 |                           |



|                 |       |    |    |        |        |        |                           |
|-----------------|-------|----|----|--------|--------|--------|---------------------------|
| 3               | QPSK  | 1  | 0  | 23.37  | 23.29  | 23.41  | 24.00                     |
| 3               | QPSK  | 1  | 8  | 23.16  | 23.14  | 22.91  |                           |
| 3               | QPSK  | 1  | 14 | 23.02  | 23.08  | 22.99  |                           |
| 3               | QPSK  | 8  | 0  | 22.40  | 22.46  | 22.54  | 23.00                     |
| 3               | QPSK  | 8  | 4  | 22.63  | 22.53  | 22.29  |                           |
| 3               | QPSK  | 8  | 7  | 22.48  | 22.51  | 22.30  |                           |
| 3               | QPSK  | 15 | 0  | 22.46  | 22.55  | 22.43  |                           |
| 3               | 16QAM | 1  | 0  | 22.17  | 22.13  | 22.38  | 23.00                     |
| 3               | 16QAM | 1  | 8  | 22.36  | 22.45  | 22.07  |                           |
| 3               | 16QAM | 1  | 14 | 22.55  | 22.29  | 22.10  |                           |
| 3               | 16QAM | 8  | 0  | 21.78  | 21.74  | 21.99  | 22.50                     |
| 3               | 16QAM | 8  | 4  | 21.97  | 22.06  | 21.68  |                           |
| 3               | 16QAM | 8  | 7  | 22.16  | 21.90  | 21.71  |                           |
| 3               | 16QAM | 15 | 0  | 22.08  | 22.17  | 22.05  |                           |
| Channel         |       |    |    | 19957  | 20175  | 20393  | Tune-up<br>limit<br>(dBm) |
| Frequency (MHz) |       |    |    | 1710.7 | 1732.5 | 1754.3 |                           |
| 1.4             | QPSK  | 1  | 0  | 23.23  | 23.15  | 23.27  | 24.00                     |
| 1.4             | QPSK  | 1  | 3  | 23.02  | 23.00  | 22.77  |                           |
| 1.4             | QPSK  | 1  | 5  | 22.88  | 22.94  | 22.85  |                           |
| 1.4             | QPSK  | 3  | 0  | 22.26  | 22.32  | 22.40  |                           |
| 1.4             | QPSK  | 3  | 1  | 22.49  | 22.39  | 22.15  |                           |
| 1.4             | QPSK  | 3  | 3  | 22.34  | 22.37  | 22.16  |                           |
| 1.4             | QPSK  | 6  | 0  | 22.32  | 22.41  | 22.29  | 23.00                     |
| 1.4             | 16QAM | 1  | 0  | 22.03  | 21.99  | 22.24  | 23.00                     |
| 1.4             | 16QAM | 1  | 3  | 22.22  | 22.31  | 21.93  |                           |
| 1.4             | 16QAM | 1  | 5  | 22.41  | 22.15  | 21.96  |                           |
| 1.4             | 16QAM | 3  | 0  | 21.66  | 21.62  | 21.87  |                           |
| 1.4             | 16QAM | 3  | 1  | 21.85  | 21.94  | 21.56  |                           |
| 1.4             | 16QAM | 3  | 3  | 22.04  | 21.78  | 21.59  |                           |
| 1.4             | 16QAM | 6  | 0  | 21.96  | 22.05  | 21.93  | 22.50                     |



## &lt;LTE Band 13&gt;

| BW<br>[MHz]     | Modulation | RB Size | RB<br>Offset | Low<br>Channel | Middle<br>Channel | High<br>Channel | Tune-up<br>limit<br>(dBm) |
|-----------------|------------|---------|--------------|----------------|-------------------|-----------------|---------------------------|
| Channel         |            |         |              | 23230          |                   |                 |                           |
| Frequency (MHz) |            |         |              | 782            |                   |                 |                           |
| 10              | QPSK       | 1       | 0            | 23.73          |                   |                 | 24.50                     |
| 10              | QPSK       | 1       | 25           | 23.79          |                   |                 |                           |
| 10              | QPSK       | 1       | 49           | 23.64          |                   |                 |                           |
| 10              | QPSK       | 25      | 0            | 22.39          |                   |                 | 23.50                     |
| 10              | QPSK       | 25      | 12           | 22.66          |                   |                 |                           |
| 10              | QPSK       | 25      | 25           | 22.77          |                   |                 |                           |
| 10              | QPSK       | 50      | 0            | 22.70          |                   |                 |                           |
| 10              | 16QAM      | 1       | 0            | 21.69          |                   |                 | 22.50                     |
| 10              | 16QAM      | 1       | 25           | 21.95          |                   |                 |                           |
| 10              | 16QAM      | 1       | 49           | 21.94          |                   |                 |                           |
| 10              | 16QAM      | 25      | 0            | 21.47          |                   |                 | 22.00                     |
| 10              | 16QAM      | 25      | 12           | 21.42          |                   |                 |                           |
| 10              | 16QAM      | 25      | 25           | 21.53          |                   |                 |                           |
| 10              | 16QAM      | 50      | 0            | 21.48          |                   |                 |                           |
| Channel         |            |         |              | 23205          | 23230             | 23255           | Tune-up<br>limit<br>(dBm) |
| Frequency (MHz) |            |         |              | 779.5          | 782               | 784.5           |                           |
| 5               | QPSK       | 1       | 0            | 23.51          | 23.43             | 23.40           | 24.00                     |
| 5               | QPSK       | 1       | 12           | 23.22          | 23.26             | 23.36           |                           |
| 5               | QPSK       | 1       | 24           | 23.51          | 23.53             | 23.42           |                           |
| 5               | QPSK       | 12      | 0            | 22.38          | 22.32             | 22.41           | 23.00                     |
| 5               | QPSK       | 12      | 7            | 22.41          | 22.38             | 22.31           |                           |
| 5               | QPSK       | 12      | 13           | 22.44          | 22.46             | 22.26           |                           |
| 5               | QPSK       | 25      | 0            | 22.36          | 22.31             | 22.11           |                           |
| 5               | 16QAM      | 1       | 0            | 21.74          | 21.71             | 21.64           | 22.50                     |
| 5               | 16QAM      | 1       | 12           | 21.91          | 21.88             | 21.71           |                           |
| 5               | 16QAM      | 1       | 24           | 21.54          | 21.58             | 21.59           |                           |
| 5               | 16QAM      | 12      | 0            | 21.34          | 21.31             | 21.24           | 22.00                     |
| 5               | 16QAM      | 12      | 7            | 21.55          | 21.54             | 21.41           |                           |
| 5               | 16QAM      | 12      | 13           | 21.46          | 21.43             | 21.34           |                           |
| 5               | 16QAM      | 25      | 0            | 21.49          | 21.57             | 21.55           |                           |

**➤ WLAN Output Power****<WLAN 2.4GHz>**

| 2.4GHz<br>WLAN | Mode                  | Channel | Frequency<br>(MHz) | Test Value | Duty Factor<br>Calculated | Tune-Up<br>Limit |
|----------------|-----------------------|---------|--------------------|------------|---------------------------|------------------|
|                | 802.11b<br>1Mbps      | CH 1    | 2412               | 14.20      | 14.26                     | 15.00            |
|                |                       | CH 6    | 2437               | 18.56      | 18.62                     | 19.00            |
|                |                       | CH 11   | 2462               | 14.21      | 14.27                     | 15.00            |
|                | 802.11g<br>6Mbps      | CH 1    | 2412               | 15.44      | 15.78                     | 16.00            |
|                |                       | CH 6    | 2437               | 19.02      | 19.36                     | 20.00            |
|                |                       | CH 11   | 2462               | 15.36      | 15.70                     | 16.50            |
|                | 802.11n-HT2<br>0 MCS0 | CH 1    | 2412               | 15.50      | 15.86                     | 16.50            |
|                |                       | CH 6    | 2437               | 19.46      | 19.82                     | 20.50            |
|                |                       | CH 11   | 2462               | 15.52      | 15.88                     | 16.50            |

**<WLAN 5.2GHz>**

| 5.2GHz<br>WLAN | Mode                  | Channel | Frequency<br>(MHz) | Test Value | Duty Factor<br>Calculated | Tune-Up<br>Limit |
|----------------|-----------------------|---------|--------------------|------------|---------------------------|------------------|
|                | 802.11n-HT2<br>0 MCS0 | CH 36   | 5180               | 16.33      | 16.67                     | 17.00            |
|                |                       | CH 40   | 5200               | 16.35      | 16.69                     | 17.00            |
|                |                       | CH 48   | 5240               | 16.30      | 16.64                     | 17.00            |

**<WLAN 5.8GHz>**

| 5.8GHz<br>WLAN | Mode                  | Channel | Frequency<br>(MHz) | Test Value | Duty Factor<br>Calculated | Tune-Up<br>Limit |
|----------------|-----------------------|---------|--------------------|------------|---------------------------|------------------|
|                | 802.11n-HT2<br>0 MCS0 | CH 149  | 5745               | 16.45      | 16.79                     | 17.00            |
|                |                       | CH 157  | 5785               | 16.51      | 16.85                     | 17.00            |
|                |                       | CH 165  | 5825               | 16.47      | 16.81                     | 17.00            |

### ➤ Bluetooth Output Power

| Mode                | Channel | Frequency (MHz) | Average power (dBm) |                        |            |                        |            |                        |
|---------------------|---------|-----------------|---------------------|------------------------|------------|------------------------|------------|------------------------|
|                     |         |                 | 1Mbps               |                        | 2Mbps      |                        | 3Mbps      |                        |
|                     |         |                 | Test Value          | Duty Factor Calculated | Test Value | Duty Factor Calculated | Test Value | Duty Factor Calculated |
| BR / EDR            | CH 00   | 2402            | 9.04                | 10.17                  | 7.95       | 9.08                   | 7.93       | 9.06                   |
|                     | CH 39   | 2441            | 9.28                | 10.41                  | 8.13       | 9.26                   | 8.01       | 9.14                   |
|                     | CH 78   | 2480            | 9.02                | 10.15                  | 7.77       | 8.90                   | 7.80       | 8.93                   |
| Tune-up Limit (dBm) |         |                 | 9.50                | 11.00                  | 8.50       | 9.50                   | 8.50       | 9.50                   |

| Mode                | Channel | Frequency (MHz) | Average power (dBm) |                        |
|---------------------|---------|-----------------|---------------------|------------------------|
|                     |         |                 | GFSK                |                        |
|                     |         |                 | Test Value          | Duty Factor Calculated |
| LE                  | CH 00   | 2402            | 7.54                | 9.74                   |
|                     | CH 19   | 2440            | 7.99                | 10.19                  |
|                     | CH 39   | 2480            | 7.64                | 9.84                   |
| Tune-up Limit (dBm) |         |                 | 8.50                | 10.50                  |

### ➤ Z-wave Output Power

| Mode                | Frequency (MHz) | Average power (dBm) |                        |
|---------------------|-----------------|---------------------|------------------------|
|                     |                 | Test Value          | Duty Factor Calculated |
| Z-wave              | 908.40          | -15.83              | 1.34                   |
|                     | 908.42          | -15.98              | 1.19                   |
|                     | 916.00          | -15.53              | -5.27                  |
| Tune-up Limit (dBm) |                 | -15.00              | 2.00                   |

| Mode                | Frequency (MHz) | Average power (dBm) |                        |
|---------------------|-----------------|---------------------|------------------------|
|                     |                 | Test Value          | Duty Factor Calculated |
| Z-wave              | 912             | -4.85               | 12.23                  |
|                     | 920             | -5.53               | 11.55                  |
| Tune-up Limit (dBm) |                 | -4.00               | 13.00                  |

➤ **900MHz Output Power**

| Mode                | Frequency<br>(MHz) | Average power (dBm) |                           |
|---------------------|--------------------|---------------------|---------------------------|
|                     |                    | Test Value          | Duty Factor<br>Calculated |
| 900MHz              | 904                | -3.75               | 17.99                     |
|                     | 912                | -2.65               | 19.09                     |
|                     | 922                | -1.80               | 19.94                     |
| Tune-up Limit (dBm) |                    | -1.00               | 20.50                     |

**Note:**

The output power of WLAN & Bluetooth & Z-wave & 900MHz is derived from the report SZ22090043W03/04/05/06/07/08/16.

## 5. RF Exposure Assessment

### ➤ Standalone Transmission Assessment:

| Bands       | Frequency (MHz) | Maximum Tune-up Power (dBm) | Antenna Gain (dBi) | EIRP (mW) | Power Density (mW/cm <sup>2</sup> ) | Limit for MPE (mW/cm <sup>2</sup> ) |
|-------------|-----------------|-----------------------------|--------------------|-----------|-------------------------------------|-------------------------------------|
| LTE Band 4  | 1745            | 24.50                       | 1.24               | 374.973   | 0.075                               | 1.000                               |
| LTE Band 13 | 782             | 24.50                       | 0.89               | 345.939   | 0.069                               | 0.521                               |
| WLAN 2.4GHz | 2437            | 20.50                       | 3.13               | 230.675   | 0.046                               | 1.000                               |
| WLAN 5.2GHz | 5200            | 17.00                       | 0.75               | 59.566    | 0.012                               | 1.000                               |
| WLAN 5.8GHz | 5785            | 17.00                       | 0.32               | 53.951    | 0.011                               | 1.000                               |
| Bluetooth   | 2441            | 11.00                       | 3.13               | 25.882    | 0.005                               | 1.000                               |
| Z-wave      | 912             | 13.00                       | 1.35               | 27.227    | 0.005                               | 0.608                               |
| 900MHz      | 922             | 20.50                       | 0.02               | 112.720   | 0.022                               | 0.615                               |

#### Note:

1. According to KDB 447498, SAR test exclusion conditions are based on source-based time-averaged maximum conducted output power of the RF channel requiring assessment, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.
2. MPE calculate method

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

Where: S= Power density (in appropriate units, e.g. mW/cm<sup>2</sup> )

P = Time-average maximum tune-up power (in appropriate units, e.g. dBm)

G = numeric gain of the antenna (in appropriate units, e.g. dBi)

R = Separation distance to the centre of radiation of the antenna (20cm)

➤ **Simultaneous Transmission Assessment:**

**Multi-Band Simultaneous Transmission Consideration**

| Simultaneous Transmission Consideration | Applicable Combination             |
|-----------------------------------------|------------------------------------|
|                                         | WWAN + WLAN 2.4GHz                 |
|                                         | WWAN + WLAN 5GHz                   |
|                                         | WWAN + Bluetooth                   |
|                                         | WLAN + Z-wave                      |
|                                         | WLAN + 900MHz                      |
|                                         | WWAN + WLAN + Z-wave + 900MHz      |
|                                         | WWAN + Bluetooth + Z-wave + 900MHz |

1. This device contains transmitters that may be operated simultaneously, therefore simultaneous transmission analysis is required.
2. The worst condition for WWAN & WLAN/Bluetooth & Z-wave & 900MHz will be calculated for transmitting simultaneously.

Formula:  $\text{Result} = \text{Power density}_1 / \text{limit}_1 + \text{Power density}_2 / \text{limit}_2 + \text{Power density}_3 / \text{limit}_3 + \text{Power density}_4 / \text{limit}_4 \leq 1$ .

| Transmission Bands | Power Density/<br>SAR | Limit | Simultaneous Transmission Result |
|--------------------|-----------------------|-------|----------------------------------|
| WWAN               | 0.075                 | 1     | 0.165                            |
| WLAN/Bluetooth     | 0.046                 | 1     |                                  |
| Z-wave             | 0.005                 | 0.608 |                                  |
| 900MHz             | 0.022                 | 0.615 |                                  |

➤ **Conclusion:**

According to FCC 47 CFR Part 2(2.1091), this device complies with human exposure basic restrictions.





## Annex A General Information

### 1. Identification of the Responsible Testing Laboratory

|                     |                                                                                                                                  |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------|
| Laboratory Name:    | Shenzhen Morlab Communications Technology Co., Ltd.                                                                              |
| Laboratory Address: | FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, Guangdong Province, P. R. China |
| Telephone:          | +86 755 36698555                                                                                                                 |
| Facsimile:          | +86 755 36698525                                                                                                                 |

### 2. Identification of the Responsible Testing Location

|          |                                                                                                                                  |
|----------|----------------------------------------------------------------------------------------------------------------------------------|
| Name:    | Shenzhen Morlab Communications Technology Co., Ltd.                                                                              |
| Address: | FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, Guangdong Province, P. R. China |

### 3. Facilities and Accreditations

The FCC designation number is CN1192, the test firm registration number is 226174.

————— END OF REPORT —————