



# RF MPE REPORT

**Report No.:** SET2022-16608

**Product Name:** Mobile360 M500

**Model No.:** Mobile360 M500

**FCC ID:** 2A9K7-M360-M500

**Applicant:** VIA Intelligent Automotive, INC.

**Address:** 8F., NO. 525, ZHONGZHENG RD., XINDIAN DIST., NEW TAIPEI CITY 23148, TAIWAN

**Dates of Testing:** 11/24/2022 - 12/15/2022

**Issued by:** CCIC Southern Testing Co., Ltd.

**Lab Location:** Electronic Testing Building, No. 43 Shahe Road, Xili Street, Nanshan District, Shenzhen, Guangdong, China.

**Tel:** 86 755 26627338      **Fax:** 86 755 26627238

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### Test Report

**Product** .....: Mobile360 M500

**Brand Name**.....: VIA

**Trade Name** .....: VIA

**Applicant**.....: VIA Intelligent Automotive, INC.

**Applicant Address** .....: 8F., NO. 525, ZHONGZHENG RD., XINDIAN DIST.,  
NEW TAIPEI CITY 23148, TAIWAN

**Manufacturer** .....: VIA Intelligent Automotive, INC.

**Manufacturer Address** .....: 8F., NO. 525, ZHONGZHENG RD., XINDIAN DIST.,  
NEW TAIPEI CITY 23148, TAIWAN

**Test Standards** .....: 47 CFR Part 2.1091

**Test Result**.....: Pass

**Tested by** .....: Chuiwang Zhang 2022.12.16  
Chuiwang Zhang, Test Engineer

**Reviewed by** .....: Chris You 2022.12.16  
Chris You, Senior Engineer

**Approved by** .....: Hou Tao 2022.12.16  
Tao Hou, Manager



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| Change History |            |                   |
|----------------|------------|-------------------|
| Issue          | Date       | Reason for change |
| 1.0            | 2022.12.16 | First edition     |
|                |            |                   |



# 1. GENERAL INFORMATION

## 1.1. EUT Description

|                                 |   |  |
|---------------------------------|---|--|
| Product Name                    | Mobile360 M500  |  |
| Model No.                       | Mobile360 M500  |  |
| Hardware Version                | RA  |  |
| Software Version                | 2.0.4   |  |
| EUT supports Radios application | WCDMA Band 2/4/5<br>LTE Band 2/4/5/12/13/14/66/71<br>BT/BLE/2.4G WIFI/5G WIFI |  |
| Frequency Range(Tx)             | WCDMA 850: 824MHz~849MHz  |  |
|                                 | WCDMA 1700: 1710MHz~1755MHz   |  |
|                                 | WCDMA 1900: 1850MHz~1910MHz   |  |
|                                 | LTE Band 2: 1850MHz~1910MHz   |  |
|                                 | LTE Band 4: 1710MHz~1755MHz   |  |
|                                 | LTE Band 5: 824MHz~849MHz   |  |
|                                 | LTE Band 12: 699MHz~716MHz  |  |
|                                 | LTE Band 13: 777MHz~787MHz  |  |
|                                 | LTE Band 14: 788MHz~798MHz  |  |
|                                 | LTE Band 66: 1710MHz~1780MHz  |  |
| Bandwidth                       | LTE Band 71: 663MHz~698MHz  |  |
|                                 | BT/BLE: 2.402GHz ~ 2.480GHz   |  |
|                                 | 2.4G WIFI: 2.412GHz ~ 2.462GHz  |  |
|                                 | 5.2G WIFI: 5.15GHz ~ 5.25GHz  |  |
|                                 | 5.8G WIFI: 5.725GHz ~ 5.85GHz   |  |
|                                 | WCDMA B2/4/5:   | 5MHz                                       |
|                                 | LTE Band 2/4/66:  | 1.4MHz/3MHz/5MHz/10MHz/15MHz/20MHz         |
|                                 | LTE Band 5/12:  | 1.4MHz/3MHz/5MHz/10MHz                     |
|                                 | LTE Band 13/14:   | 5MHz/10MHz                                 |
|                                 | LTE Band 71:  | 5MHz/10MHz/15MHz/20MHz                     |
| BT                              | 1/2Mbps   |  |
| BLE                             | 1/2/3Mbps   |  |
| 2.4G WIFI:                      | 802.11b/g/n-HT20: 20MHz   |  |
|                                 | 802.11n-HT40: 40MHz   |  |
| 5.0G WIFI:                      | 802.11a: 20MHz  |  |
|                                 | 802.11n: 20MHz/40MHz  |  |
|                                 | 802.11ac: 20MHz/40MHz/80MHz   |  |
| Modulation Type                 | WCDMA   | WCDMA: QPSK(Uplink)<br>HSDPA: QPSK(Uplink) |



|              |                          |                                  |
|--------------|--------------------------|----------------------------------|
|              |                          | HSUPA: QPSK(Uplink)              |
|              | LTE                      | QPSK/16QAM/64QAM(downlink only)  |
|              | BT                       | GFSK, $\pi/4$ -DQPSK, 8DPSK      |
|              | BLE                      | GFSK                             |
|              | 2.4G WIFI                | DSSS (802.11b), OFDM (802.11g/n) |
|              | 5G WIFI                  | OFDM (802.11a/n/ac)              |
| Antenna gain | WCDMA 850: -1.22 dBi     | WCDMA 1900: 2.62 dBi,            |
|              | WCDMA 1700: 1.12 dBi     |                                  |
|              | LTE Band 2: 2.62 dBi     | LTE Band 4: 1.12 dBi             |
|              | LTE Band 5: -1.22 dBi    | LTE Band 12: -3.10 dBi           |
|              | LTE Band 13: -2.25 dBi   | LTE Band 14: -3.01dBi            |
|              | LTE Band 66: 1.12 dBi    | LTE Band 71: -3.86 dBi           |
|              | BT/BLE/2.4G WIFI: 3.7dBi |                                  |
|              | 5G WIFI: 1.05dBi         |                                  |
| Antenna Type | External Antenna         |                                  |



## 1.2. EUT Description

EUT has been tested according to the following standards.

| No. | Identity  | Document Title  |
|-----|---|---|
| 1   | 47 CFR Part 1                                   | Practice and Procedure  |
| 2   | 47 CFR Part 2                                   | Frequency Allocations and Radio Treaty Matters; General Rules and Regulations                         |
| 3   | KDB 447498 D01 General RF Exposure Guidance v06 | RF Exposure Procedures and Equipment Authorization Policies for Mobile and Portable Devices           |
| 4   | OET Bulletin 65 Edition 97-01                   | Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields |

## 1.3. Laboratory Facilities

### FCC-Registration No.: 406086

CCIC Southern Testing Co., Ltd EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Designation Number: CN1283, valid time is until April 19th, 2023.

### ISED Registration: 11185A-1

CCIC Southern Testing Co., Ltd. EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 11185A-1 on Aug. 04, 2016, valid time is until Jun. 30th, 2023.

### A2LA Code: 5721.01

CCIC-SET is a third party testing organization accredited by A2LA according to ISO/IEC 17025. The accreditation certificate number is 5721.01.

## 1.4. Laboratory Location

|               |   |
|---------------|---|
| Company Name: | CCIC Southern Testing Co., Ltd.   |
| Address:      | Electronic Testing Building, No. 43 Shahe Road, Xili Street, Nanshan District, Shenzhen, Guangdong, China |

## 2. Technical Requirements Specification in CFR Title 47 Part 2.1091

### 2.1. Exposure Limits

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).

**Table 1 to § 1.1310(e)(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) |
|--|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| (i) Limits for Occupational/Controlled Exposure                      |                               |                               |                                     |                          |
| 0.3-3.0  | 614                           | 1.63                          | *(100)                              | < 6                      |
| 3.0-30   | 1824/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                      |
| (ii) Limits for General Population/Uncontrolled Exposure             |                               |                               |                                     |                          |
| 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                     |
| Note: f = frequency in MHz. * = Plane-wave equivalent power density. |                               |                               |                                     |                          |

### 2.2. Predication of MPE limit at a given distance

Refer to formulas on page 19 of OET Bulletin 65, Edition 97-01.

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

Where:

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

P = power input to the antenna (in appropriate units, e.g., mW)

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

R = distance to the centre of radiation of the antenna (appropriate units, e.g., cm)



### 2.3. Evaluation Results

#### Worst-Case mode Conducted Output Power Results for BT

| Band | Mode | Frequency (MHz) | Maximum Output Power (dBm) | Max Tune up power (dBm) | Max Tune up power (mW) |
|------|------|-----------------|----------------------------|-------------------------|------------------------|
| BT   | GFSK | 2480            | 4.96                       | 4 ± 1                   | 3.16                   |

#### Worst-Case mode Conducted Output Power Results for BLE

| Band   | Mode | Frequency (MHz) | Maximum Output Power (dBm) | Max Tune up power (dBm) | Max Tune up power (mW) |
|--------|------|-----------------|----------------------------|-------------------------|------------------------|
| BLE-2M | GFSK | 2480            | 3.737                      | 3 ± 1                   | 2.51                   |

#### Worst-Case mode Conducted Output Power Results for 2.4G WLAN

| Band      | Mode      | Frequency (MHz) | Maximum Output Power (dBm) | Max Tune up power (dBm) | Max Tune up power (mW) |
|-----------|-----------|-----------------|----------------------------|-------------------------|------------------------|
| 2.4G WIFI | 802.11n20 | 2462            | 15.83                      | 15 ± 1                  | 39.81                  |

#### Worst-Case mode Conducted Output Power Results for 5G WLAN

| Band    | Mode    | Frequency (MHz) | Maximum Output Power (dBm) | Max Tune up power (dBm) | Max Tune up power (mW) |
|---------|---------|-----------------|----------------------------|-------------------------|------------------------|
| 5G WIFI | 802.11a | 5745            | 15.84                      | 15 ± 1                  | 39.81                  |

#### Worst-Case mode Conducted Output Power Results for WWAN

| Band        | Frequency (MHz) | Maximum Output power(dBm) | Max Tune up power (dBm) | Max Tune up power (mW) |
|-------------|-----------------|---------------------------|-------------------------|------------------------|
| WCDMA 850   | 826.4           | 23.38                     | 23 ± 1                  | 251.19                 |
| WCDMA 1700  | 1732.6          | 22.26                     | 22 ± 1                  | 199.53                 |
| WCDMA 1900  | 1907.6          | 21.79                     | 23 ± 1                  | 251.19                 |
| LTE Band 2  | 1908.5          | 22.22                     | 22 ± 1                  | 199.53                 |
| LTE Band 4  | 1750.0          | 21.88                     | 23 ± 1                  | 251.19                 |
| LTE Band 5  | 836.5           | 23.63                     | 23 ± 1                  | 251.19                 |
| LTE Band 12 | 711.0           | 24.04                     | 24 ± 1                  | 316.23                 |
| LTE Band 13 | 784.5           | 23.67                     | 23 ± 1                  | 251.19                 |
| LTE Band 14 | 795.5           | 23.35                     | 23 ± 1                  | 251.19                 |
| LTE Band 66 | 1778.5          | 22.41                     | 22 ± 1                  | 199.53                 |
| LTE Band 71 | 688.0           | 23.45                     | 23 ± 1                  | 251.19                 |

**Calculation results: Worst-Case mode**

| Band        | Max Tune up power (dBm) | Antenna Gain (dBi) | Distance (cm) | Result (mW/cm <sup>2</sup> ) | Power Density (mW/cm <sup>2</sup> ) | Ratio        |
|-------------|-------------------------|--------------------|---------------|------------------------------|-------------------------------------|--------------|
| BT          | 5                       | 3.7                | 20            | 0.001                        | 1.00                                | <b>0.001</b> |
| BLE         | 4                       | 3.7                | 20            | 0.001                        | 1.00                                | 0.001        |
| 2.4G WIFI   | 16                      | 3.7                | 20            | 0.019                        | 1.00                                | <b>0.015</b> |
| 5G WIFI     | 16                      | 1.05               | 20            | 0.010                        | 1.00                                | 0.010        |
| WCDMA 850   | 24                      | -1.22              | 20            | 0.038                        | 0.55                                | 0.069        |
| WCDMA 1700  | 23                      | 1.12               | 20            | 0.051                        | 1.00                                | 0.051        |
| WCDMA 1900  | 24                      | 2.62               | 20            | 0.091                        | 1.00                                | <b>0.091</b> |
| LTE Band 2  | 23                      | 2.62               | 20            | 0.073                        | 1.00                                | 0.073        |
| LTE Band 4  | 24                      | 1.12               | 20            | 0.065                        | 1.00                                | 0.065        |
| LTE Band 5  | 24                      | -1.22              | 20            | 0.038                        | 0.56                                | 0.067        |
| LTE Band 12 | 25                      | -3.10              | 20            | 0.031                        | 0.47                                | 0.066        |
| LTE Band 13 | 24                      | -2.25              | 20            | 0.030                        | 0.52                                | 0.058        |
| LTE Band 14 | 24                      | -3.01              | 20            | 0.025                        | 0.53                                | 0.047        |
| LTE Band 66 | 23                      | 1.12               | 20            | 0.051                        | 1.00                                | 0.051        |
| LTE Band 71 | 24                      | -3.86              | 20            | 0.021                        | 0.46                                | 0.046        |

**Simultaneous Transmission Calculation (Worst-case mode)**

| No. | Transmitter Combinations | Scenario Supported or not |
|-----|--------------------------|---------------------------|
| 1   | WWAN + BT + 2.4G WLAN    | Yes                       |
| 2   | WWAN + BT + 5G WLAN      | Yes                       |

**Max Simultaneous Transmission Calculation (Worst-case mode)**

| No. | Worst Mode                  | MPE Ratio | Limit | Results |
|-----|-----------------------------|-----------|-------|---------|
| 1   | WCDMA 1900 + BT + 2.4G WIFI | 0.111     | ≤ 1.0 | Pass    |

Note: MPE Ratio = 0.091 + 0.001 + 0.015 = 0.108.

**2.4. Conclusion**

According to the KDB 447498 D01 General RF Exposure Guidance v06 section 7.2 determine the device is exclusion from SAR test.

**\*\* END OF REPORT \*\***