

# RF Exposure Evaluation Report

**APPLICANT** : Thundercomm Technology Co., Ltd  
**EQUIPMENT** : Cellular Module  
**BRAND NAME** : TurboX  
**MODEL NAME** : CM6125  
**FCC ID** : 2AOHHTURBOXCM6125  
**STANDARD** : 47 CFR Part 2.1091  
FCC KDB 447498 D01 v06

We, Sporton International Inc. (Shenzhen), would like to declare that the device has been evaluated in accordance with 47 CFR Part 2.1091 and FCC KDB 447498 D01 v06, and pass the limit. Without written approval of Sporton International Inc. (Shenzhen), the test report shall not be reproduced except in full.



Approved by: Si Zhang

**Sporton International Inc. (Shenzhen)**

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People's Republic of China



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**Revision History**

| REPORT NO. | VERSION | DESCRIPTION             | ISSUED DATE   |
|------------|---------|-------------------------|---------------|
| FA232517   | Rev. 01 | Initial issue of report | Jun. 22, 2022 |
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## **1. Administration Data**

### **1.1. Testing Laboratory**

Sporton International Inc. (Shenzhen) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

| Testing Laboratory |                                                                                                                                                                            |                     |                                |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------------------------|
| Test Firm          | Sporton International Inc. (Shenzhen)                                                                                                                                      |                     |                                |
| Test Site Location | 1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055<br>People's Republic of China<br>TEL: +86-755-86379589<br>FAX: +86-755-86379595 |                     |                                |
| Test Site No.      | Sporton Site No.                                                                                                                                                           | FCC Designation No. | FCC Test Firm Registration No. |
|                    | SAR01-SZ                                                                                                                                                                   | CN1256              | 421272                         |

| Applicant    |                                                                                       |
|--------------|---------------------------------------------------------------------------------------|
| Company Name | Thundercomm Technology Co., Ltd                                                       |
| Address      | No. 107, Middle Datagu Road, Xiantao Street, Yubei District, Chongqing, China, 401122 |

| Manufacturer |                                                                                       |
|--------------|---------------------------------------------------------------------------------------|
| Company Name | Thundercomm Technology Co., Ltd                                                       |
| Address      | No. 107, Middle Datagu Road, Xiantao Street, Yubei District, Chongqing, China, 401122 |



## 2. Description of Equipment Under Test (EUT)

| Product Feature & Specification         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EUT Type                                | Cellular Module                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Brand Name                              | TurboX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Model Name                              | CM6125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| FCC ID                                  | 2AOHHTURBOXCM6125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Wireless Technology and Frequency Range | WCDMA Band II: 1850 MHz ~ 1910 MHz<br>WCDMA Band IV: 1710 MHz ~ 1755 MHz<br>WCDMA Band V: 824 MHz ~ 849 MHz<br>LTE Band 2 : 1850 MHz ~ 1910 MHz<br>LTE Band 4 : 1710 MHz ~ 1755 MHz<br>LTE Band 5 : 824 MHz ~ 849 MHz<br>LTE Band 7 : 2500 MHz ~ 2570 MHz<br>LTE Band 12 : 699 MHz ~ 716 MHz<br>LTE Band 13 : 777 MHz ~ 787 MHz<br>LTE Band 14: 788 MHz ~ 798 MHz<br>LTE Band 17: 704 MHz ~ 716 MHz<br>LTE Band 25 : 1850 MHz ~ 1915 MHz<br>LTE Band 26 : 814 MHz ~ 849 MHz<br>LTE Band 41: 2535 MHz ~ 2655 MHz<br>LTE Band 66 : 1710 MHz ~ 1780 MHz<br>LTE Band 71: 663 MHz ~ 698 MHz<br>WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz<br>WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz<br>WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz<br>WLAN 5.5GHz Band: 5500 MHz ~ 5700 MHz<br>WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz<br>Bluetooth: 2402 MHz ~ 2480 MHz |
| Mode                                    | RMC 12.2Kbps<br>HSDPA<br>HSUPA<br>DC-HSDPA<br>HSPA+(16QAM uplink is not supported)<br>LTE: QPSK, 16QAM, 64QAM<br>802.11b/g/n HT20/HT40<br>802.11a/n/ac HT20/HT40/VHT20/VHT40/VHT80<br>Bluetooth BR/EDR/LE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Antenna Gain                            | WCDMA Band II : 3.0 dBi<br>WCDMA Band IV : 4.5 dBi<br>WCDMA Band V : 1.2 dBi<br>LTE Band 2 : 3.0 dBi<br>LTE Band 4 : 4.5 dBi<br>LTE Band 5 : 1.2 dBi<br>LTE Band 7 : 4.0 dBi<br>LTE Band 12 : 1.2 dBi<br>LTE Band 13 : 1.2 dBi<br>LTE Band 14 : 1.2 dBi<br>LTE Band 17 : 1.2 dBi<br>LTE Band 25 : 3.0 dBi<br>LTE Band 26 : 1.2 dBi<br>LTE Band 41 : 4.0 dBi<br>LTE Band 66: 4.5 dBi<br>LTE Band 71: 2.0 dBi<br>WLAN2.4GHz/Bluetooth: 4.0 dBi<br>WLAN5.2GHz: 3.1 dBi<br>WLAN5.3GHz: 3.2 dBi<br>WLAN5.5GHz: 3.2 dBi<br>WLAN5.8GHz: 3.1 dBi                                                                                                                                                                                                                                                                                              |
| Antenna Type                            | WWAN : Monopole Antenna<br>WLAN5GHz : Dipole Antenna                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |



|                                                                                                                                                                                                        |                                                     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
|                                                                                                                                                                                                        | WLAN2.4GHz/Bluetooth : Monopole Antenna             |
| HW Version                                                                                                                                                                                             | V03                                                 |
| SW Version                                                                                                                                                                                             | Turbox-CM6125_xx.xx_la1.0.V.userdebug.20220509.0843 |
| EUT Stage                                                                                                                                                                                              | Identical Prototype                                 |
| <b>Remark:</b><br>1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.<br>2. The EUT has no voice function. |                                                     |

|                                                                                                                                                                                                                                                                                                                                                       |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>Comments and Explanations:</b>                                                                                                                                                                                                                                                                                                                     |  |
| 1. The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.<br>2. The maximum RF output tune up power, antenna gain also the safe distance used for evaluate RF exposure were declared by manufacturer. |  |

**3. Maximum RF average output tune up power among production units****<WCDMA>**

| Mode  |         | Maximum Average power(dBm) |
|-------|---------|----------------------------|
| WCDMA | Band II | 24.00                      |
|       | Band IV | 24.00                      |
|       | Band V  | 24.00                      |

**<LTE>**

| Mode |         | Maximum Average power(dBm) |
|------|---------|----------------------------|
| LTE  | Band 2  | 24.00                      |
|      | Band 4  | 24.00                      |
|      | Band 5  | 24.00                      |
|      | Band 7  | 24.00                      |
|      | Band 12 | 24.00                      |
|      | Band 13 | 24.00                      |
|      | Band 14 | 24.00                      |
|      | Band 17 | 24.00                      |
|      | Band 25 | 24.00                      |
|      | Band 26 | 24.00                      |
|      | Band 41 | 24.00                      |
|      | Band 66 | 24.00                      |
|      | Band 71 | 24.00                      |

**<2.4GHz WLAN>**

| Frequency   | Mode         | Maximum Average Power (dBm) |
|-------------|--------------|-----------------------------|
| WLAN 2.4GHz | 802.11b      | 18.00                       |
|             | 802.11g      | 17.00                       |
|             | 802.11n-HT20 | 17.00                       |
|             | 802.11n-HT40 | 17.00                       |

**<5GHz WLAN>**

| Frequency   | Mode           | Maximum Average Power (dBm) |
|-------------|----------------|-----------------------------|
| WLAN 5.2GHz | 802.11a        | 16.50                       |
|             | 802.11n-HT20   | 15.50                       |
|             | 802.11n-HT40   | 16.00                       |
|             | 802.11ac-VHT20 | 15.50                       |
|             | 802.11ac-VHT40 | 16.00                       |
|             | 802.11ac-VHT80 | 16.00                       |
| WLAN 5.3GHz | 802.11a        | 16.50                       |
|             | 802.11n-HT20   | 15.50                       |
|             | 802.11n-HT40   | 16.00                       |
|             | 802.11ac-VHT20 | 15.50                       |
|             | 802.11ac-VHT40 | 16.00                       |
|             | 802.11ac-VHT80 | 16.00                       |
| WLAN 5.5GHz | 802.11a        | 16.50                       |
|             | 802.11n-HT20   | 15.50                       |
|             | 802.11n-HT40   | 16.50                       |
|             | 802.11ac-VHT20 | 15.50                       |
|             | 802.11ac-VHT40 | 16.50                       |
|             | 802.11ac-VHT80 | 16.50                       |
| WLAN 5.8GHz | 802.11a        | 16.50                       |
|             | 802.11n-HT20   | 16.00                       |
|             | 802.11n-HT40   | 16.50                       |
|             | 802.11ac-VHT20 | 15.50                       |
|             | 802.11ac-VHT40 | 16.50                       |
|             | 802.11ac-VHT80 | 16.50                       |

**<Bluetooth>**

| Frequency | Mode   | Maximum Average Power (dBm) |
|-----------|--------|-----------------------------|
| Bluetooth | BR/EDR | 13.00                       |
|           | LE     | 9.00                        |





#### **4. RF Exposure Limit Introduction**

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

| Frequency range (MHz)                                          | Electric field strength (V/m) | Magnetic field strength (A/m) | Power density (mW/cm <sup>2</sup> ) | Averaging time (minutes) |
|----------------------------------------------------------------|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| <b>(A) Limits for Occupational/Controlled Exposures</b>        |                               |                               |                                     |                          |
| 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                        |
| 300-1500                                                       |                               |                               | f/300                               | 6                        |
| 1500-100,000                                                   |                               |                               | 5                                   | 6                        |
| <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                       |

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$S = \frac{PG}{4\pi R^2}$$

Where:

S = Power Density

P = Output Power at Antenna Terminals

G = Gain of Transmit Antenna (linear gain)

R = Distance from Transmitting Antenna



## 5. Radio Frequency Radiation Exposure Evaluation

### 5.1. Standalone Power Density Calculation

| Band         | Frequency (MHz) | Antenna Gain (dBi) | Maximum Power (dBm) | Maximum EIRP (dBm) | Average EIRP (mW) | Power Density at 20cm (mW/cm <sup>2</sup> ) | Limit (mW/cm <sup>2</sup> ) | Power Density / Limit |
|--------------|-----------------|--------------------|---------------------|--------------------|-------------------|---------------------------------------------|-----------------------------|-----------------------|
| WCDMA Band 2 | 1852.4          | 3.00               | 24.00               | 27.000             | 501.187           | 0.100                                       | 1.000                       | 0.100                 |
| WCDMA Band 4 | 1712.4          | 4.50               | 24.00               | 28.500             | 707.946           | 0.141                                       | 1.000                       | 0.141                 |
| WCDMA Band 5 | 826.4           | 1.20               | 24.00               | 25.200             | 331.131           | 0.066                                       | 0.551                       | 0.120                 |
| LTE Band 2   | 1850.7          | 3.00               | 24.00               | 27.000             | 501.187           | 0.100                                       | 1.000                       | 0.100                 |
| LTE Band 4   | 1710.7          | 4.50               | 24.00               | 28.500             | 707.946           | 0.141                                       | 1.000                       | 0.141                 |
| LTE Band 5   | 824.7           | 1.20               | 24.00               | 25.200             | 331.131           | 0.066                                       | 0.550                       | 0.120                 |
| LTE Band 7   | 2502.5          | 4.00               | 24.00               | 28.000             | 630.957           | 0.126                                       | 1.000                       | 0.126                 |
| LTE Band 12  | 699.7           | 1.20               | 24.00               | 25.200             | 331.131           | 0.066                                       | 0.466                       | 0.141                 |
| LTE Band 13  | 779.5           | 1.20               | 24.00               | 25.200             | 331.131           | 0.066                                       | 0.520                       | 0.127                 |
| LTE Band 14  | 790.5           | 1.20               | 24.00               | 25.200             | 331.131           | 0.066                                       | 0.527                       | 0.125                 |
| LTE Band 17  | 706.5           | 1.20               | 24.00               | 25.200             | 331.131           | 0.066                                       | 0.471                       | 0.140                 |
| LTE Band 25  | 1850.7          | 3.00               | 24.00               | 27.000             | 501.187           | 0.100                                       | 1.000                       | 0.100                 |
| LTE Band 26  | 814.7           | 1.20               | 24.00               | 25.200             | 331.131           | 0.066                                       | 0.543                       | 0.121                 |
| LTE Band 41  | 2537.5          | 4.00               | 24.00               | 28.000             | 630.957           | 0.126                                       | 1.000                       | 0.126                 |
| LTE Band 66  | 1710.7          | 4.50               | 24.00               | 28.500             | 707.946           | 0.141                                       | 1.000                       | 0.141                 |
| LTE Band 71  | 665.5           | 2.00               | 24.00               | 26.000             | 398.107           | 0.079                                       | 0.444                       | 0.179                 |
| Bluetooth    | 2402.0          | 4.00               | 13.00               | 17.000             | 50.119            | 0.010                                       | 1.000                       | 0.010                 |
| 2.4GHz WLAN  | 2412.0          | 4.00               | 18.00               | 22.000             | 158.489           | 0.032                                       | 1.000                       | 0.032                 |
| 5.2GHz WLAN  | 5180.0          | 3.10               | 16.50               | 19.600             | 91.201            | 0.018                                       | 1.000                       | 0.018                 |
| 5.3GHz WLAN  | 5260.0          | 3.20               | 16.50               | 19.700             | 93.325            | 0.019                                       | 1.000                       | 0.019                 |
| 5.5GHz WLAN  | 5500.0          | 3.20               | 16.50               | 19.700             | 93.325            | 0.019                                       | 1.000                       | 0.019                 |
| 5.8GHz WLAN  | 5745.0          | 3.10               | 16.50               | 19.600             | 91.201            | 0.018                                       | 1.000                       | 0.018                 |

**Note:**

1. For conservativeness, the lowest frequency of each band is used to determine the MPE limit of that band.
2. Chose the maximum power to do MPE analysis.

**5.2. Collocated Power Density Calculation**

| Power Density / Limit |             |           |           | $\Sigma$ (Power Density / Limit)<br>of<br>WWAN+2.4GHz WLAN/ WWAN+5GHz WLAN/<br>WWAN+ Bluetooth |
|-----------------------|-------------|-----------|-----------|------------------------------------------------------------------------------------------------|
| 1                     | 2           | 3         | 4         | 1+ max(2, 3, 4)                                                                                |
| WWAN                  | 2.4GHz WLAN | 5GHz WLAN | Bluetooth |                                                                                                |
| 0.179                 | 0.032       | 0.019     | 0.010     | 0.211                                                                                          |

**Note:**

For colocation analysis, LTE Band 71 is chosen for summation due to the highest (power density/limit) among all WWAN wireless modes.

1. Chose the worst power density among WLAN2.4/5GHz/BT to do co-located.
2. According to the EUT characteristic, WLAN 2.4GHz and Bluetooth can't transmit simultaneously.
3. According to the EUT characteristic, WLAN 5GHz and Bluetooth can't transmit simultaneously.
4. According to the EUT characteristic, WLAN 2.4GHz and WLAN 5GHz can't transmit simultaneously.
5.  $\Sigma$ (Power Density / Limit): This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission)/ (corresponding MPE limit)].

**Conclusion:**

According to 47 CFR §2.1091, the RF exposure analysis concludes that the RF Exposure is FCC compliant.

-----THE END-----